

ONLINE BAKERY SHOP

ANG LI JING

UNIVERSITI TUNKU ABDUL RAHMAN

ONLINE BAKERY SHOP

ANG LI JING


**A project report submitted in partial fulfilment of the
requirements for the award of Bachelor of Science
(Honours) Software Engineering**

**Lee Kong Chian Faculty of Engineering and Science
Universiti Tunku Abdul Rahman**

SEPTEMBER 2021

DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

Signature:  _____

Name: Ang Li Jing


Student ID: 18UEB00549

Date: 2/9/2021

APPROVAL FOR SUBMISSION

I certify that this project report entitled “**ONLINE BAKERY SHOP**” was prepared by **ANG LI JING** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Science (Honours) Software Engineering at Universiti Tunku Abdul Rahman.

Approved by,

Signature: 

Supervisor: Ms Beh Hooi Ching

Date: 21st September 2021

The copyright of this report belongs to the author under the terms of the Copyright Act 1987 as qualified by Intellectual Property Policy of Universiti Tunku Abdul Rahman. The due acknowledgement shall always be made of the use of any material contained in, or derived from, this report.

© 2021, Ang Li Jing. All right reserved.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deep and sincere gratitude to my project supervisor, Ms. Beh Hooi Ching, who gave me the golden opportunity to do this wonderful project on topic “Online Bakery Shop”, and providing valuable guidance throughout this project. Her guidance really helped me in all time of completing this project. It was a great privilege and honor to work and study under her guidance. I am extremely grateful for what she has offered me and I could not have imagined not having her as my supervisor for my final year project. Also, I am extending my heartfelt thanks to her family for their acceptance and patience during the discussion I had with her on this project.

Next, my sincere thanks also goes to Mr. Brandon and Mr. Aston Kit for offering me the internship opportunities in their teams and leading me working on diverse exciting projects that give me a valuable experience that would help me a lot in doing this project.

Lastly, I would like to thank my parents who helped me a lot in gathering different information. Collecting data and guiding me from time to time in completing this project, despite of their busy schedules, they gave me different ideas in making this project successful. Also, I am very much thankful to my brother for his understanding, prayers and continuing support to complete this project. My special thanks goes to all of my friends for the keen interest shown to complete this project successfully.

ABSTRACT

The outbreak of COVID-19 pandemic has resulted an enormous effect on society all across the world. The mass of the world's population has been prompted to radically change their behavioural patterns with regard to the number of daily activities that they initially considered automatic or ordinary. Governments has implemented different restrictions including stay-at-home orders during the COVID-19 pandemic's peak phase in an attempt to limit the disease's transmission by limiting people's movement. Therefore, online bakery shop is proposed with the development of a mobile-based application for the customers to place orders as well as a web-based management system that helps the bakery shop staff to streamline the management process. The mobile-based application will provide a more convenient and time-saving way for the customers to place orders at anytime and anywhere without having to drive to the bakery shop. It will make the ordering process, which was previously done manually, more simple and faster, since customers will be able to purchase items in seconds as long as they have internet access or a connection. On top of that, a web-based management system will be developed for the staff that streamlines the entire ordering process starting from order placement to final delivery. Hence, bakery shop owner would not have much worries on the day-to-day operations. Also, the staff will be able to make instant, real-time changes to their selling products whereby customers will always get the up-to-date changes. By having this web-based management system, challenges such as mix-ups and misunderstandings in customer orders that often leave customers dissatisfied with their experience can be overcome. Therefore, an online bakery shop is a good solution that beneficial to both the bakery shop staff and the customers.

TABLE OF CONTENTS

DECLARATION	i
APPROVAL FOR SUBMISSION	ii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xi
LIST OF FIGURES	xiv
LIST OF SYMBOLS / ABBREVIATIONS	xxiv
LIST OF APPENDICES	xxv

CHAPTER

1	INTRODUCTION	1
	1.1 Introduction	1
	1.2 Background of the problem	1
	1.3 Problem Statement	3
	1.3.1 Complex Order Configuration, Allotments and Management	3
	1.3.2 Inaccurate Stocks and Products Management	4
	1.3.3 Complications in Placing Order	5
	1.4 Project Goal	5
	1.5 Project Objectives	6
	1.6 Project Solution	6
	1.6.1 Proposed Design Architecture	7
	1.7 Project Approach	8
	1.7.1 Research Approach	8
	1.7.2 Development Approach	9
	1.8 Project Scope	10

	1.8.1	Target Users	10
	1.8.2	Target Platform	11
	1.8.3	Project Modules	11
	1.8.4	Out of scope	14
	1.9	Summary	14
2		LITERATURE REVIEW	16
	2.1	Introduction	16
	2.2	Cross-Platform Application Development	16
	2.2.1	Mobile Application Development	16
	2.2.2	Web Application Development	17
	2.3	Research Methodology	17
	2.3.1	Qualitative Research Methodology	18
	2.3.2	Quantitative Research Methodology	21
	2.3.3	Qualitative Research vs Quantitative Research	24
	2.4	Software Development Methodology	25
	2.4.1	Traditional Software Development Methodology	25
	2.4.2	Agile Software Development Methodology	28
	2.4.3	Traditional Development methodology vs Agile Development Methodology	35
	2.5	Similar Existing Systems in The Market	36
	2.5.1	Fergusson Plarre Bakehouses Reservation System	36
	2.5.2	BakerDays Reservation System	39
	2.5.3	Bread History	43
	2.5.4	Tong Kee Bakery	46
	2.5.5	Comparison of Features between Existing Bakery Shop Applications	50
	2.5.6	Strengths and Weaknesses between Existing Applications	50
	2.5.7	Summary	52
	2.6	Conclusion	52
3		METHODOLOGY AND WORK PLAN	54

3.1	Introduction	54
3.2	Software Development Methodology	54
3.2.1	Rapid Application Development	54
3.3	Project Plan	58
3.3.1	Work Breakdown Structure (WBS)	58
3.3.2	Work Plan	62
3.3.3	Gantt Chart	64
3.4	Development Tools	68
3.4.1	Tools	68
3.4.2	Programming language	70
3.4.3	Framework	70
3.5	Summary	71
4	PROJECT SPECIFICATION	72
4.1	Introduction	72
4.2	Requirements Specification	72
4.2.1	Functional Requirements	72
4.2.2	Non-Functional Requirements	76
4.3	System Use Case	77
4.3.1	Use Case Diagrams	77
4.3.2	Use Case Descriptions	78
4.4	Survey Analysis	98
4.4.1	Demographics	98
4.4.2	Fact finding	100
4.5	High-Fidelity Prototypes	106
4.5.1	Mobile-based Application	108
4.5.2	Web-based Management System	115
4.6	Summary	125
5	SYSTEM DESIGN	126
5.1	Introduction	126
5.2	System Architecture Design	126
5.3	System Design Models	128

5.3.1	Conceptual Data Modelling	128
5.3.2	Activity Diagram	129
5.3.3	Data Flow Diagram (DFD)	147
5.3.4	Page Navigation Flow	154
5.4	User Interface Design	156
5.4.1	UI Design for Mobile-based Application	156
5.4.2	UI Design for Web-based Management System	163
6	SYSTEM IMPLEMENTATION	174
6.1	Introduction	174
6.2	System Modules	174
6.2.1	Modules in Mobile-based Application	175
6.2.2	Modules in Web-based Management System	185
7	SYSTEM TESTING	210
7.1	Introduction	210
7.2	Unit Testing	210
7.2.1	Test Case for Mobile-based Application	211
7.2.2	Test Case for Web-based Management System	221
7.3	Usability Test	239
7.3.1	System Usability Scale Template	239
7.4	Requirements Traceability Matrix	242
7.4.1	Use Case Reference	242
7.4.2	Functional Requirements Reference	243
7.4.3	Test Case Reference	246
7.4.4	Traceability Matrix	247
7.5	User Acceptance Test (UAT)	248
7.5.1	UAT Test Cases	249
7.5.2	User Acceptance Test (UAT) Result	260
8	CONCLUSIONS AND RECOMMENDATIONS	264
8.1	Introduction	264
8.2	Achievement of Objectives	264

8.3	Limitations and Recommendations	265
	REFERENCES	271
	APPENDICES	274

LIST OF TABLES

Table 2.1: Qualitative Methods and Its Steps	18
Table 2.2: Advantages and Disadvantages of Qualitative Approaches	19
Table 2.3: Quantitative Methods and Its Steps	21
Table 2.4: Advantages and Disadvantages of Quantitative Methods	22
Table 2.5: Comparison between Qualitative and Quantitative Research Methodology	24
Table 2.6: Strengths and Weaknesses of Waterfall Model	27
Table 2.7: Strengths and Weaknesses of Iterative Model	28
Table 2.8: Characteristics, Strengths and Weaknesses of RAD Model	29
Table 2.9: Characteristics, Strengths and Weaknesses of Scrum	31
Table 2.10: Characteristics, Strengths and Weaknesses of Extreme Programming	32
Table 2.11: Characteristics, Strengths and Weaknesses of Crystal Methods	34
Table 2.12: Characteristics, Strengths and Weaknesses of Behaviour-driven	35
Table 2.13: Comparison between Traditional and Agile Development Methodology	35
Table 2.14: Comparison of Features between Similar Existing Applications	50
Table 2.15: Strengths and Weaknesses between Similar Existing Applications	51
Table 4.1: Functional Requirements for Mobile-based Application	73
Table 4.2: Functional Requirements for Web-based Management System	74
Table 4.3: Non-Functional Requirements	76
Table 4.4: Use Case for Register Account	78

Table 4.5: Use Case for Search Items	80
Table 4.6: Use Case for Manage Profile	81
Table 4.7: Use Case for Make Purchase	82
Table 4.8: Use Case for Manage Cart	84
Table 4.9: Use Case for Check Orders	85
Table 4.10: Use Case for Manage Products	87
Table 4.11: Use Case for Manage Stocks	89
Table 4.12: Use Case for Manage Promotions	92
Table 4.13: Use Case for Manage Delivery	94
Table 4.14: Use Case for Manage Orders	95
Table 4.15: Use Case for Manage Customer Records	96
Table 4.16: Importance of The Features Towards The Participants	106
Table 4.17: Reference Table for System Designs to Functional Requirements	107
Table 6.1: System Modules	174
Table 7.1: Test Case for Registration	211
Table 7.2: Test Case for Products	215
Table 7.3: Test Case for Manage Profile	217
Table 7.4: Test Case for Manage Shopping Cart	218
Table 7.5: Test Case for Orders	219
Table 7.6: Unit Test Case for Manage Products	221
Table 7.7: Unit Test Case for Manage Stocks	227
Table 7.8: Unit Test Case for Manage Orders	230
Table 7.9: Unit Test Case for Manage Delivery	231
Table 7.10: Unit Test Case for Manage Promotions	233
Table 7.11: Unit Test Case for Manage Customers	237

Table 7.12: Summarized System Usability Scale (SUS) Score	241
Table 7.13: SUS Grading Scale	242
Table 7.14: Use Case Reference Table	242
Table 7.15: Functional Requirements Reference Table	243
Table 7.16: Test Case Reference Table	246
Table 7.17: Traceability Matrix	247
Table 7.18: Template of UAT Test Form for Examiners Use	249
Table 7.19: UAT Test Cases for Mobile-based Application	249
Table 7.20: UAT Test Cases for Web-based Management System	253
Table 7.21: Summary of User Acceptance Test (UAT) Result	260
Table 8.1: Limitations and Recommendations	266

LIST OF FIGURES

Figure 1.1: Design Architecture	7
Figure 1.2: Software Development Life Cycle (SDLC)	9
Figure 2.1: Waterfall Model	26
Figure 2.2: Iterative Model	27
Figure 2.3: Rapid Application Development (RAD) Methodology	29
Figure 2.4: Scrum Process	30
Figure 2.5: Extreme Programming (XP)	32
Figure 2.6: Crystal Methods Methodology	33
Figure 2.7: Behaviour-driven Development	34
Figure 2.8: Registration Module of Fergusson Plarre Bakehouses	37
Figure 2.9: Login Module of Fergusson Plarre Bakehouses	37
Figure 2.10: Home Page of Fergusson Plarre Bakehouses	38
Figure 2.11: Menu Page of Fergusson Plarre Bakehouses	38
Figure 2.12: Product Module of Fergusson Plarre Bakehouses	39
Figure 2.13: Registration Module of Bakerdays	40
Figure 2.14: Login Module of Bakerdays	40
Figure 2.15: Home Page of Bakerdays	41
Figure 2.16: Menu Page of Bakerdays	41
Figure 2.17: Product Module of Bakerdays	42
Figure 2.18: Product Customization Module of Bakerdays	42
Figure 2.19: Registration Module of Bread History	44
Figure 2.20: Login Module of Bread History	44
Figure 2.21: Home Page of Bread History	45

Figure 2.22: Menu Page of Bread History	45
Figure 2.23: Product Module of Bread History	46
Figure 2.24: Registration Module of TK Bakery	47
Figure 2.25: Login Module of TK Bakery	48
Figure 2.26: Home Page of TK Bakery	48
Figure 2.27: Menu Page of TK Bakery	49
Figure 2.28: Product Module of TK Bakery	49
Figure 3.1: Rapid Application Development (RAD) Model	55
Figure 3.2: Gantt Chart for Requirements Planning Phase	64
Figure 3.3: Gantt Chart for User Design Phase	65
Figure 3.4: Gantt Chart for Construction Phase	66
Figure 3.5: Gantt Chart for Closure Phase	67
Figure 4.1: Use Case Diagram for Mobile-based Application	77
Figure 4.2: Use Case Diagram for Web-based Management System	78
Figure 4.3: Summary of Participants' Gender	98
Figure 4.4: Summary of Participants' Age Range	99
Figure 4.5: Summary of Participants' Current Occupation	99
Figure 4.6: Summary of Participants Having to Purchase Bakery Products	100
Figure 4.7: Summary of Having Difficulty In Purchase Bakery Products Physically	100
Figure 4.8: Summary on Reasons of Having Difficulty in Purchase Bakery Products Physically	101
Figure 4.9: Summary of Participants Using Other Bakery Shop Applications	102
Figure 4.10: Summary of Bakery Shop Application Installed by Participants	102

Figure 4.11: Summary of Experience in Using Bakery Shop Application Installed	102
Figure 4.12: Summary on Reasons of Never Installed Any Bakery Shop Application	103
Figure 4.13: Summary of Participants' Opinion on Having An Online Bakery Shop Application	103
Figure 4.14: Summary of Participants' Opinion on Using An Online Bakery Shop Application	104
Figure 4.15: Summary on Product' Information Expected by The Participants	104
Figure 4.16: Summary of Participants' Opinion on Features/ Functionalities to be Included in An Online Bakery Shop Application	105
Figure 4.17: Welcome Screen	108
Figure 4.18: Registration Screen	109
Figure 4.19: Login Screen	109
Figure 4.20: Home Screen	110
Figure 4.21: Products Screen	110
Figure 4.22: Product Details Screen	111
Figure 4.23: Update Profile Information Screen	111
Figure 4.24: About Us Screen	112
Figure 4.25: Contact Us Screen	112
Figure 4.26: Shopping Cart Screen	113
Figure 4.27: Checkout Payment Screen	113
Figure 4.28: Order Successfully Placed Screen	114
Figure 4.29: Track Order Screen	114
Figure 4.30: Dashboard Page	115
Figure 4.31: Manage Products Page	115
Figure 4.32: View Product Details Page	116

Figure 4.33: Update Product Details Page	116
Figure 4.34: Add New Product Page	117
Figure 4.35: Manage Stocks Page	117
Figure 4.36: Add New Stock Page	118
Figure 4.37: Update Stock Details Page	118
Figure 4.38: Manage Orders Page	119
Figure 4.39: View Order Details Page	119
Figure 4.40: Update Order Status Page	120
Figure 4.41: Manage Delivery Page	120
Figure 4.42: View Delivery Details Page	121
Figure 4.43: Update Delivery Status Page	121
Figure 4.44: Manage Promotions Page	122
Figure 4.45: Add New Promotion Page	122
Figure 4.46: View Promotion Details Page	123
Figure 4.47: Update Promotion Details Page	123
Figure 4.48: Manage Customers Page	124
Figure 4.49: View Customer Record Page	124
Figure 4.50: Update Customer Record Page	125
Figure 5.1: Architecture Design of the System	127
Figure 5.2: Conceptual Data Model	129
Figure 5.3: Activity Diagram for Register Account	130
Figure 5.4: Activity Diagram for Search Items	131
Figure 5.5: Activity Diagram for Manage Profile	132
Figure 5.6: Activity Diagram for Add Item Into Shopping Cart	133
Figure 5.7: Activity Diagram for Check Orders	134

Figure 5.8: Activity Diagram for Make Purchase	135
Figure 5.9: Activity Diagram for Login	136
Figure 5.10: Activity Diagram for View A Product	137
Figure 5.11: Activity Diagram for Add New Product	138
Figure 5.12: Activity Diagram for Update Product	139
Figure 5.13: Activity Diagram for View A Stock	140
Figure 5.14: Activity Diagram for Add New Stock	140
Figure 5.15: Activity Diagram for Update Stock	141
Figure 5.16: Activity Diagram for View A Customer' Order	141
Figure 5.17: Activity Diagram for Update Order' Status	142
Figure 5.18: Activity Diagram for View A Delivery Order	142
Figure 5.19: Activity Diagram for Update Delivery Status	143
Figure 5.20: Activity Diagram for View A Promotion	143
Figure 5.21: Activity Diagram for Add a New Promotion	144
Figure 5.22: Activity Diagram for Update Promotion	145
Figure 5.23: Activity Diagram for View A Customer' Record	146
Figure 5.24: Activity Diagram for Update Customer' Account Status	146
Figure 5.25: Context Diagram	147
Figure 5.26: Level 0 Data Flow Diagram	148
Figure 5.27: Level 1 Data Flow Diagram for Manage Products	149
Figure 5.28: Level 1 Data Flow Diagram for Manage Stocks	150
Figure 5.29: Level 1 Data Flow Diagram for Manage Orders	150
Figure 5.30: Level 1 Data Flow Diagram for Manage Delivery	151
Figure 5.31: Level 1 Data Flow Diagram for Manage Promotions	151
Figure 5.32: Level 1 Data Flow Diagram for Manage Customers	152

Figure 5.33: Level 1 Data Flow Diagram for Manage Shopping Cart	152
Figure 5.34: Level 1 Data Flow Diagram for Manage Account	153
Figure 5.35: Level 1 Data Flow Diagram for Search Items	153
Figure 5.36: Page Navigation Flow for Mobile-based Application	154
Figure 5.37: Page Navigation Flow for Web-based Management System	155
Figure 5.38: UI for Welcome Page	156
Figure 5.39: UI for Registration Page	157
Figure 5.40: UI for Login Page	157
Figure 5.41: UI for Home page	158
Figure 5.42: UI for Profile Page	158
Figure 5.43: UI for Products Page	159
Figure 5.44: UI for Product Details Page	159
Figure 5.45: UI for My Shopping Cart Page	160
Figure 5.46: UI for Checkout Page	160
Figure 5.47: UI for Order Successful Page	161
Figure 5.48: UI for My Orders Page	161
Figure 5.49: UI for About Us Page	162
Figure 5.50: UI for Contact Us Page	162
Figure 5.51: UI for Login Page	163
Figure 5.52: UI for Dashboard Page	163
Figure 5.53: UI for Product List Page	164
Figure 5.54: UI for Add New Product Page	164
Figure 5.55: UI for Product Details Page	165
Figure 5.56: UI for Edit Product Page	165
Figure 5.57: UI for Stock List Page	166

Figure 5.58: UI for Add New Stock Page	166
Figure 5.59: UI for Edit Stock Page	167
Figure 5.60: UI for Order List Page	167
Figure 5.61: UI for Order Details Page	168
Figure 5.62: UI for Update Product Status Page	168
Figure 5.63: UI for Delivery Order List Page	169
Figure 5.64: UI for Delivery Order Details Page	169
Figure 5.65: UI for Update Delivery Status Page	170
Figure 5.66: UI for Promotion List Page	170
Figure 5.67: UI for Add New Promotion Page	171
Figure 5.68: UI for Promotion Details Page	171
Figure 5.69: UI for Edit Promotion Page	172
Figure 5.70: UI for Customer List Page	172
Figure 5.71: UI for Customer Details Page	173
Figure 5.72: UI for Update Account Status Page	173
Figure 6.1: Code Segment for Register Function	175
Figure 6.2: Registration Page	176
Figure 6.3: Empty Credentials	176
Figure 6.4: Invalid credentials format	177
Figure 6.5: Account already exist	177
Figure 6.6: Registration Successful	177
Figure 6.7: Code Segment for Search Function	178
Figure 6.8: Product Categories at Home Page	179
Figure 6.9: Product Categories at Side Navigation Bar	179
Figure 6.10: Products Page	179

Figure 6.11: Product Details Page	179
Figure 6.12: Product successfully added into shopping cart	180
Figure 6.13: Select Delivery Method	180
Figure 6.14: Select Payment Method	180
Figure 6.15: Unable to Checkout	181
Figure 6.16: Checkout Page	181
Figure 6.17: Order Success Page	182
Figure 6.18: My Order Page	182
Figure 6.19: Profile Page	183
Figure 6.20: Invalid Input Formats	183
Figure 6.21: Code Segment for Form Validation	183
Figure 6.22: Successful Profile Update	184
Figure 6.23: Shopping Cart Page	185
Figure 6.24: Products Overview Page	186
Figure 6.25: Add Product Page	187
Figure 6.26: Wrong Input Format	187
Figure 6.27: Empty Field	188
Figure 6.28: Product Added Successfully	188
Figure 6.29: Fail to Add Product	188
Figure 6.30: Product Already Exists	188
Figure 6.31: Eye Icon in Products List	189
Figure 6.32: Product Details Page	189
Figure 6.33: Pen Icon in Products List	190
Figure 6.34: Edit Product Page	190
Figure 6.35: Successful Product Update	191

Figure 6.36: Trash Icon in Products List	191
Figure 6.37: Product Successfully Deleted	191
Figure 6.38: Stocks Overview Page	192
Figure 6.39: Add New Stock Modal	193
Figure 6.40: Empty Input Field	193
Figure 6.41: Pen Icon in Stocks List	194
Figure 6.42: Edit Stock Modal	194
Figure 6.43: Trash Icon In Stocks List	195
Figure 6.44: Stock Successfully Deleted	195
Figure 6.45: Orders Overview Page	196
Figure 6.46: Eye Icon In Orders List	197
Figure 6.47: View Order Modal	197
Figure 6.48: Pen Icon In Orders List	198
Figure 6.49: Update Order Status	198
Figure 6.50: Delivery Orders Overview Page	199
Figure 6.51: Eye Icon In Delivery Orders List	199
Figure 6.52: View Delivery Order	200
Figure 6.53: Pen Icon In Delivery Orders List	200
Figure 6.54: Update Delivery Status	201
Figure 6.55: Promotions Overview Page	202
Figure 6.56: Add New Promotion	203
Figure 6.57: Empty Input Field	203
Figure 6.58: Record Already Exists	203
Figure 6.59: Eye Icon In Promotions List	204
Figure 6.60: View Promotion Modal	204

Figure 6.61: Pen Icon In Promotions List	205
Figure 6.62: Edit Promotion Modal	205
Figure 6.63: Trash Icon In Promotions List	206
Figure 6.64: Promotion Successfully Deleted	206
Figure 6.65: Customers Overview Page	207
Figure 6.66: Eye Icon In Customers List	207
Figure 6.67: View Customer Record	208
Figure 6.68: Pen Icon In Customers List	208
Figure 6.69: Update Account Status	209
Figure 7.1: System Usability Scale Template	240

LIST OF SYMBOLS / ABBREVIATIONS

AJAX	Asynchronous JavaScript And XML
COVID	Coronavirus Disease
CSS	Cascading Style Sheets
DFD	Data Flow Diagram
DOM	Document Object Model
FDD	Feature Driven Development
FYP	Final Year Project
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IOS	iPhone Operating System
JS	JavaScript
JSX	JavaScript Syntax Extension
PHP	Hypertext Preprocessor
RAD	Rapid Application Development
RTM	Requirements Traceability Matrix
RUP	Rational Unified Process
SDK	Software Development Kit
SDLC	Software Development Life Cycle
SQL	Structured Query Language
SUS	System Usability Scale
UAT	User Acceptance Test
UI	User Interface
UML	Unified Modelling Language
WBS	Work Breakdown Structure
XP	Extreme Programming

LIST OF APPENDICES

APPENDIX A: Survey Questionnaire	274
APPENDIX B: Low-Fidelity Prototypes	280
APPENDIX C: SUS Assessment Result by User	296
APPENDIX D: User Acceptance Test (UAT) Result	301

CHAPTER 1

INTRODUCTION

1.1 Introduction

Traditionally, people have to make phone calls to make an order or drive to the bakery shop no matter how far the distance in order to purchase bakery products. However, it is obvious that these traditional methods of placing order are very time-consuming and it could lead to many mistakes. Moreover, by acknowledging COVID-19 outbreak as a present-day and ongoing worldwide issue which will continue to happen in the future, it is a fact that there will be limitation on freedom of movement, whereby it is very inconvenient for many people to physically present at a bakery shop to make purchase. From another point of view, this has undeniably affected bakery shops business opportunities and increased the risk of closure due to the unpredictable length of the crisis (Nelson, 2020). Besides, putting aside the impacts caused by this pandemic, there are sometimes whereby the staff of bakery shops find it difficult to manage the customer orders especially when there are huge amounts of order and to keep track of their stocks daily.

In order to tackle this issue, this project is initialized to propose a solution in enhancing the relationship and connection between the customers and the staff of bakery shops. Thus, this chapter includes a summary of the problem's overview, the problem identification, goal and objectives to be achieved in this project, as well as the proposed solution and approach to achieve the project goal.

1.2 Background of the problem

Online ordering has gone from a desirable convenience to an utter necessity for food-industry survival in recent years, especially during the global COVID-19 pandemic. Even before the alarming COVID-19 grabbed the worldwide attention, online food ordering was gaining traction as a result of increased digitalization and the availability of more ordering apps. Moreover, recently Malaysia government has imposed stricter movement restrictions throughout the nation to curb the spread of Covid-19 epidemic and it has caused some of the people to make no choice to use the method of phone calls to order bakery products. While before the outbreak of this pandemic, most of the people will physically present at the shops to purchase bakery products. However,

people claimed that both these kinds of ordering methods revealed them to a lot of inconveniences.

Next, there are also some of them who claim that they cannot easily browse through different shops to choose whatever they want in the shortest amount of time. It takes them a long time to enter a store and try to find their way around on the lane, and it can be even more difficult when the store is closed. Besides, customers need to manually look for their items at the shop, which they find inefficient and time-consuming. Also, there is a disappointment by those who want a large selection of items all in one place, and those who find shopping in-store is inconvenient because of the limited space available.

Besides, it is undeniably true that setting up customers' order fulfilment processes to handle day-to-day business is a significant challenge in and of itself, especially during seasonal peak periods such as public holidays and beyond. Furthermore, during peak periods, the problems and difficulties posed by order fulfilment are clearly visible (Ascarelli, 2020). Therefore, the vast amount of paperwork required to process a customer order and ensure the best customer service is one of the most time-consuming concerns businesses face. The manual method generally requires regular re-entry of data into different areas. Therefore, there is no question that manual processes played a significant role in many business success stories. Even so, it will never be perfect, and there will always be space for growth.

In these days, many new or small businesses are still practicing the manual solutions whereby they use a pen and paper to keep track of stocks and goods. In order to keep records up to date, each sale is registered in a ledger as it occurs. The owner of the business would then need to double-check the written record as required in order to avoid understocking and overstocking (Jenkins, 2020). It is true that this type of management is easy and low-cost. However, human mistakes and time-consuming on the other hand, are also its significant weaknesses especially when the volume is increasing.

Furthermore, there are also some small-to-medium sized businesses who do management and tracking of their stocks and products via spreadsheet. It is undeniably that a program such as Excel, at a basic level, it can be very useful for stock management. Furthermore, a professional with a clear understanding of spreadsheets will put together a functional framework. Stock, value, sales figures, and other information can all be tracked in one simple document. Human error, on the other hand,

remains a major drawback to spreadsheet-based systems. Although spreadsheets and similar tools are useful in the early stages of a business, they can easily become debilitating.

While this online ordering application enables customers to make an order without having to place a phone call or physically present at the bakery shop, saving time and money that would otherwise be spent travelling to pick up an order. Besides, customers benefit from online shopping because it gives them access to almost unlimited menu choices and encourages them to browse bakery items they may not have seen before. In other words, consumers can learn about new menu items by viewing a digital menu that includes attractive, high-quality food images and its associated descriptions and ingredients. While from the bakery shops owners' perspective, smaller, family-owned businesses, they will no longer have much worries on bakery's sale, regular tracking of orders, deliveries, stocks and products management whereby all these information are organized efficiently and effectively in the system.

1.3 Problem Statement

1.3.1 Complex Order Configuration, Allotments and Management

The method of efficiently tracking and fulfilling sales orders is known as order management. It encompasses the customer cycle, procedures, and deliveries in order to have a meaningful customer experience. The order management process begins when a customer places an order and continues until the order is fulfilled. It also entails maintaining a customer record, which could include information such as purchasing history, payment process, and order quantity. However, no matter how qualified we are, there is always a risk that we will make a few mistakes when it comes to data entry. These data entry problems, obviously, can have a negative effect on the shop's operation. Customers will be disappointed if a large order of 100 toasts becomes a small order of 10 toasts due to human error, and if a small order of 10 toasts becomes a large order of 100 toasts, the company will lose money and hundreds of Malaysian ringgit.

Since manual order processing involves several touch points, there is indeed an increased chance of errors. Human-caused errors waste a lot of time and resources for businesses, and they are the leading cause of fulfilment mistakes. Incorrect data

entry and lost records are examples of such mistakes. Replicating a single order due to a mistake or a lost document can be expensive and lead to order fulfilment delays. Due to order processing errors, miscommunication with service distribution lines can result in additional shipping costs, wasted supplies, credit notes, and dissatisfied customers. Also, staffs would wish to have a higher efficiency way to do their job by replacing the manual processes of managing customers orders. In other words, the staff need a management system that allows them to keep track and manage customer orders, delivery information, product details, orders' information and payments whereby it indicates that the staffs have all of the resources that they required to operate the bakery shop in one place.

1.3.2 Inaccurate Stocks and Products Management

Due to unavoided human errors, staff may lose track of how much is the quantity of a product or stocks they have. This may cause one of these two conditions to occur which are overstocking and understocking. Overstocking is something all shop owner must avoid. This is due to the reason that it may produce a significant and damaging problem whereby at worst-case scenario, overstocking will cause the wastage of foods whereby each ingredients has its shelf life or expiry date. This means that the shop owner also wasted the money on buying them which at last ended with disposing them.

Another condition, which is understocking, is a condition whereby the shop fails to meet the customer demand. When the stock is insufficient, it may affect the production of bakery products. Having insufficient stocks is often detrimental as when a shop under stocks can create issues to the shop. Customers can place orders for products that are out of stock, but the shop is more than likely to fail to fulfil such orders. If they do not have an alternative, they should decline orders or label products as out of stock. Refusing orders is something that no brand should ever do if at all possible, and it is the concept of sales decline. Not only that, it may also cause frustration and dissatisfaction from customers. Not to mention forcing stores to offer refunds or other forms of compensation, which would damage the store's credibility.

In short, as a business grows, it becomes more difficult to efficiently manage stocks. Utilizing technology to make it simpler for both the owner and the workers as it will help them achieve a higher degree of precision in having the correct goods and quantities, at the appropriate time and at the appropriate price. In other words, when

many previously time-consuming stock and inventory management processes are automated, they become much simpler.

1.3.3 Complications in Placing Order

The biggest drawback of the traditional methods of placing orders physically at bakery shop or through phone calls will be in terms of convenience. This is due to the reason that there are some people who might not have the time devoted to a leisurely shopping in-store. Thus, people wish to have a more time-saving way to place order which is able to place order at anytime and anywhere without delaying their works on hand. Not only that, there is also another case where people feel inconvenient. As all of us know, most of the bakery shops are operational until 10pm only or even earlier than that generally. However, there are many people who do not work normal hours whereby they needs to have a light meal such as breads to fill their empty stomach and to keep them energized during work. Therefore, this is totally one of the main problems faced by people who work late hours whereby they are unable to access the stores 24 hours.

Other than that, it is witnessed how frequently most of the stores have sales and best buys especially on special occasions such as Hari Raya, Chinese Lunar New Year, Deepavali and so on. On these days, many people will rush to store in order to grab this golden chance to purchase as many products. At this time, these stores will be crowded with people. However, it is known that due to the Covid-19 pandemic, Malaysia government have encouraged all of us to avoid crowded spaces in order to control the pandemic. Therefore, there is no best way that enables both the customers and staff to stay safe while also enjoying the pleasures of shopping in a bakery shop.

1.4 Project Goal

This project aims to develop a mobile-based application that ease the bakery shop customers to place orders and integrated with a web-based management system that helps the bakery shop owner and staff to track and manage the records.

1.5 Project Objectives

The objectives to be achieved in this project are as follow:

1. To conduct a literature review on cross-platform application development, software development methodologies, research methodologies as well as similar existing bakery shop applications.
2. To develop a mobile-based application that allows customers to do online bakery products ordering and reservation.
3. To design and develop a web-based management system that allows the bakery shop staff to manage the records and information from selling products, customer orders to delivery.
4. To evaluate both the mobile-based application and web-based management system through unit testing, usability testing and user acceptance test.

1.6 Project Solution

Referring to the problems identified, it is clearly shown that this project requires the development of application in both mobile and web platforms. The web-based management system will mainly serve the bakery shop staff while the mobile online bakery shop application will serve all the customers. In general, this system will include most of the typical functionalities which are included in other existing systems. Additionally, some new and unique features will be also included in this system to make it more attractive and user-friendly.

As mentioned above, the web-based management system is developed for the staff to use. This management system is very essential in carrying out business efficiently across various industries to ensure that all the management are organized and streamlined. Therefore, this web-based management system will include some features that are necessary for the smooth running of business. One of the features in this system is that this system allows smooth tracking of all the customer orders. The staff of a bakery shop have the capability to track different orders of customers, whereby each order is given a unique Id to increase the accuracy of customer orders. Thus, a number of orders can be managed in bulk and tracking backorders become faster and easier. In this way, customer satisfaction is kept on excellent levels. Beside than order tracking, stocks management is also one of the features that will be included in this system whereby it allows the staff to get an idea on when they need to do

restocking of stocks by hinting at those stocks which are running low without much delaying as it may affect the daily productions of bakeries. Other than that, this system also allows the staff to manage and update all the selling products and its associated information such as to update which bakeries products are available to purchase for today and the changes in price of bakery products.

Similarly, the mobile-based application developed for the customers will allow them to browse through all the bakery products and its associated details such as category, price, descriptions and so on which provides them a more convenient and time-saving way to make purchase or order without having to physically present at the bakery shop. From the point of view from customers, they are allowed to take their time to browse through all the products and get familiar with add-on deals and offers. Thus, there is a high possibility that customers discover some products that they have never seen before and want to have a try on it or customers purchase more than initially decided in order to get the promotion price. Undeniably, this can lead to an exponential increase in the total sale of bakery shop. Besides, this mobile application also allows customers to track for their purchased order.

1.6.1 Proposed Design Architecture

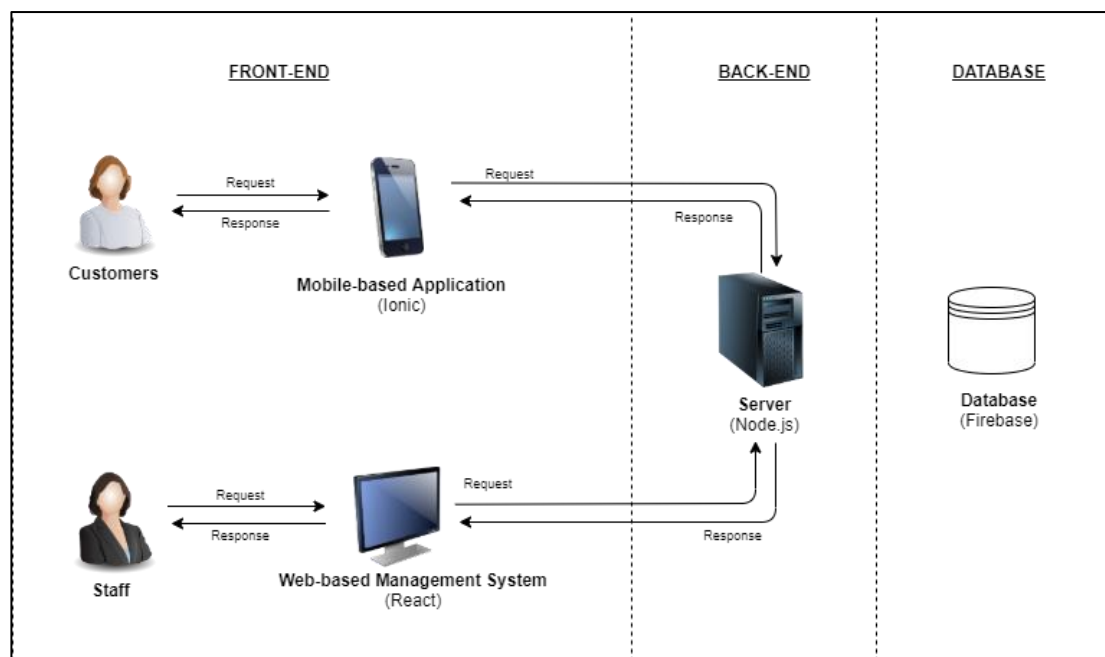


Figure 1.1: Design Architecture

Referring to Figure 1.1, the front-end software architecture composes the software applications that runs on the users' side. As mentioned earlier, this project is proposed to be a cross-platform development which will include both the web and mobile platform. Therefore, the software applications here will be the web-based management system that will mainly serve the staff and also the mobile application that will serve the customers.

All of the processes required in creating an HTML page that a web browser can interpret are performed on a remote server when a web application renders server-side. In this project, the server will be the Node.js. Then, there is querying of databases for data and running whatever logic that the software applications demand. While the remote server is busy processing the request and submitting a response, the web browser remains idle. As the software applications receive a response, it is translated and the content is presented on the screen to the users.

Client-side rendering, also known as front-end development, renders content on devices rather than on a remote web server, using the de facto web language, JavaScript. In other words, this ensures that a server is only needed to support the raw web application, with the browser rendering it in its final form, HTML. It also implies that some of the logic required in creating the web page is handled on the client side, particularly logic related to how objects are shown on the screen to the user (known as presentation logic).

1.7 Project Approach

1.7.1 Research Approach

During the execution of this project, the research approach used is quantitative approach. Quantitative approach is classified as a systematic review of phenomena utilizing measurable data and statistical, mathematical, or computing approaches (Basias and Pollalis, n.d.). Quantitative analysis collects data from existing and prospective customers through sampling techniques and the distribution of online surveys, interviews, questionnaires, and other approaches, with the results being evaluated quantitatively (Bhatia, 2018). In other words, multiple survey questions can be asked to gather data from such a number of people, and it can then be analysed to obtain numerical results while performing survey research. As a result, among the

many types of quantitative research, survey research is used in this project to ask questions to a sample of respondents through online surveys.

This survey is conducted aims to receive the responses from randomly selected respondents on their expected functionalities and features of a bakery shop application. Through the responses from all the respondents, the data collected is then analysed to compare with the system requirements and come out with a generalized conclusion.

1.7.2 Development Approach

Software development approach is a process or sequence of processes used in development of a software. As all of us know, software development is integrally related with the SDLC.

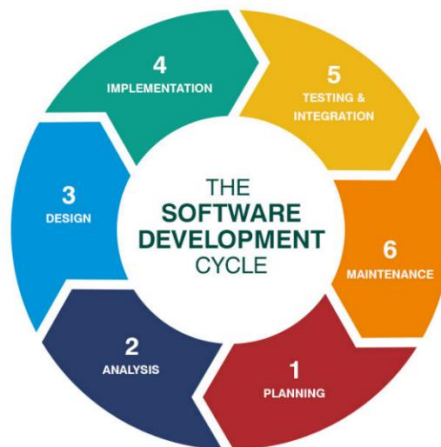


Figure 1.2: Software Development Life Cycle (SDLC)

SDLC is a sequence of steps which take place during the development of a piece of software (Luenendonk, 2020). Generally, there are six basic stages in SDLC which are planning, analysis, design, implementation, testing and integration and lastly is maintenance (Habsy, 2014). There are numerous different development approaches that can be used in development of a software project such as scrum, prototype, waterfall, agile, spiral, extreme programming and so on whereby each of the methodology provides a solution for the SDLC's seven stages. Therefore, selecting a suitable software development approach is very important as it plays a crucial role in contributing to a smooth and successful software project.

Next, it is undeniably that each of the development methodology have their associated strengths and weaknesses. While for this project, the development approach

used is Rapid Application Development (RAD). In the RAD development model, rapid prototyping and feedback take precedence over lengthy development and testing cycles. Developers may make several changes and adjustments to applications without having to restart the development process from the beginning (Flora and Chande, 2014).

One of the reasons for preferring RAD over other models such as Waterfall model is that in Waterfall model, once the application is in the testing process, changing the core functions and features of the software becomes difficult. As a result, we are dealing with software that may or may not meet our changing needs. Unlike the waterfall model, RAD is mostly based on prototypes, with the aim of producing a functional version of the application as soon as possible and then iterating on it. As a result, as each iteration is completed, the product becomes increasingly refined (Carroll, 2020). Besides, there is another reason for choosing RAD for this project is that this approach promotes customer input, which often allows for software project' improvement in terms of specifications and also the possibility of software defects is lower due to the results of prototyping in nature (Davies et al., 1999). Further elaborations on the RAD phases is discussed in the chapter 3, section 3.2.1.

1.8 Project Scope

1.8.1 Target Users

The target users of this project include the customers and the staff of bakery shop.

1. Target customers

The target customers are those people from all walks of life who want to purchase bakery products but unable or not willing to physically present at the bakery shop due to some reasons. Besides, it also includes people who want to make reservations of order for a specific date.

2. Target staff

There are two types of target staff that will be using this management system. The first type is the bakery shop manager who holds the rights to change the products' information and use the system to make any changes. For example, managers can use the online management system to make

changes on the price of bakery products. Also, bakery shop managers will need this management system to keep track of the stocks (ingredients) condition, to ensure that the supply of ingredients is always sufficient for daily productions. Besides, the target staff of this project also include the on-duty staff whereby they will be using this management system to update the daily menus and check on the customer orders.

1.8.2 Target Platform

This project is considered a cross-platform project which includes a front-end part and back-end part. As for the front-end part, it will involve the customers whereby an application will be developed using a mobile platform. While for the back-end part that involves the staff of a bakery shop, a web-based management system will be developed for them.

Considering the convenience of all the customers to order the bakery products, that is the main reason for choosing to develop a mobile-based application which is a mobile-based platform. This is due to the fact that once the mobile application is installed in their mobile phone, it provides them freedom to make orders from any place at any time without having to pause everything. Besides, it is obvious that how much actual people nowadays spend their time on using mobile phones every day. Therefore, this is one of the good reasons that the bakery shop application for customers is developed using mobile platforms as this will undeniably cause them to visit the application more frequently.

While from the perspective of the bakery shop' staff, it is more convenient, effective and efficient for them to use the management system which is web-based to track all the records and information by using the computer or laptop in the bakery shop.

1.8.3 Project Modules

The modules discussed below will be developed in this project in order to enhance and improve the users' experiences which include:

1.8.3.1 Project Front-end (Mobile-based Application)

1. Sign-up module

This sign-up module is required for the customers who have not yet registered with an account. Each customer who wishes to purchase bakery products has to do this process at least once to create and set up an account so that all their account information is kept secure. This module will require customers to enter some basic personal details such as address, mobile number, birth of date, email address and so on in order to verify their identity.

2. Products module

This module acts like a digital menu, with all the vital details about the selling products included such as list of products, products categorization, products information, products price and so on. In this module, each product is classified based on its type to provide convenience for the customers to look for it and purchase.

3. Order module

This module allows customers to make purchases or order some bakery products. In this module, customers have to ensure that all the essential ordering information such as delivery date, delivery address, quantity of items and so on are correct before proceeding to payment.

4. Profile module

This module included customers' basic personal details such as address, mobile number, birth of date, email address and so on whereby they can always update and make changes on these details. Also, customers are able to check all their purchase or order history and its delivery status in this module.

5. Shopping cart module

This module will keep the record of the items a customer has interested in from the online store. Customers are able to add products, edit product

quantities and also remove products in this module. Also, this module will show customers the total price for all the selected items.

1.8.3.2 Project Back-end (Web-based Management System)

1. Customers module

This module will provide the staff of bakery shop an overview of all the customers' record. It allows the staff to get all the customers' information which include their account information as well as their purchase activities performed.

2. Orders module

This module includes all the essential details about the customers orders such as list of orders, orders date and time, orders payments, orders items and so on. This module eventually helps the bakery shop' staff to keep track of each of the customer orders which it actually increases the accuracy of orders information as compared to the manuals way. In this way, it will eventually increase the customer's satisfaction.

3. Stocks module

This module acts like a digital warehouse, with all the essential details about the stocks included such as list of stocks, stocks availability, stocks conditions and so on. In this module, it will give an idea to the shop owner of how frequently they need to buy for each of the ingredients by hinting at the stock of ingredients which is running low so that they may immediately do restocking as soon as possible without affecting the daily productions.

4. Delivery module

This module includes all the delivery details such as list of orders to be delivered, delivery date and time, delivery address and so on. It provides a more convenient and easier way for bakery shop' staff to track the delivery details of each order to ensure that problems such as incorrect products, late deliveries, wrong address and so on would not occur.

5. Products module

This module includes all the essential details about the selling products such as list of products, product categorization, products information, products price and so on. In this module, bakery shop' staff are allowed to make changes on all of the products details mentioned above such as updating the price changes, quantity remaining of each selling product, today's selling products and others so that customers will always get the up-to-date information about the products.

6. Promotions module

This module includes all the essential details about the promotions such as terms and conditions, start date, end date, descriptions, and so on. In this module, bakery shop' staff are allowed to create and make changes on all of the promotion details mentioned above such as updating its status so that customers will always get clear details on each of the promotion.

1.8.4 Out of scope

The project modules that are out of scope of the front-end mobile application are stated as below:

1. Payments module

This module will allow the customers to choose any method of payment such as through credit or debit card (VISA, Mastercard), eWallet (Boost, Touch' n Go eWallet), or online banking (Maybank2u, HongLeong connect), credit or debit card (VISA, Mastercard).

2. Delivery Tracking module

This module will allow the customers to be able to track their orders in real time, immediately after the orders being placed successfully. Hence, this module will keep the customers informed about the whereabouts of their orders by receiving the real-time delivery updates.

1.9 Summary

In conclusion, it is obvious that online buying is getting more popular among all age groups due to its conveniences especially during this pandemic whereby there are

governments enforcement of restrictions on our movements. Hence, the bakery shop application is developed and delivered to the bakery shop customers to provide them an experience of ordering bakery products in a more convenient and time-saving way without having to present physically at the shop.

Moving forward, without a good online management system, all areas of the bakery shop business can quickly become overwhelmed as the management of orders, products and its associated information, delivery, stocks (ingredients) and so on can all come under pressure very quickly. Moreover, when there is a scenario where hundreds more orders flood in, it will then bring over a whole new set of complications. Imagine that one of those management falls over and messed up, the bakery shop may have to encounter the risk of losing customers, sales, profits and includes the damage to the bakery shop' reputation. Therefore, these facts clearly show how crucial the role of an online management system is to a bakery shop.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

As is known to all, the World Wide Web seems to have a major impact on people's attitudes and behaviours all over the world. This blessing has resulted in the emergence of online purchases, which have influenced the lives of the people, especially during the Covid-19 pandemic outbreak. Many of the people can feel the convenience it brings whereby it saves our crucial time to purchase a product from a physical store. Therefore, this chapter will provide an overview on the study of similar existing applications, cross-platform application development, comparison between the various research methodologies as well as development methodologies.

2.2 Cross-Platform Application Development

As mentioned earlier in the Chapter 1, this project will be a cross-platform application development. Traditionally, application development for different device platforms must be built separately due to the reason that each operating system uses a different programming language that are not recognized by the others. Cross-platform development, on the other hand, allows developer to create an application using a universal programming language like JavaScript and then export it to a variety of smartphone platforms. From the standpoint of development and maintenance, having a single backend shared across them is an effective and cost-saving option (Shiklo, 2017).

2.2.1 Mobile Application Development

Instead of being rendered inside a browser, mobile apps are applications that are downloaded and installed on mobile device. Considering that people nowadays are spending more and more time on mobile devices, therefore the development of this online bakery shop application will be a mobile application. A mobile application provides value to users through a new channel for engagement. Instead of viewing the same text and images as a website, mobile applications may have features that enable users to interact with the application's specific components. Also, mobile applications store users' data locally on their device. Moreover, mobile applications allow users to

set up their own preferences. This will undeniably increase the user experience and satisfaction in using the application to purchase a product.

2.2.2 Web Application Development

While the bakery shop management system is built for the ease of the staff of bakery shop, hence the development of this management system will be a web application. One of the main reasons is considering the convenience of the bakery shop staff when using this system. Unlike mobile devices, which are limited to particular platforms (iOS or Android), a web application can be accessed from any mobile device with an internet connection, regardless of operating system. Furthermore, users are not required to spend time downloading new versions or enhancements of the application in order to benefit from website improvements (Ciligot, 2020).

Web applications do not require writing several codebases for different platforms. The code is only written once for web browsers. Besides, websites are easy to update, fix bugs, and support. Usually, the programming language that are needed in order to develop a user-friendly web application is C#, JavaScript or HTML.

One of the web application development tools that helps in building a successful web application is React. It is a JavaScript library used for building interactive UIs. This technology enables developers to build dynamic and responsive web applications as it requires less coding and provides more functionality compared to its rivals. JavaScript Syntax Extension (JSX) and Virtual DOM are the two core features that make this JS library so appealing for the developers.

2.3 Research Methodology

The procedures or strategies used to categorize, choose, process, and evaluate data on a subject are referred to as the research methodology (Jansen and Warren, 2020). In other words, it is about how a researcher plans a study in such a way that the findings are accurate and credible and meet the research's goals and objectives. Quantitative and qualitative analysis techniques are the two most common approaches used in research. Additionally, there are also a variety of other approaches, such as mixed methods research, which incorporates qualitative and quantitative methodologies. However in this project, the research methodologies that will be focused and further discussed are qualitative and quantitative research methodology.

2.3.1 Qualitative Research Methodology

Qualitative approach is concerned with the data gathering and analyzation of words (both written and spoken) and textual data. This method aims to collect data from a subset of a target population and generalize the results. Researchers frequently utilize a qualitative method when the study goals and objectives are exploratory in nature. For example, to learn about people's reactions to a recent tragedy, a qualitative method may be applied.

2.3.1.1 Qualitative Methods

The table below shows and describes the main qualitative methods and its multiple step involved in each of the methods.

Table 2.1: Qualitative Methods and Its Steps

Qualitative methods	Steps taken
Observation	<ol style="list-style-type: none"> 1. The problem is defined, as well as the concepts that go with it. 2. Select events and peoples to be observed. 3. Observations are analysed and conclusions are drawn.
Ethnography	<ol style="list-style-type: none"> 1. Keep a watch on the phenomena. 2. Recognize the cultural context of the action. 3. Participants' attitudes and beliefs are recorded. 4. The phenomena are analysed and interpreted.
Case studies	<ol style="list-style-type: none"> 1. Choose an instance to study. 2. Collect data. 3. Analyse and interpret data in a systematic way. 4. Perceive the obtained conclusions.
Structured interviews	<ol style="list-style-type: none"> 1. Design the interview. 2. Responds to questions.
In-depth interviews	<ol style="list-style-type: none"> 1. Choose an instance to study.

	<ol style="list-style-type: none"> 2. Formulate depth-providing questions. 3. Inclusion of ad hoc questions.
Focus groups	<ol style="list-style-type: none"> 1. Plan and define the format of study. 2. Recruit participants. 3. Conduct the interviews. 4. Transcribe the interviews. 5. Analyse the information.
Field research	<ol style="list-style-type: none"> 1. Observation of participants. 2. Perform interviews. 3. Artifact analysis.

2.3.1.2 Comparison of Approaches

Table 2.2 at below summarizes the major benefits and drawbacks of each qualitative methodology method.

Table 2.2: Advantages and Disadvantages of Qualitative Approaches

Method	Advantages	Disadvantages
Observation	<ul style="list-style-type: none"> • Collect data as the situation is happening. • In an unobtrusive way that is not dependant on someone's response. • Adaptable and focused on information exploration. 	<ul style="list-style-type: none"> • It takes a long time. • Depends on the observer's objectivity. • It necessitates a considerable amount of preparation. • Data collection in real time is difficult.
Ethnography	<ul style="list-style-type: none"> • Include in-depth observations • Suitable for exploring new lines of research • Based on direct involvement authors' observations and interviews 	<ul style="list-style-type: none"> • Takes a long time • Is difficult to come up with succinct and accurate conclusions • The researcher must have a thorough understanding of the problem domain.

Field research	<ul style="list-style-type: none"> • Enough to obtain very accurate data. • Stresses the significance and role of social context. 	<ul style="list-style-type: none"> • Data from a large number of individuals or groups is difficult to generalise. • Documenting findings can be a difficult task . • Relies on the objectivity of the observer.
Focus groups	<ul style="list-style-type: none"> • Enough to gather detailed personal and community information. • Allow for questions to be asked and answered. • Individual interviews are more expensive and time-consuming. 	<ul style="list-style-type: none"> • Difficult to monitor and control. • Difficult to get people to participate. • There is no way to be inclusive of the whole population.
Case studies	<ul style="list-style-type: none"> • Provide specific details about people. • Provide an excellent opportunity for creativity and the modification of existing theoretical assumptions. • May be used instead of or in addition to focus groups. 	<ul style="list-style-type: none"> • Creating cause-and-effect links is hard. • Generalizing from a small number of case studies is challenging. • There may be ethical problems, particularly with regard to secrecy.
Structured interviews	<ul style="list-style-type: none"> • The responses are well-structured and easy to analyse. • Can hit a broad sample • Replicate can be done easily. • Conducting an interview is a relatively simple process. 	<ul style="list-style-type: none"> • The response's choice is very consistent low flexibility. • Obtaining detailed information is difficult. • Preparing for an interview will take a long time.
In-depth interviews	<ul style="list-style-type: none"> • Adapted to obtain comprehensive and informative data on a particular domain. 	<ul style="list-style-type: none"> • It takes a long time and is quite expensive. • To extract comparable data, a lengthy verification procedure is required.

	<ul style="list-style-type: none"> • Fewer participants are expected to provide useful and relevant information. • It is possible to do it in a non-formal environment. 	<ul style="list-style-type: none"> • Participants should be carefully chosen to avoid prejudice. • Difficult to generalise.
--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------

2.3.1.3 Qualitative Data

Qualitative data is more comprehensive and often based on a subjective perspective. Qualitative research allows for a more in-depth understanding of the problem being researched, yet it generally only involves a limited number of participants due to time restrictions (Austin and Sutton, 2014). As a result, the findings are limited to the specific study project and cannot be applied to other situations or groups. Semi-structured or unstructured interviews, observations, and record analysis are all examples of qualitative data techniques. Qualitative research, on average, takes longer than quantitative research.

2.3.2 Quantitative Research Methodology

Quantitative research, in contrast to qualitative research, focuses on objective measurements and mathematical, analytical, or numerical analysis of data acquired via polls, questionnaires, and surveys, as well as modifying pre-existing statistical data using computing approaches (Creswell, 2020). In other words, quantitative analysis is concerned with the measurement and testing of numerical results. The quantitative method is often utilized when the research aims and objectives are confirmatory in nature. To identify the connections between two variables or to evaluate a set of hypotheses, for example, a quantitative method can be applied.

2.3.2.1 Quantitative Methods

Table 2.3 at below shows and describes the main quantitative methods and the steps to be carried out for each of the methods.

Table 2.3: Quantitative Methods and Its Steps

Quantitative methods	Steps taken
Surveys	1. Collect data

	<ol style="list-style-type: none"> 2. Evaluate data 3. Identify patterns 4. Interpret results
Simulation	<ol style="list-style-type: none"> 1. Create a hypothesis about the situation. 2. Assemble proof 3. Hypotheses based on proof are put to the test
Field experiments	<ol style="list-style-type: none"> 1. Define the environmental and conditions 2. Define the main group and control group 3. Apply a quantitative research technique 4. Establish cause-and-effect relationships
Correlational study	<ol style="list-style-type: none"> 1. Selection of the sample 2. Define the variables in analysis 3. Measure the covariation among them
Multivariate analysis	<ol style="list-style-type: none"> 1. Selection of the sample 2. Define the variables in analysis 3. Define the adopted multivariate models 4. Execute the selected multivariate models 5. Analysis of data and extract conclusions

2.3.2.2 Comparison of Approaches

Table 2.4 at below summarises the key benefits and drawbacks of each quantitative technique approach under consideration.

Table 2.4: Advantages and Disadvantages of Quantitative Methods

Method	Advantages	Disadvantages
Field experiments	<ul style="list-style-type: none"> • Works in a natural settings. • Larger-scale research. 	<ul style="list-style-type: none"> • It is hard to keep track of variables.

	<ul style="list-style-type: none"> • Experiments have no effect on the subjects. 	<ul style="list-style-type: none"> • Reproducing the same research circumstances is difficult. • Ethical issues may arise.
Simulation	<ul style="list-style-type: none"> • It is a tool for studying complicated systems. • Shorten a time frame to enable for a more rapid examination of the system's behaviour. 	<ul style="list-style-type: none"> • Model construction needs in-depth understanding of the topic. • It is time-consuming and expensive. • It may necessitate the utilization of complex hardware and software resources.
Surveys	<ul style="list-style-type: none"> • Low development costs. • Data collecting and statistical analysis are simple. • Can hit a broad audience. • Has a high degree of representativeness. • Is unaffected by the researcher's subjectivity. 	<ul style="list-style-type: none"> • Reliability of results is greatly dependent on the quality of responses and the survey's format.
Correlational study	<ul style="list-style-type: none"> • The degree of interaction between two factors may be easily assessed. • A wide range of information and subjects can be discussed. • There is no need to manipulate actions. 	<ul style="list-style-type: none"> • Does not offer a credible explanation for the existence of a connection between two variables. • Does not give a convincing explanation for the presence of a connection between two variables. • May lack internal/external validity.
Multivariate analysis	<ul style="list-style-type: none"> • There is a variety of knowledge and various domains that can be discussed. • The method is technically rigorous. 	<ul style="list-style-type: none"> • Needs the use of advanced statistical tools due to the difficulty of the techniques used.

2.3.2.3 Quantitative Data

Quantitative data, on the other hand, is easier to collect and analyze since it is based on a huge number of participants. Quantitative methods work with data that can be objectively analyzed using numbers. The data are examined using numerical comparisons and statistical analysis. As a result, it appears to be more scientific, which may appeal to those seeking clear solutions to particular causal concerns. Quantitative analysis is also quicker to accomplish because it involves the usage of software. Generalization to a broader population beyond the research sample is conceivable due to the huge number of responses.

2.3.3 Qualitative Research vs Quantitative Research

The comparison of the two approaches to research methodology is presented in tabular format in this section. Table 2.5 at below shows the differences between qualitative and quantitative analysis approaches.

Table 2.5: Comparison between Qualitative and Quantitative Research Methodology

Criteria	Qualitative Research	Quantitative Research
Purpose	To understand & interpret social interactions.	To test hypotheses, look at cause & effect, & make predictions.
Group Studied	Smaller & not randomly selected.	Larger & randomly selected.
Variables	Study of the whole, not variables.	Specific variables studied
Type of Data Collected	Words, images, or objects.	Numbers and statistics.
Form of Data Collected	Qualitative data such as open- ended responses, interviews, participant observations, field notes, & reflections.	Quantitative data based on precise measurements using structured & validated data-collection instruments.

Type of Data Analysis	Identify patterns, features, themes.	Identify statistical relationships.
Objectivity and Subjectivity	Subjectivity.	Objectivity.
Results	Findings that are not as generalizable as others.	Findings that can be applied to other groups.
Scientific Method	The researcher develops a new hypothesis and theory based on the information gathered.	The researcher uses data to test the hypothesis and theory.
View of Human Behaviour	Dynamic, situational, social, & personal.	Regular & predictable.

2.4 Software Development Methodology

A framework for planning, organizing, and regulating the development of an information system is known as a software development methodology. This generally includes decisions like which features should be included in the current version, when the software will be delivered, who will work on what, and how testing will be done. There is no such thing as a one-size-fits-all solution that works in every situation. When it comes to cost, meeting deadlines, customers satisfaction, software robustness, or reducing costs on failed projects, choosing an efficient management structure may make a big difference in getting a successful final result. Analysis, planning, production, testing, implementation and maintenance are all examples of software development methods. Traditional and agile are the two major groups in which they can be classified.

2.4.1 Traditional Software Development Methodology

Traditional software development methodologies were among the first and are still widely used in many organisations. Each of these methodologies appear similar, consist of a sequence of clearly defined phases. They do not place more value on regular customer communication or prompt response to requirement changes. Instead, they are based on the well defined use-cases at the start of the project whereby it changes in client requirements after they have been defined can be very costly.

Therefore, traditional models are not suitable for those projects with a lack of well-defined specifications or those that change frequently.

2.4.1.1 Waterfall Model

The Waterfall software development model is regarded as one of the oldest and most common software engineering models. This model is linear, meaning that we must complete each phase before moving on to the next (Half, 2021). It is checked at the end of each step to ensure that it complies with the first step's requirements. It consists of 5 high level, non-overlapping, sequential stages which are analysis, design, implementation, testing and maintenance. This model works best for projects with well-defined criteria that are well understood by all parties concerned. The figure below depicts the Waterfall model's various phases.

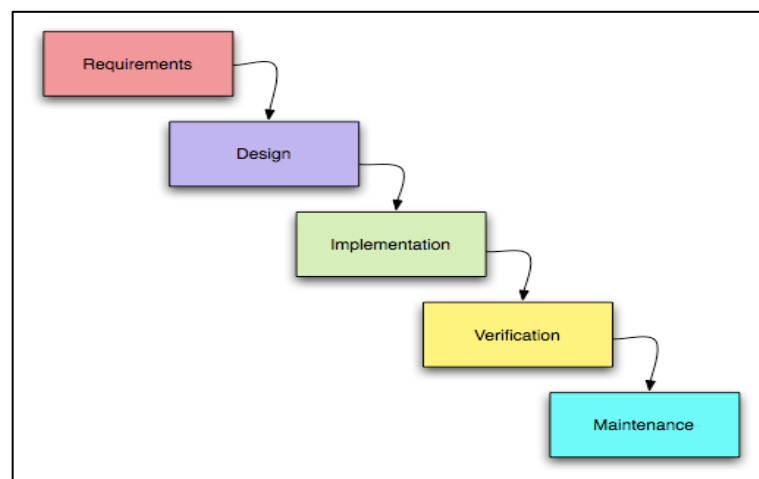


Figure 2.1: Waterfall Model

The aim of the first step, requirement analysis and specification, is to fully comprehend the customer's requirements and properly record them. The second step involves converting the requirement definition into a framework that can be implemented in a programming language. Tiny modules are reviewed separately from the rest of the software products after the concept has been implemented. The last phase of this model is testing and maintenance whereby it may include activities such as error detection, capability enhancement, optimization removal and so on. It is a very important phase to preserve the value of the software overtime. Also, it is extremely costly, accounting for one-third to one-half of the total cost of a typical project.

Table 2.6 at below shows the strengths and weaknesses of the Waterfall model as well as the type of projects that are suitable with this model.

Table 2.6: Strengths and Weaknesses of Waterfall Model

Strengths	Weaknesses	Type of projects
<ul style="list-style-type: none"> • Controllable results. • Consistent with many technology practices. • Minimizes planning overhead. • Reduces the amount of time and effort that is expended. 	<ul style="list-style-type: none"> • Inflexible and unsupportive of iterations. • Delivers result late in the development cycle • Addressing mistakes is difficult task. • User feedback is not taken into account during production. 	<ul style="list-style-type: none"> • For issues that are well-understood. • Project with a short time-frame. • Automation of existing manual system.

2.4.1.2 Iterative Model

The Iterative model, in which the project is divided into smaller segments and built in several iterations, is another example of traditional software development methodologies (Sami, 2012). The mini-waterfall model is used in each iteration. This approach allows software with imperfect implementation to be released after each iteration, reducing issues with integration and new specifications in early iterations while also allowing incrementing improvements to be tracked. The figure below shows the different stages of the Iterative model.

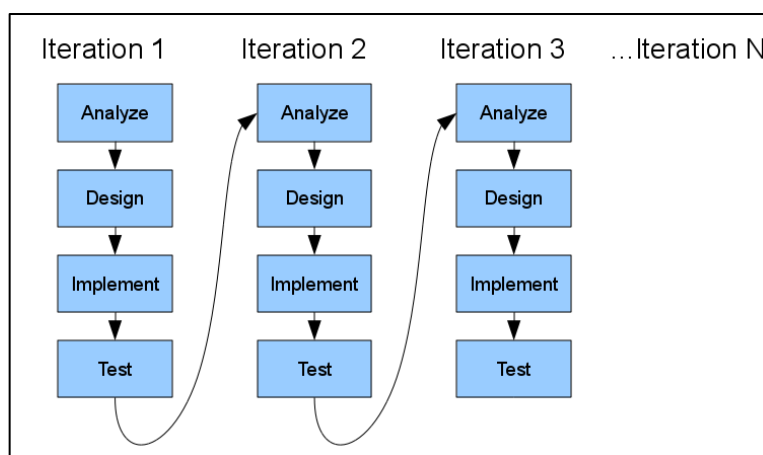


Figure 2.2: Iterative Model

Table 2.7 at below shows the strengths and weaknesses of the Iterative model as well as the type of projects that are suitable with this model.

Table 2.7: Strengths and Weaknesses of Iterative Model

Strengths	Weaknesses	Type of projects
<ul style="list-style-type: none"> • Early in the lifecycle, produces working system. • More adaptable because changes in scope and specifications can be introduced at a low cost. • Allow user feedbacks. • Low risk factor because threats can be detected and overcome during each iteration. • Simpler testing and debugging because iterations are limited. 	<ul style="list-style-type: none"> • The phases in this model are very rigid and do not overlap. • Not all specifications are gathered prior to beginning development; this may lead to system design issues. • There could be preparation overhead for each iteration. 	<ul style="list-style-type: none"> • For businesses that need to get things done quickly. • Where there is a possibility of a lengthy project. • Where requirements are not known.

2.4.2 Agile Software Development Methodology

Iterative SDLC models have appeared in recent years, and they are often referred to as Agile models. Agile methodologies, like conventional methodologies, come with a variety of types. Feature Driven Development (FDD), Rapid Application Development (RAD), Scrum, Extreme Programming (XP), and Rational Unified Process (RUP) are some common examples. Agile models are built to respond effectively to change, with the primary goal of delivering applications quickly and on a regular basis. They are based on the concept of iterative and gradual growth. This ensures that the steps are repeated until the client is fully pleased with the finished product.

2.4.2.1 Rapid Application Development

RAD is a development lifecycle that aims to produce significantly faster and high quality outcomes over conventional methodologies (Carroll, 2020). Rapid application development places a greater focus on development rather than planning. In RAD, multiple cycles may be done concurrently because development cycles are time boxed. The figure below shows the schematic overview of the RAD process.

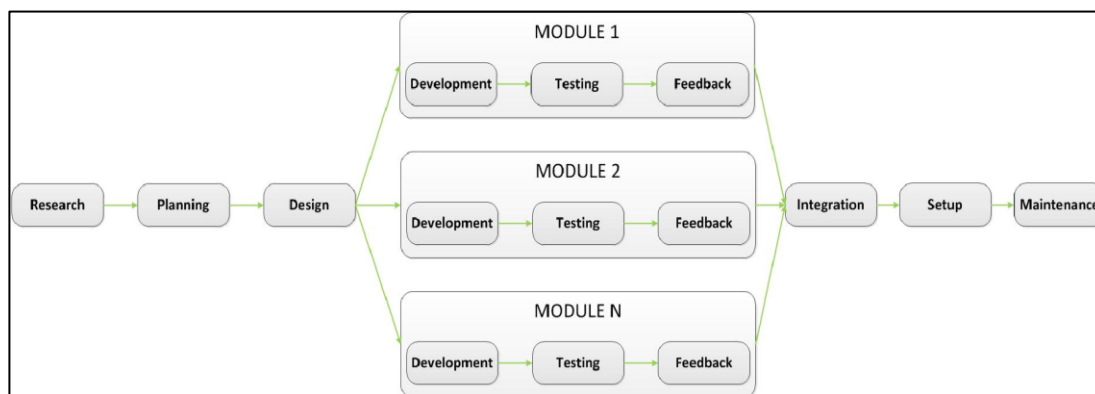


Figure 2.3: Rapid Application Development (RAD) Methodology

After each module is completed, the project owner receives feedback. With the restriction that projects must be broken down into modules, the Rapid application development approach is appropriate for small, medium, and large scale projects.

Table 2.8 at below shows the characteristics of RAD as well as its strengths and weaknesses.

Table 2.8: Characteristics, Strengths and Weaknesses of RAD Model

Characteristics	Strengths	Weaknesses
<ul style="list-style-type: none"> • A greater emphasis on development rather than preparation activities • Timebox approach 	<ul style="list-style-type: none"> • Fast application development • Reusable code 	<ul style="list-style-type: none"> • Poor documentation • Expensive development • Problems with code integration • The application must be divided into modules.

2.4.2.2 Scrum

Scrum is a software development method system that is iterative and gradual. The Scrum team is made up of three roles which include the Product Owner, who is responsible on the handling of the Product Backlog, the development team, who is in charge of creating product increments after each sprint, and the Scrum Master, who is in charge of ensuring Scrum rules are followed (Nicholson, 2020).

The Sprint, a one-month or less time-box after which a product increment is developed, is at the heart of the Scrum model. Sprint preparation (creating a Sprint backlog based on the Product Backlog), Regular Scrums (daily 15-minute meetings for developers to synchronise their work), production work, Sprint Review (inspection of the Increment at the end of the Sprint), and Sprint Retrospective are all part of each Sprint (opportunity for the Scrum Team to inspect the Scrum process and improve next Sprints) (Zima, 2015).

The product backlog is a centralised point where all of the product's specifications are held. The Product Owner is in charge of it. Also, it contains all of the product's features, fixes, and specifications represented as product backlog items, each with a definition, order, estimate, and value. As time passes, the product backlog can change. For example, new specifications may be identified or more precise estimates may be made. The Sprint Backlog is generated during the Sprint Planning process of each Sprint and consists of selected Product Backlog items. The figure below shows the schematic overview of the Scrum process.

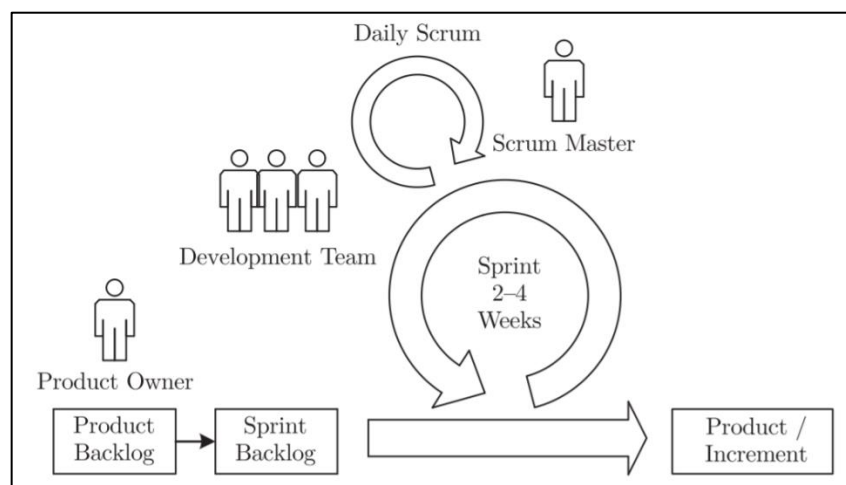


Figure 2.4: Scrum Process

Table 2.9 at below shows the characteristics of Scrum as well as its strengths and weaknesses.

Table 2.9: Characteristics, Strengths and Weaknesses of Scrum

Characteristics	Strengths	Weaknesses
<ul style="list-style-type: none"> • Iterative development. • Daily meetings to access progress. • Self-organizing development team. • Backlogs are used to manage tasks: product backlogs and sprint backlogs. 	<ul style="list-style-type: none"> • Contact between team members is effective and reliable. • Constant input from customers. • Produces high-quality products that satisfy customers. • Frequent meetings of Scrum and make it easier to track team's and individual's progress and productivity. 	<ul style="list-style-type: none"> • Employees lack knowledge of Scrum. • Simple to understand but difficult to master. • Suitable for small projects. • Scrum lacks of engineering practices.

2.4.2.3 Extreme Programming

Extreme Programming (XP) is a method that is iterative and gradual. The project is broken down into smaller tasks and each of it results in a new release of features. A release is a commercially viable version of the expected framework. Many of the features included in the update have been fully implemented. In order to get early and regular feedback, an XP project produces frequent releases each one to three months. As a result, the releases gradually create the required functionality. The Planning Games are where releases are negotiated. Either the customer specifies what should be included in the release and the developers estimate how long it will take to implement it, or the customer establishes a timeline and the developers estimate how much work can be completed in that period. Each release cycle is made up of a few iterations, each lasting no more than three weeks. Iteration is mainly an organisational tool for making the requisite preparation easier.

Exploration, preparation, and steering are the three stages in the Planning Game. The customer decides what he or she needs the system to do during the exploration process, and the developers predict how long it will take to incorporate the desired behaviour. Both parties negotiate which of the desired features can be

accomplished within the specified constraints during the planning process. The steering process comes after the preparation phase. When putting the plan into action, the agreed plan is revised as needed in response to what is learned in development and business. The figure below shows the simplified process structure for XP.

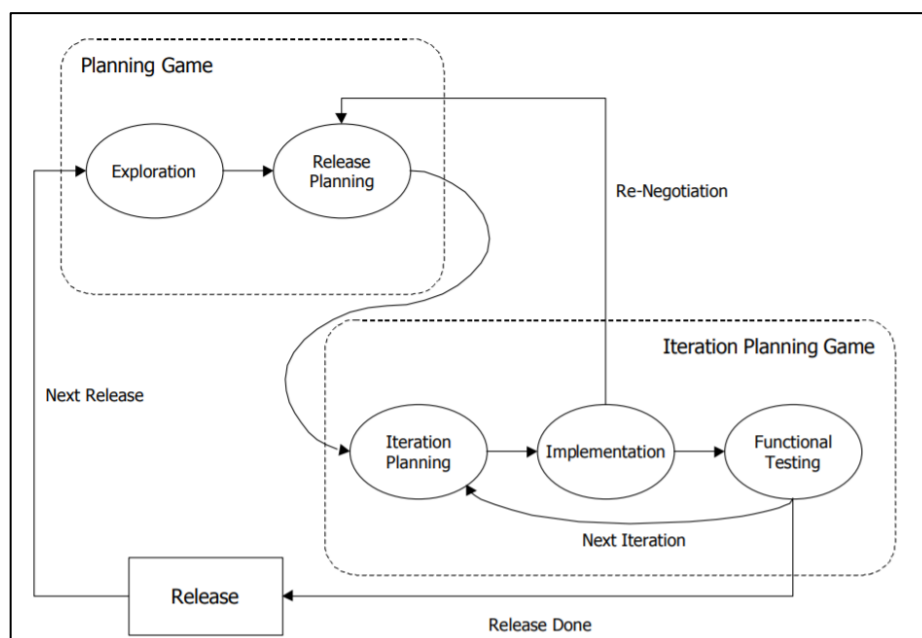


Figure 2.5: Extreme Programming (XP)

Table 2.10 at below shows the characteristics of XP as well as its strengths and weaknesses.

Table 2.10: Characteristics, Strengths and Weaknesses of Extreme Programming

Characteristics	Strengths	Weaknesses
<ul style="list-style-type: none"> • Fast consecutive releases. • Collective ownership. • Open workspace. • Unit testing. • The project owner determines the order in which tasks should be completed. 	<ul style="list-style-type: none"> • Quality product with customer satisfaction. • Works well for simple and small scale projects. • Can easily accommodate uncertain and evolving requirements. 	<ul style="list-style-type: none"> • Lack of documentation. • Poor architectural framework. • Lack of design emphasis. • Pair programming necessitates two programmers sharing a similar understanding and skill set.

	<ul style="list-style-type: none"> • Pair programming and continuous integration boost efficiency. 	
--	-------------------------------------------------------------------------------------------------------------------	--

2.4.2.4 Crystal Methods Methodology

Crystal Methods is a collection of methodologies based on the idea that the most critical element in any software project is people, not resources or processes. Crystal Methods is a collection of methodology elements that adapt processes and resources to the project's profile and scale rather than approaching each project in the same way. Projects that are large or safety-critical necessitate a greater number of methodology components than smaller, non-critical projects. Organizations can build and use as much approach as their market demands with Crystal Methods. Crystal takes an iterative approach to development, but does not require a release after each iteration. The figure below shows the schematic overview of Crystal Methods methodology.

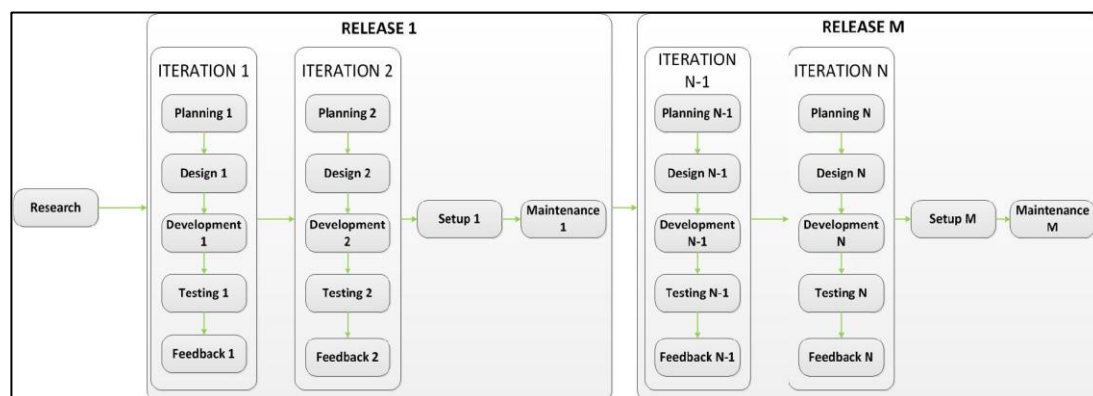


Figure 2.6: Crystal Methods Methodology

After each iteration is completed, the project owner receives input. Small, medium, and large-scale projects can all benefit from the Crystal Methods approach. Depending on the scope of the project, it takes a different approach. Table 2.11 at below shows the characteristics of Crystal methods as well as its strengths and weaknesses.

Table 2.11: Characteristics, Strengths and Weaknesses of Crystal Methods

Characteristics	Strengths	Weaknesses
<ul style="list-style-type: none"> • More concerned on people and skill rather than process. • Several iterations in a single update. • Various methods depending on the size and importance of the project. 	<ul style="list-style-type: none"> • Easy to adopt. • Distribution of working code on a regular basis. • Developers have allocated time slots to focus on future code changes. 	<ul style="list-style-type: none"> • Individuals, rather than the whole team, make critical decisions about the application's design.

2.4.2.5 Behaviour-driven development

Acceptance testing is the core of the behaviour-driven development approach. The specifications are written in the form of acceptance tests in a standardized format by the project owner. User stories are used to describe requirements, which include a title, a narrative section, and acceptance criteria. Developers can add features based on the acceptance test scenarios. When functionality is built, the same acceptance testing scenarios are used to test it. The code is pushed to the live environment if it passes the tests. The procedure is then repeated until all of the specifications have been met. The figure below shows the schematic overview of the Behaviour-driven development methodology.

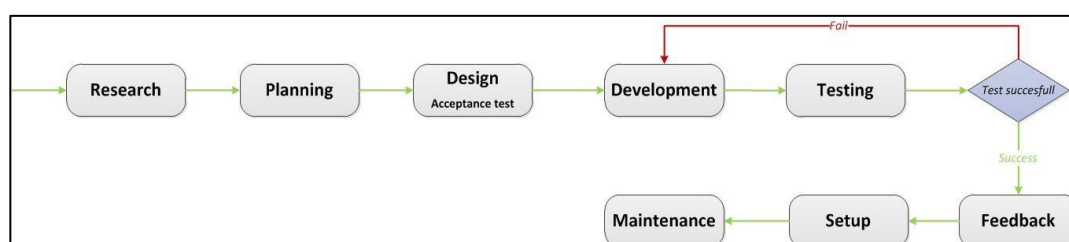


Figure 2.7: Behaviour-driven Development

After the code has been successfully tested, the project owner's feedback is obtained. Small, medium, and large-scale initiatives may all benefit from the behaviour-driven development approach. It is also useful in situations where developers must deal with legacy code. Table 2.12 at below shows the characteristics of Behaviour-driven development methodology as well as its strengths and weaknesses.

Table 2.12: Characteristics, Strengths and Weaknesses of Behaviour-driven

Characteristics	Strengths	Weaknesses
<ul style="list-style-type: none"> • Unit testing. • Focuses on business value. • Genuine collaboration between business and development. 	<ul style="list-style-type: none"> • Easy to manage. • Early detection of usability problems. • Lower defect rate. • Easy integration of new code. 	<ul style="list-style-type: none"> • Owners of projects are reluctant to write behaviour scenarios.

2.4.3 Traditional Development methodology vs Agile Development Methodology

Both traditional and Agile methodologies are both capable of completing the mission at hand, but each methodology has its own set of advantages and disadvantages. As a result, a project that did not work out using one of the methodologies could have worked better using the other. Traditional methodologies are known for having straightforward specifications, being simple to be implemented and maintain, while Agile methodologies are known for their ability to adapt and for requiring constant face-to-face communication between team members. The differences between Waterfall and Agile methodology are summarized in Table 2.13 at below.

Table 2.13: Comparison between Traditional and Agile Development Methodology

Aspect	Traditional development	Agile development
Fundamental hypothesis	Systems are completely customizable, predictable, and the product of extensive and meticulous preparation.	Small teams create high-quality agile applications based on the concept of continuous design and testing based on rapid feedback and change.
Communication	Formal way	Informal way
Development model	Life cycle model such as Waterfall model	Evolutionary-delivery model
Quality control	Difficult preparation and strict supervision are	Permanent specifications, architecture, and solutions

	required, testing that is complicated and late	control. Testing will proceed indefinitely.
User requirements	Defined prior to implementation phase	Interactive input
Testing	After coding is completed	Each iteration
Client involvement	Low involvement	High involvement
Suitable project scale	Large-scale	Low and medium-scale
Requirements	Quite stable, and known ahead of time	Emergent, characterised by rapid transformations
Remodelling	High cost	Low cost
Size	Large project teams	Small project teams

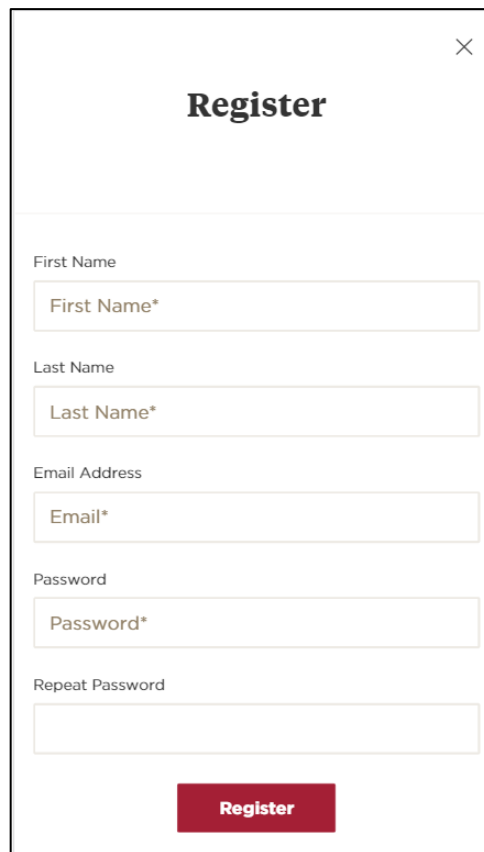
2.5 Similar Existing Systems in The Market

2.5.1 Fergusson Plarre Bakehouses Reservation System

Ferguson Plarre Bakehouses is a century-old family company in its fourth generation, and they see the economy and long-term business development as the most important issues for business and society in the future (Ferguson Plarre Bakehouses, n.d.). They look for ways to reduce their environmental impact in anything from packaging to water and energy efficient bakery design.

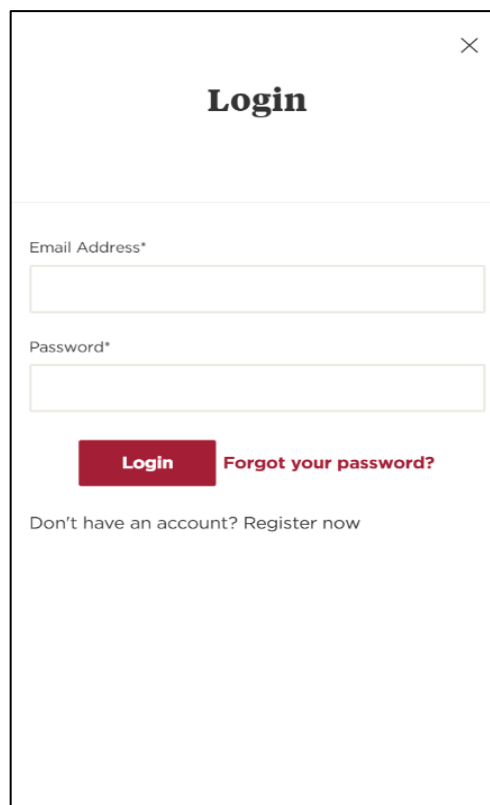
Fergusson Plarre Bakehouses reservation system consists of several modules such as registration module, user login module, cake customisation module, search module, reservation module, and payment module. The integration of these modules results in a consistent user experience when customizing and purchasing their self-designed cake over the online platform. The user interface is simple, avoiding clutter and allowing users to concentrate on designing and closing deals. There are also numerous pre-customized cake options available to make it simple for customers to design their own cakes without the need of professional assistance.

The figures below show some of the modules that are included in the Fergusson Plarre Bakehouses reservation system.



A registration form titled "Register" with a close button (X) in the top right corner. The form contains five input fields: "First Name" (with "First Name*" placeholder), "Last Name" (with "Last Name*" placeholder), "Email Address" (with "Email*" placeholder), "Password" (with "Password*" placeholder), and "Repeat Password". A red "Register" button is located at the bottom center.

Figure 2.8: Registration Module of Fergusson Plarre Bakehouses



A login form titled "Login" with a close button (X) in the top right corner. The form contains two input fields: "Email Address*" and "Password*". Below the input fields is a red "Login" button and a link "Forgot your password?". At the bottom, there is a text link "Don't have an account? Register now".

Figure 2.9: Login Module of Fergusson Plarre Bakehouses



Figure 2.10: Home Page of Fergusson Plarre Bakehouses

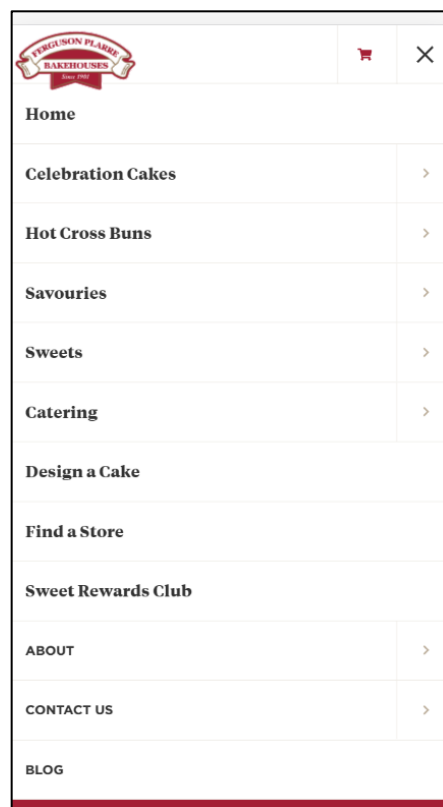


Figure 2.11: Menu Page of Fergusson Plarre Bakehouses

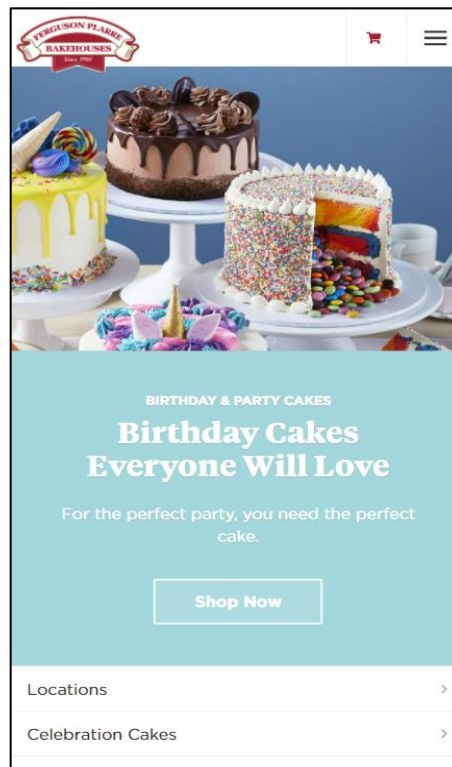


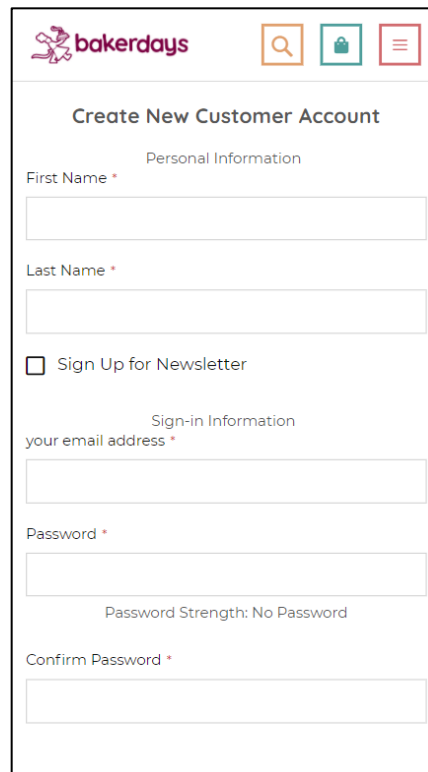
Figure 2.12: Product Module of Fergusson Plarre Bakehouses




2.5.2 BakerDays Reservation System

Bakerdays is located in Nottingham's city centre. They securely distribute fantastic celebration and gift cakes around the UK the next day after we place our order (BakerDays, n.d.). Customers can personalize over 1000 of their designs by adding their own message or uploading their own images. Customers who order bakerdays' delicious cake and cupcakes will also be given the option of adding some awesome extras to their order, such as fully inflated Helium balloons presented in their own package.

Bakerdays reservation system has several modules including registration module, login module, search module, cake design customisation module, reservation module, and payment module. The reservation system displays several cake designs based on categories; welcoming celebrations, birthday cakes, corporate cakes, graduation cakes, and others. Users can choose a certain category before designing the cake appropriate to certain occasions. Images of each corresponding cake based on certain categories have also been included to help the user to make a decision.

The figures below show some of the modules that are included in the Bakerdays reservation system.



bakerdays   

Create New Customer Account

Personal Information

First Name *

Last Name *

Sign Up for Newsletter

Sign-in Information

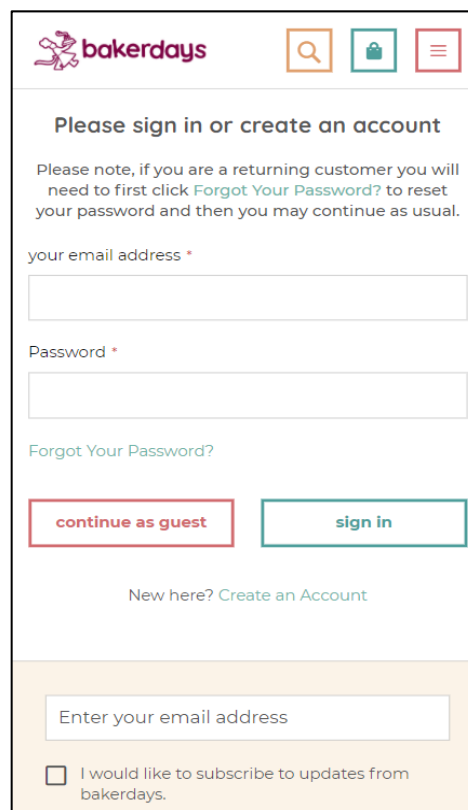
your email address *




Password *

Password Strength: No Password

Confirm Password *

Figure 2.13: Registration Module of Bakerdays



bakerdays   

Please sign in or create an account

Please note, if you are a returning customer you will need to first click [Forgot Your Password?](#) to reset your password and then you may continue as usual.

your email address *

Password *

[Forgot Your Password?](#)

New here? [Create an Account](#)

Enter your email address

I would like to subscribe to updates from bakerdays.

Figure 2.14: Login Module of Bakerdays

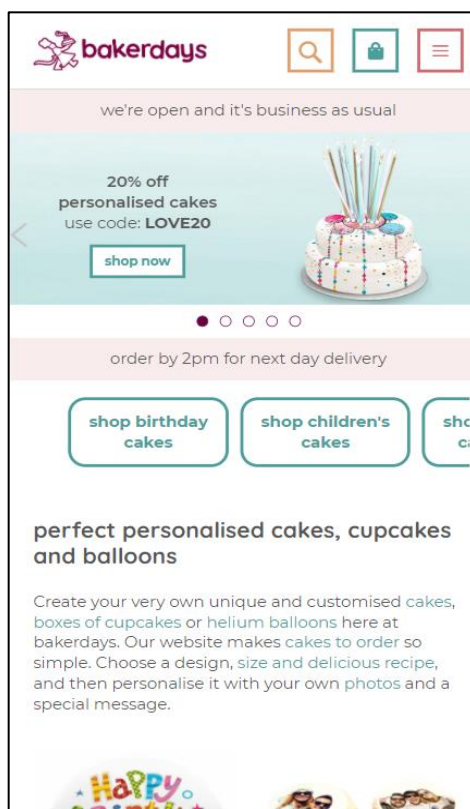


Figure 2.15: Home Page of Bakerdays

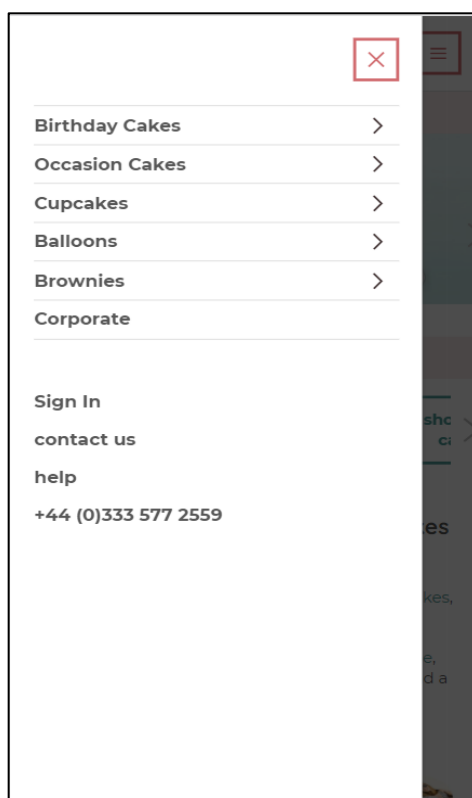


Figure 2.16: Menu Page of Bakerdays

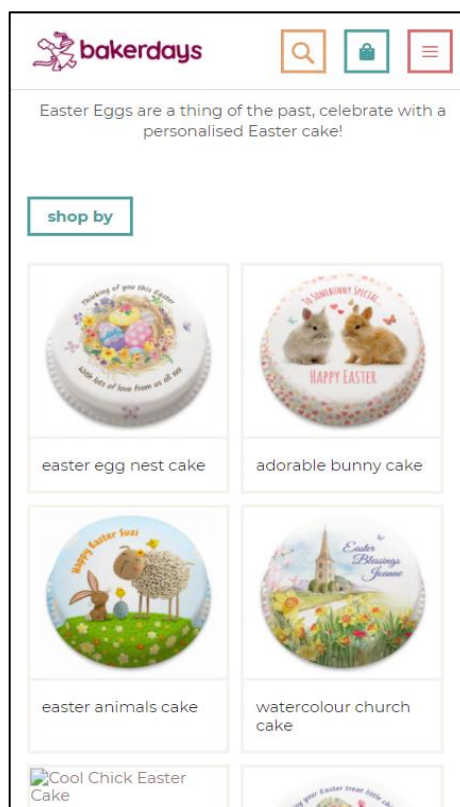


Figure 2.17: Product Module of Bakerdays

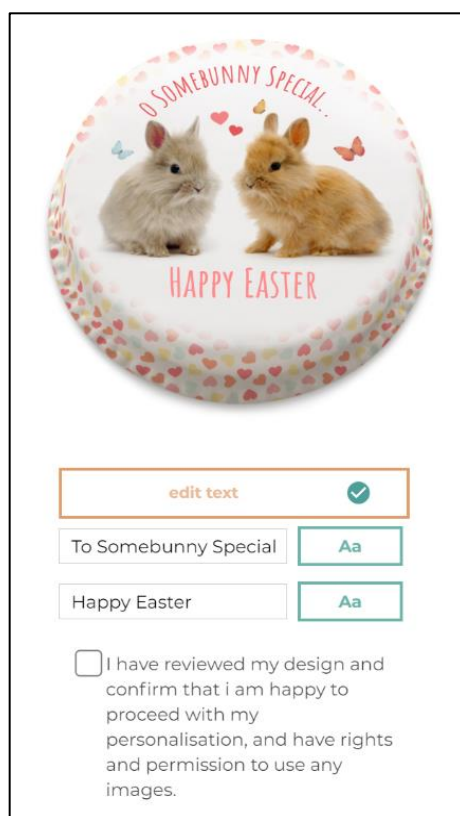


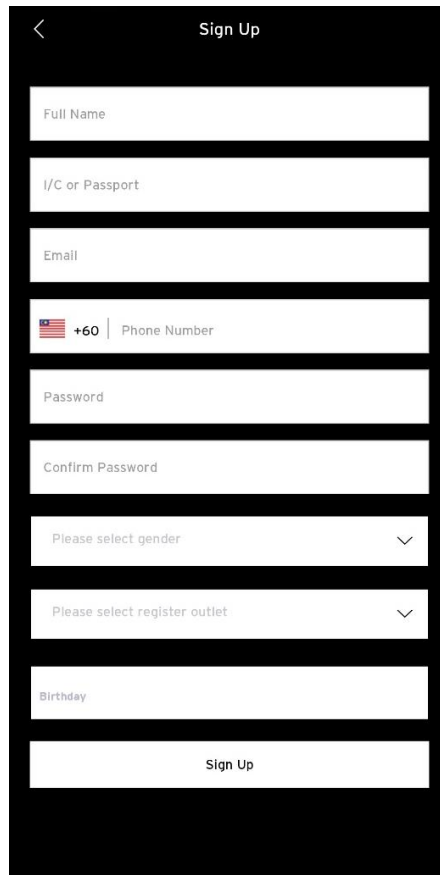
Figure 2.18: Product Customization Module of Bakerdays

2.5.3 Bread History

Bread History is one of the most well-known bakeries in Malaysia's northern region. They keep the best of conventional approaches while welcoming the benefits of new technology and thought. In order to meet consumer demands, Bread History is committed in making a specific line of buns, pastries, and cakes that are forward-thinking in terms of style, taste, and design. The headquarters is located in Juru Light Industrial Area and serves as the bakery chain's central kitchen. They have the best bakery in the world because they uphold high hygiene standards, use the best traditional methods, and embrace modern technology (Bread History, n.d.). Original Chicken Floss, Spicy Chicken Floss, Croissants, Japanese Hokkaido Loaf, and Pumpkin Loaf are all well-known in Bread History.

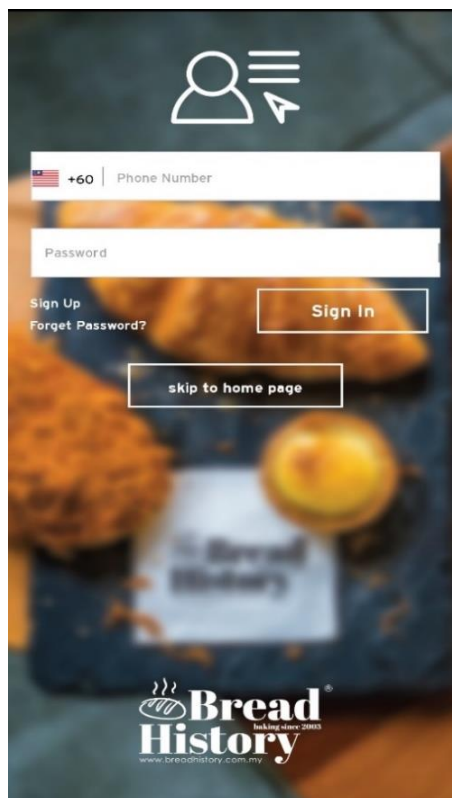
Customers can order ahead of time and pick up their orders for free at local Bread History locations using the online application. Their reservation system consists of several modules such as registration module, user login module, search module, reservation module, and payment module. The user interface used is clear and understanding whereby it provides the customers with a great experience. Their application has a notification feature that keeps their customers up to date on their latest news, promotions and deals. Besides, they encourage their customers to go cashless with their built in e-wallet and spend to earn points and enjoy cashback.

The figures below show some of the modules that are included in the Bread History reservation system.



The image shows a mobile application screen titled "Sign Up". At the top left is a back arrow icon. The form consists of several input fields: "Full Name", "I/C or Passport", "Email", "Phone Number" (with a dropdown for country code, currently showing "+60" and a US flag), "Password", "Confirm Password", "Please select gender" (with a dropdown arrow), "Please select register outlet" (with a dropdown arrow), and "Birthday". At the bottom of the form is a "Sign Up" button.

Figure 2.19: Registration Module of Bread History



The image shows a mobile application screen for the login module. At the top is a user profile icon with a menu icon. Below it are input fields for "Phone Number" (with a dropdown for country code, currently showing "+60" and a US flag) and "Password". There are three buttons: "Sign Up" (with a link "Forget Password?" below it), "Sign In", and "skip to home page". At the bottom is the "Bread History" logo, which includes a steam icon, the text "Bread History" in a stylized font, "baking since 2003", and the website "www.breadhistory.com.my". The background of the screen shows a blurred image of bread and a sign that says "Bread History".

Figure 2.20: Login Module of Bread History



Figure 2.21: Home Page of Bread History

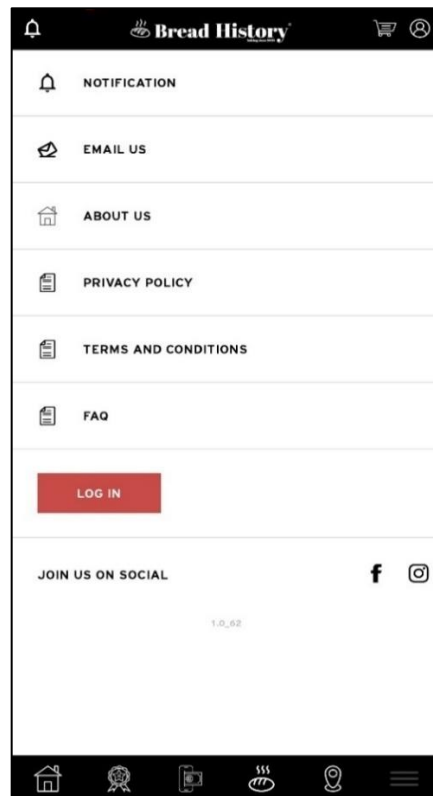


Figure 2.22: Menu Page of Bread History

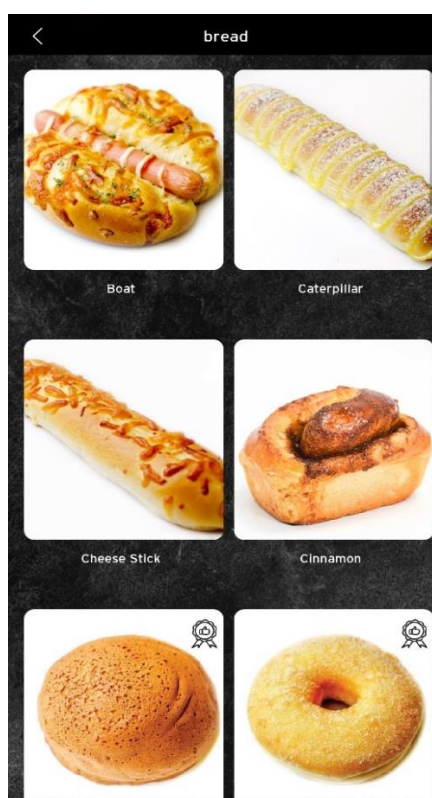


Figure 2.23: Product Module of Bread History

2.5.4 Tong Kee Bakery

Since its founding, Tong Kee Bakery is a well-known brand, especially among Klang Valley residents. Egg tarts, best seller in Tong Kee, are baked every day in order to maintain freshness and consistency, and have been praised for their flaky outer crust and smooth egg custard for decades. The business was passed on to his seven children in order to continue the founder's success. The Hoong siblings carried on their father's legacy by running the company together and as a family. Tong Kee bakery is now run by the third generation of the Hoong family, with a lot of help and support from the second generation (TK Bakery, n.d.).

TK Bakery first opened its doors in 1970. Starting with 30 egg tarts a day, Tong Kee now sells approximately 10,000 egg tarts per day across all branches. This is undoubtedly the product of the Hoong family's unwavering commitment to providing the best service to their customers.

Tong Kee Bakery has launched the most convenient ordering service. Applying the principle of innovation with a traditional approach, not forgetting to adapt to new technology to provide consumers with more convenient services. Using Tong Kee's

application, customers can order Tong Kee's products at any time and enjoy special monthly promotions as well as birthday offers. Customers can also top up their account, making online transactions more convenient, safe and secure. After ordering on their application, customers can choose to pick up at the store whereby it can reduce the waiting time in-store so that customers can easily purchase the products during the festivities.

The figures below show some of the modules that are included in the Tong Kee Bakery reservation system.

The image shows a mobile application interface for a 'Sign Up' registration module. At the top, there is a back arrow and the text 'Sign Up'. Below this, there are several input fields with error messages:

- Full Name:** A text input field with the error message 'Full Name Required' above it.
- Phone Number:** A text input field with a dropdown menu for country codes (currently showing '+60') and a text input for the number (currently showing '146313312'). The error message 'Phone Number' is above the field.
- Password:** A text input field with the error message 'Password must at least 6 characters' above it.
- Confirm Password:** A text input field with the error message 'Confirm password did not match with password' above it.
- Gender:** A dropdown menu with the error message 'Gender required' above it.
- Birthday:** A text input field with the error message 'Birthday is required' above it.

At the bottom of the form is a large orange button labeled 'Sign Up'.

Figure 2.24: Registration Module of TK Bakery

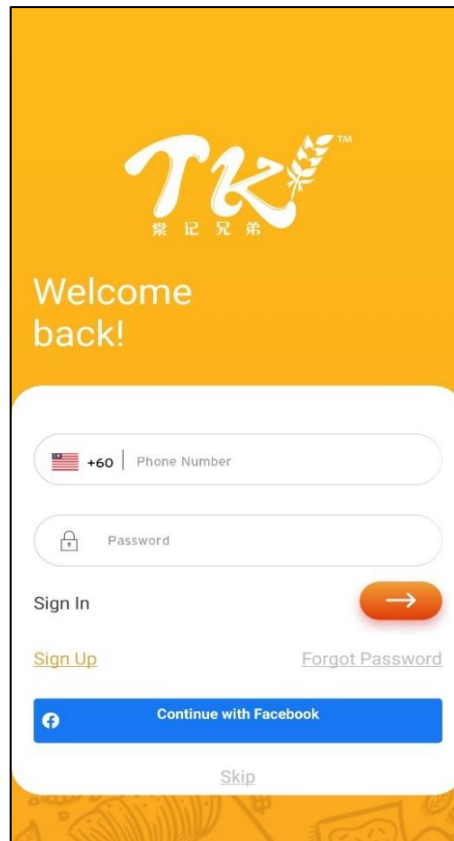


Figure 2.25: Login Module of TK Bakery

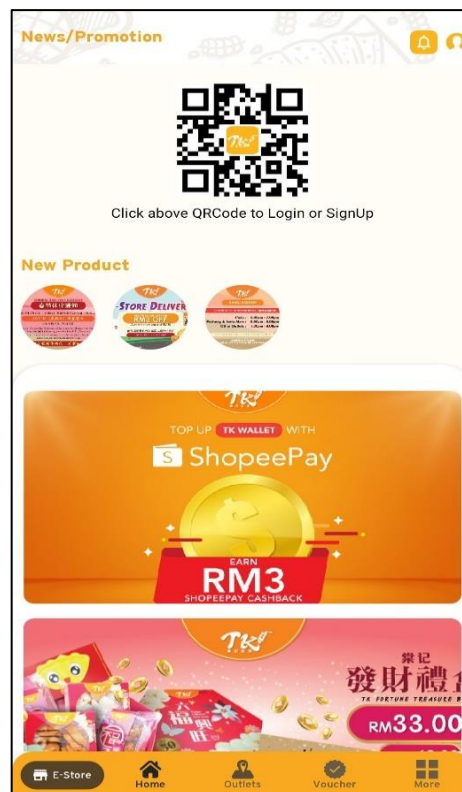


Figure 2.26: Home Page of TK Bakery

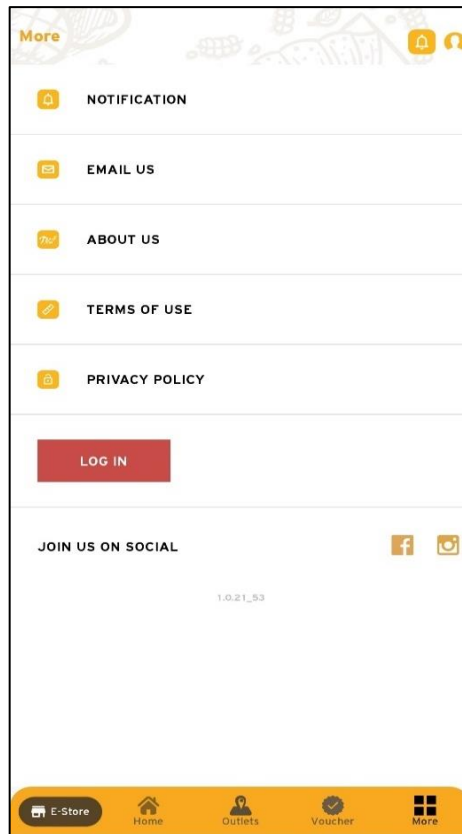


Figure 2.27: Menu Page of TK Bakery



Figure 2.28: Product Module of TK Bakery

2.5.5 Comparison of Features between Existing Bakery Shop Applications

Table 2.14 summarizes the differences between the similar existing applications in terms of their features or functionalities in the application itself.

Table 2.14: Comparison of Features between Similar Existing Applications

Applications Features	Fergusson Plarre Bakehouses	BakerDays	Bread History	Tong Kee Bakery	Cakey Bakey Bakery
Account creation & Login	Yes	Yes	Yes	Yes	Yes
Products overview	Yes	Yes	Yes	Yes	Yes
Manage profile information	No	No	Yes	Yes	Yes
Shopping Cart	Yes	Yes	Yes	Yes	Yes
Search products	Yes	Yes	No	No	Yes
Customization of products	Yes	Yes	No	No	No
Notifications on sales and promotions	Yes	No	Yes	Yes	Yes

2.5.6 Strengths and Weaknesses between Existing Applications

Table 2.15 summarizes the strengths and weaknesses associated with each of the similar existing applications in the market.

Table 2.15: Strengths and Weaknesses between Similar Existing Applications

Application	Strengths	Weaknesses
Fergusson Plarre Bakehouses	<ul style="list-style-type: none"> • Allow customization of products • Provide steps to show how to make order • Complete presentation of product details 	<ul style="list-style-type: none"> • Has minimum limit of quantity purchased
BakerDays	<ul style="list-style-type: none"> • Allow customization of products • Simple design of user interface • Provide delivery service • Able to view customer' reviews • Offer international delivery 	<ul style="list-style-type: none"> • Non-food add-ons such as balloons, candles, and other decorations will be paid at the standard rate of 20%.
Bread History	<ul style="list-style-type: none"> • Able to view products without having to register • Nice and simple user interface • Go cashless with their built in E-wallet • Spend to earn points and enjoy cashback 	<ul style="list-style-type: none"> • Does not offer delivery service • Non-customizable pick-up time
Tong Kee Bakery	<ul style="list-style-type: none"> • Allow user to top up credits in his/her account 	<ul style="list-style-type: none"> • Unable to view products without registering an account

	<ul style="list-style-type: none"> • Allow user to transfer credits to other accounts • Has a Qr code for each account creation 	<ul style="list-style-type: none"> • Slow loading in information • Has minimum order quantity • Not all products support delivery service • Complicated operations • Low legibility of contents
--	---------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

2.5.7 Summary

In short, although each of the bakery shop reservation systems has a different focus and provides different features, some of the features are common and shall be included in this project. The common features can be concluded as below:

1. Registration module
2. Login module
3. Product module
4. Search module
5. My Profile module
6. Shopping Cart module
7. Order Module

2.6 Conclusion

In conclusion, this literature review has successfully studied 4 of the areas mentioned which are cross-platform application development, study of similar existing applications, research methodologies as well as development methodologies and concluded with different results. In the beginning of this chapter, some similar existing bakery reservation applications have been reviewed and compared among each other. The relevant and important features or functionalities identified from those applications will be implemented as a part in this project. Next, this chapter is followed

by the discussion on cross-platform development. Furthermore, this chapter discusses the two forms of research methodology, quantitative and qualitative, as well as their different approaches, benefits, and drawbacks. Last but not emphatically least, software development methodologies are discussed and reviewed in this chapter since following a proper approach allows a project to have better forecasts, produce reliable processes, keep the customer updated, create a clear picture of the job ahead of time, and recognise pitfalls sooner, allowing for enough time to make changes. The advantages and disadvantages of these software development methodologies were identified and compared among each other as well as their characteristics.

CHAPTER 3

METHODOLOGY AND WORK PLAN

3.1 Introduction

This section covers the software development methodology as well as project planning for the whole project. In this project, the RAD methodology is used, and the implementation of this methodology will be discussed in the subsection below. This chapter also contains the project's work plan, which includes the Work Breakdown Structure as well as the Gantt Chart.

3.2 Software Development Methodology

Rapid Application Development methodology was selected for the development of this project. Below shows a breakdown of the work plan for each step of the lifecycle process.

3.2.1 Rapid Application Development

RAD is a method of managing software development projects that has been around for a long time. It is a software development method that emphasize fast prototyping over thorough planning. A prototype is a working model that operates similarly to a finished product. The gradual and progressive delivery of working models to users is emphasised by the RAD approach. This leads to faster delivery to customers and more customer involvement throughout the product development cycle, lowering the risk of non-conformance with the actual user requirements.

The main advantage of a RAD method is the short project turnaround, which makes it appealing to software engineers that operate in a fast-paced setting. The focus of RAD on minimizing the planning stage and optimizing prototype output is primarily responsible for the quick turnaround. By reducing planning time and emphasising idea prototypes, RAD assists project managers and stakeholders in keeping track of progress and communicating in real time on emerging concerns or changes. As a result, productivity, growth, and communication have all improved.

Generally, the RAD methodology is break down into 4 major phases which include requirements planning, user design, construction and cutover. The 4 phases of RAD model is depicted in details as the diagram 3.1 at below.

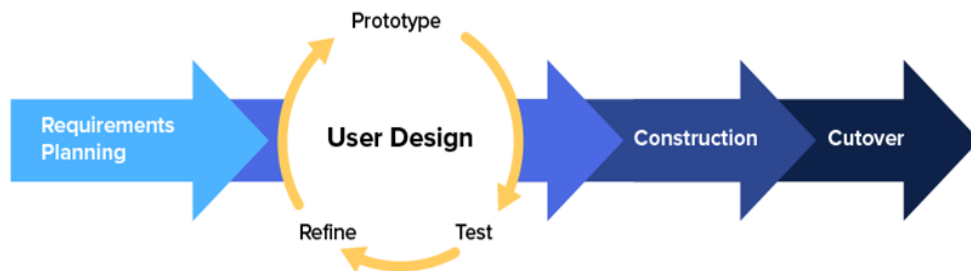


Figure 3.1: Rapid Application Development (RAD) Model

There are some few reasons whereby the RAD model is chosen to be applied in this project. One of the most important factors is that this system can be modularized and delivered in stages. It is known that RAD model is chosen to be used effectively in projects where direct modularization is feasible. If the project cannot be split down into modules, RAD may fail. The functional components are built in parallel as prototypes under this methodology, then merged to make the finished product for rapid delivery. It is easy to incorporate changes into the development process because no thorough planning is done ahead of time. The activities performed in each of the phases are shown as below.

3.2.1.1 Requirements planning

This is the very first phase of the RAD model. This procedure is similar to a project scoping meeting. Despite the fact that the planning phase is brief in comparison to other project management approaches, it is important to the project's ultimate success. It includes obtaining specs for an ongoing software project.

The RAD approach, unlike other software development methodologies, starts with a huge need. Due to the wide nature of the requirement, exact specifications may be fed to the project at various points during the development cycle. Developers and users meet at this stage to discuss the project's aims and objectives, as well as any existing or prospective problems that need to be addressed throughout construction.

The research phase of this project entails determining the current issues, determining the project's aim and objectives, determining the scope of project, as well as the solution and approach to the project and defining the requirements of the project. Initially, all of the activities stated at above are carried out without supported by any evidence. Hence, there are some approaches have been conducted in order to get a better understanding on the activities mentioned above. One of it through conducting the literature review. It entails an analysis of the project's current system, research methodologies, software development methodologies, and a study of cross platform development. These existing systems are examined in order to determine their strengths and limitations, as well as the basic and common characteristics that can be used to improve the proposed system. As a result, there will be a basic understanding of the project's scope as well as the system's flow.

3.2.1.2 User Description/User Design

After the project has been scoped, it is time to start working on the user interface through several prototype iterations. As a result, the user interface process is the second phase of the Rapid Application Development model. It entails gathering the user feedbacks to create multiple iterations of the project in progress.

During this step, clients and developers work together to ensure that their requirements are met at any point of the design process. Developers build a variety of designs with different features and functions rather than operating with a collection of strict specifications. In an iterative process, all the bugs are smoothed out. The developer creates a prototype, and it is then tested by the user. The users reviews all of these prototypes, and they come together to collaborate and discuss what to hold and what to discard.

In short, the data obtained during the first step is re-examined and validated during this phase. The identification of dataset attributes is also part of this process. As a result, this approach allows developers to fine-tune the model as they go before they arrive at a satisfactory design. The practice benefits both the software developers and the consumers, ensuring that nothing falls through the gaps.

In this project, the specifications gathered in the previous process will be used to demonstrate the system's architecture and flow. First and foremost, the system's specifications are defined, which include both functional and non-functional requirements. The use cases of the system are then illustrated using Use Case Diagram

that covered both the front-end and back-end part. Moreover, Use Case Description is further written to provide a deeper explanation and understanding to the use cases illustrated in the Use Case Diagram. Also, a Data Flow Diagram is used to map out the flow of information for the system. Lastly, the low-fidelity and high-fidelity prototypes of both the systems are developed using Axure RP to show the initial design of the user interfaces associated with the functionalities.

3.2.1.3 Construction

The refined prototypes developed in the previous phase are then included in the construction phase. During this time, everything is checked to ensure that everything is working properly and that the end product fulfils the users' expectations. Developers may construct the final operational model faster than they might with a typical project management technique since most of the challenges and improvements were solved during the iterative design phase.

During the third step of the RAD Model, all of the collected changes and improvements are implemented. This process provides feedback on what is good, what is bad, what should be kept, and what should be removed. As a result, this step is critical since the users can still provide feedbacks in the process. They will make suggestions for improvements, modifications, or even new ideas to solve problems as they occur.

During the construction phase, feedbacks are provided on a variety of topics, including design, interfacing, and so on. The prototyping process then begins, taking into account all of the obtained input. Prototyping and feedback will continue until a final product is developed that best meets the users' requirements.

3.2.1.4 Cutover

The final step involves finalising the software project's design, functionality, functions, interface, and everything else. Interfaces between different independent modules must be thoroughly tested and completed during the cutover process. In other words, this is the stage at which the finished product is ready to be released.

Effective automated tools are used to carry out the above. The users then performs acceptance testing. Before releasing the final product to the customer, it is necessary to ensure that the created software has a desirable level of maintainability,

reliability, and usability. While the developers and clients continue to search for flaws in the system, all final improvements are made.

As prototypes are separately assessed after receiving input, the RAD approach decreases overall testing time. On the other hand, the data flow and interfaces between all of the modules have been carefully verified. Because most of the programming modules have previously been evaluated, the chances of severe issues are decreased.

3.3 Project Plan

3.3.1 Work Breakdown Structure (WBS)

A WBS is needed to show the decomposition of the tasks to be carried out in order to accomplish the project's goal and objectives. Thus, the WBS for this project is outlined as below.

- 1.0 Online Bakery Shop
- 2.0 Requirements Planning
 - 2.1 Study background of the problem
 - 2.2 Define problem statement
 - 2.3 Identify project goal and objectives
 - 2.4 Determine project solution
 - 2.5 Propose project approaches
 - 2.5.1 Determine research approach
 - 2.5.2 Determine development approach
 - 2.6 Define project scope
 - 2.6.1 Identify target users
 - 2.6.2 Identify target platforms
 - 2.7 Conduct literature review
 - 2.7.1 Research on cross platform application development
 - 2.7.1.2 Define mobile application development
 - 2.7.1.2 Define web application development
 - 2.7.2 Study on research methodologies
 - 2.7.2.1 Define qualitative research methodology
 - 2.7.2.1.1 Identify qualitative methods

- 2.7.2.1.2 Identify comparisons between qualitative methods
- 2.7.2.1.3 Identify qualitative data
- 2.7.2.2 Define quantitative research methodology
 - 2.7.2.2.1 Identify quantitative methods
 - 2.7.2.2.2 Identify comparisons between quantitative methods
 - 2.7.2.2.3 Identify quantitative data
- 2.7.2.3 Identify differences between qualitative and quantitative research methodology
- 2.7.3 Research on software development methodologies
 - 2.7.3.1 Research on traditional development methodology
 - 2.7.3.1.1 Define Waterfall model
 - 2.7.3.1.1.1 Identify strengths and weaknesses
 - 2.7.3.1.1.2 Identify suitable projects
 - 2.7.3.1.2 Define Iterative model
 - 2.7.3.1.1.1 Identify strengths and weaknesses
 - 2.7.3.1.1.2 Identify suitable projects
 - 2.7.3.2 Research on Agile development methodology
 - 2.7.3.2.1 Define Rapid Application Development
 - 2.7.3.2.1.1 Identify strengths and weaknesses
 - 2.7.3.2.1.2 Identify characteristics
 - 2.7.3.2.2 Define Scrum
 - 2.7.3.2.2.1 Identify strengths and weaknesses
 - 2.7.3.2.2.2 Identify characteristics
 - 2.7.3.2.3 Define Extreme Programming
 - 2.7.3.2.3.1 Identify strengths and weaknesses
 - 2.7.3.2.3.2 Identify characteristics
 - 2.7.3.2.4 Define Crystal Methods

- 2.7.3.2.4.1 Identify strengths and weaknesses
 - 2.7.3.2.4.2 Identify characteristics
 - 2.7.3.2.5 Define Behavior-driven development
 - 2.7.3.2.5.1 Identify strengths and weaknesses
 - 2.7.3.2.5.2 Identify characteristics
 - 2.7.3.3 Identify differences between traditional and Agile development methodology
 - 2.7.4 Review similar existing applications
 - 2.7.4.1 Fergusson Plarre Bakehouses
 - 2.7.4.2 BakerDays reservation system
 - 2.7.4.3 Bread History
 - 2.7.4.4 Tong Kee Bakery
 - 2.7.4.5 Comparison of features
 - 2.7.4.6 Comparison of strengths and weaknesses
 - 2.8 Project scheduling
 - 2.8.1 Create Work Breakdown Structure
 - 2.8.1.1 Identify main features
 - 2.8.1.2 Breakdown features
 - 2.8.2 Generate Gantt Chart
 - 2.8.2.1 Identify tasks to be achieved
 - 2.8.2.2 Estimate start date and end date
 - 2.8.2.3 Create a Gantt chart
 - 2.9 Conduct survey analysis
 - 2.9.1 Prepare questionnaires
 - 2.9.2 Distribute questionnaires through Google Forms
 - 2.9.3 Analyse results collected
- 3.0 User Design
 - 3.1 Requirements specification
 - 3.1.1 Identify functional requirements
 - 3.1.2 Identify non-functional requirements
 - 3.2 Create UML diagram
 - 3.2.1 Develop Use Case diagrams

- 3.2.2 Create Use Case descriptions
- 3.2.3 Create Data Flow Diagrams
- 3.2.4 Create conceptual model diagram
- 3.2.5 Create activity diagrams
- 3.3 High level prototyping
 - 3.3.1 Develop design prototypes for web-based management system
 - 3.3.2 Develop design prototypes for mobile-based application
- 4.0 Construction
 - 4.1 Develop project modules
 - 4.1.1 Mobile application modules
 - 4.1.1.1 Registration module
 - 4.1.1.2 Login module
 - 4.1.1.3 Product module
 - 4.1.1.4 Profile module
 - 4.1.1.5 Cart module
 - 4.1.1.6 Order module
 - 4.1.2 Web application modules
 - 4.1.2.1 Login module
 - 4.1.2.2 Product module
 - 4.1.2.3 Delivery module
 - 4.1.2.4 Stock module
 - 4.1.2.5 Order module
 - 4.1.2.6 Promotion module
- 5.0 Cutover
 - 5.1 Black box testing
 - 5.1.1 Functional testing
 - 5.1.1.1 Unit testing
 - 5.1.1.1.1 Determine functionality to be tested
 - 5.1.1.1.2 Create the input data for the functionality to be tested
 - 5.1.1.1.3 Develop line coverage test cases
 - 5.1.1.1.4 Develop method coverage test cases
 - 5.1.1.1.5 Develop code path coverage test cases
 - 5.1.1.1.6 Execute test cases developed

5.1.1.2 User Acceptance testing

5.1.1.2.1 Analyze business requirements and define key deliverables

5.1.1.2.2 Create UAT test plan

5.1.1.2.3 Identify test scenarios

5.1.1.2.4 Create UAT test cases

5.1.1.2.5 Prepare test data

5.1.1.2.6 Run the test cases

5.1.1.2.7 Collect and analyze output information

5.1.2 Non-functional testing

5.1.2.1 Usability Testing

5.1.2.1.1 Create test plan

5.1.2.1.2 Recruit target users

5.1.2.1.3 Perform the test

5.1.2.1.4 Document the test result

5.2 Finalize all the documentations

5.3 Prepare a poster for the application

5.4 Prepare the presentation slides

3.3.2 Work Plan

The Gantt Chart below illustrates all of the activities and tasks to be carried out in order to achieve the goal and objectives defined in this project. This final year project (FYP) has mainly 2 parts, which are FYP 1 and FYP 2, whereby FYP 2 is carried out after FYP 1 is completed. The requirements planning and user design phase will cover the work plan for FYP 1 while the construction and cutover phase will cover the work plan for FYP 2 in order to carry out this project effectively and efficiently. Therefore, the requirements planning and user design phase will include all the activities performed during FYP 1 for the durations of 12 weeks.

According to the Gantt Chart, the project title for this final year project will be determined during the first and second weeks. After the title has confirmed, some researches will be carried out through the online platform, Internet in order to get a better understanding of the project's title. Therefore, the deliverables for the first and second week will be the problem planning, introduction, and the problem formulation.

After the problems are formulated, the goal and objectives to be achieved in this project are determined during the second and the third week.

During the third week, related documents will be collected, compared, and analysed in preparation for the project's literature review. This literature review will last until week 9 in order to better understand the concepts, processes, and details that are important to the proposed work. At the same time, the project solution and the project approach is outlined according to the formulated problem statement and the defined project's goal and objectives during week 4 and week 5. For the following weeks, which is week 5 and week 6, the development methodology and the research approach applied in this project will also be identified and evaluated.

During week 6 and week 7, the requirement specification and modelling will be carried out which includes both functional and non-functional requirements of the system's front-end and back-end to act as a baseline, in order to meet the project goal and objectives. At the same time, the modelling of the system will also be illustrated using UML diagrams such as use case diagrams.

After all the requirements have been identified, the software models will be decided in week 7 for a two-week preliminary architecture design process. As soon as the design patterns and models have been accomplished, a prototype of the system will be developed which include all the main functionalities stated in the requirements specification and the use case diagram. The development of the prototype of this system will take a duration of 4 weeks, starting from week 7 to week 10. Lastly, in week 10, the preliminary report was further addressed and finalized in order to prepare for the submission in week 12. At the same time, the presentation slides that provide an overview of the project will also be prepared before the starting of presentation in week 12.

3.3.3 Gantt Chart

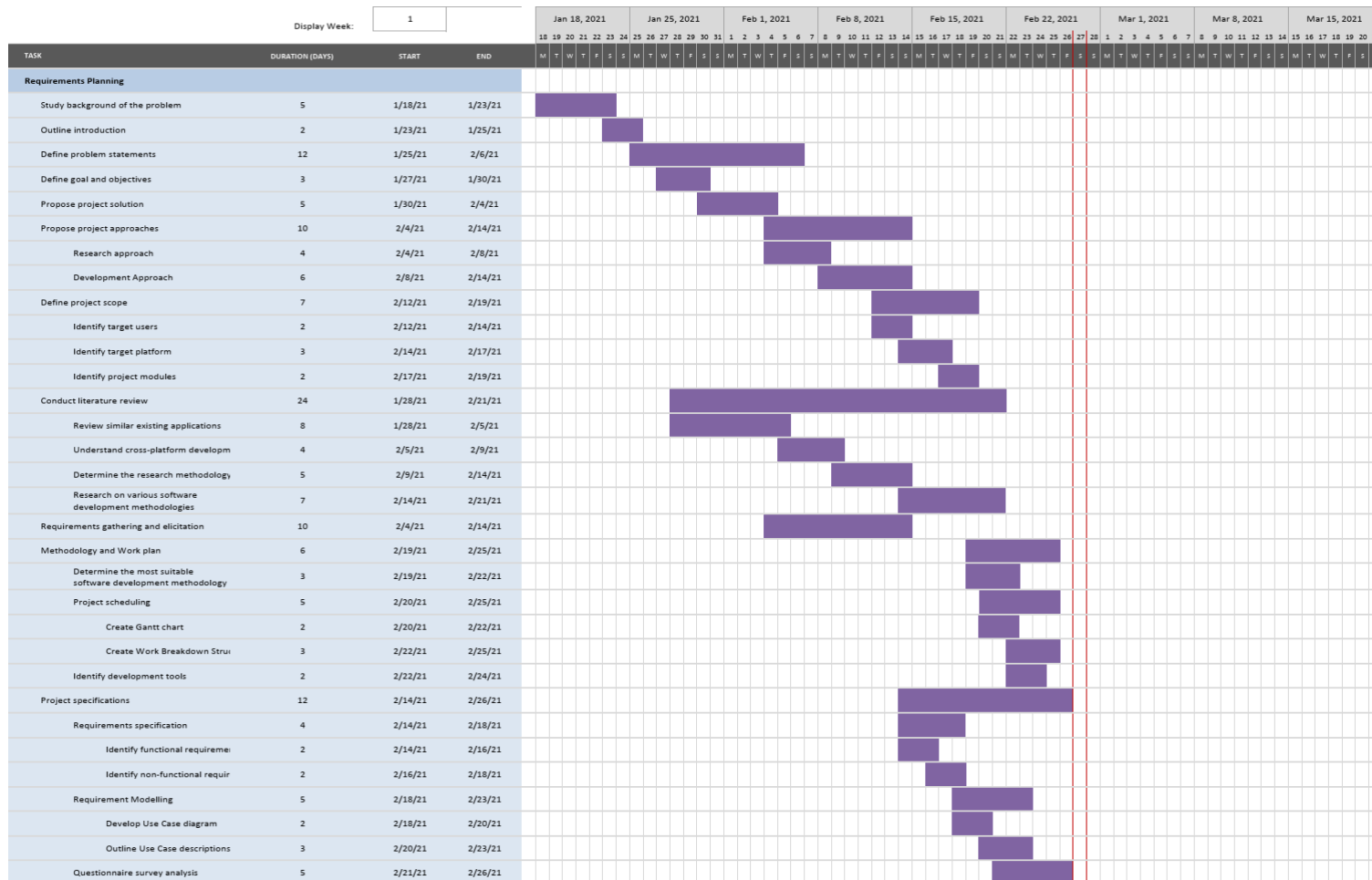


Figure 3.2: Gantt Chart for Requirements Planning Phase

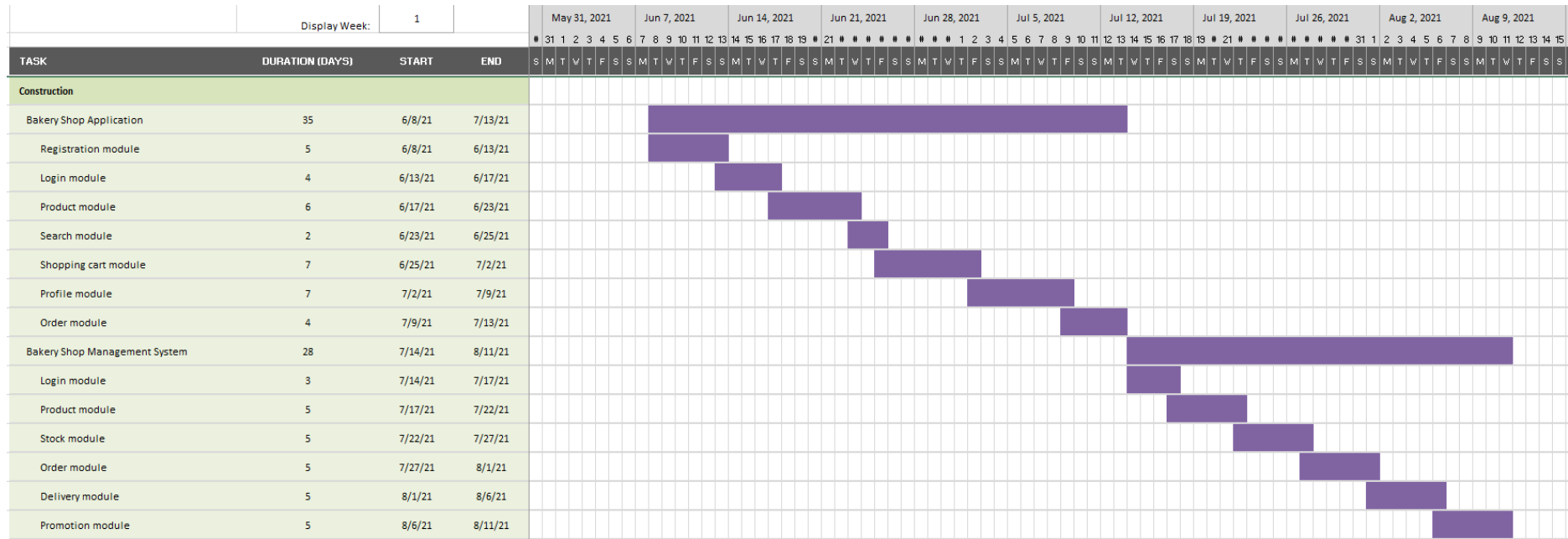


Figure 3.4: Gantt Chart for Construction Phase

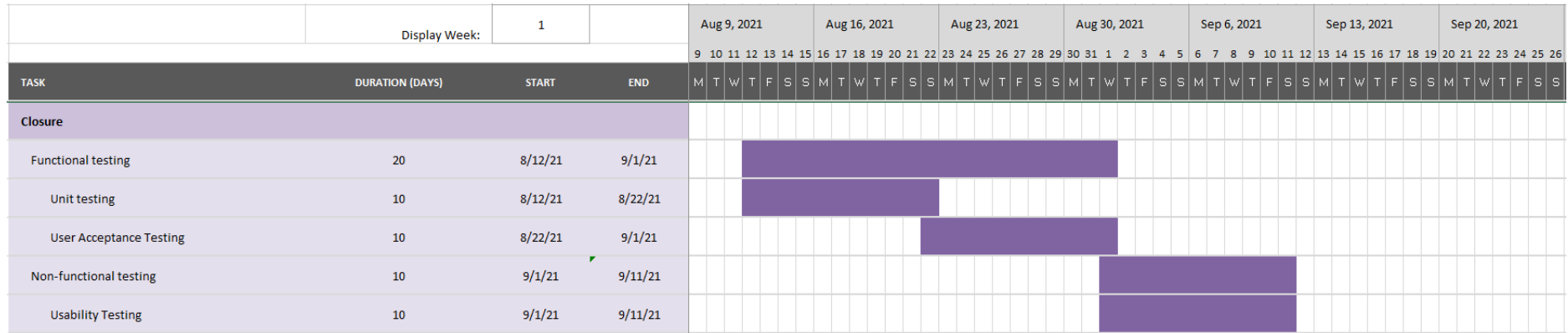


Figure 3.5: Gantt Chart for Closure Phase

3.4 Development Tools

3.4.1 Tools

1. Visual Studio Code

Visual Studio Code (VS Code) is used in this project because it is an open-source text editor whereby a program's code can be viewed, modified and shared. Moreover, it is written in Typescript and their open source extensions are free to install, which it will enhance our coding experience. Visual Studio Code's architecture combines the finest aspects of web, native, and language-specific technologies. In Visual Studio Code, Electron is a software platform that blends web technologies like JavaScript and Node.js with native app performance and adaptability (Visual Studio Code, n.d.).

2. Axure RP

Axure RP is a prototyping software that is used in this project to make rich, functional prototypes of the system design. As a prototyping tool, Axure RP enables the creation of interactive UIs without the needs of coding. In Axure RP, it creates wireframes, which shows the workflow of particular actions. Also, with Axure RP, the design of the prototype can be tested, which aids the developers to decide a better design during the implementation. Additionally, Axure RP was used to create the low-fidelity prototype for this project.

3. Node.js

Node.js is a backend JavaScript runtime framework that allows us to run JavaScript code without having to use a web browser. It is cross-platform and open source and is used in this project because it makes it easier for developers to build command-line tools and server-side scripting with JavaScript. Before the page is submitted to the user's web browser, it runs the scripts on the server to produce dynamic web page content.

4. React Native

React Native is a JavaScript framework that allows us to create natively rendered, real-time iOS and Android applications. It combines the best features of native development with React, a top-of-the-line JavaScript framework for developing user interfaces. Developers may utilize React Native to make completely native apps that do not compromise the user's experience. It provides a minimal set of platform-independent native components that correspond to the platform's native UI building elements, such as View, Text, and Image. Therefore, it is used as the development framework for the mobile application in this project. By leveraging existing rendering methods on the platform, React Native transforms markup into live, native UI components. Furthermore, React runs independently of the main UI line. As a result, the app can sustain high performance without losing functionality.

5. React

React is a free and open-source front-end JavaScript framework for building user interfaces and user interface components. It allows us to create reusable user interface components. React is incredibly easy to understand and develop excellent online and mobile applications because of its component-based architecture, well-defined lifecycle, and usage of only plain JavaScript. React uses a unique syntax known as JSX, which allows us to combine HTML and JavaScript.

6. Firestore

Firestore is a flexible, scalable NoSQL cloud storage that can be accessed directly via native SDKs in iOS, Android, and web applications. It gives us the freedom to store and sync data. Through storing information in documents that are organised into sets, the Cloud Firestore data model allows for scalable, hierarchical data structures. Queries in Cloud Firestore can be used to retrieve specific documents or the entire collection of documents that match the query parameters.

3.4.2 Programming language

1. Html

HTML, Hypertext Markup Language is used in this project to create the whole website layout of the bakery management system. It is used to develop and display the structure and contents of the web pages.

2. CSS

CSS, Cascading StyleSheets is used to describe how web pages are presented, including colours, layout, and fonts. It provides stylings that help in beautifying the website to make the website look more elegant and nice.

3. Php

PHP is a server-side scripting language that is used to link the website to the database in this project since PHP has built-in support for dealing with MySQL Server.

4. JavaScript

JavaScript is a text-based programming language that is used to make web pages interactive on both the client and server sides. It enhances the web page's user experience by adding interactive elements, transforming it from a static to an interactive page.

5. SQL

SQL is a programming language that is dealing with relational databases. SQL statements are used to run queries on a database, such as updating and extracting data.

3.4.3 Framework

1. Ionic

Ionic is an open-source software development kit (SDK) for hybrid mobile applications that is known for offering platform-specific UI elements through a library of native iOS and Android components. Ionic uses front-end technologies including HTML, CSS, JavaScript, and

Angular for application development. Ionic is a framework that allows developers to construct cross-platform mobile apps with a single codebase. In a nutshell, Ionic is a front-end SDK for building hybrid mobile applications that provides a set of components that replicate each mobile platform's native look, feel, and functionality.

2. Apache Cordova

Apache Cordova is a mobile development framework that is free and open-source. It enables cross-platform development using common web technologies like as HTML5, CSS3, and JavaScript. Applications run within platform-specific wrappers and rely on standards-compliant API bindings to access features like sensors, data, and network status. In short, Cordova works as a bridge between Ionic and native code by converting HTML, JavaScript, and CSS into native apps that can run on Android, iOS, and Windows Phone devices natively.

3. Angular

Angular is a platform and framework for creating single-page client applications utilizing HTML and the TypeScript programming language, which is based on JavaScript. It is implemented as a series of TypeScript libraries that are loaded into the application to implement core and optional features. The architecture of Angular relies on specific essential Angular concepts.

3.5 Summary

In conclusion, the beginning of this chapter has discussed how the selected software development methodology is being implemented in this project. Besides, the next part of this chapter is followed by the work plan throughout the development of this project in terms of Gantt Chart and Work Breakdown Structure. Lastly, the development tools that are used in this project are covered in this chapter.

CHAPTER 4

PROJECT SPECIFICATION

4.1 Introduction

This chapter primarily focuses on the initial specification of this project, which includes defining the system's specifications in terms of both functional and non-functional requirements, visualising the system's architecture using use case diagrams and use case descriptions, as well as the user interfaces design using low-fidelity prototypes and high-fidelity prototypes. Also, the survey questionnaires collected from the participants are also analyzed.

4.2 Requirements Specification

The requirements specification section includes the functional and the non-functional requirements of the system. The functional requirements of the system are separated into two groups, which represent the mobile application and also the web-based management system. The non-functional requirements of this system are mainly focused on 6 aspects which include availability requirements, development requirements, performance requirements, security requirements, usability requirements and integrity requirements.

4.2.1 Functional Requirements

The functional requirements of this project are separated into two parts, which are functional requirements for the mobile-based application and the functional requirements for the web-based management system.

4.2.1.1 Mobile-based Application

The functional requirements for the mobile-based application are listed as Table 4.1 at below:

Table 4.1: Functional Requirements for Mobile-based Application

Module	ID	Functional Requirements
Registration	SRS01	The system must allow customers to register a new account.
Products	SRS02	The system must display a list of bakery products according to the product category.
	SRS03	The system must allow customers to search for bakery products using keywords.
	SRS04	The system must allow customers to view all the details of a specific bakery product.
	SRS05	The system must allow customers to add a bakery product into the shopping cart.
Order	SRS06	The system must allow customers to place an order based on the items in the shopping cart.
	SRS07	The system must allow customers to select the delivery method for each of the order placed.
	SRS08	The system must allow customers to select the payment method for each of the order placed.
	SRS09	The system must allow customers to specify the delivery address for each of the order placed.
	SRS10	The system must allow the customers to trace the status of all their placed orders.
Profile	SRS11	The system must allow customers to update their profile's information.
Shopping cart	SRS12	The system must allow customers to remove a selected bakery product from the shopping cart.
	SRS13	The system must allow customers to view the details of the items added in the shopping cart.

4.2.1.2 Web-based Management System

The functional requirements for the web-based management system are listed as Table 4.2 at below.

Table 4.2: Functional Requirements for Web-based Management System

Module	ID	Functional Requirements
Customers	SRS14	The system must allow the staff to view all the customers' record associated with the account information and the purchase records.
	SRS15	The system must allow the staff to update the account status for each of the customer.
Orders	SRS16	The system must display a list of customer's orders.
	SRS17	The system must allow the staff to view all the customer's orders associated with the details of the order.
	SRS18	The system must allow the staff to search for a customer's order.
	SRS19	The system must allow the staff to update the status for an order.
Stocks	SRS20	The system must display a list of stocks.
	SRS21	The system must allow the staff to view all the stocks associated with the details of the stock.
	SRS22	The system must allow the staff to add a new stock.
	SRS23	The system must allow the staff to search for a stock.
	SRS24	The system must allow the staff to update the status for each of the stock.
	SRS25	The system must allow the staff to delete a stock.
Delivery	SRS26	The system must display a list of delivery records.
	SRS27	The system must allow the staff to view all the delivery records associated with the details of the record.

	SRS28	The system must allow the staff to search for a delivery record.
	SRS29	The system must allow the staff to update the delivery status for each of the customer orders.
Products	SRS30	The system must display a list of bakery products according to its category.
	SRS31	The system must allow the staff to view all the bakery products associated with the information of the product.
	SRS32	The system must allow the staff to create a new product.
	SRS33	The system must allow the staff to search for a bakery product.
	SRS34	The system must allow the staff to delete a bakery product.
	SRS35	The system must allow the staff to update all the information associated with the product.
Promotions	SRS36	The system must display a list of promotions.
	SRS37	The system must allow the staff to view all the promotions associated with the information of the promotion.
	SRS38	The system must allow the staff to create a new promotion.
	SRS39	The system must allow the staff to search for a promotion.
	SRS40	The system must allow the staff to delete a promotion.
	SRS41	The system must allow the staff to update all the information associated with the promotion.

4.2.2 Non-Functional Requirements

The non-functional requirements of this system are discussed in this section.

Table 4.3: Non-Functional Requirements

Category	ID	Requirements
Availability	NFR01	The mobile application and the web management system shall be available regardless of time and location with condition that users have internet connection.
	NFR02	An updated version of the application shall be available for the customers within 24 hours.
Performance	NFR03	The web management system and mobile application shall be usable within 3 seconds.
	NFR04	The mobile application's interface shall respond to user interactions within 5 seconds.
	NFR05	The database shall be normalized to avoid redundant data and increase consistency.
Development	NFR06	The system shall be built in Android platform and web platform.
	NFR07	Code editor used for development shall be Visual Studio Code.
	NFR08	The methodology used in development shall be Rapid Application Development Methodology.
	NFR09	Programming language used in web development shall be HTML and JavaScript.
	NFR10	All data records shall be stored in the Firebase database.
Security	NFR11	The system shall only allow authorized users to access the system.
	NFR12	Passwords must never be visible while entering or at any other time.

Usability	NFR13	The user interface of the web management system and mobile application shall be user-friendly.
	NFR14	The user interface shall be easy to learn and navigate with no prior training.
	NFR15	The user interface shall allow users to accomplish their tasks without errors.
	NFR16	The system shall be simple and convenient for users to complete their tasks.
Integrity	NFR17	All monetary figures must be two decimal places precise and measured in Malaysian Ringgit (RM).

4.3 System Use Case

4.3.1 Use Case Diagrams

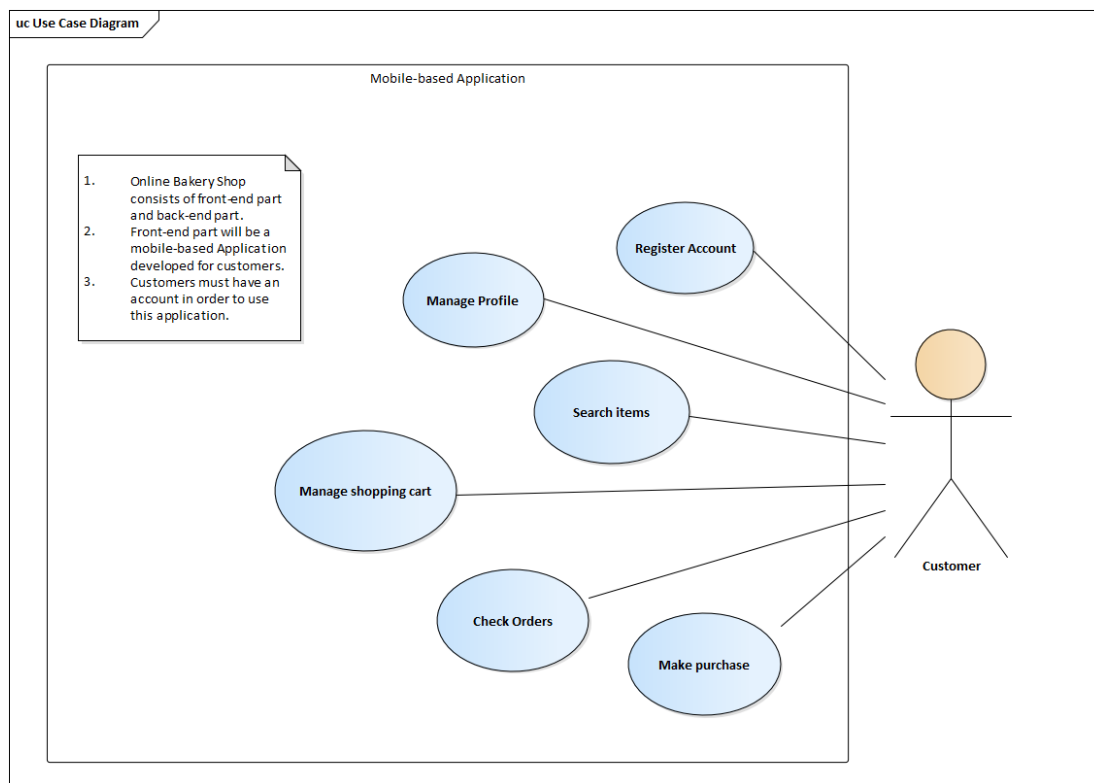


Figure 4.1: Use Case Diagram for Mobile-based Application

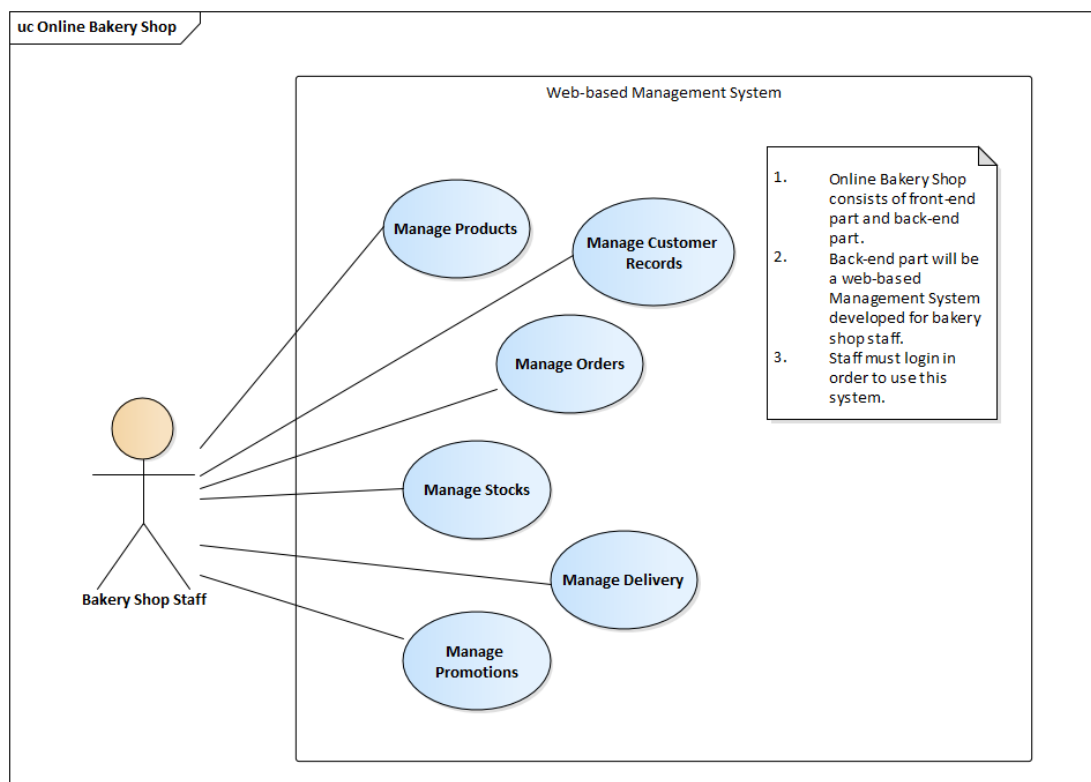


Figure 4.2: Use Case Diagram for Web-based Management System

4.3.2 Use Case Descriptions

Table 4.4: Use Case for Register Account

Name: Register Account	ID: 1	Priority: High
Actor: Customer	Type: Detail, Essential	
Stakeholder's Information: Customer -> Person who is new to the mobile application, does not have an account and wants to order bakery products via mobile application.		
Summary of Use Case: This use case describes the actions needed to performed by the customer to create an account for use of mobile application.		
Triggering Situation: The customer who wants to access the application but does not has an account.		
Precondition: -		
Relationship: <ul style="list-style-type: none"> • Association: Customer • Include: Login 		

- Extend: -

Normal Event Flow:

- 1) The customer accesses the mobile application.
- 2) The customer clicks on the “Register now” button at the bottom of the login page in the mobile application.
- 3) The system displays the registration dialog box.
- 4) The customer enters the username, email, mobile number, password and the confirmation password respectively in the fields given.
- 5) If the customer forgets his/her account password, the S-1: forget password subflow is performed.
- 6) The customer clicks the register button.
- 7) The system validates the registration information.
- 8) Upon successful account creation, the mobile application displays a success message to notify user and user will proceed to login.

Sub Event Flow:**S-1: Forget Password**

1. The customer clicks the “forget password” button.
2. The system will send a password reset email to the customer’ registered mailbox.

Optional Flow:

- 7.1 If the username or password input by the user does not meet the required format, the registration process is cancelled and the system will display an error message. Then, the customer is required to enter the username or password again.
- 7.2 If the password and the confirmation password input by the user does not match, the registration process is cancelled and the system will display an error message. Then, the customer is required to enter the password or the confirmation password again.

7.3 If user left out any of the input fields, or an empty field is present, the registration process is cancelled and the system will display an error message. Then, the customer is required to fill in the empty field.

Table 4.5: Use Case for Search Items

Name: Search Items	ID: 2	Priority: High
Actor: Customer	Type: Detail, Essential	
Stakeholder's Information: Customer -> Person who wants to look for specific bakery products in a faster way.		
Summary of Use Case: This use case outlines the actions needed to be performed by the customer to search for specific bakery product.		
Triggering Situation: The customer who wants to look for a specific bakery product.		
Precondition: The customer has logged in into his/her account.		
Relationship: <ul style="list-style-type: none"> • Association: Customer • Include: - • Extend: - 		
Normal Event Flow: <ol style="list-style-type: none"> 1) The customer performs Use Case ID 3: View list of products. 2) In the list of product page, the customer enters the keywords in the search bar to be searched for. 3) Once the customer starts typing in the search bar, the system will start to filter the list of products which match or contain the keywords entered by the customer in the search bar. 		
Sub Event Flow: -		
Optional Flow:		

3.1 The customer clicks the “x” button in the search bar to clear aall the search input.

Table 4.6: Use Case for Manage Profile

Name: Manage Profile	ID: 3	Priority: High
Actor: Customer	Type: Detail, Essential	
Stakeholder’s Information:		
Customer -> Person who wants to view my profile or change the profile’s information		
Summary of Use Case:		
This use case outlines the actions needed to be performed by the customer to view and update the profile’s details.		
Triggering Situation:		
The customer who wishes to view or change the information of their profile.		
Precondition:		
The customer has logged in into his/her account.		
Relationship:		
<ul style="list-style-type: none"> • Association: Customer • Include: - • Extend: - 		
Normal Event Flow:		
<ol style="list-style-type: none"> 1) The customer clicks on the account icon labelled with “Account” that is located at the bottom right of the mobile application. 2) The system will display all the profile information of the customer account. 3) The customer enters the new information of his/her account in the respective fields given. 4) The customer clicks the update button. 5) The system validates the update information. 6) Upon successful update, the mobile application will display a success message to notify the user. 		
Sub Event Flow: -		

<p>Optional Flow:</p> <p>5.1 If the username or password input by the user does not meet the required format, the profile update process is cancelled and the system will display an error message. Then, the customer is required to enter the username or password again.</p> <p>5.2 If the password and the confirmation password input by the user does not match, the profile update process is cancelled and the system will display an error message. Then, the customer is required to enter the password or the confirmation password again.</p> <p>5.3 If user left out any of the must fill in input fields, or an empty field is present, the update profile process is cancelled and the system will display an error message. Then, the customer is required to fill in the empty field.</p>

Table 4.7: Use Case for Make Purchase

Name: Make Purchase	ID: 4	Priority: High
Actor: Customer	Type: Detail, Essential	
Stakeholder's Information:		
Customer -> Person who is interested with specific bakery product and wants to purchase it.		
Summary of Use Case:		
This use case describes the actions needed to be performed by the customer to purchase the selected product.		
Triggering Situation:		
The customer who wants to purchase specific bakery products.		
Precondition:		
<ol style="list-style-type: none"> 1. The customer has logged in into his/her account. 2. The customer has selected at least one item in the shopping cart. 		
Relationship:		
<ul style="list-style-type: none"> • Association: Customer 		

- Include: -
- Extend: -

Normal Event Flow:

1. The customer clicks on the cart icon labelled with “Cart” that placed at the bottom of the mobile application to navigate to the “My Cart” page.
2. The system displays the My Cart screen with all the previously added items.
3. The customer selects the items to be purchased.
4. The customer clicks the “PROCEED TO CHECKOUT” button at the bottom of the page.
5. The system will display a checkout form.
6. The customer selects the delivery method.
7. The customer fills out the delivery address if delivery service is needed.
8. The customer selects the method of payment.
9. The customer enters the promo code (if any).
10. The customer clicks the “Place Order” button at the bottom of the checkout form.
11. The customer will be directed to the payment.
12. Upon successful placing the order, the system will direct the customer to the successful order page.
13. To cancel the purchase process, S-1: Cancel Make Purchase subflow is performed.

Sub Event Flow:**S-1: Cancel Make Purchase**

1. The customer clicks the “x” button located at the top right corner of the checkout form.
2. The system will redirect user to the Cart page.

Optional Flow: -

Table 4.8: Use Case for Manage Cart

Name: Manage Cart	ID: 5	Priority: High
Actor: Customer	Type: Detail, Essential	
Stakeholder's Information: Customer -> Person who wants to modify items in the cart.		
Summary of Use Case: This use case describes the actions needed to be performed by the customer to view his/her cart, remove items from the cart, edit the quantities or empty his/her shopping cart.		
Triggering Situation: The customer who has added item into his/her cart and wants to view, edit or delete the item.		
Precondition: <ol style="list-style-type: none"> 1. The customer has logged in into his/her account. 2. The shopping cart has at least one item. 		
Relationship: <ul style="list-style-type: none"> • Association: Customer • Include: - • Extend: - 		
Normal Event Flow: <ol style="list-style-type: none"> 1) The customer clicks on the cart icon labelled with "Cart" that placed at the bottom of the mobile application to navigate to the "My Cart" page. 2) The system displays the My Cart screen with all the previously added items. The subtotal field displays the total cost of the selected items in the shopping cart. 3) To view the details of an item in the cart, S-1: View items in cart subflow is performed. 4) To change the quantity of an item in the cart, S-2: Edit items in cart subflow is performed. 5) To delete an item from the cart, S-3: Delete item in cart subflow is performed. 		
Sub Event Flow:		

<p>S-1: View items in cart</p> <ol style="list-style-type: none"> 3. The customer clicks on the item to be viewed. 4. The system will display all the details of the item. <p>S-2: Edit items in cart</p> <ol style="list-style-type: none"> 1. In order to add the quantity of an item in the cart, the customer clicks the plus button (+) placed at right to the quantity field of that item. 2. Once the button is clicked, the system will adjust and update the quantity field, price field and the subtotal field simultaneously. 3. In order to reduce the quantity of an item in the cart, customer clicks the minus button (-) placed at left to the quantity field of that item. 4. Once the button is clicked, the system will adjust and update the quantity field, price field and the subtotal field simultaneously. <p>S-3: Delete items from cart</p> <ol style="list-style-type: none"> 1. The customer clicks the “x” button located at the top right corner of the item to be deleted. 2. The system will display a message to get confirmation from the customer to delete the item from the cart. 3. The customer clicks the “Yes” button from the dialog box to confirm deleting the item from the cart. 4. The system will remove the item from the cart and adjust the subtotal due.
<p>Optional Flow:</p> <ol style="list-style-type: none"> 6.1 The customer clicks on the “Cancel” button from the dialog box. The system will display the cart screen without making any changes.

Table 4.9: Use Case for Check Orders

Name: Check Orders	ID: 6	Priority: High
Actor: Customer	Type: Detail, Essential	
Stakeholder's Information:		

Customer -> Person who wants to track the status of their orders or to check their orders record.
<p>Summary of Use Case:</p> <p>This use case describes the actions needed to be performed by the customer to track the status of their purchased order.</p>
<p>Triggering Situation:</p> <p>The customer who has placed an order and wants to track the status of the order.</p>
<p>Precondition:</p> <ol style="list-style-type: none"> 1. The customer has logged in into his/her account. 2. The customer has successfully placed an order.
<p>Relationship:</p> <ul style="list-style-type: none"> • Association: Customer • Include: - • Extend: -
<p>Normal Event Flow:</p> <ol style="list-style-type: none"> 1) The customer clicks on the order icon labelled with “Order” that is placed at the bottom of the mobile application to navigate to the “My Orders” page. 2) The system will display the “My Order” screen with all the previously purchased order. 3) To view the details of an order, S-1: View Orders subflow is performed.
<p>Sub Event Flow:</p> <p>S-1: View Orders</p> <ol style="list-style-type: none"> 1. The customer clicks the “Details” button located at the bottom right of the order record. 2. The system will display all the details of the purchase order.
<p>Optional Flow:</p> <ol style="list-style-type: none"> 2.1 The customer clicks on the “Close” button from the dialog box. The system will close all the details and display the My Orders screen. .

Table 4.10: Use Case for Manage Products

Name: Manage Products	ID: 7	Priority: High
Actor: Bakery Shop Staff	Type: Detail, Essential	
Stakeholder's Information:		
Bakery Shop Staff -> Person who wants to manage the products and its associated information.		
Summary of Use Case:		
This use case describes the actions needed to be performed by the staff of the bakery shop to add or remove the products, edit the details of the products as well as update the quantities of the selling products.		
Triggering Situation:		
The bakery shop staffs who want to keep the products' information up-to-date.		
Precondition:		
The bakery shop staff has logged in into the management system.		
Relationship:		
<ul style="list-style-type: none"> • Association: Bakery Shop Staff • Include: - • Extend: - 		
Normal Event Flow:		
<ol style="list-style-type: none"> 1) The staff navigates to the "Products" page from the side menu. 2) The system displays a list of product categories with the total quantity of products under each of the categories. To add a new category, S-1: Add New Category subflow is performed. 3) The staff chooses one category from the list and clicks the view button (represented with an eye icon) under the "Actions" column. 4) The system displays a list of products under the selected category. 5) To add a new product, S-2: Add New Product subflow is performed. 6) To view a product and its associated information, S-3: View Product subflow is performed. 7) To update the status or edit the details of the product, S-4: Update Product subflow is performed. 		
Sub Event Flow:		

S-1: Add New Category

1. The staff clicks the “New Entry” button located at the bottom left of the page.
2. The system will display an Add new category form.
3. The staff enters the new category name in the given fields and clicks the “Add” button.
4. Once the “Add” button is clicked, the system will redirect the staff to the list of categories page with the new added category.

S-2: Add New Product

1. The staff clicks the “New Entry” button located at the bottom left of the page.
2. The system will display an Add new product form.
3. The staff enters all the details of the new product in the respective fields provided.
4. The staff clicks the “Add” button located at the bottom right of the form to confirm adding the new product.
5. Once the “Add” button is clicked, the system will redirect the staff to the list of products page with the new added product.

S-3: View Product

1. The staff selects a product to be viewed and clicks on the view button (represented with an eye icon) located in the same row as the selected product under the “Actions” column.
2. The system will display all the information associated with the selected product.

S-4: Update Product

1. The staff selects a product to be updated and clicks on the edit button (represented with a pencil icon) located in the same row as the selected product under the “Actions” column.
2. The system will display an Edit product form.

<p>3. The staff enters all the details of the product in the respective fields provided.</p> <p>4. The staff clicks the “Update” button located at the bottom right of the form to confirm updating all the details of the product.</p> <p>5. Once the “Update” button is clicked, the system will redirect the staff to the list of products page with all the information updated.</p>
<p>Optional Flow:</p> <p>2.1 The staff clicks on the “Cancel” button at bottom right of the form or the “x” button located at the top right corner of the form. The system will redirect the staff to the list of categories page without making any changes.</p> <p>5.1 The staff clicks the “Cancel” button located at the bottom right corner of the form. The system will redirect the staff to the list of products page without making any changes.</p> <p>7.1 The staff clicks the “Cancel” button located at the bottom right corner of the form. The system will display a message to get confirmation from the staff to discard all the changes made. The staff clicks the “Discard” button from the dialog box to discard all the changes made. The system will redirect the staff to the list of products page without making any changes.</p>

Table 4.11: Use Case for Manage Stocks

Name: Manage Stocks	ID: 8	Priority: High
Actor: Bakery Shop Staff	Type: Detail, Essential	
Stakeholder’s Information: Bakery Shop Staff -> Person who wants to manage the stocks and its associated details.		
Summary of Use Case:		

<p>This use case describes the actions needed to be performed by the staff of the bakery shop to add a new stock, edit or remove a stock as well as update the status of the stocks.</p>
<p>Triggering Situation:</p> <p>The bakery shop staffs who want to keep the stocks' information up-to-date.</p>
<p>Precondition:</p> <p>The bakery shop staff has logged in into the management system.</p>
<p>Relationship:</p> <ul style="list-style-type: none"> • Association: Bakery Shop Staff • Include: - • Extend: -
<p>Normal Event Flow:</p> <ol style="list-style-type: none"> 1) The staff navigates to the “Stocks” page from the side menu. 2) The system displays a list of stocks and its associated information. 3) To add a new stock, S-1: Add New Stock subflow is performed. 4) To update the status or edit the details of the stock, S-2: Update stock subflow is performed 5) To delete a stock and its associated information, S-3: Delete Stock subflow is performed
<p>Sub Event Flow:</p> <p>S-1: Add New Stock</p> <ol style="list-style-type: none"> 1. The staff clicks the “New Entry” button located at the bottom left of the page. 2. The system will display an Add New Ingredient form. 3. The staff enters all the details of the ingredient in the respective fields provided. 4. The staff clicks the “Add” button located at the bottom right of the form to confirm adding the new stock. 5. Once the “Add” button is clicked, the system will redirect the staff to the list of stocks page with the new added stock. <p>S-2: Update Stock</p>

1. The staff selects a stock to be updated and clicks on the edit button (represented with a pencil icon) located in the same row as the selected stock under the “Actions” column.
2. The system will display an Edit/Update Ingredient form.
3. The staff enters all the details of the stock in the respective fields provided.
4. The staff clicks the “Update” button located at the bottom right of the form to confirm updating all the details of the stock.
5. Once the “Update” button is clicked, the system will redirect the staff to the list of stocks page with all the information updated.

S-3: Delete Stock

1. The staff chooses one stock to be deleted from the list and clicks the delete button (represented with a trash icon) located in the same row as the selected stock under the “Actions” column.
2. Once the button is clicked, the system will display a message to get confirmation from the staff on deleting the selected stock.
3. The staff clicks the “Remove” button from the dialog box to confirm the delete process.
4. The system will redirect the staff to the list of stocks page with a new list of stocks.

Optional Flow:

- 3.1 The staff clicks on the “Close” button at bottom right of the form or the “x” button located at the top right corner of the form. The system will redirect the staff to the list of stocks page without making any changes.
- 4.1 The staff clicks on the “Close” button at bottom right of the form or the “x” button located at the top right corner of the form. The system will redirect the staff to the list of stocks page without making any changes.
- 5.1 The staff clicks on the “Close” button at bottom right of the form or the “x” button located at the top right corner of the form. The system will redirect the staff to the list of stocks page without making any changes.

--

Table 4.12: Use Case for Manage Promotions

Name: Manage Promotions	ID: 9	Priority: High
Actor: Bakery Shop Staff	Type: Detail, Essential	
Stakeholder's Information: Bakery Shop Staff -> Person who wants to manage the promotions and its associated details.		
Summary of Use Case: This use case describes the actions needed to be performed by the staff of the bakery shop to add a new promotion, view a promotion, edit a promotion as well as update the status of the promotion.		
Triggering Situation: The bakery shop staffs who want to keep the promotions' information up-to-date.		
Precondition: The bakery shop staff has logged in into the management system.		
Relationship: <ul style="list-style-type: none"> • Association: Bakery Shop Staff • Include: - • Extend: - 		
Normal Event Flow: <ol style="list-style-type: none"> 1) The staff navigates to the "Promotions" page from the side menu. 2) The system displays a list of promotions and its associated information. 3) To add a new promotion, S-1: Add New Promotion subflow is performed. 4) To update the status or edit the details of the promotion, S-2: Update Promotion subflow is performed. 5) To view a promotion and its associated information, S-3: View Promotion subflow is performed. 		
Sub Event Flow: S-1: Add New Promotion <ol style="list-style-type: none"> 1. The staff clicks the "New Entry" button located at the bottom left of the page. 		

2. The system will display an Add New Promotion form.
3. The staff enters all the details of the promotion in the respective fields provided.
4. The staff clicks the “Add” button located at the bottom right of the form to confirm adding the new promotion.
5. Once the “Add” button is clicked, the system will redirect the staff to the list of promotions page with the new added promotion.

S-2: Update Promotion

1. The staff selects a promotion to be updated and clicks on the edit button (represented with a pencil icon) located in the same row as the selected promotion under the “Actions” column.
2. The system will display an Edit Promotion form.
3. The staff enters all the details of the promotion in the respective fields provided.
4. The staff clicks the “Update” button located at the bottom right of the form to confirm updating all the details of the promotion.
5. Once the “Update” button is clicked, the system will redirect the staff to the list of promotions page with all the information updated.

S-3: View Promotion

1. The staff selects a promotion to be viewed and clicks on the view button (represented with an eye icon) located in the same row as the selected promotion under the “Actions” column.
2. The system will display all the information associated with the selected promotion.

Optional Flow:

- 1.1 The staff clicks on the “Cancel” button at bottom right of the form or the “x” button located at the top right corner of the form. The system will redirect the staff to the list of promotions page without making any changes.

1.1 The staff clicks the “Cancel” button located at the bottom right corner of the form. The system will display a message to get confirmation from the staff to discard all the changes made. The staff clicks the “Discard” button from the dialog box to discard all the changes made. The system will redirect the staff to the list of promotions page without making any changes.

Table 4.13: Use Case for Manage Delivery

Name: Manage Delivery	ID: 10	Priority: High
Actor: Bakery Shop Staff	Type: Detail, Essential	
Stakeholder’s Information: Bakery Shop Staff -> Person who wants to manage the deliveries status.		
Summary of Use Case: This use case describes the actions needed to be performed by the staff of the bakery shop to view a delivery order and update the status of the delivery order.		
Triggering Situation: The bakery shop staffs who want to keep the deliveries’ status information up-to-date.		
Precondition: The bakery shop staff has logged in into the management system.		
Relationship: <ul style="list-style-type: none"> • Association: Bakery Shop Staff • Include: - • Extend: - 		
Normal Event Flow: <ol style="list-style-type: none"> 1) The staff navigates to the “Delivery” page from the side menu. 2) The system displays a list of delivery orders and its associated information. 3) To view a delivery order and its associated information, S-1: View Delivery Order subflow is performed. 4) To update the status of a delivery order, S-2: Update Delivery Status subflow is performed. 		

Sub Event Flow:**S-1: View Delivery Order**

1. The staff selects a delivery order to be viewed and clicks on the view button (represented with an eye icon) located in the same row as the selected delivery order under the “Actions” column.
2. The system will display all the information associated with the selected delivery order.

S-2: Update Delivery Status

1. The staff selects a delivery order to be updated and clicks on the edit button (represented with a pencil icon) located in the same row as the selected delivery order under the “Actions” column.
2. The system will display all the information associated with the selected delivery order.
3. The staff updates the status of the delivery order by selecting its latest delivery status.
4. The staff clicks the “Update” button located at the bottom right of the form to confirm updating the new status for the delivery order.
5. Once the “Update” button is clicked, the system will redirect the staff to the list of delivery orders page with all the information updated.

Optional Flow:

- 4.1 The staff clicks the “Cancel” button located at the bottom right corner of the form. The system will display a message to get confirmation from the staff to discard all the changes made. The staff clicks the “Discard” button from the dialog box to discard all the changes made. The system will redirect the staff to the list of promotions page without making any changes.

Table 4.14: Use Case for Manage Orders

Name: Manage Orders	ID: 11	Priority: High
Actor: Bakery Shop Staff	Type: Detail, Essential	

<p>Stakeholder's Information:</p> <p>Bakery Shop Staff -> Person who wants to manage the customers' order.</p>
<p>Summary of Use Case:</p> <p>This use case describes the actions needed to be performed by the staff of the bakery shop to view customers' order.</p>
<p>Triggering Situation:</p> <p>The bakery shop staffs who want to check the customer' orders and its associated information.</p>
<p>Precondition:</p> <p>The bakery shop staff has logged in into the management system.</p>
<p>Relationship:</p> <ul style="list-style-type: none"> • Association: Bakery Shop Staff • Include: - • Extend: -
<p>Normal Event Flow:</p> <ol style="list-style-type: none"> 1) The staff navigates to the "Orders" page from the side menu. 2) The system displays a list of customer orders and its associated information. 3) The staff selects a customer' order to be viewed and clicks on the view button (represented with an eye icon) located in the same row as the selected order under the "Actions" column. 4) The system will display all the information associated with the selected order.
<p>Sub Event Flow: -</p>
<p>Optional Flow: -</p>

Table 4.15: Use Case for Manage Customer Records

Name: Manage Customer Records	ID: 12	Priority: High
Actor: Bakery Shop Staff	Type: Detail, Essential	
<p>Stakeholder's Information:</p> <p>Bakery Shop Staff -> Person who wants to manage the customer records.</p>		

<p>Summary of Use Case:</p> <p>This use case describes the actions needed to be performed by the staff of the bakery shop to view a customer record.</p>
<p>Triggering Situation:</p> <p>The bakery shop staffs who want to trace a customer' purchase record.</p>
<p>Precondition:</p> <p>The bakery shop staff has logged in into the management system.</p>
<p>Relationship:</p> <ul style="list-style-type: none"> • Association: Bakery Shop Staff • Include: - • Extend: -
<p>Normal Event Flow:</p> <ol style="list-style-type: none"> 1) The staff navigates to the “Customers” page from the side menu. 2) The system displays a list of customer records and its associated information. 3) To view a specific customer' record and its associated information, S-1: View Customer Record subflow is performed.
<p>Sub Event Flow:</p> <p>S-1: View Customer Record</p> <ol style="list-style-type: none"> 1. The staff selects a customer record to be viewed and clicks on the view button (represented with an eye icon) located in the same row as the selected customer' record under the “Actions” column. 2. The system will display all the information associated with the selected customer' record.
<p>Optional Flow: -</p>

4.4 Survey Analysis

In order to determine the requirements as well as the functionalities and features to build the online bakery shop application, an online survey has been carried out through Google Forms with a total of 40 responses.

4.4.1 Demographics

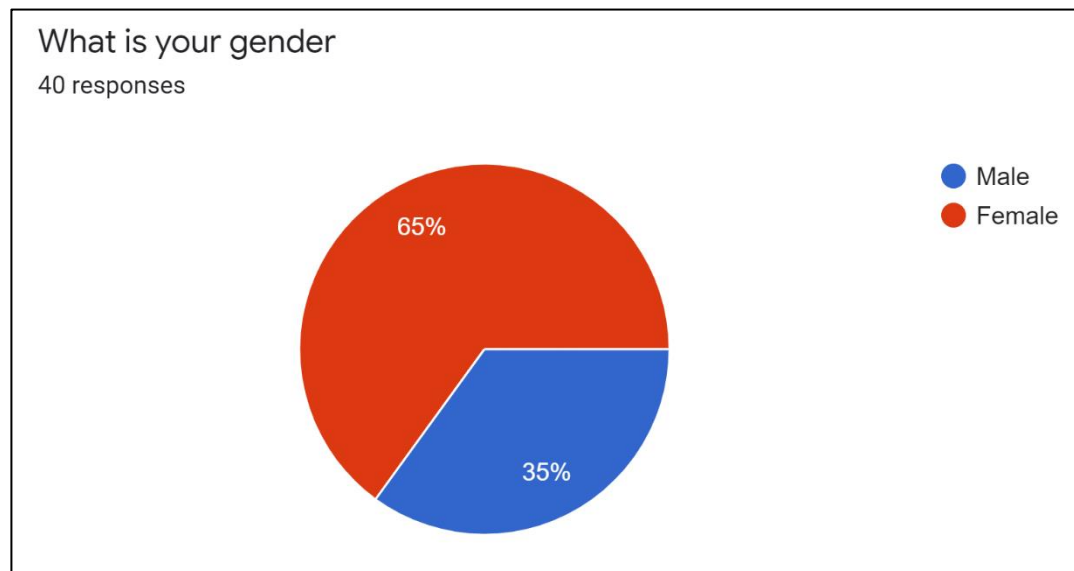


Figure 4.3: Summary of Participants' Gender

This survey is initiated with a question of asking the gender of the participants. Based on the data collected above, it shows that among the total of 40 responses, the number of female participants is higher than the male participants with a difference of 12 participants, whereby it shows that most of the participants are female with a number of 26 participants.

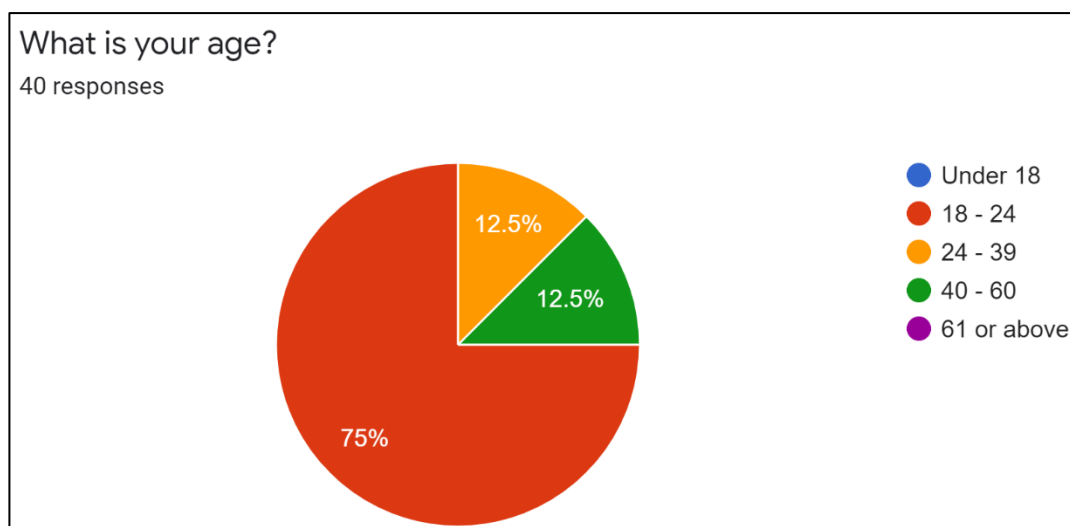


Figure 4.4: Summary of Participants' Age Range

The second question of this survey is aimed to study the age range of the participants. According to the data gathered above, most of the participants are aged 18 to 26 with a total number of 30 participants among the overall of 40 responses. Excluding these 30 participants, the number of participants aged 24 to 39 is the same as the number of participants aged 40 to 60, which is 5 participants.

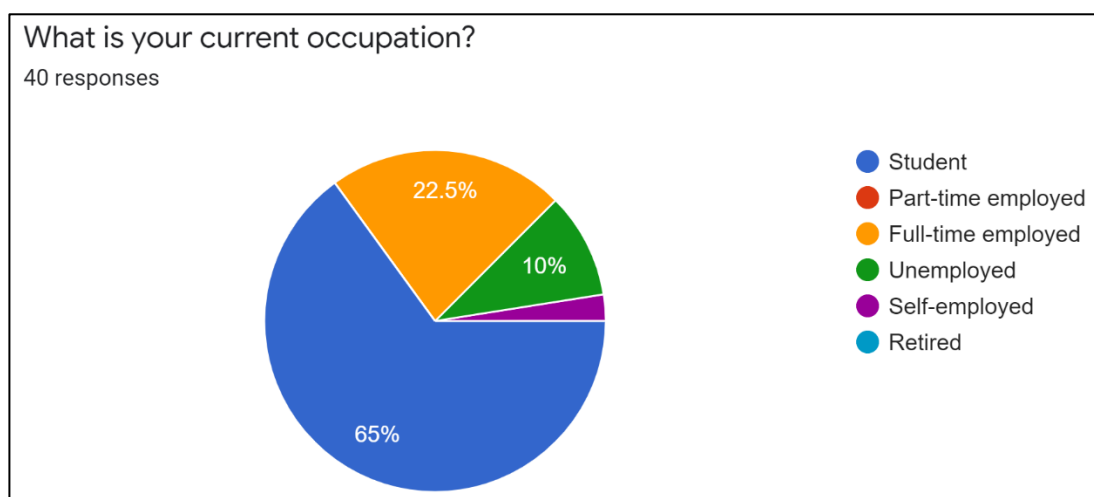


Figure 4.5: Summary of Participants' Current Occupation

This survey is followed by the third question which is asking the current occupation of the participants. Since the data collected from the last question shows that most of the participants are aged 18 to 24, therefore it is believed that the majority of them are still students with a number of 26 participants. In addition to that, the

number of participants which are full-time employed, unemployed and self-employed is 9, 4 and 1 respectively.

4.4.2 Fact finding

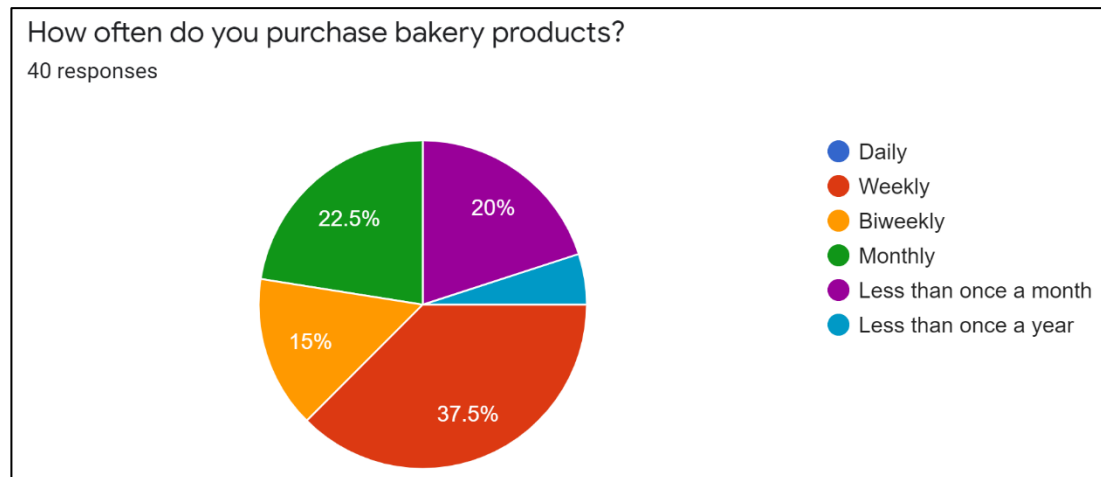


Figure 4.6: Summary of Participants Having to Purchase Bakery Products

The fourth question in this survey is to determine how often the participants purchase bakery products. The data gathered shows that the majority of the participants purchase bakery products weekly, which consists of 15 participants, followed by 9 participants who purchase it monthly and 8 participants who purchase bakery products less than once a month. Minority of the participants purchase bakery products biweekly and only 2 participants who purchase it less than once a year. Therefore, it can be said that people are quite often purchasing bakery products.

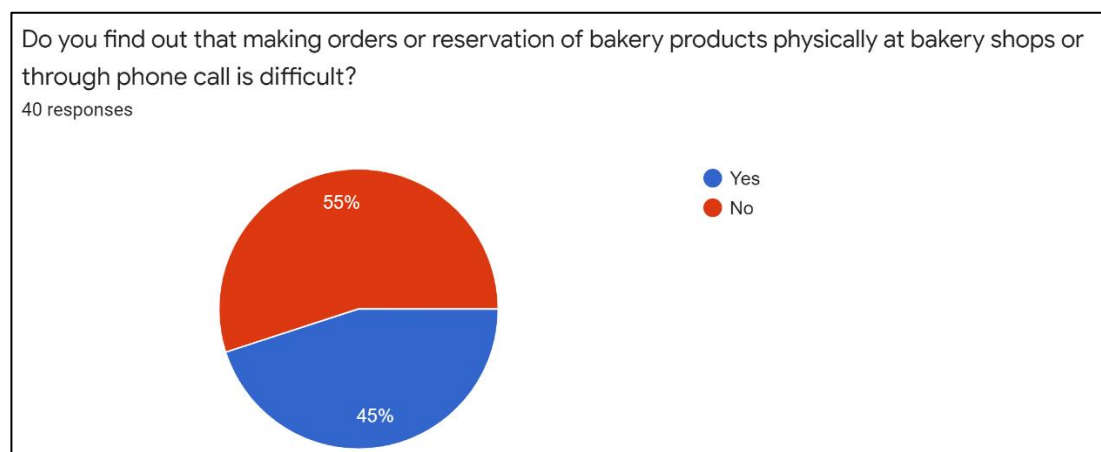


Figure 4.7: Summary of Having Difficulty In Purchase Bakery Products Physically

This question is aimed to determine whether the participants are having difficulty in purchasing bakery products physically at the shop or through phone calls. The data collected shows that there are only minor differences of 4 participants between those who find it difficult and those who do not feel difficult.

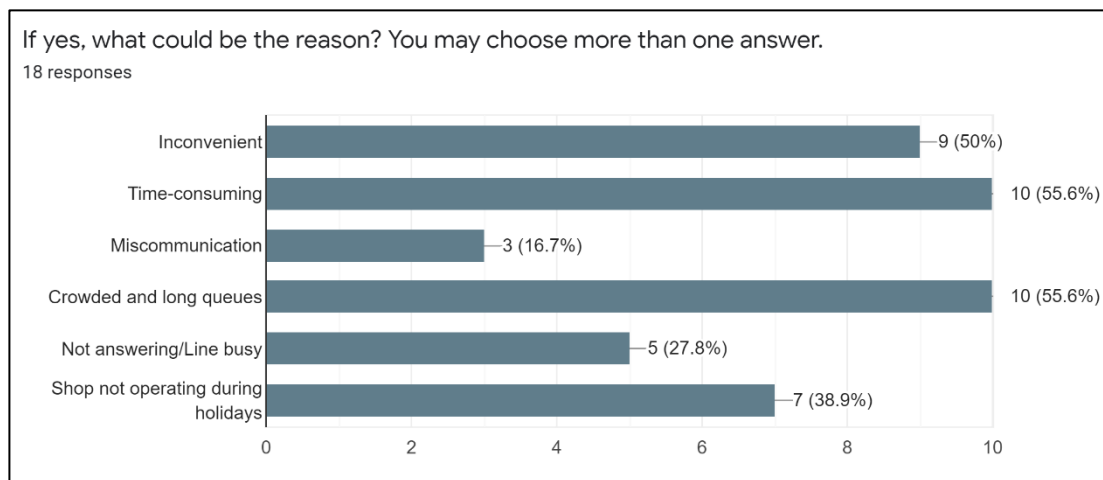


Figure 4.8: Summary on Reasons of Having Difficulty in Purchase Bakery Products Physically

Among the 18 participants who are having difficulty in purchasing bakery products physically as shown in Figure 4.7, time-consuming, crowded and long queue, and inconvenient are the top main reasons. Additionally, shops not operating during holidays, followed by not answering/line busy and miscommunication are also the reasons participants having difficulty purchase bakery products physically.

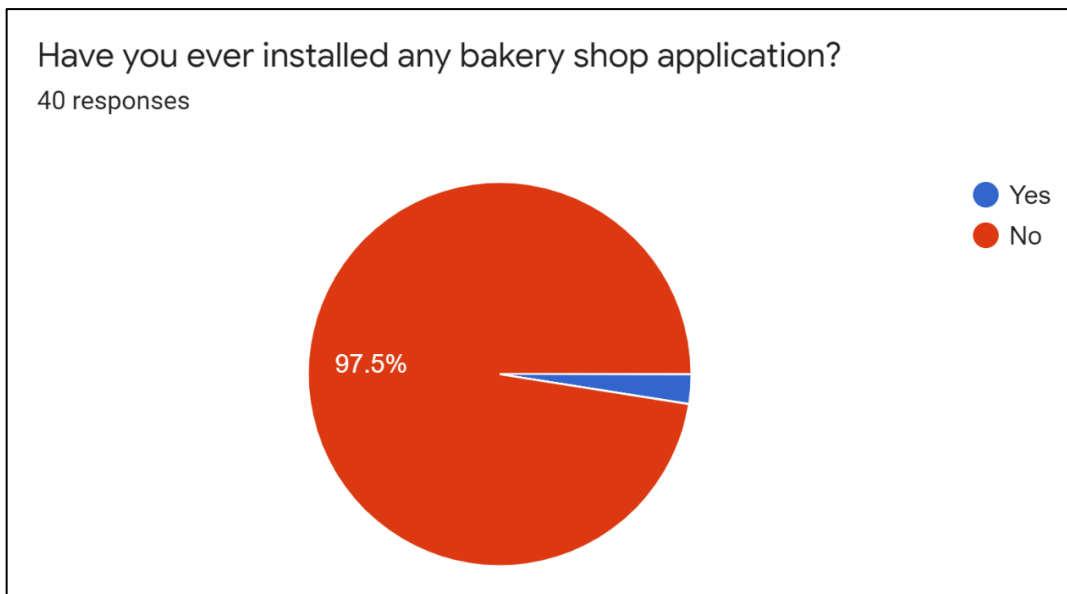


Figure 4.9: Summary of Participants Using Other Bakery Shop Applications

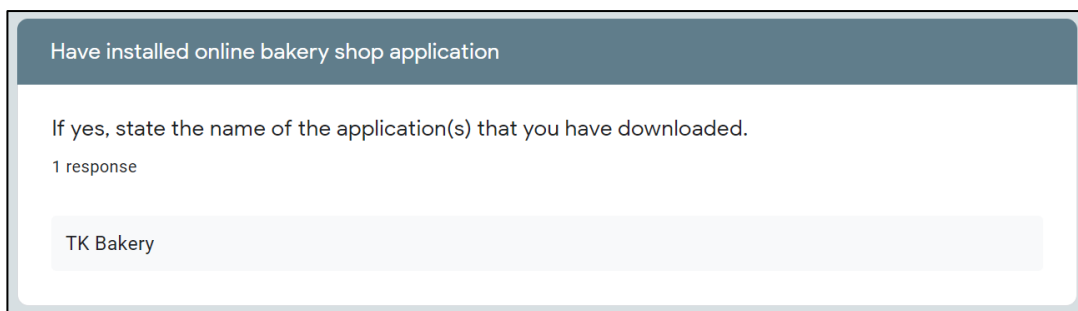


Figure 4.10: Summary of Bakery Shop Application Installed by Participants

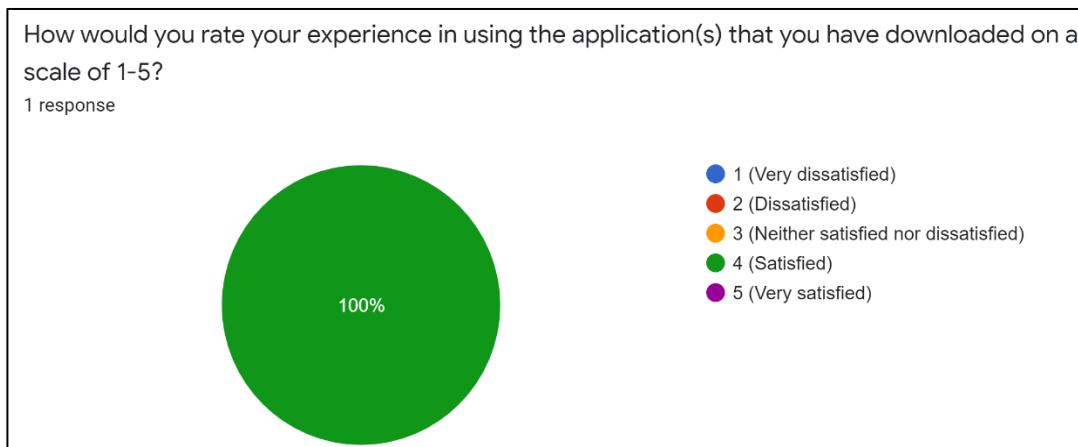


Figure 4.11: Summary of Experience in Using Bakery Shop Application Installed

The question in Figure 4.9 is to determine whether the participants have installed any bakery shop applications in the market. The data gathered above clearly

showed that only one participant from the overall of 40 participants have installed a bakery shop application and the application is TK bakery, as shown in Figure 4.10. Additionally, the participant is satisfied with the experience in using the TK bakery application, as shown in Figure 4.11.

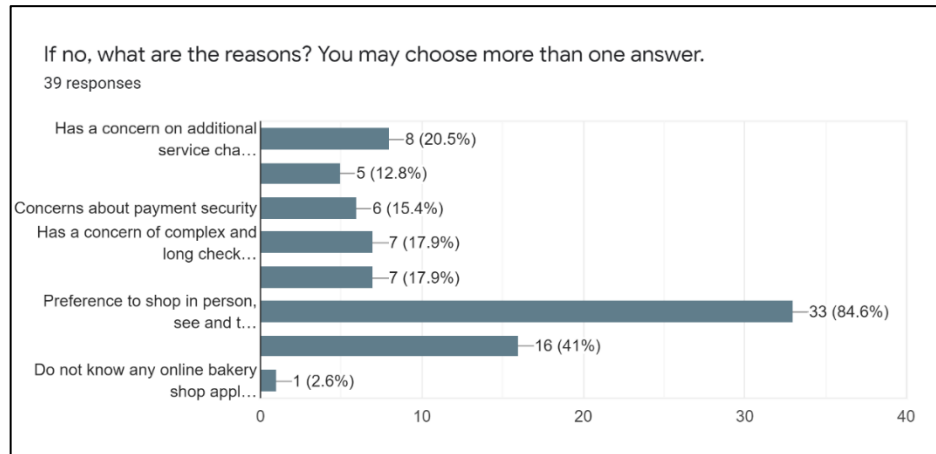


Figure 4.12: Summary on Reasons of Never Installed Any Bakery Shop Application

Among the 39 participants who have never installed a bakery shop application in the markets as shown in Figure 4.9, the top main reason is due to their preference to shop in person as they can see and touch the products. The following reason is the participants have the trust concerns on receiving and returning of products. Also, the participants are also having some concerns such as additional service charges, complex and long checkout process, complicated navigation within the application and also its payment security. Also, there is one participant due to the reason for not knowing any online bakery shop application.



Figure 4.13: Summary of Participants' Opinion on Having An Online Bakery Shop Application

This question is to determine whether the participants need an online bakery shop application to make orders. The data collected clearly showed that the majority of them, which consists of 36 participants, find that it is helpful to have an application to make orders.

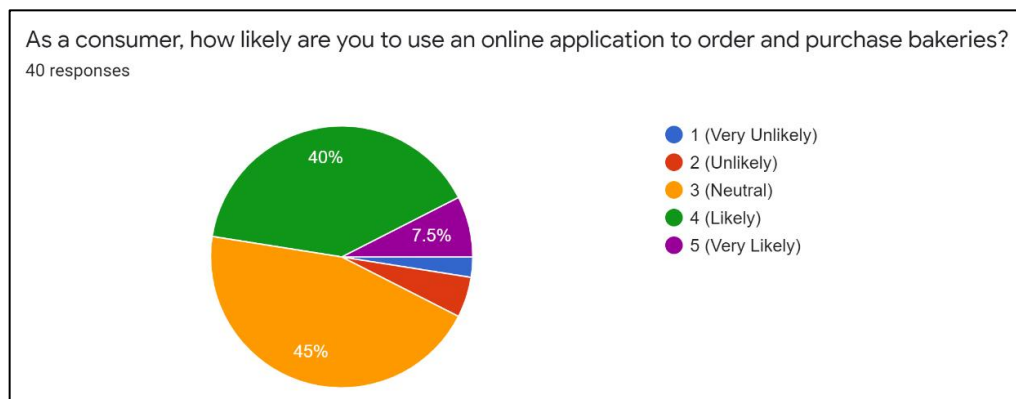


Figure 4.14: Summary of Participants' Opinion on Using An Online Bakery Shop Application

This question is to determine whether how likely participants will use an online application to purchase bakery products. The data collected showed that 18 participants are neutral towards using an online application to purchase bakeries, followed by 16 participants that are likely to use it. Additionally, the number of participants who are very likely, unlikely and very unlikely to use an online application to make orders is 5, 2 and 1 participants respectively.

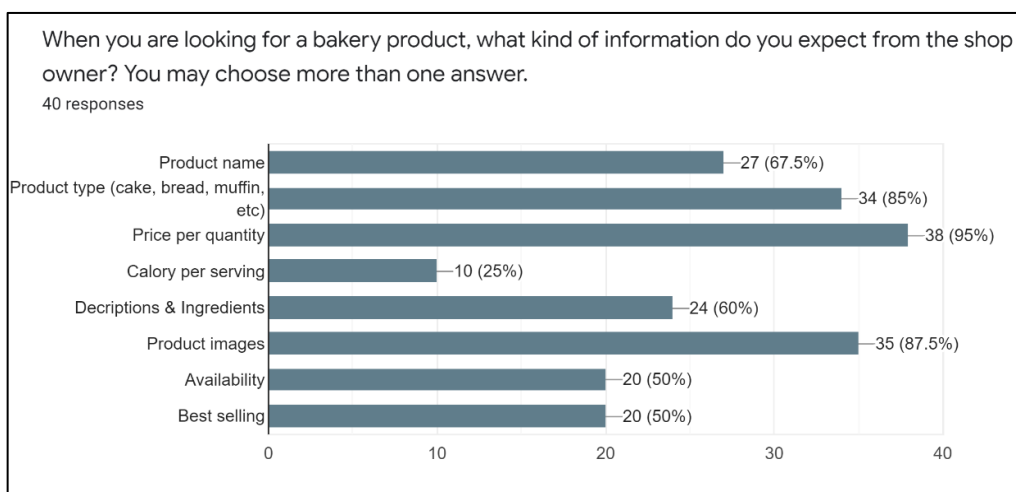


Figure 4.15: Summary on Product' Information Expected by The Participants

This question is aimed to determine what kind of information on a product are expected from the participants to the bakery shop owner. Based on the results collected, the participants have the highest expectation on the display of price per quantity, followed by its images, category type, name, descriptions and ingredients, availability as well as best selling and lastly is the calorie per serving of a product.



Figure 4.16: Summary of Participants’ Opinion on Features/ Functionalities to be Included in An Online Bakery Shop Application



Figure 4.16 (Continued)

This question is aimed to determine the features or functionalities to be included in the online bakery shop application based on how important these features

are to the participants. The data collected is summarized in the Table 4.16, associated with the number of participants.

Table 4.16: Importance of The Features Towards The Participants

Feature/ Functionality	Not important	Slightly important	Moderately important	Important	Very important
Profile creation	1	3	10	16	10
Products categorization	0	1	7	19	13
Shopping cart	0	2	3	17	18
Search product	0	2	5	12	21
Order history	0	4	15	11	10
Notifications (e.g. news on promotions)	2	12	9	11	6
Profile settings	1	4	12	20	3
Points accumulation	2	9	11	10	8
Customer ratings	0	8	6	9	17

4.5 High-Fidelity Prototypes

The rough representations of UIs for both the mobile-based application and web-based management system were created and presented in Appendix B. These low-fidelity prototypes have been used as an input source for developing a more complete representations of UIs, which are shown in this following section. Table 4.17 at below will act as a reference to show how the system designs meet all the functional requirements specified.

Table 4.17: Reference Table for System Designs to Functional Requirements

System	Functional Requirement ID	System Design Reference
Mobile-based Application	SRS01	Figure 4.18
	SRS02	Figure 4.21
	SRS03	Figure 4.21
	SRS04	Figure 4.22
	SRS05	Figure 4.22
	SRS06	Figure 4.26
	SRS07	Figure 4.27
	SRS08	Figure 4.27
	SRS09	Figure 4.27
	SRS10	Figure 4.29
	SRS11	Figure 4.23
	SRS12	Figure 4.26
	SRS13	Figure 4.22
Web-based Management System	SRS14	Figure 4.48, Figure 4.49
	SRS15	Figure 4.50
	SRS16	Figure 4.38
	SRS17	Figure 4.39
	SRS18	Figure 4.38
	SRS19	Figure 4.40
	SRS20	Figure 4.35
	SRS21	Figure 4.35
	SRS22	Figure 4.36
	SRS23	Figure 4.35
	SRS24	Figure 4.37
	SRS25	Figure 4.35
	SRS26	Figure 4.41
	SRS27	Figure 4.42
	SRS28	Figure 4.41
	SRS29	Figure 4.43
	SRS30	Figure 4.31

	SRS31	Figure 4.32
	SRS32	Figure 4.34
	SRS33	Figure 4.31
	SRS34	Figure 4.31
	SRS35	Figure 4.33
	SRS36	Figure 4.44
	SRS37	Figure 4.46
	SRS38	Figure 4.45
	SRS39	Figure 4.44
	SRS40	Figure 4.44
	SRS41	Figure 4.47

4.5.1 Mobile-based Application

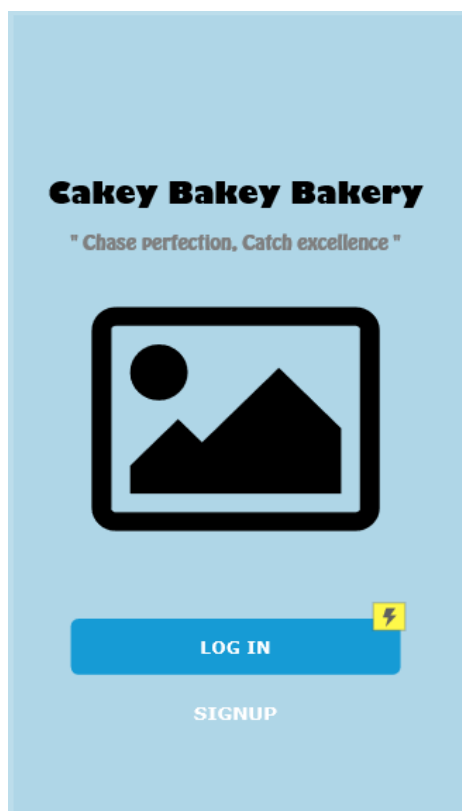
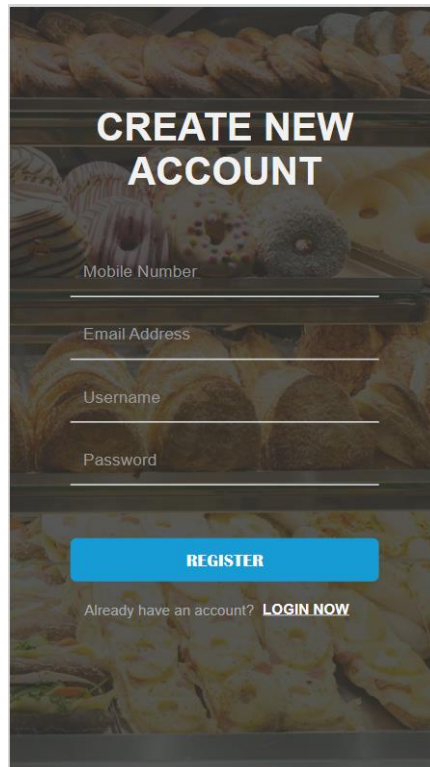


Figure 4.17: Welcome Screen



CREATE NEW ACCOUNT

Mobile Number

Email Address

Username

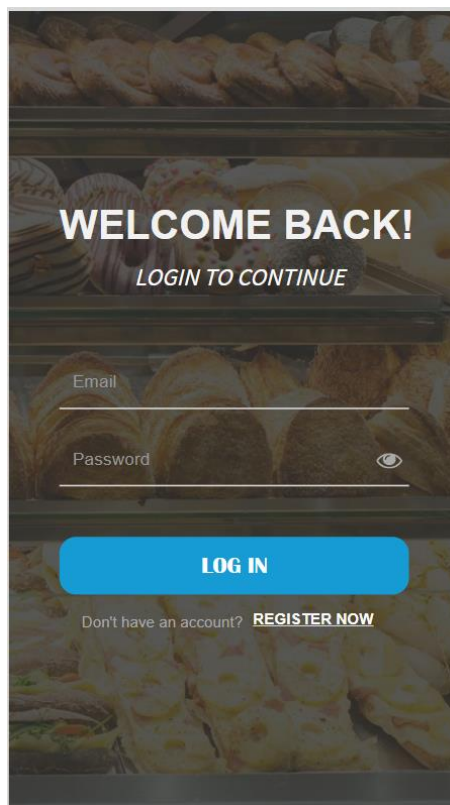
Password

REGISTER

Already have an account? **LOGIN NOW**

The registration screen features a dark background with a subtle pattern of various breads. The title 'CREATE NEW ACCOUNT' is centered at the top in a large, bold, white font. Below the title are four input fields, each with a light gray placeholder text: 'Mobile Number', 'Email Address', 'Username', and 'Password'. A prominent blue button with the text 'REGISTER' in white is positioned below the input fields. At the bottom, there is a link that says 'Already have an account? LOGIN NOW'.

Figure 4.18: Registration Screen



WELCOME BACK!

LOGIN TO CONTINUE

Email

Password

LOG IN

Don't have an account? **REGISTER NOW**

The login screen features a dark background with a subtle pattern of various breads. The title 'WELCOME BACK!' is centered at the top in a large, bold, white font, with the subtitle 'LOGIN TO CONTINUE' in a smaller, italicized white font below it. Below the subtitle are two input fields: 'Email' and 'Password'. The 'Password' field includes a small eye icon to the right of the input line, indicating a toggle for password visibility. A prominent blue button with the text 'LOG IN' in white is positioned below the input fields. At the bottom, there is a link that says 'Don't have an account? REGISTER NOW'.

Figure 4.19: Login Screen

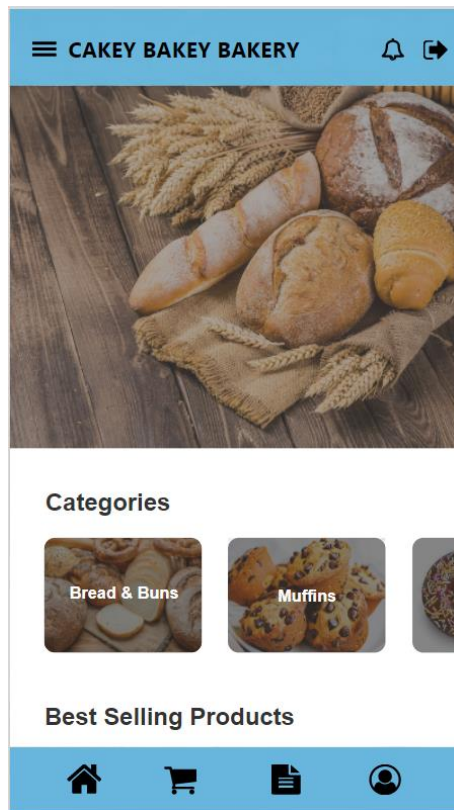


Figure 4.20: Home Screen

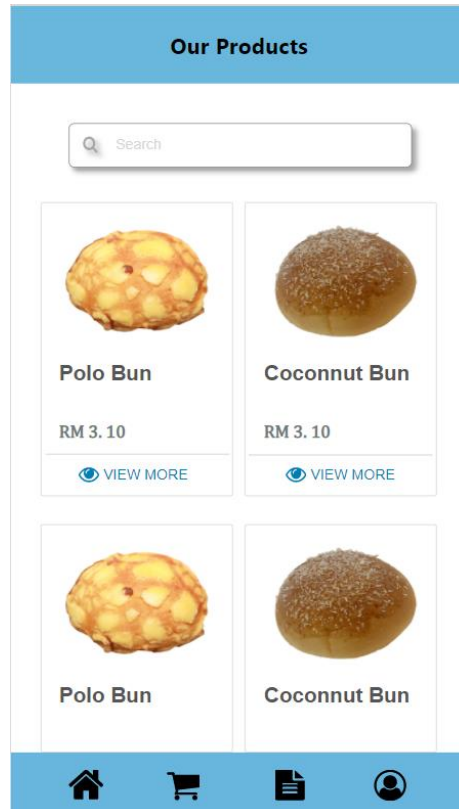


Figure 4.21: Products Screen

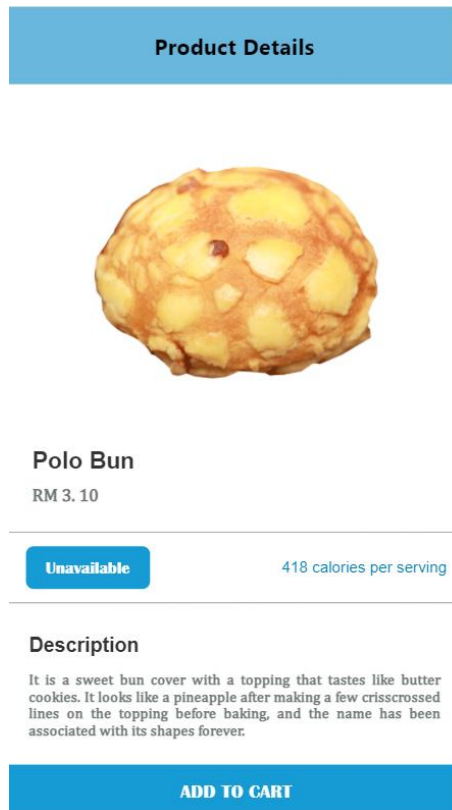


Figure 4.22: Product Details Screen

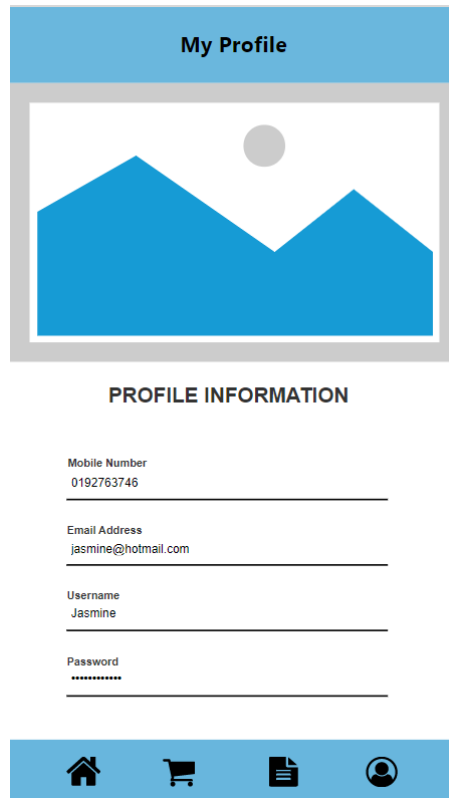


Figure 4.23: Update Profile Information Screen



Figure 4.24: About Us Screen

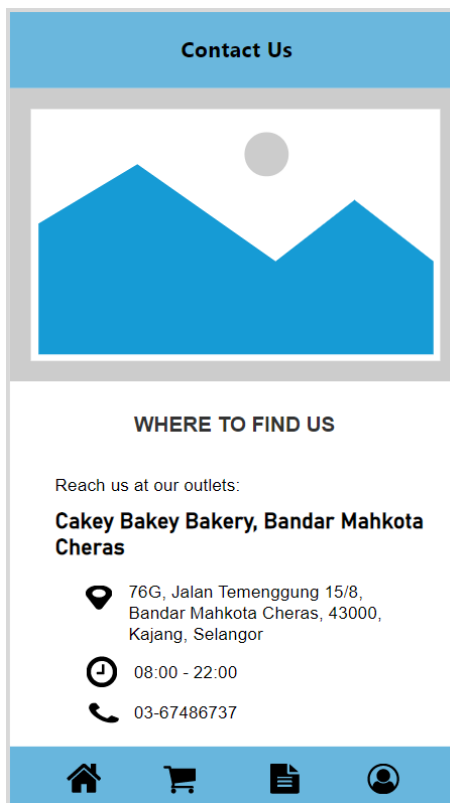


Figure 4.25: Contact Us Screen



Figure 4.26: Shopping Cart Screen

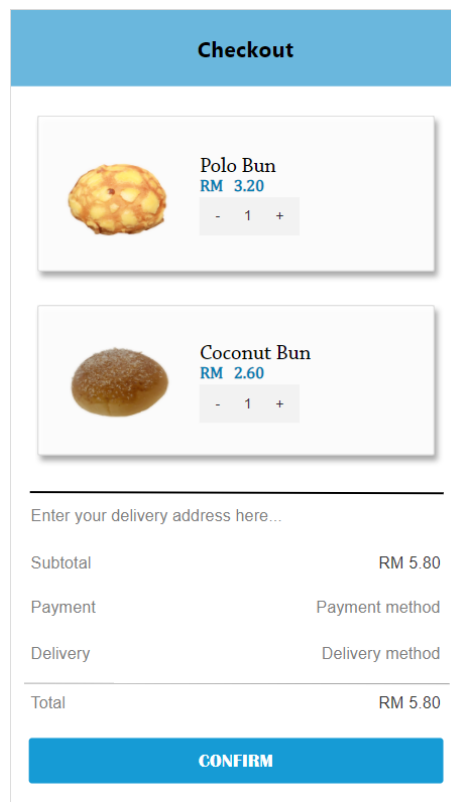


Figure 4.27: Checkout Payment Screen

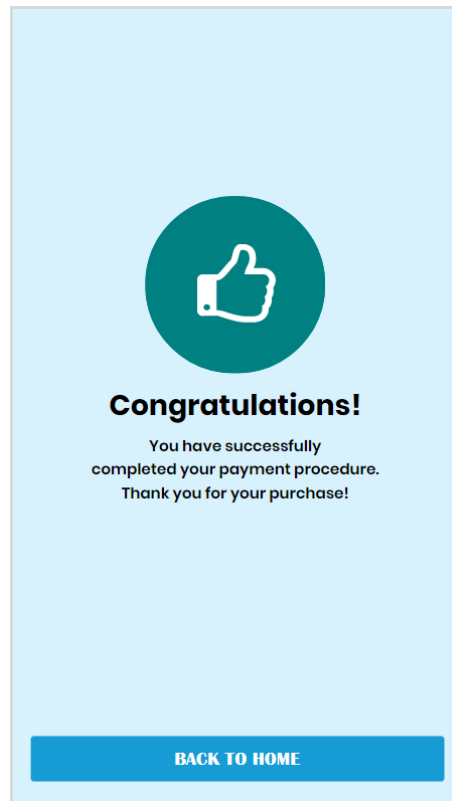


Figure 4.28: Order Successfully Placed Screen

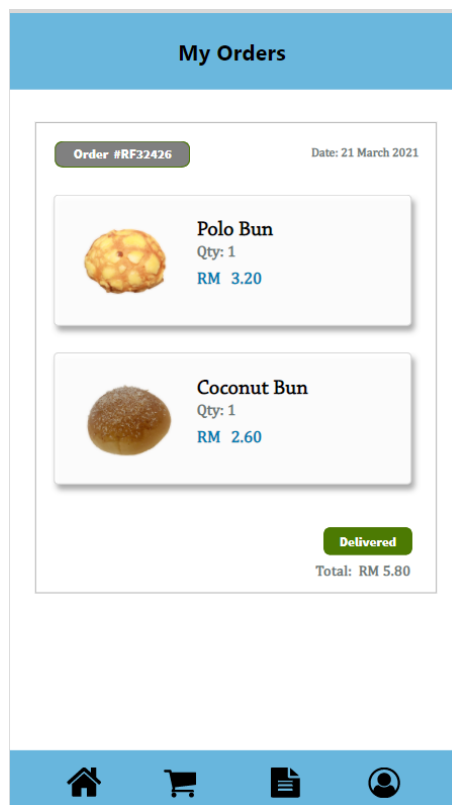


Figure 4.29: Track Order Screen

4.5.2 Web-based Management System



Figure 4.30: Dashboard Page

The products overview table contains the following data:

Date Created	Breads	Price	Quantity Left	Status	Actions
May 20, 2020	Magic Cheese Wand	RM 3.10	23	Available	View Edit
May 23, 2020	Butter Sugar	RM 3.40	11	Available	View Edit
May 28, 2020	Flossy Hottie	RM 3.70	24	Available	View Edit
May 20, 2020	Mexico Coffee	RM 3.70	22	Available	View Edit
May 20, 2020	Garlic Butter	RM 3.40	16	Available	View Edit
May 22, 2020	Flossy Signature	RM 3.50	23	Available	View Edit
May 22, 2020	Yam Coconut	RM 3.80	25	Unavailable	View Edit
May 21, 2020	Tuna Mayonese	RM 3.30	18	Available	View Edit
May 20, 2020	Italian Tomato	RM 4.70	19	Unavailable	View Edit

Figure 4.31: Manage Products Page

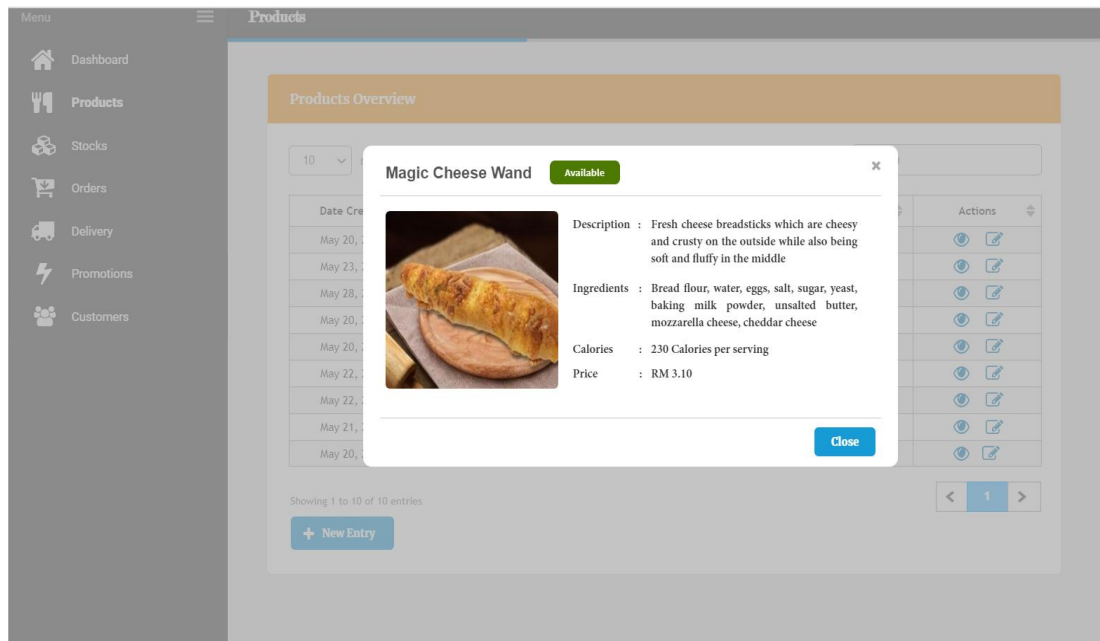


Figure 4.32: View Product Details Page

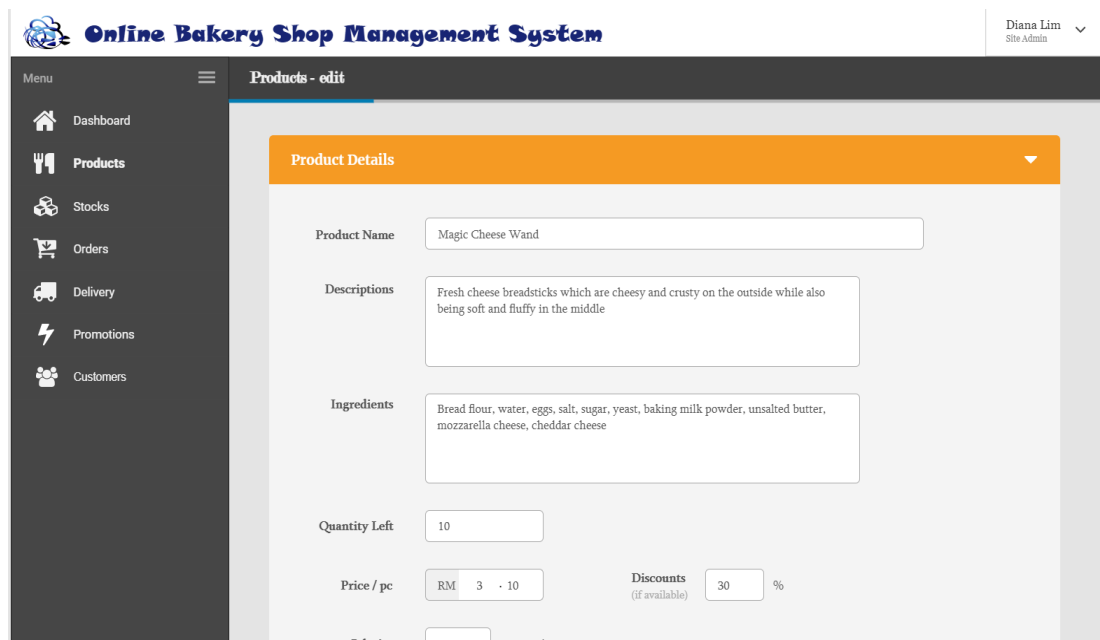


Figure 4.33: Update Product Details Page

Online Bakery Shop Management System

Diana Lim
Site Admin

Menu

Dashboard

Products

Stocks

Orders

Delivery

Promotions

Customers

Products - add new

Product Details

Product Name: e.g. Blueberry Cheesecake

Descriptions: Descriptions of product...

Ingredients: Ingredients needed...

Quantity Left: 0

Price / pc: RM 0.00

Discounts (if available): 0 %

Calories: 0 per serving

Figure 4.34: Add New Product Page

Online Bakery Shop Management System

Diana Lim
Site Admin

Menu

Dashboard

Products

Stocks

Orders

Delivery

Promotions

Customers

Stocks

Stocks Overview

10 records per page

Search

Date Created	Ingredients	Status	Actions
May 20, 2020	Bread flour	Sufficient	Edit Delete
March 11, 2020	Cheddar Cheese	Out of Stock	Edit Delete
April 28, 2020	Salt	Sufficient	Edit Delete
June 18, 2020	Butter	Running Low	Edit Delete
March 11, 2020	Eggs	Running Low	Edit Delete
August 22, 2020	Sugar	Sufficient	Edit Delete
September 29, 2020	Hotdog	Out of Stock	Edit Delete
March 12, 2020	Mozzarella Cheese	Sufficient	Edit Delete
March 12, 2020	Yeast	Running Low	Edit Delete

Showing 1 to 10 of 59 entries

[+ New Entry](#)

Figure 4.35: Manage Stocks Page

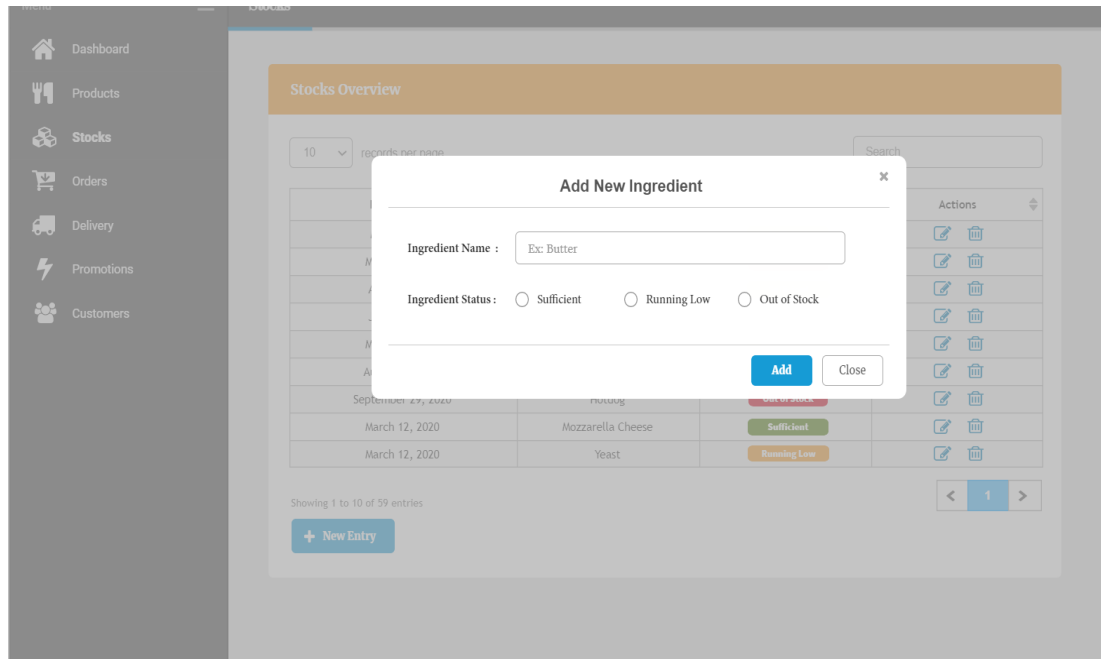


Figure 4.36: Add New Stock Page

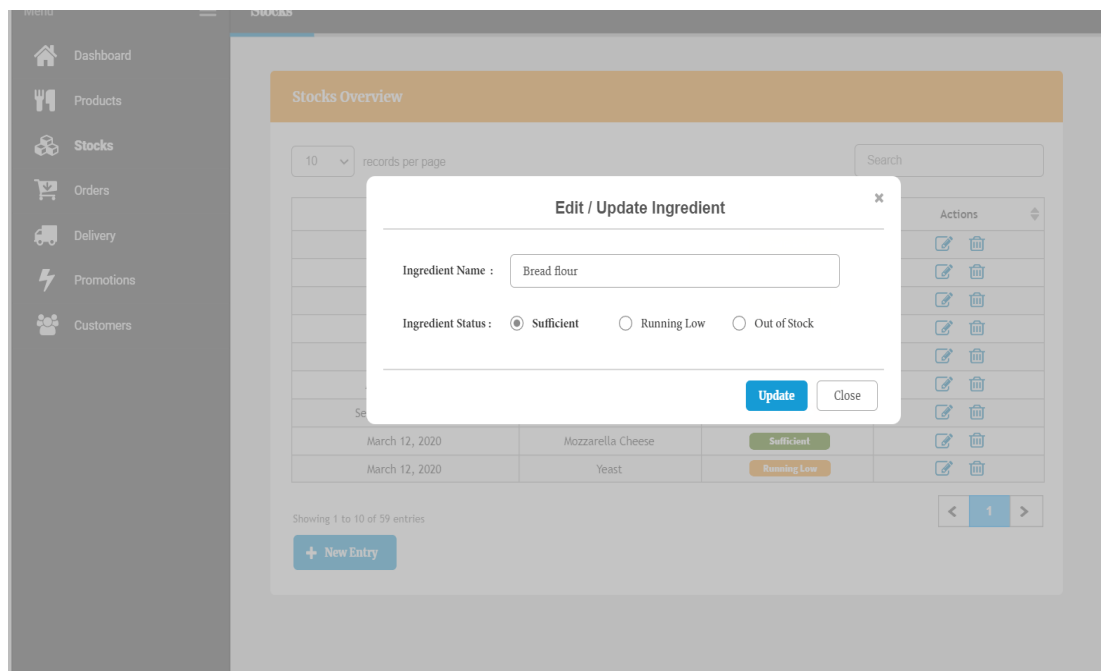


Figure 4.37: Update Stock Details Page

Online Bakery Shop Management System

Diana Lim Site Admin

Menu

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers

Orders

Orders Overview

10 records per page

Search

Date Ordered	Reference Id	Contact No	Item Quantity	Amounts	Actions
February 25, 2021	RF546433	010-45216145	5	RM 26.40	
February 25, 2021	RF768575	012-34871911	6	RM 30.80	
April 28, 2020	RF899433	016-18047947	2	RM 8.50	
February 26, 2021	RF120083	014-34979194	5	RM 23.20	
February 27, 2021	RF456990	012-97788221	5	RM 29.90	
February 22, 2021	RF455893	010-34749373	7	RM 37.80	
February 29, 2021	RF314190	011-22494880	3	RM 13.30	
March 12, 2020	RF345783	018-34579787	6	RM 32.90	
March 12, 2020	RF432949	012-39487418	4	RM 20.10	

Showing 1 to 9 of 119 entries

Figure 4.38: Manage Orders Page

Online Bakery Shop Management System

Site Admin

Menu

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers

Orders

Orders Overview

10 records per page

Search

RF546433

Date Ordered : February 25, 2021
 Time Ordered : 11:17 AM
 Contact Num : 010-45216145
 Date to received : February 27, 2021
 Address : No 92, Jalan SL 7/13, Bandar Sungai Long, 43000, Kajang, Selangor

Order Details

1 Butter Sugar Bread	RM 3.40
1 Flossy Signature Bread	RM 3.50
2 Chocalate & Chips Muffin	RM 5.40
1 Hazelnut Cookies	RM 7.90

5 Subtotal	RM 20.20
Discounts	RM 0.00
Tax (Include 6% GST)	RM 3.20
Delivery Fee	RM 3.00
TOTAL AMOUNT	RM 26.40

Close

Figure 4.39: View Order Details Page

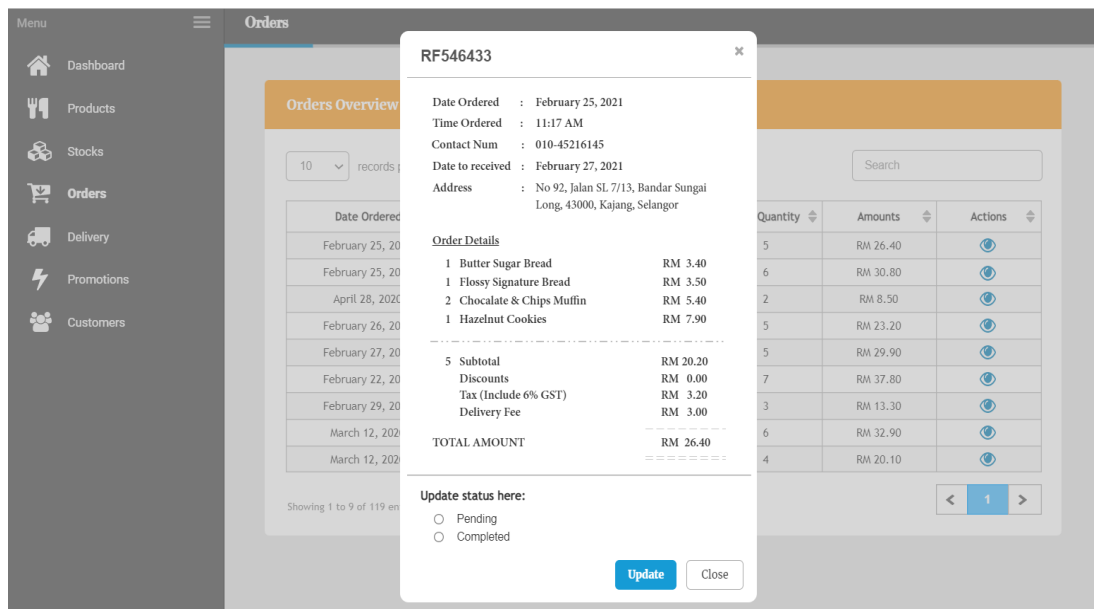


Figure 4.40: Update Order Status Page

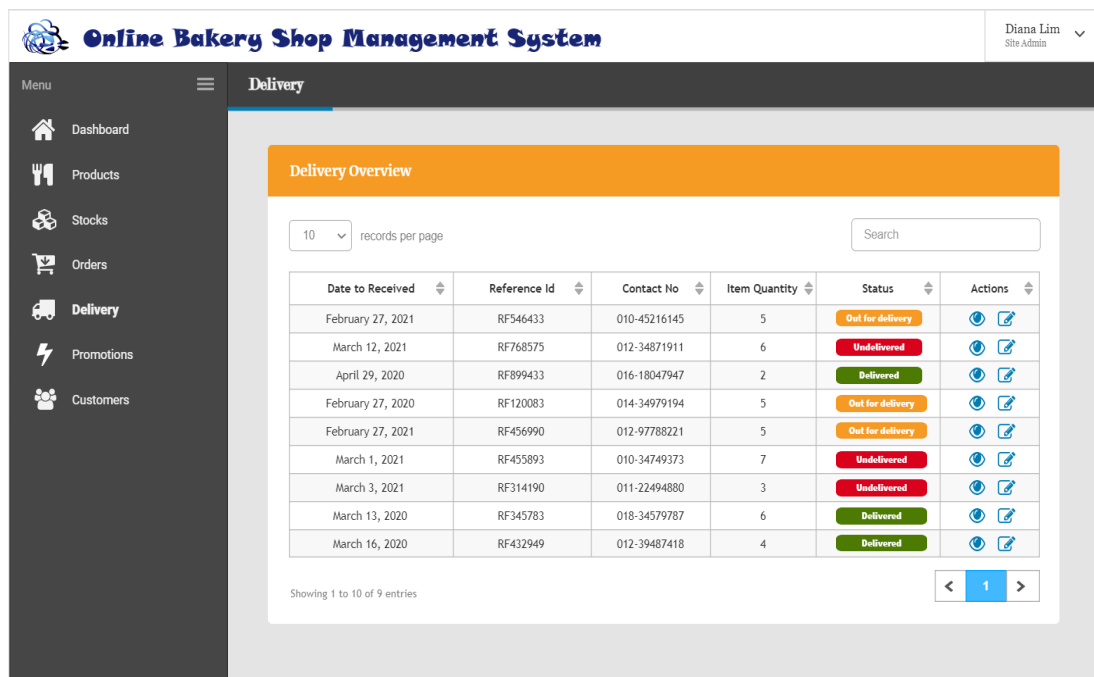


Figure 4.41: Manage Delivery Page

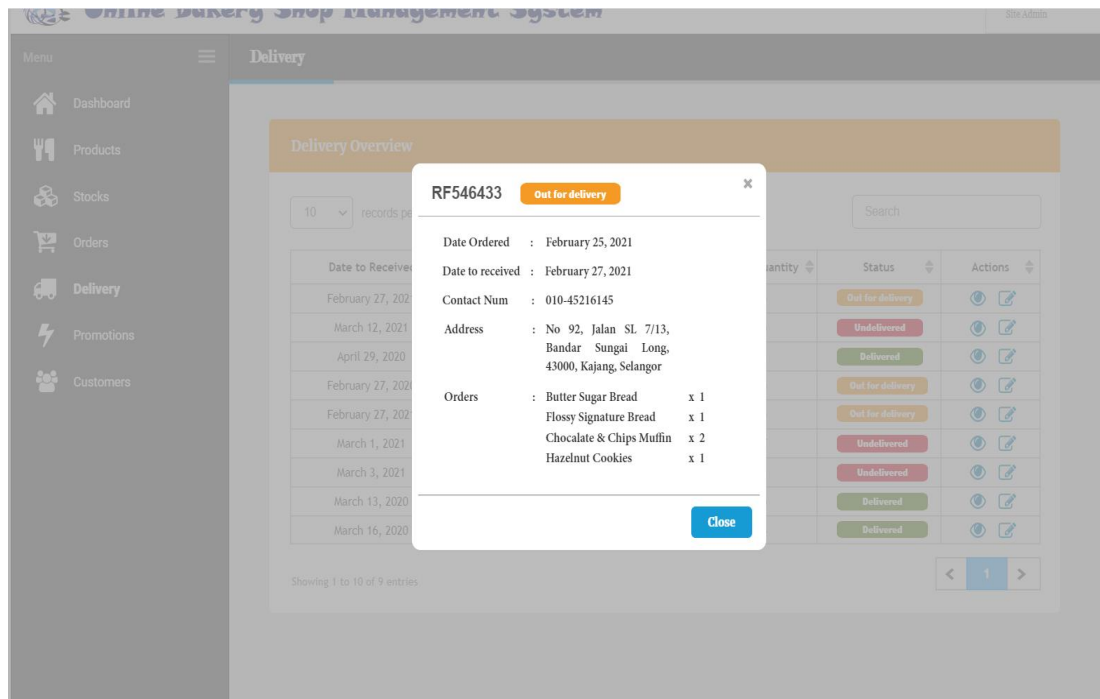


Figure 4.42: View Delivery Details Page

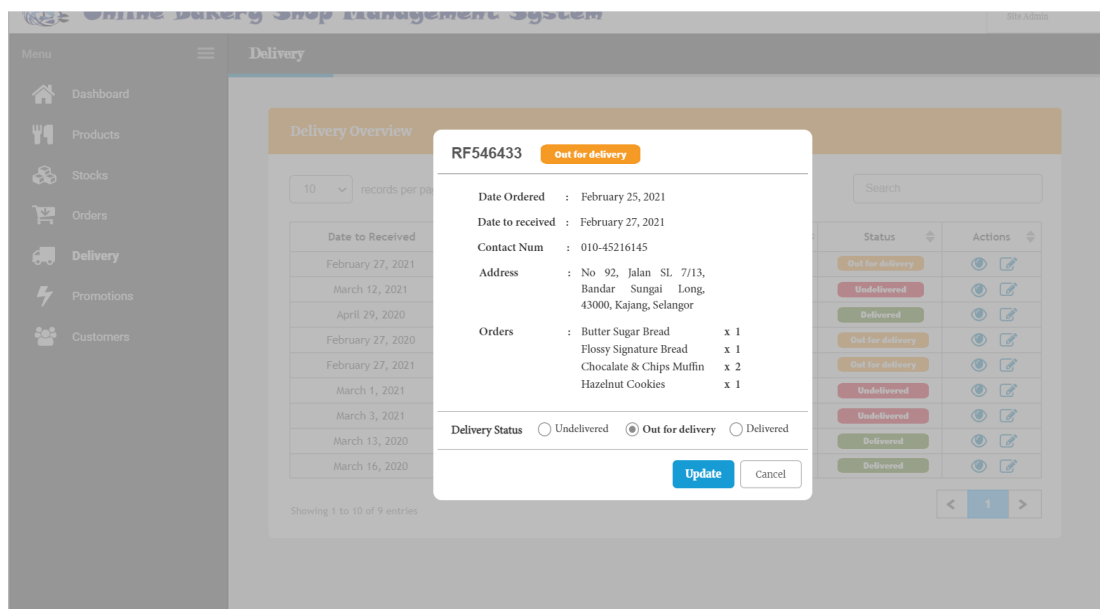


Figure 4.43: Update Delivery Status Page

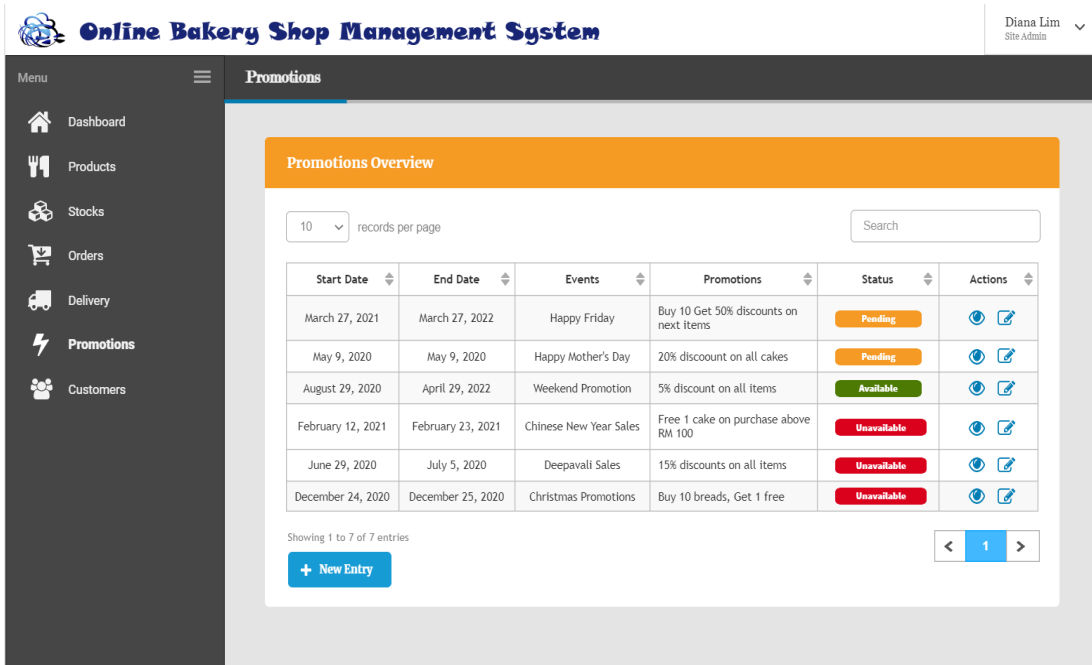


Figure 4.44: Manage Promotions Page

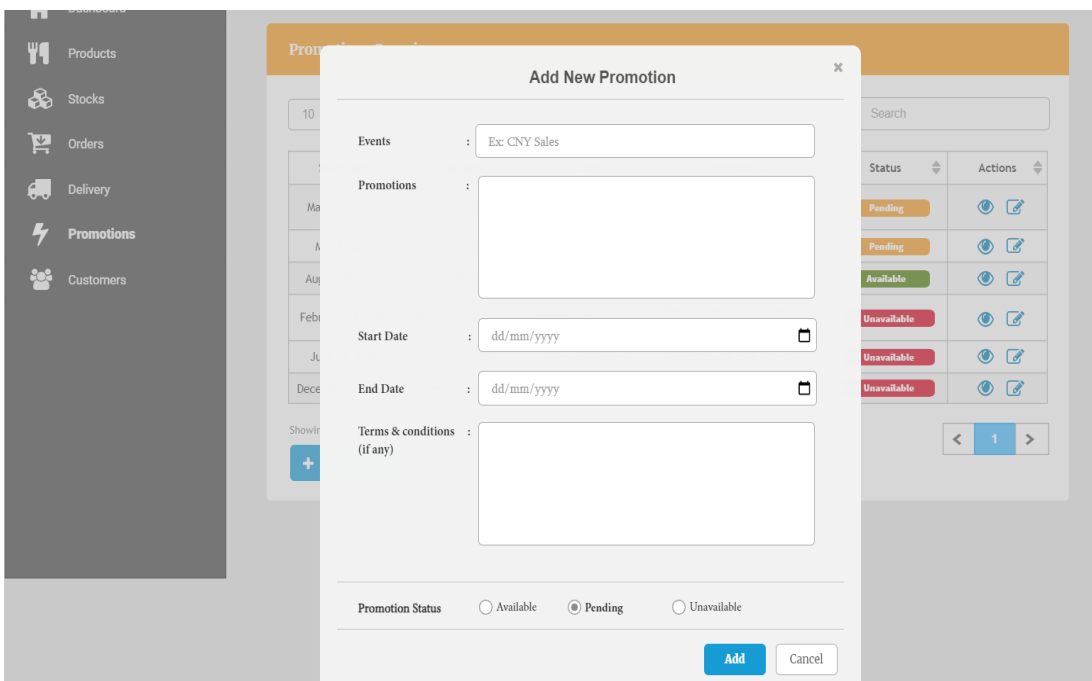


Figure 4.45: Add New Promotion Page

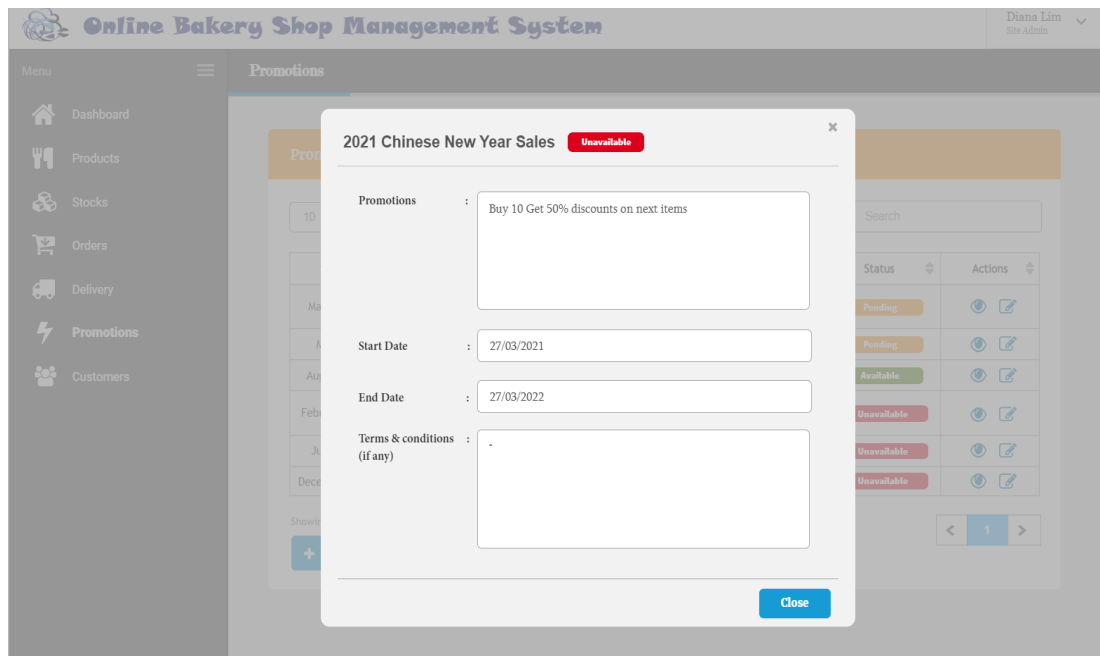


Figure 4.46: View Promotion Details Page

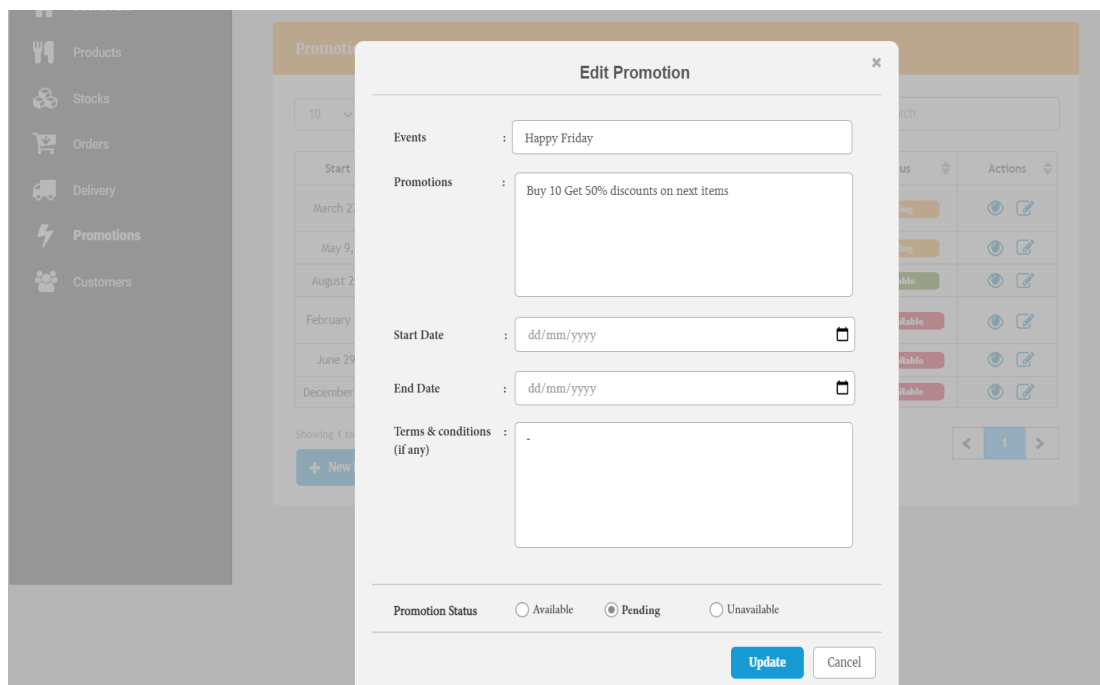


Figure 4.47: Update Promotion Details Page

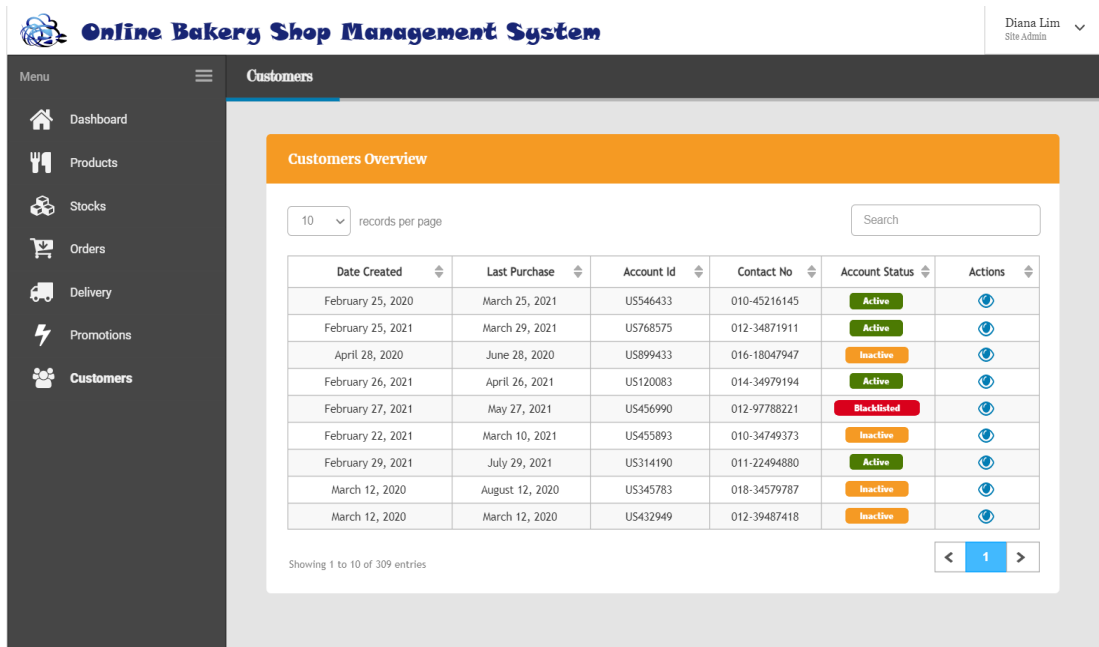


Figure 4.48: Manage Customers Page

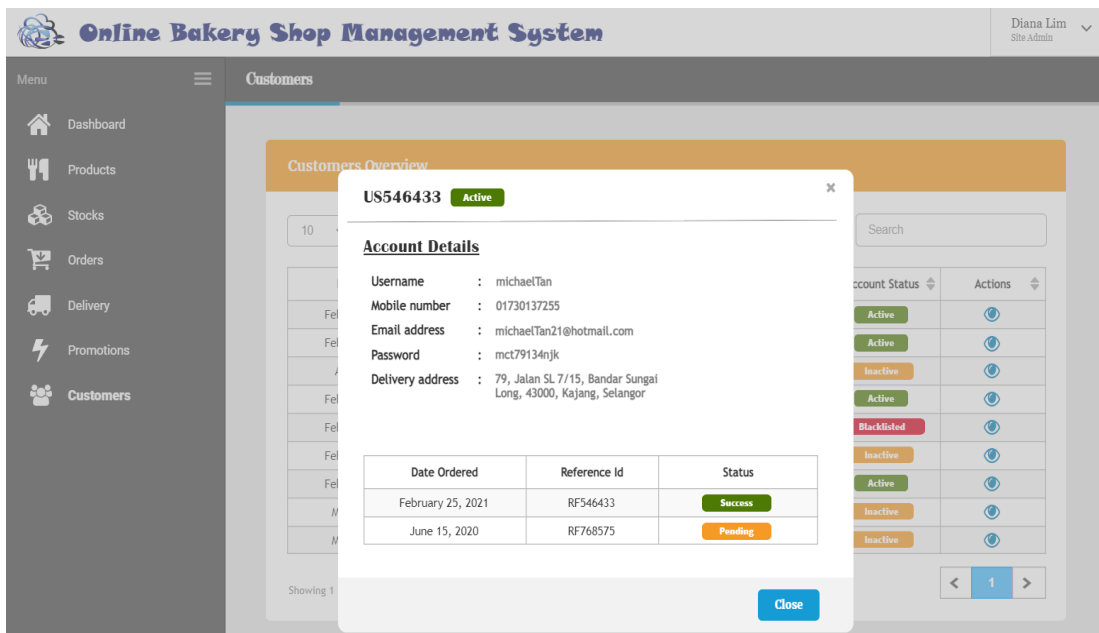


Figure 4.49: View Customer Record Page

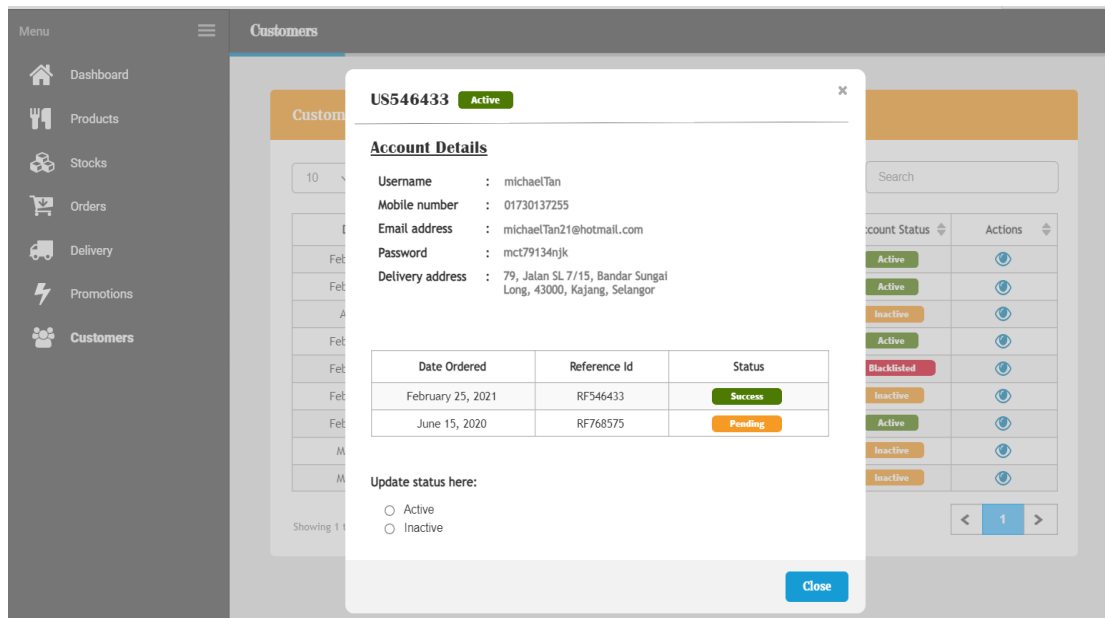


Figure 4.50: Update Customer Record Page

4.6 Summary

In conclusion, this chapter summarizes the specifications of the system by stating its functional and non-functional requirements for both front-end mobile application and back-end web-based management system. Also, an use case diagram is illustrated in this chapter to show an overview of all the activities to be performed by the users associated with the use case descriptions. Lastly, the data collected through the survey questionnaires is analyzed and the low-fidelity prototypes, as well as the high-fidelity prototypes are attached.

CHAPTER 5

SYSTEM DESIGN

5.1 Introduction

This chapter presents an overview on the design of the system with the illustration of system architecture which demonstrated the structure of the system as well as some diagrams which include Activity Diagram that describes the operation of the system by showing a series of actions and workflows in the system, Data Flow Diagram (DFD) that maps out the flow of information or data through the system and lastly Conceptual Model Diagram that visualizes the relationship between models of the system.

5.2 System Architecture Design

As shown in Figure 5.1 below, the system architecture of this project is three-tier architecture. It consists of mainly three layers, which are the presentation layer, or user interface, the application layer, where the data is processed and the data layer, where the data associated with the system is stored and managed. The fact that each layer runs on its own infrastructure is one of the major reasons for using a three-tier architecture for this project. In other words, each layer can operate on the operating system and server platform that best suits its functional needs, such as a web server, application server, or database server. Therefore, each layer can be developed simultaneously and can be updated as required without affecting the other layers. This undeniably promote faster development, improve scalability as any layer can be customized independently of the others as needed as well as improve reliability as an outage in one layer is less likely to impact the performance of the other layers. The most importantly, three-tier architecture improves security due to the reason that the presentation layer cannot communicate directly with the data layer whereby this can prevent the malicious exploits.

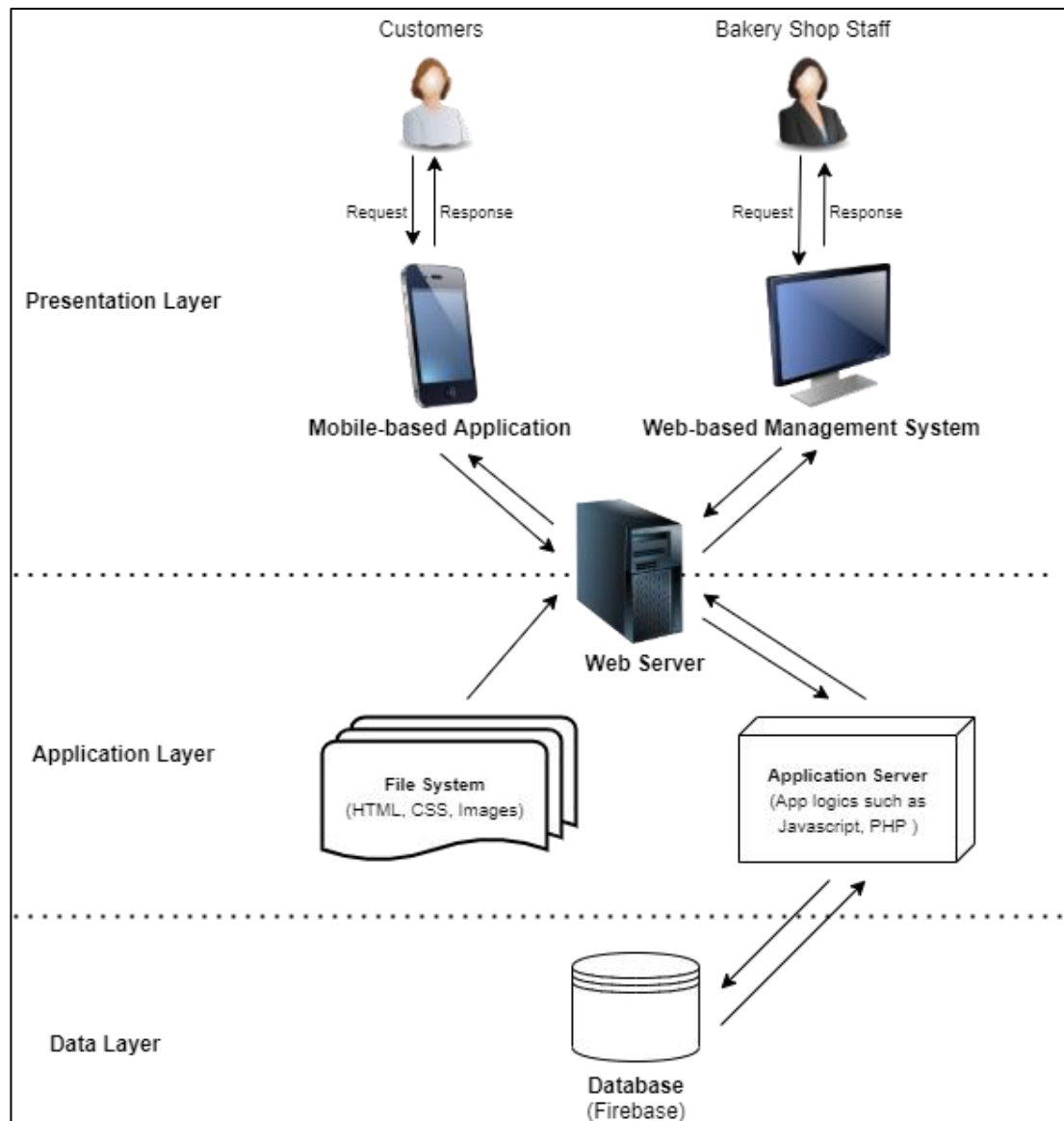


Figure 5.1: Architecture Design of the System

Presentation layer, the top-most layer of the application refers to the front-end of the system. In other words, it is responsible for the visualization of the system and represents the user interface. It is a communication layer of the system which users can interact directly with the system. The main purpose of the presentation layer is to display all the information related to the system as well as collect information from the user. For this project, the presentation layer for the bakery shop staff will be web presentation while for the customers will be mobile application.

Next, application layer, also known as middle layer or logic layer, is the layer where the information collected in the presentation layer and data layer is processed using business logic. It controls the system's core functionality by performing detailed

processing. Business logic acts as an intermediary for data exchange between the presentation layer and the data layer. For this project, this business layer will be developed using AJAX, PHP and JavaScript code. The programs of the business layer receive HTTP GET or POST requests from the presentation layer which dictate how it behaves as well as determines how data from the database is used and what it can and cannot do within the system itself.

Lastly, the data layer is the data or backend layer of a system. This is the layer where the information processed by the application is stored and managed. In this project, the data layer will be implemented using NodeJS, database management software, MySQL, PHP MyAdmin as well as NoSQL Database server, which is Firebase.

5.3 System Design Models

This section includes the illustration of conceptual data model that describes the organized view of database concepts and their relationships. Additionally, activity diagram that visually shows the all the activities performed by a system as well as data flow diagram that illustrates the way information or data flows through a process or system are also presented in this section.

5.3.1 Conceptual Data Modelling

Conceptual data model at below illustrates the structured view of the database design and data required to support the business processes by establishing the entities, their attributes and their relationships.

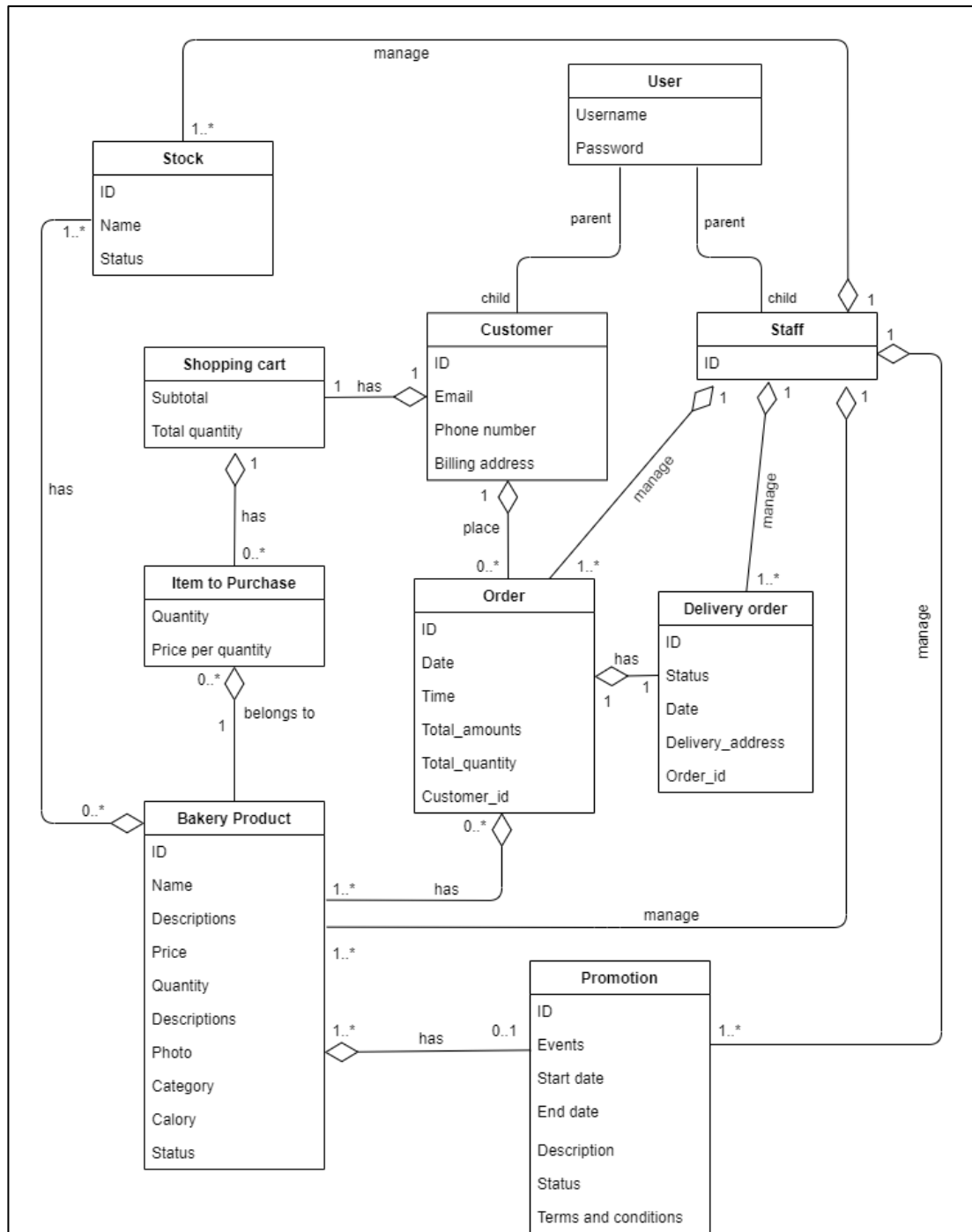


Figure 5.2: Conceptual Data Model

5.3.2 Activity Diagram

Activity diagrams at below provide a view of the behaviour of the system by describing the sequence of actions in a process. It portrays the workflow from one activity to another and put emphasis on the condition of flow and the order in which it occurs.

5.3.2.1 Activity Diagram for Mobile-based Application

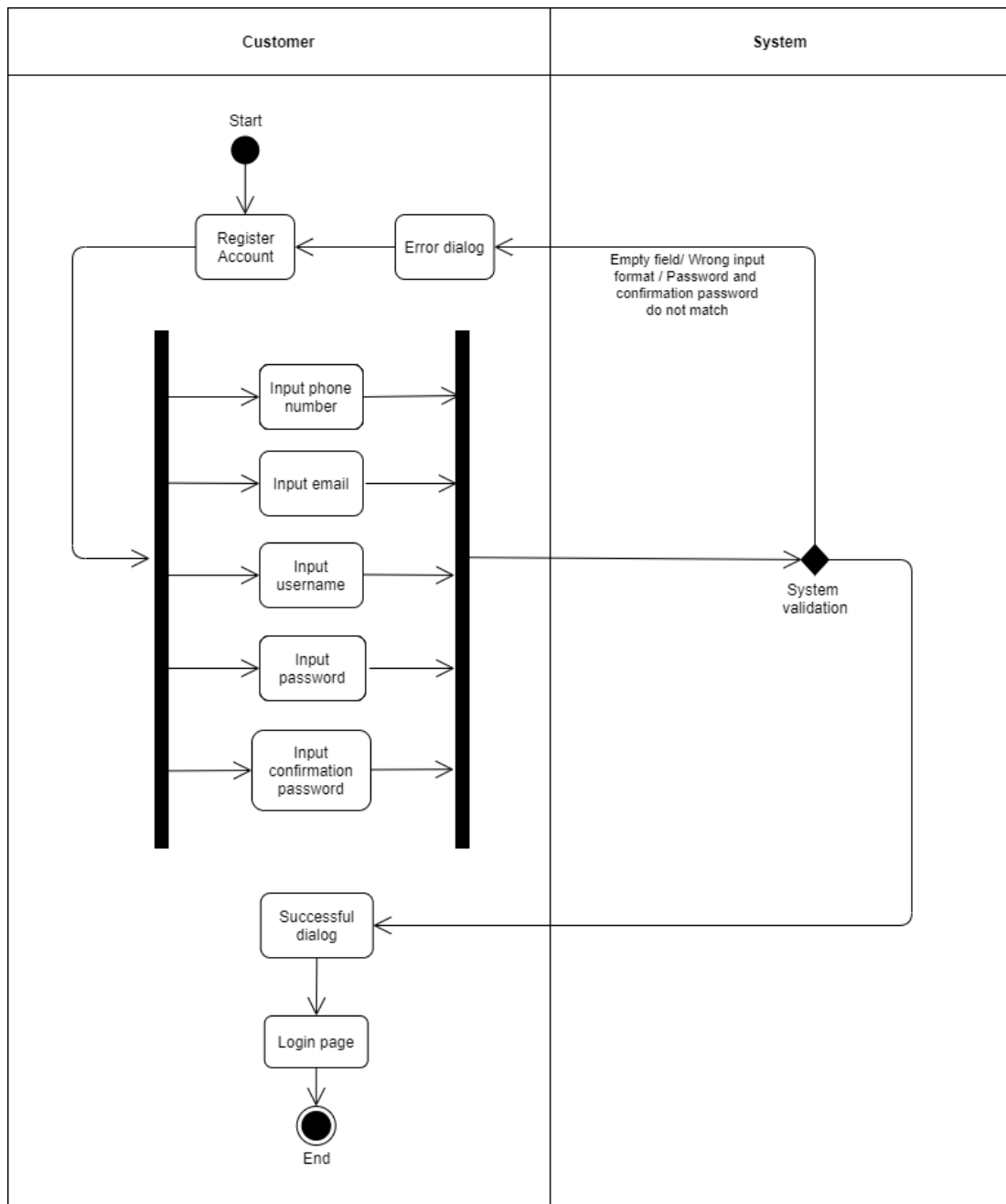


Figure 5.3: Activity Diagram for Register Account

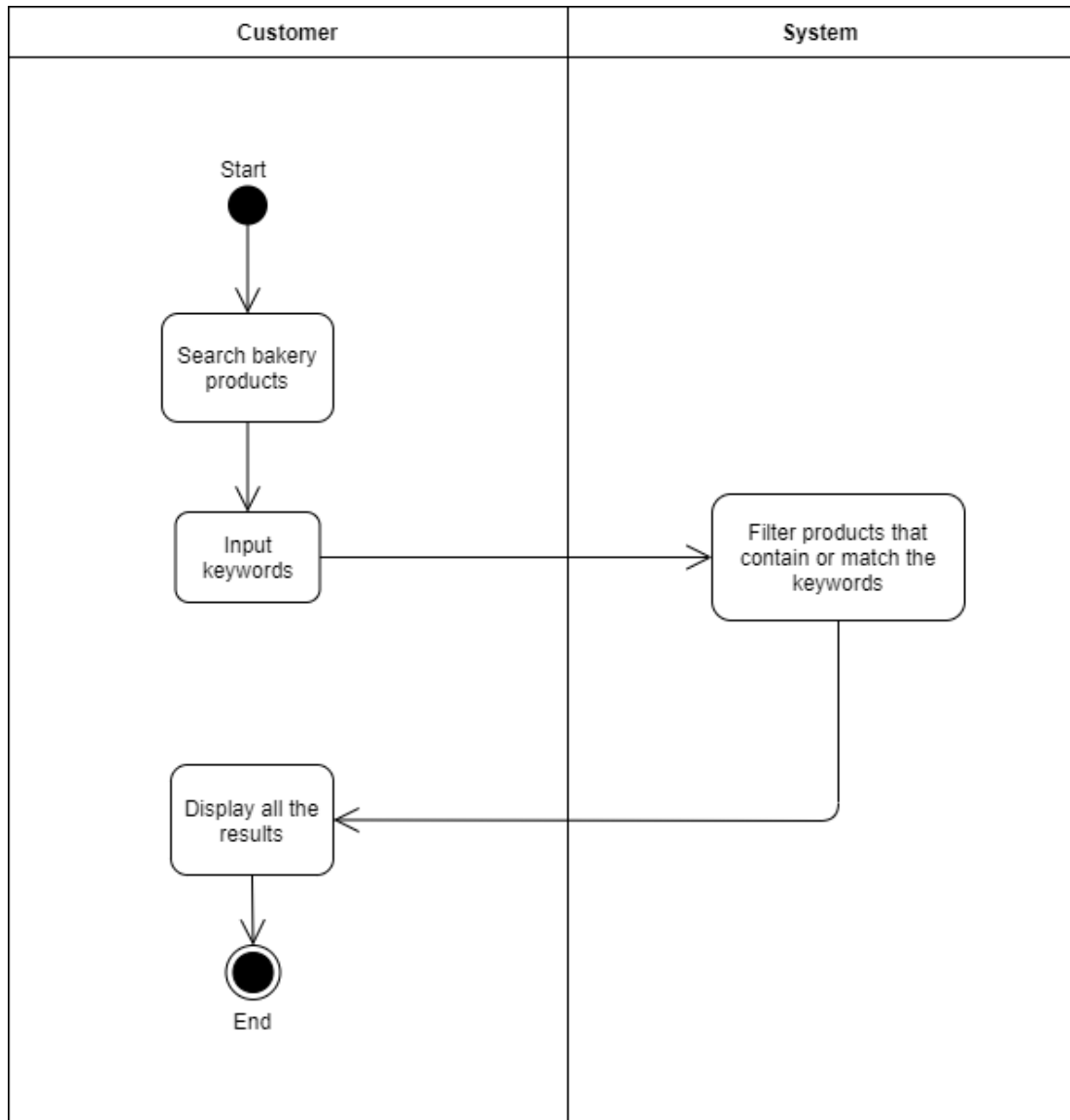


Figure 5.4: Activity Diagram for Search Items

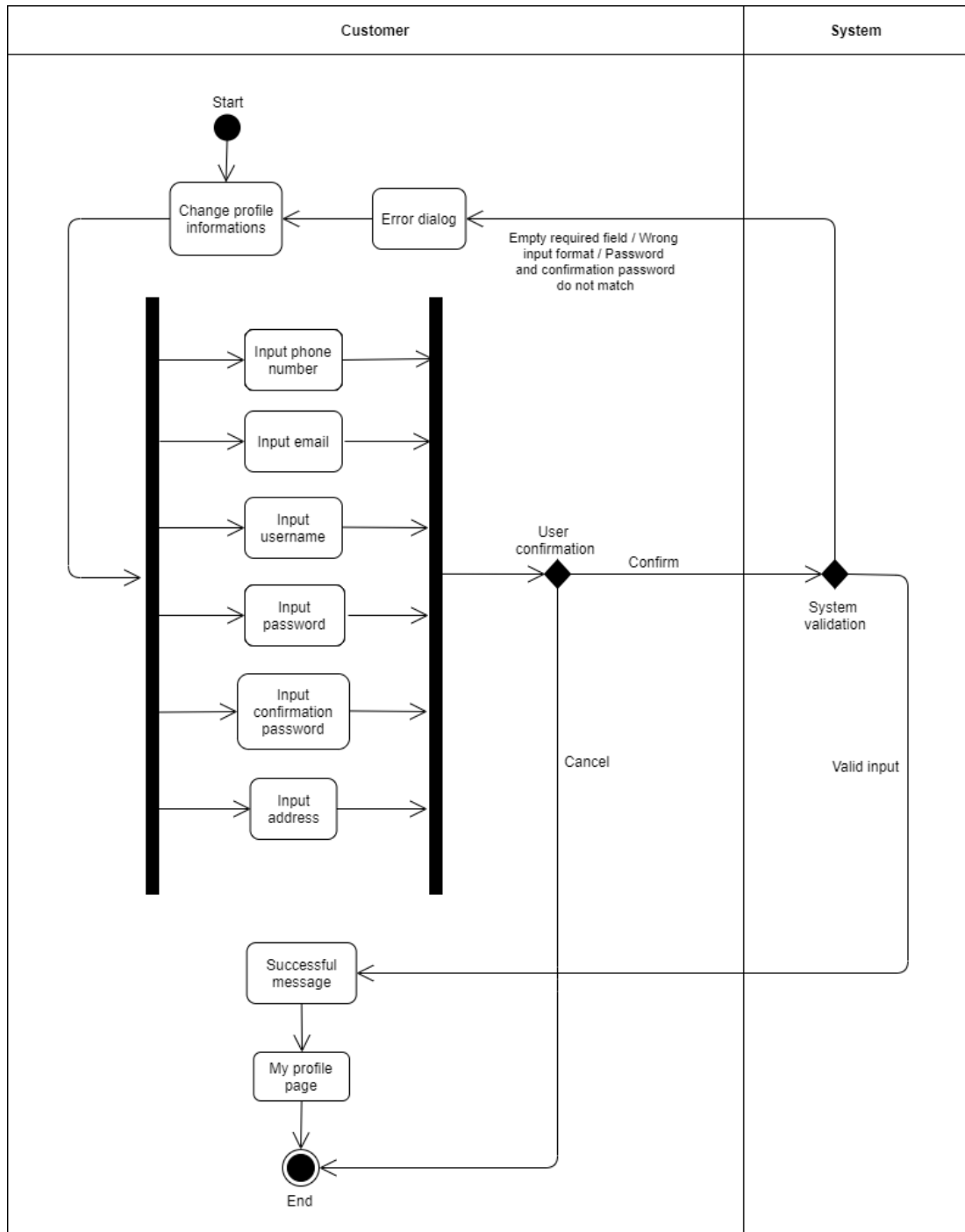


Figure 5.5: Activity Diagram for Manage Profile

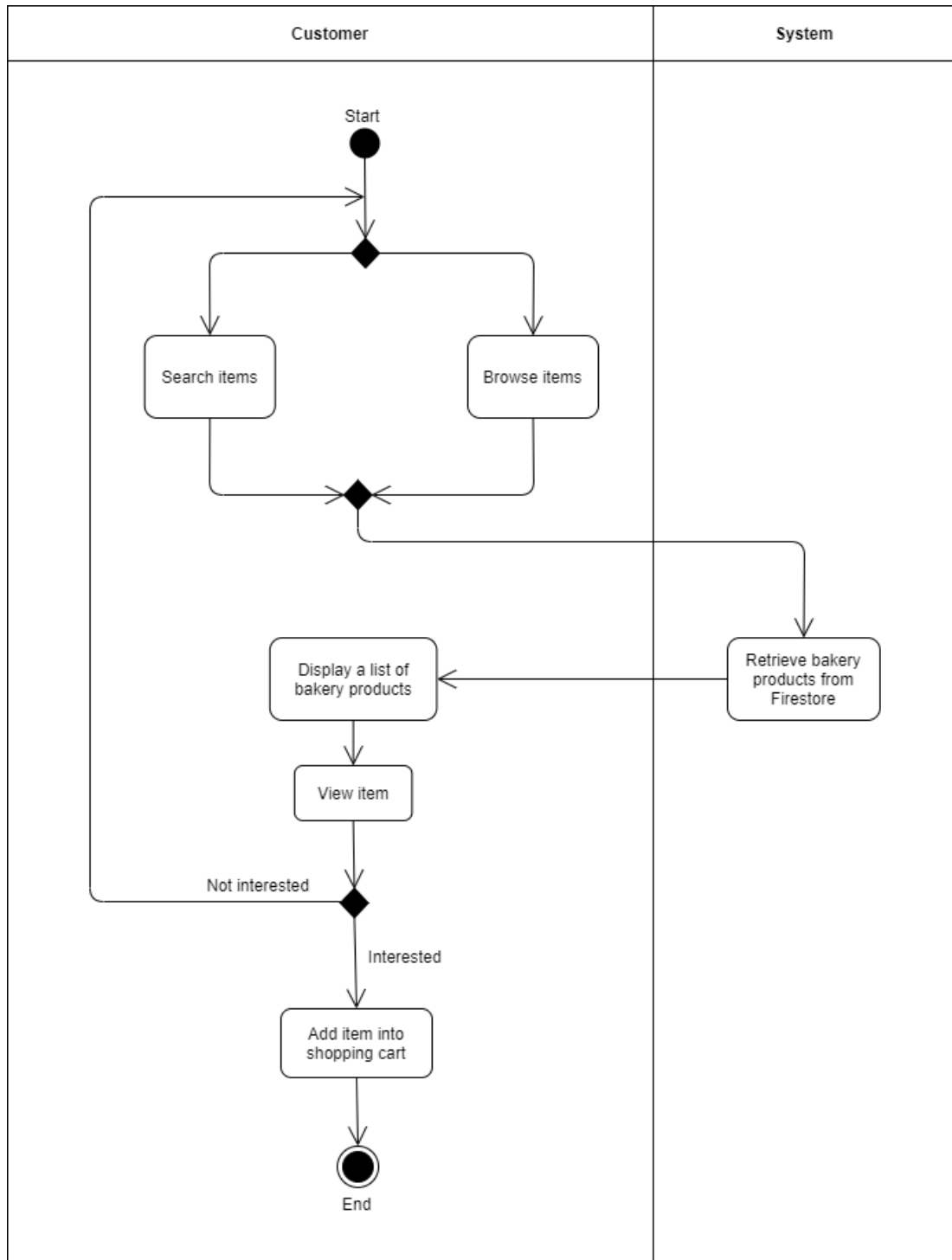


Figure 5.6: Activity Diagram for Add Item Into Shopping Cart

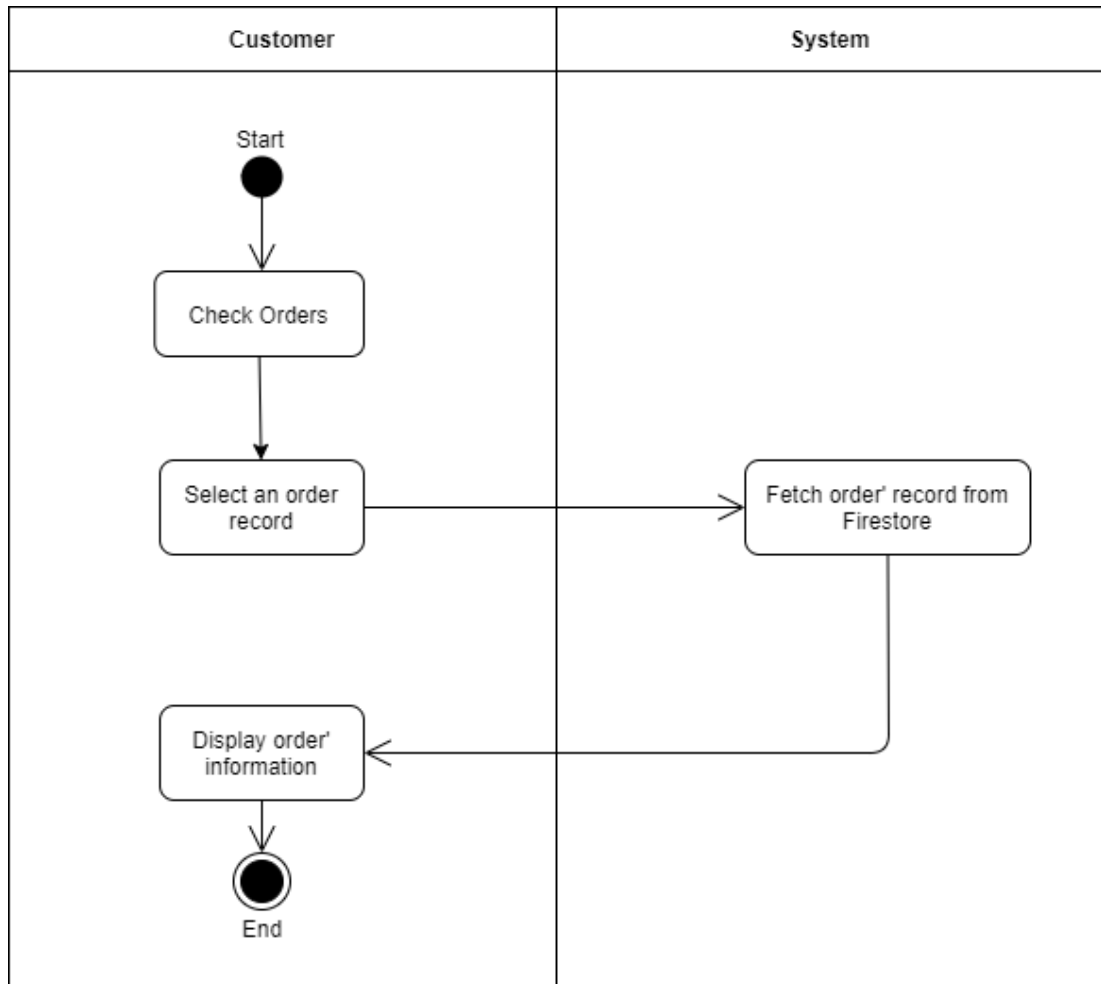


Figure 5.7: Activity Diagram for Check Orders

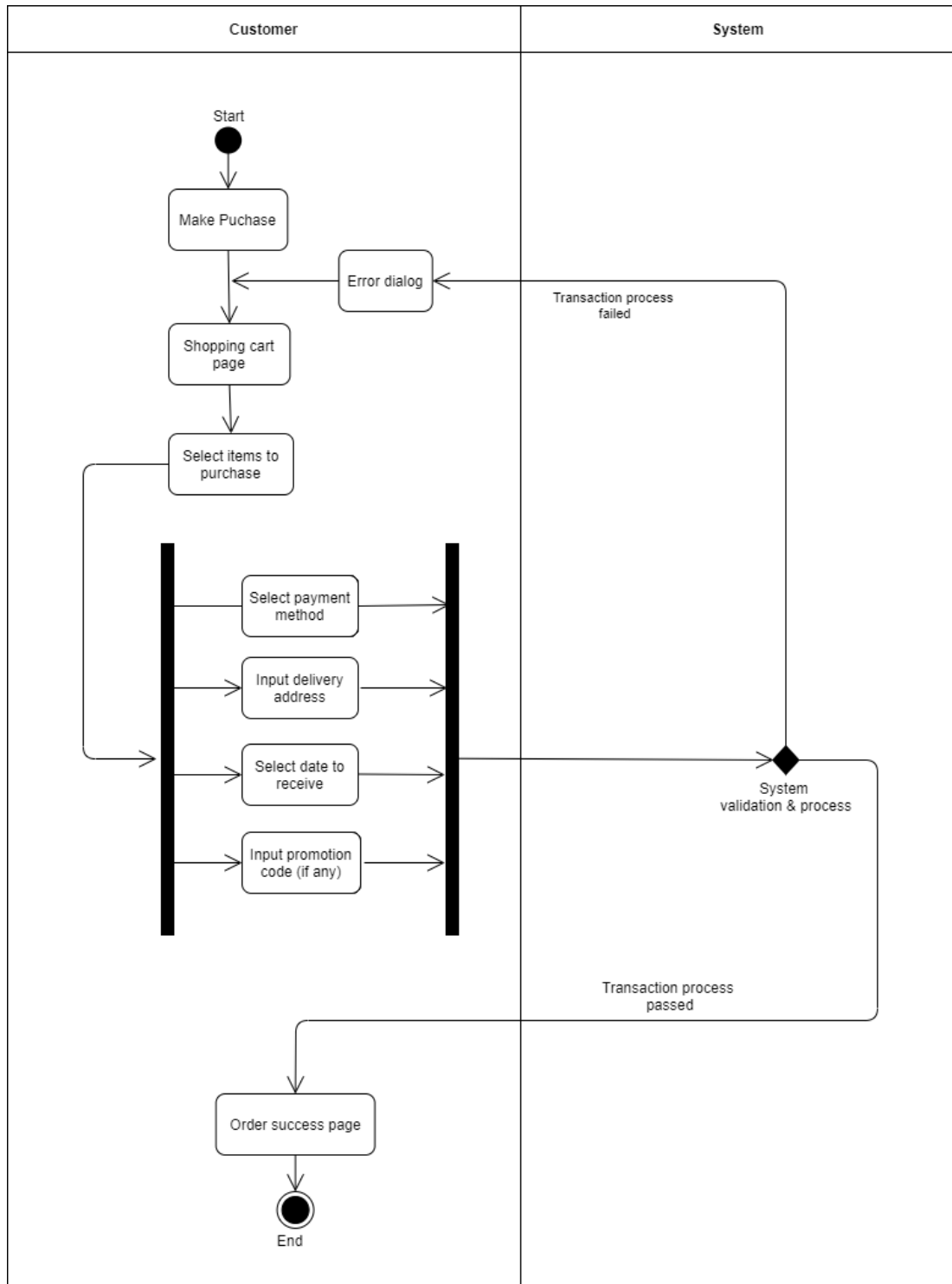


Figure 5.8: Activity Diagram for Make Purchase

5.3.2.2 Activity Diagram for Web-based Management System

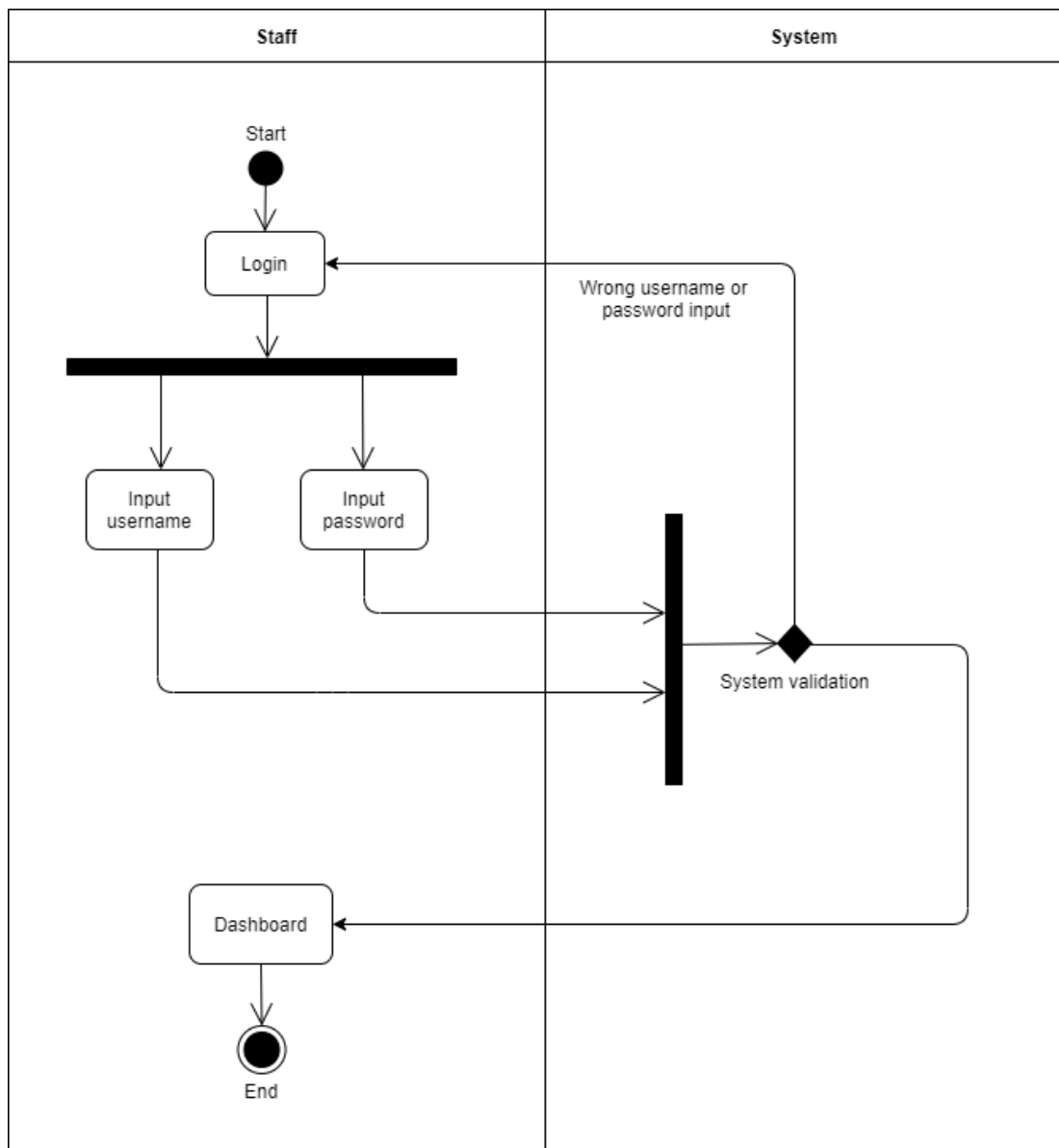


Figure 5.9: Activity Diagram for Login

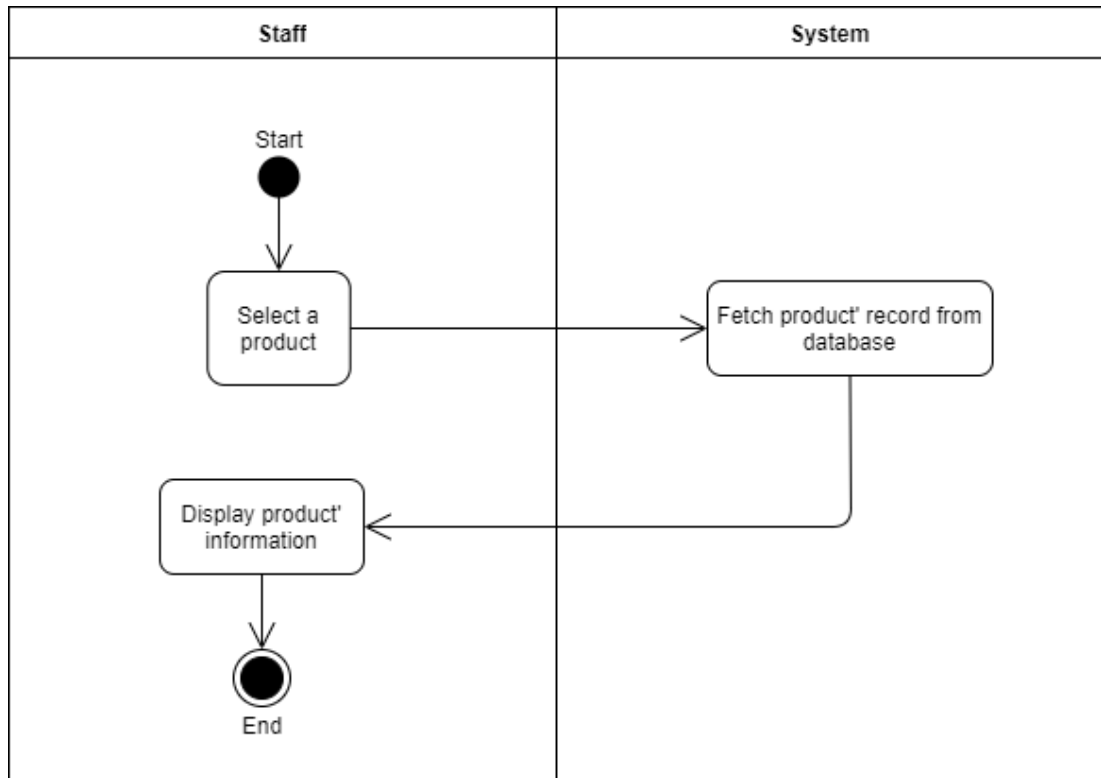


Figure 5.10: Activity Diagram for View A Product

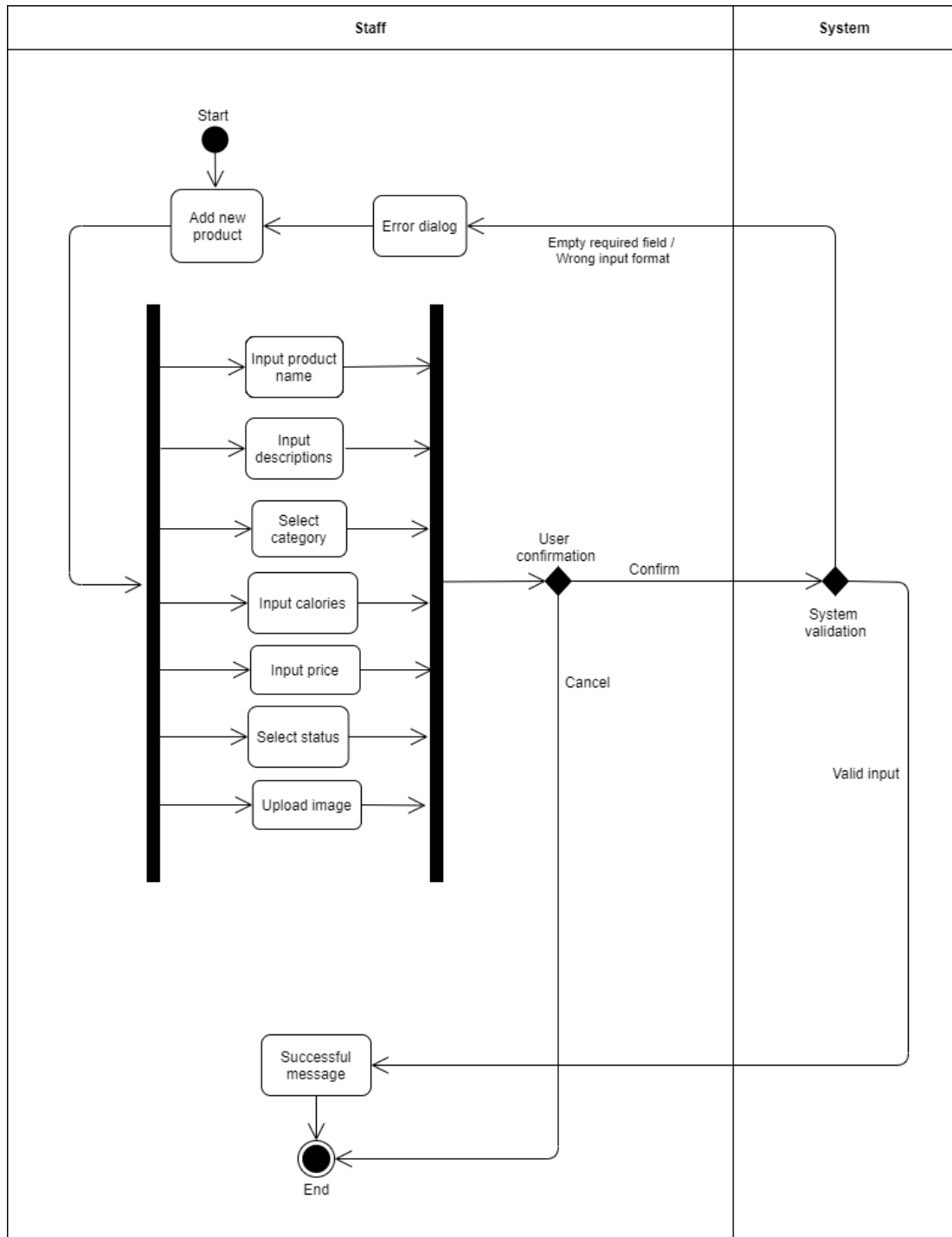


Figure 5.11: Activity Diagram for Add New Product

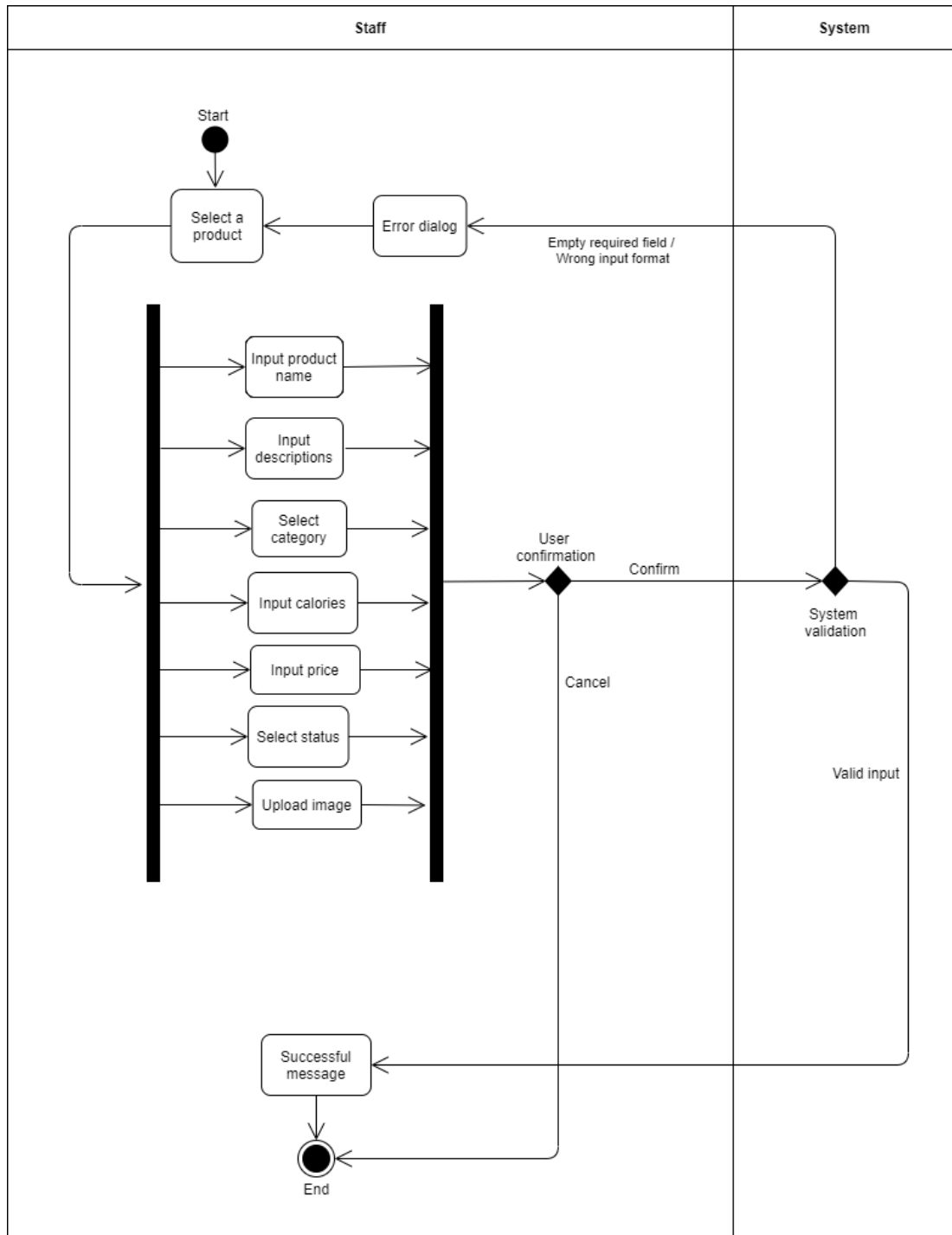


Figure 5.12: Activity Diagram for Update Product

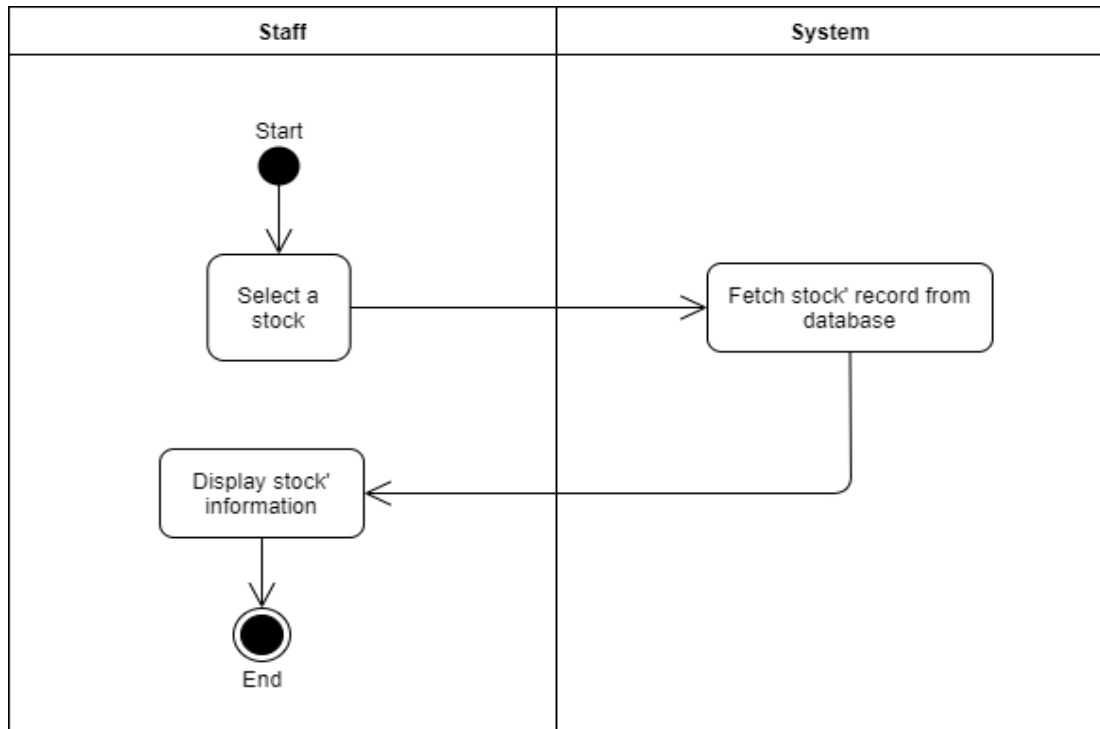


Figure 5.13: Activity Diagram for View A Stock

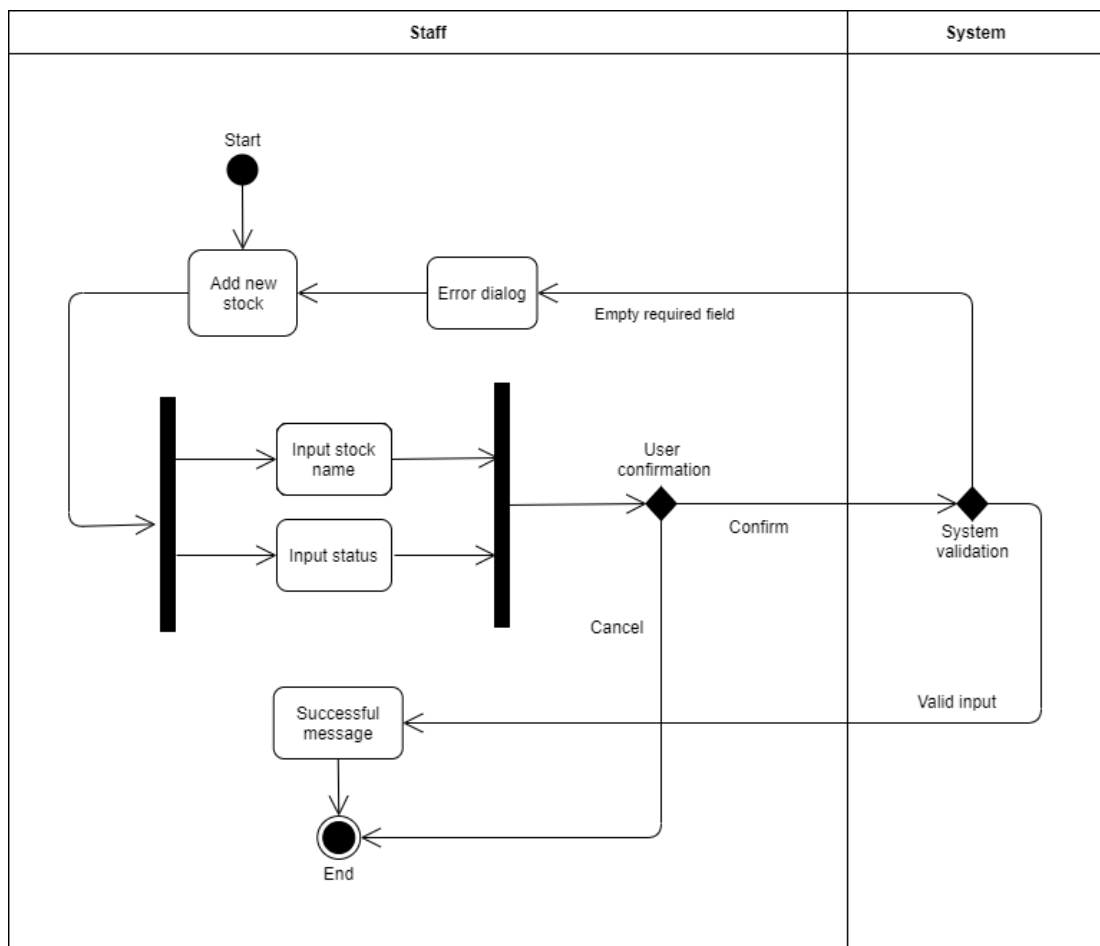


Figure 5.14: Activity Diagram for Add New Stock

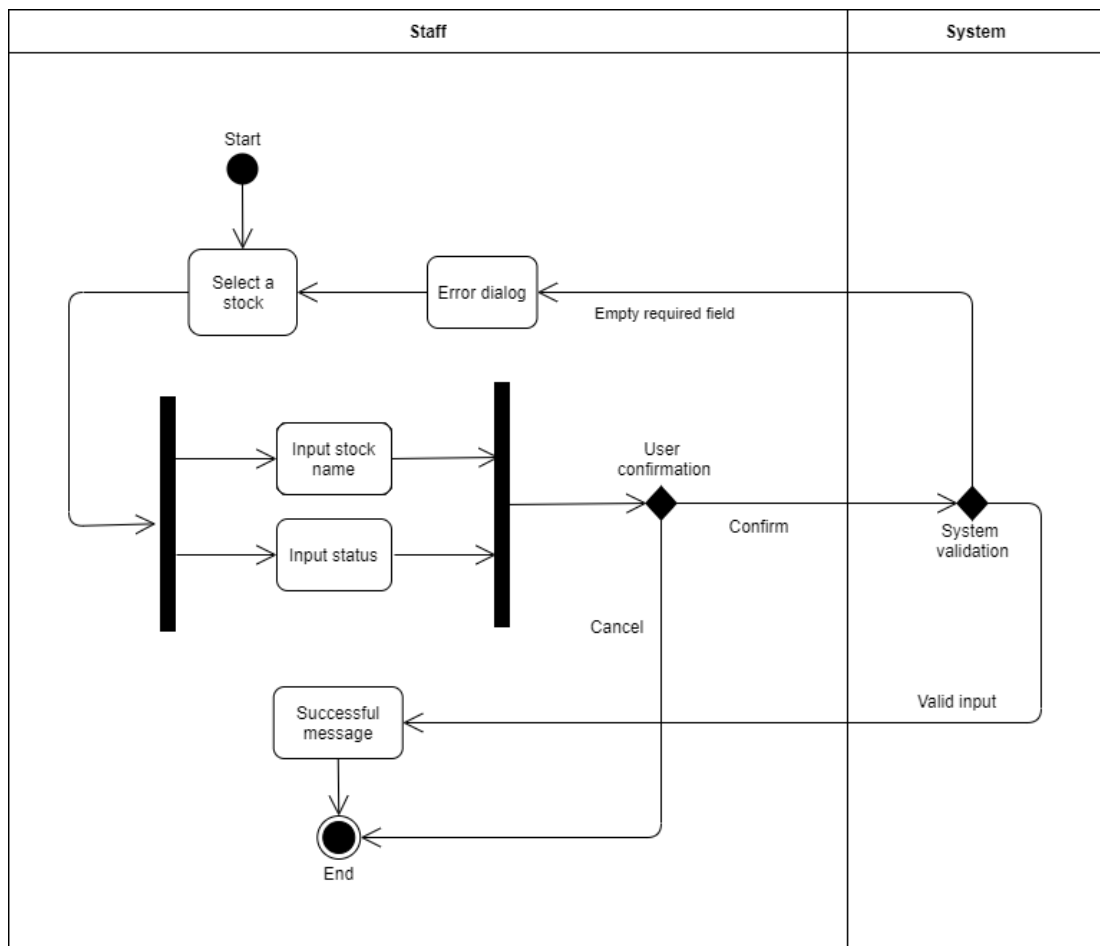


Figure 5.15: Activity Diagram for Update Stock

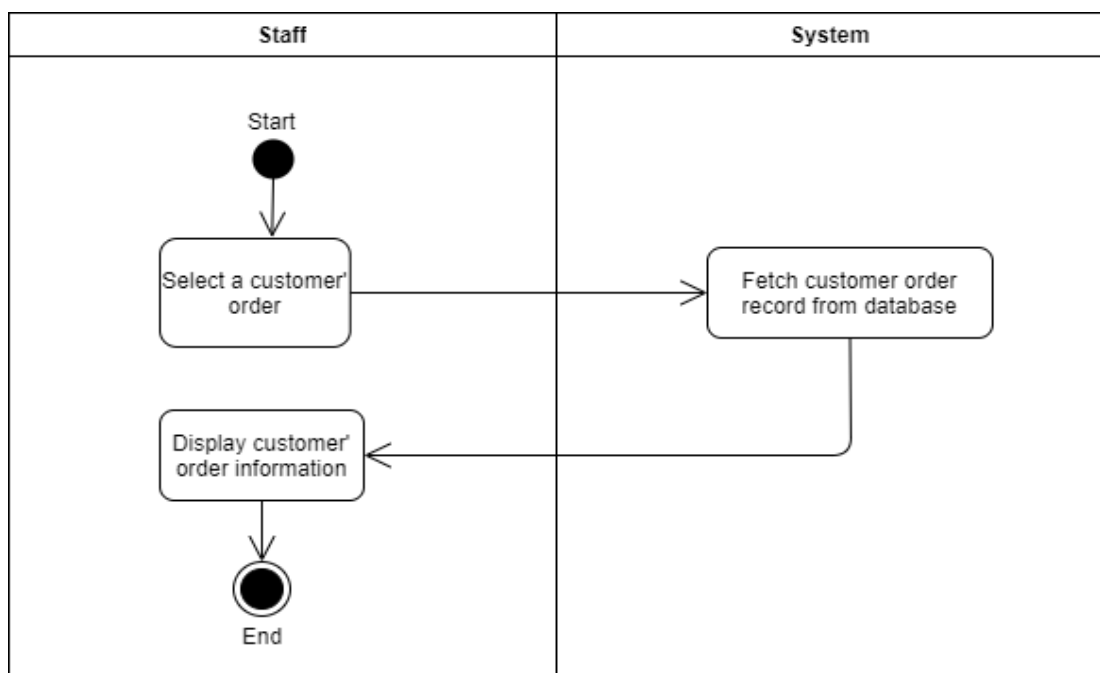


Figure 5.16: Activity Diagram for View A Customer' Order

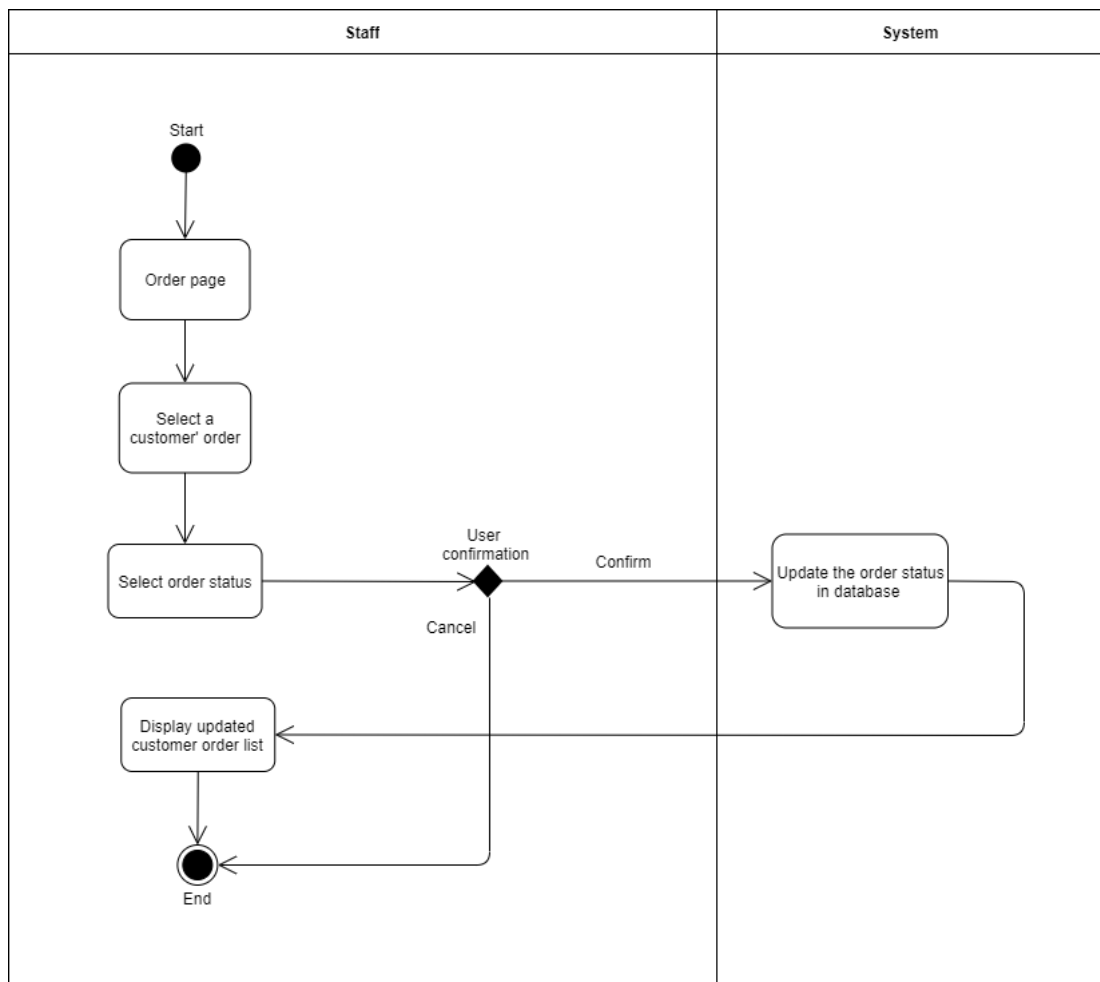


Figure 5.17: Activity Diagram for Update Order' Status

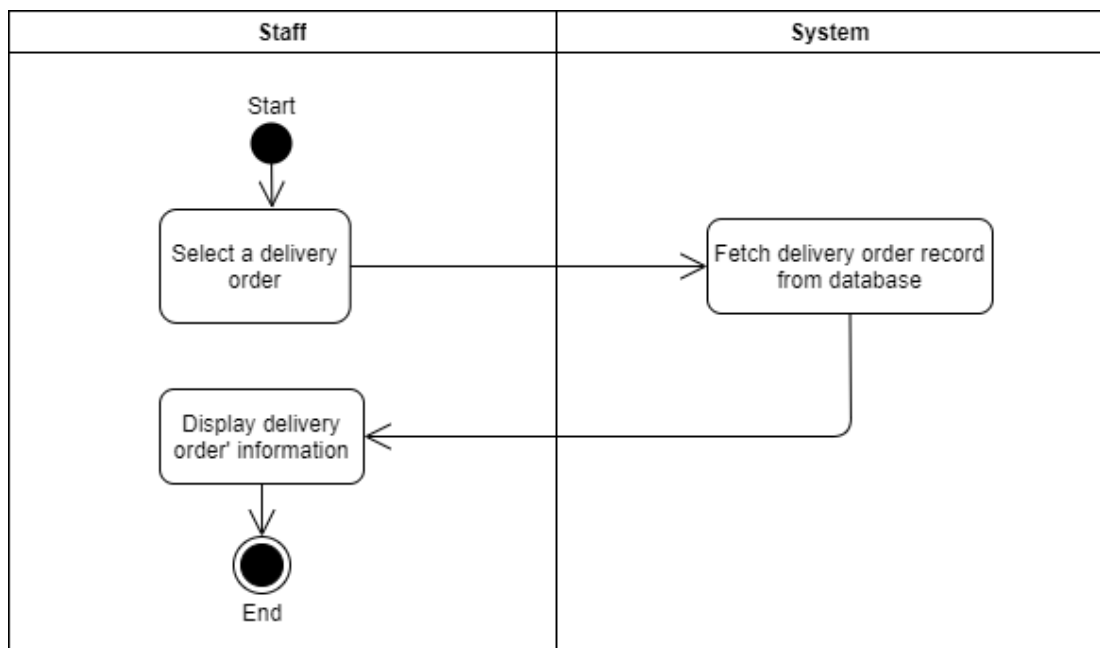


Figure 5.18: Activity Diagram for View A Delivery Order

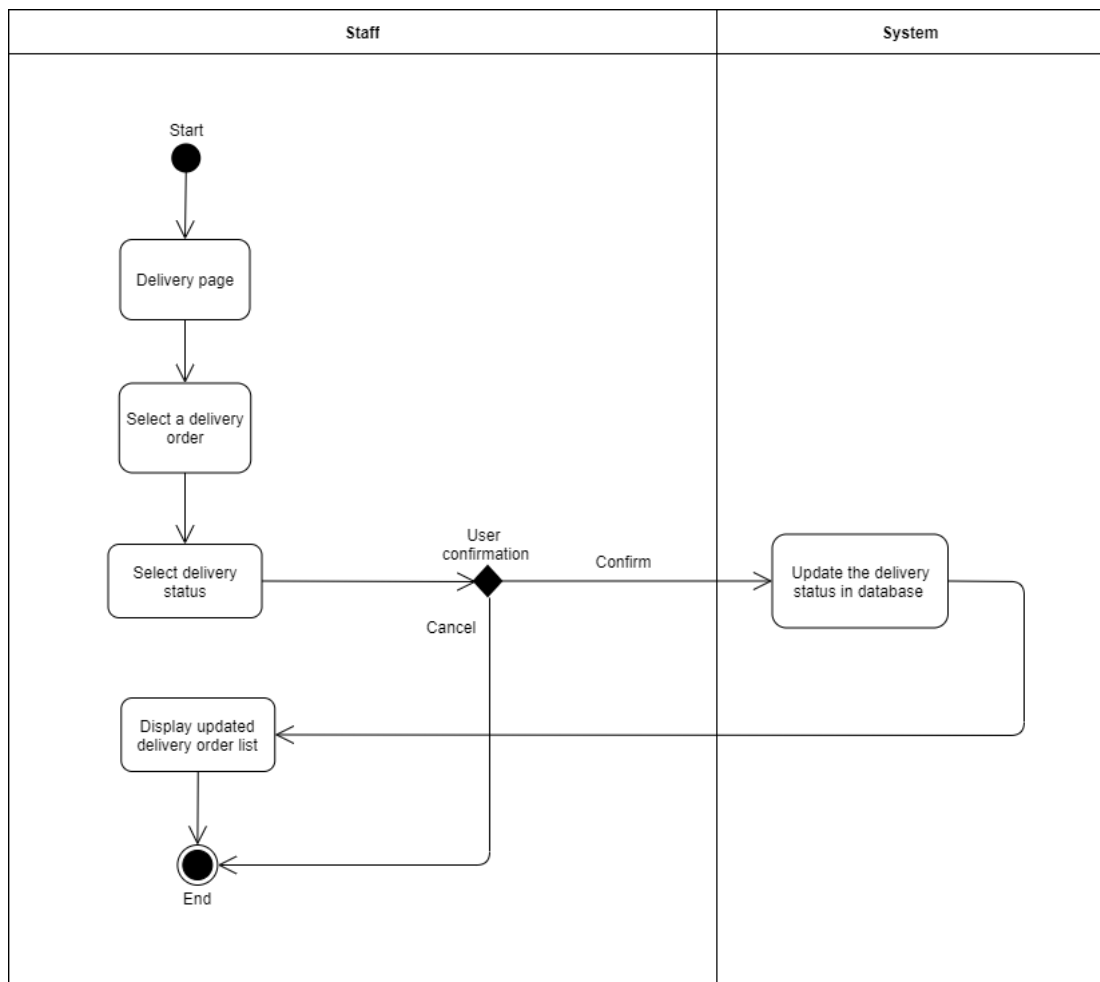


Figure 5.19: Activity Diagram for Update Delivery Status

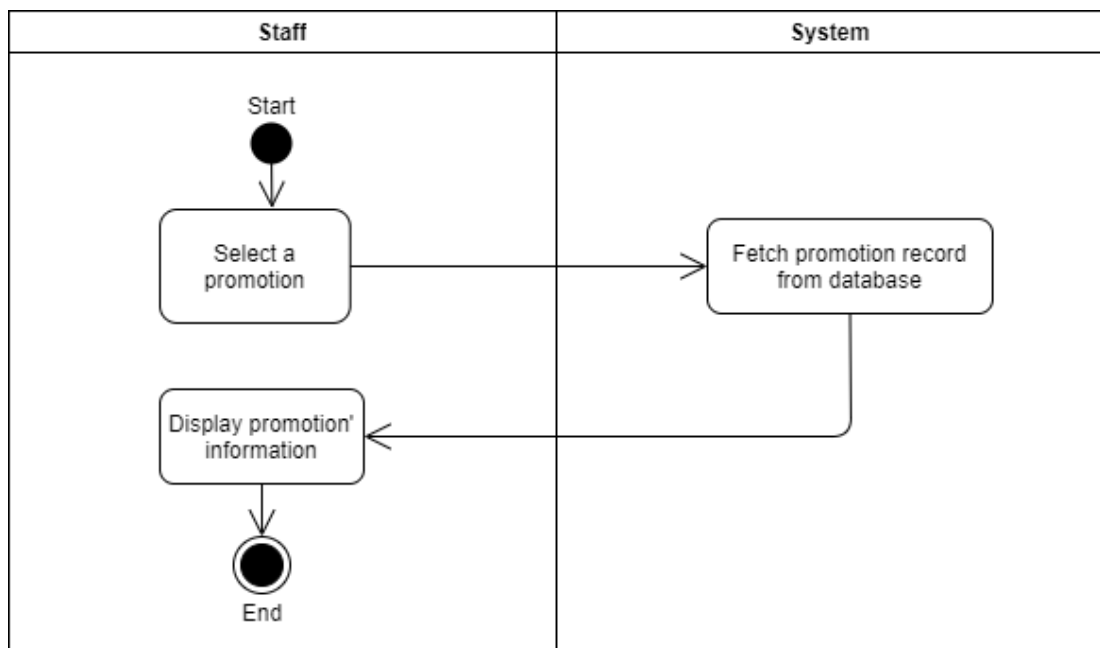


Figure 5.20: Activity Diagram for View A Promotion

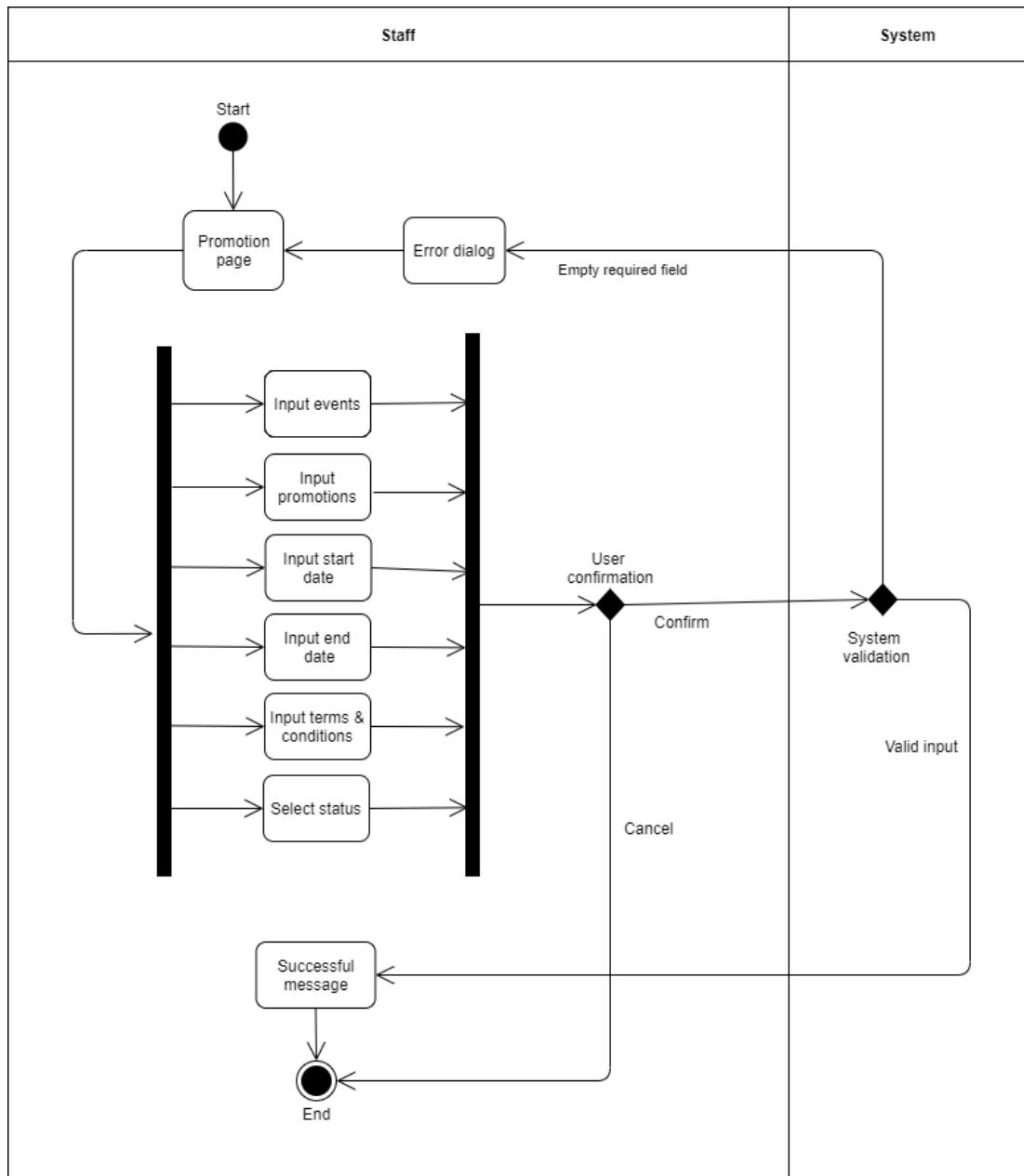


Figure 5.21: Activity Diagram for Add a New Promotion

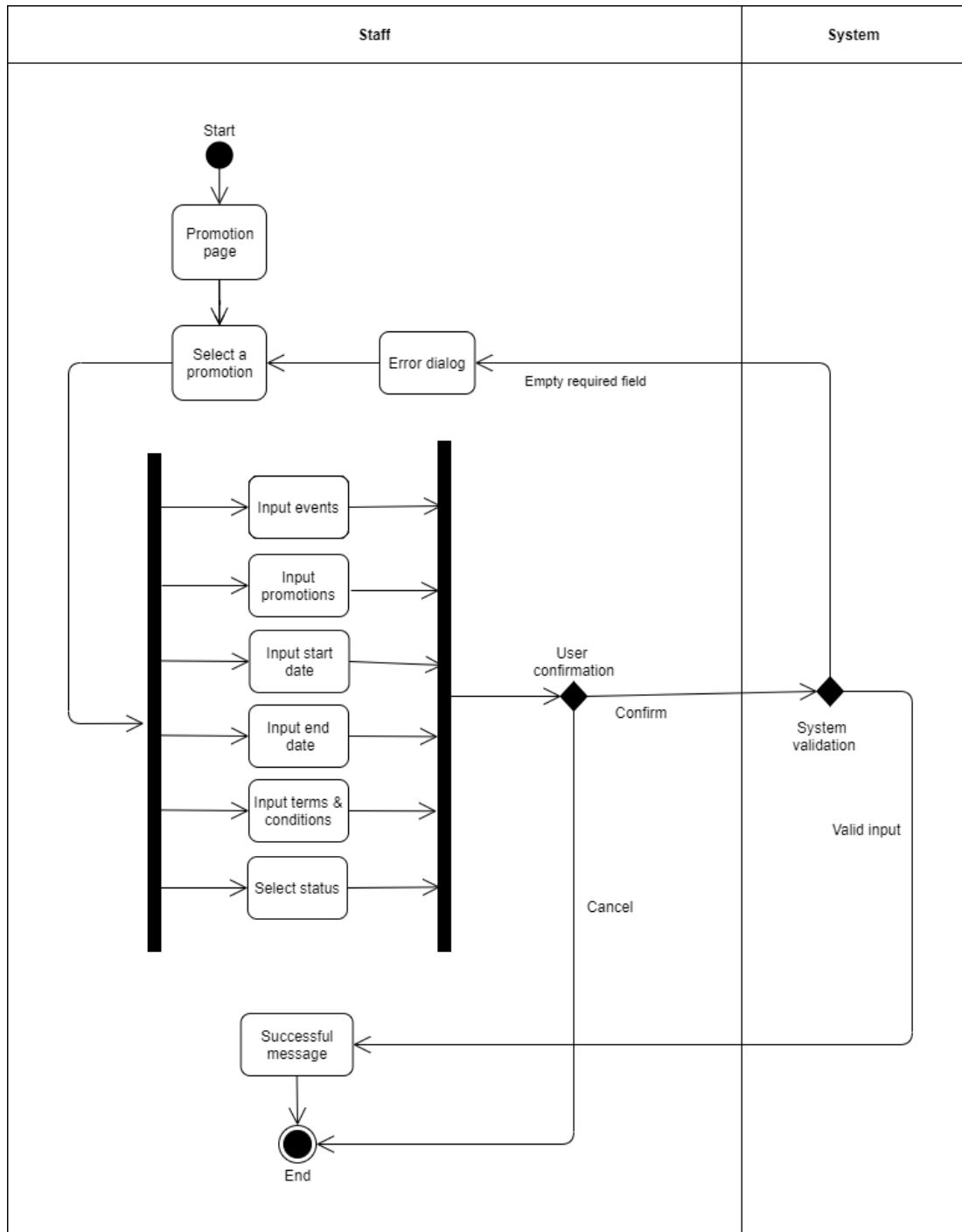


Figure 5.22: Activity Diagram for Update Promotion

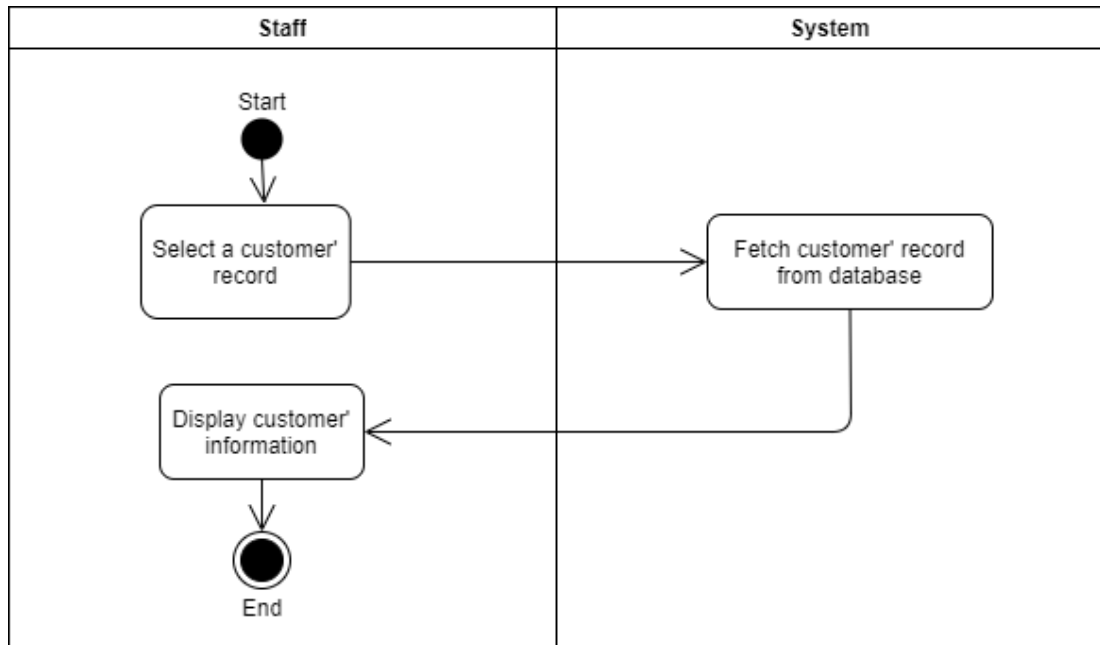


Figure 5.23: Activity Diagram for View A Customer' Record

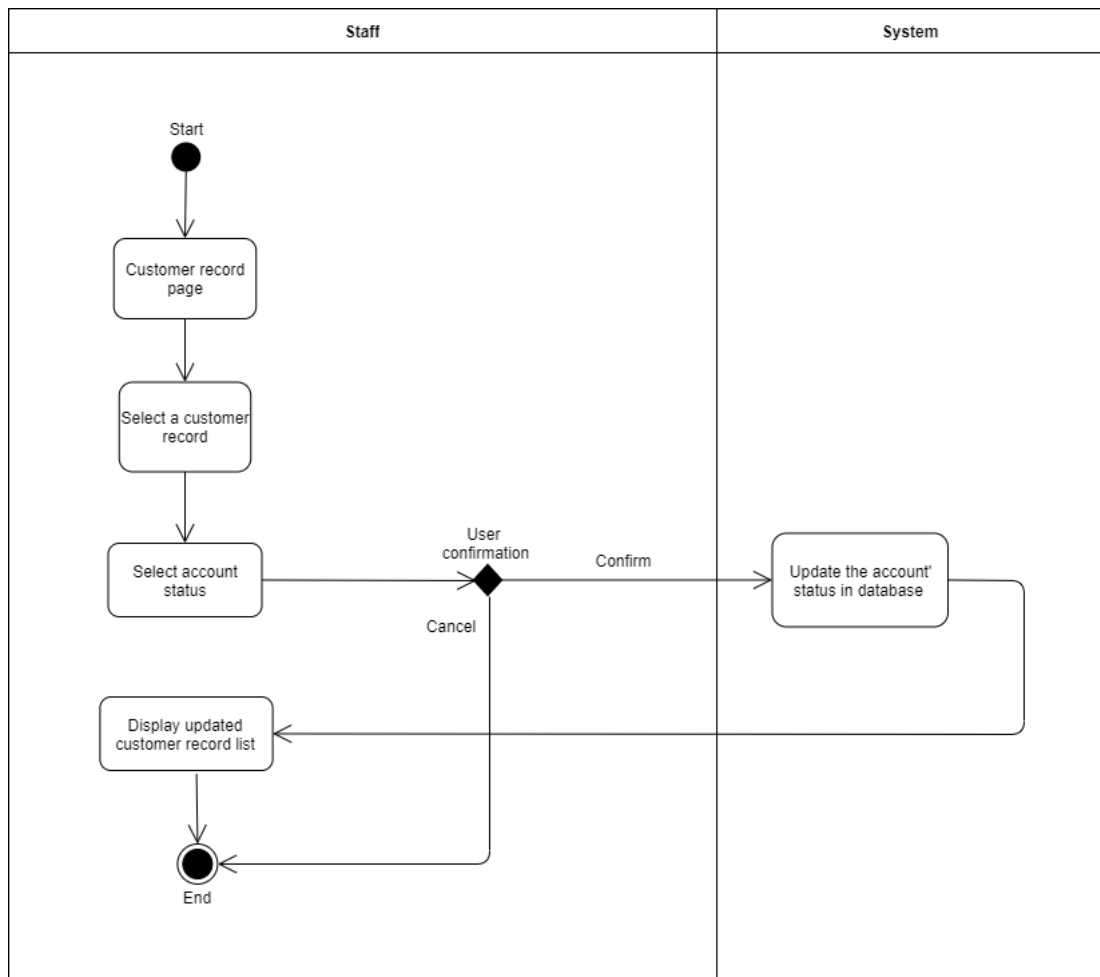


Figure 5.24: Activity Diagram for Update Customer' Account Status

5.3.3 Data Flow Diagram (DFD)

Data flow diagram (DFD) at below illustrates how information and data is processed by the system in terms of inputs and outputs.

5.3.3.1 Context Diagram

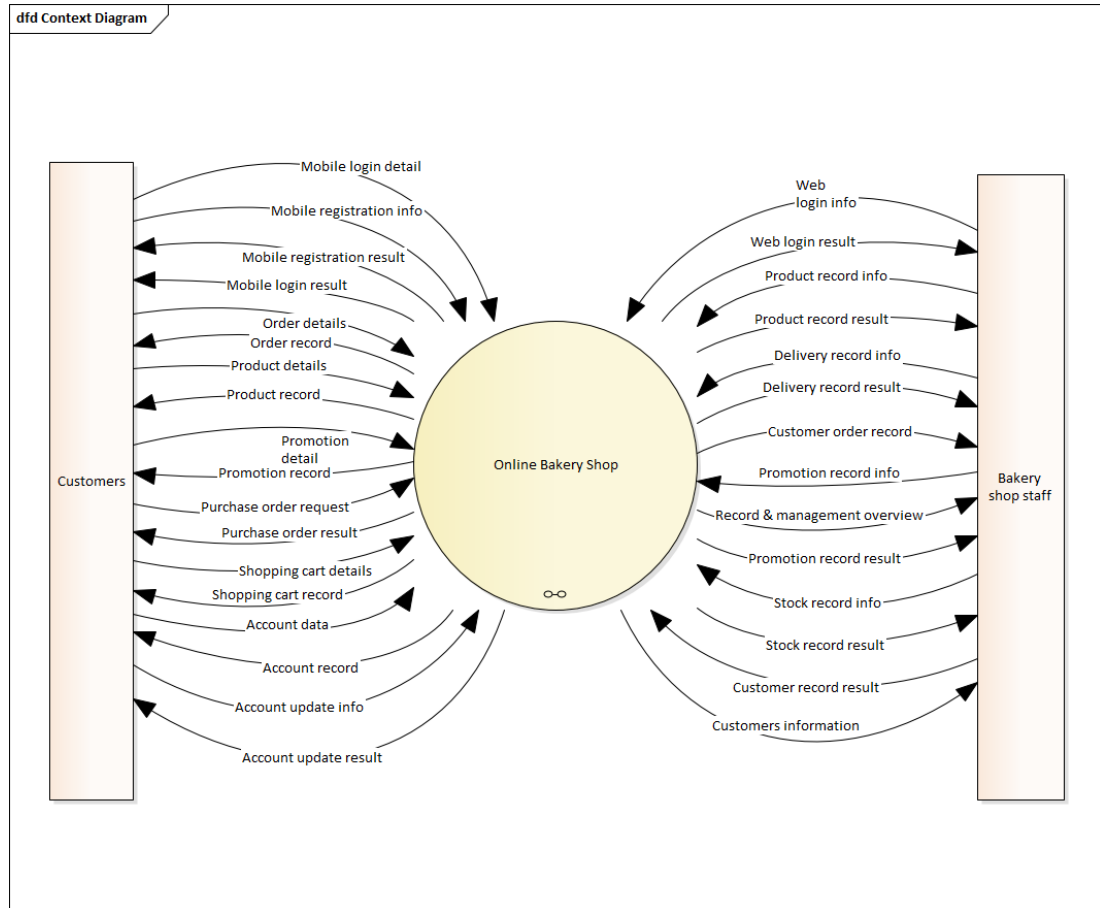


Figure 5.25: Context Diagram

5.3.3.2 Level 0 Data Flow Diagram

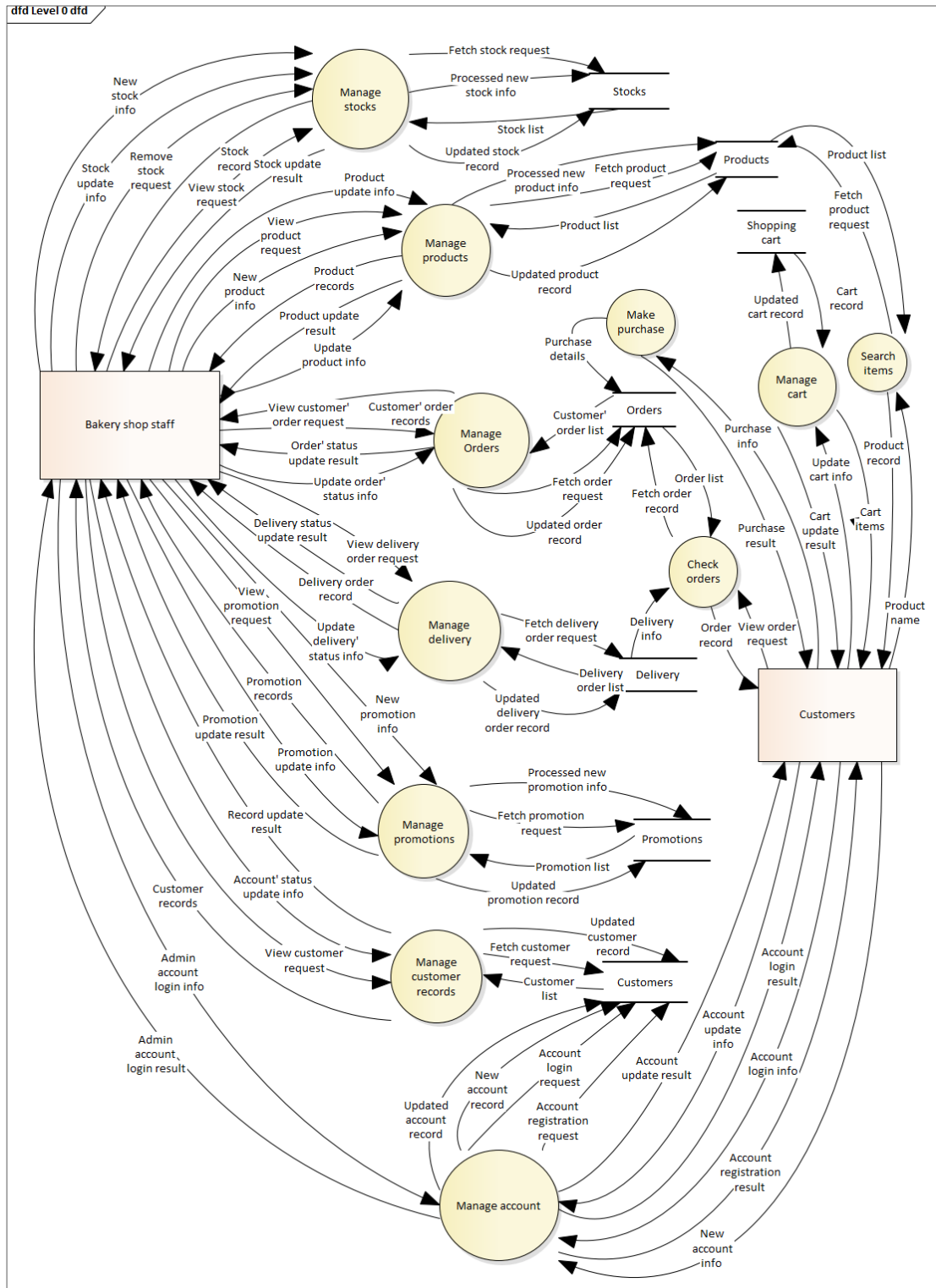


Figure 5.26: Level 0 Data Flow Diagram

5.3.3.3 Level 1 Data Flow Diagram

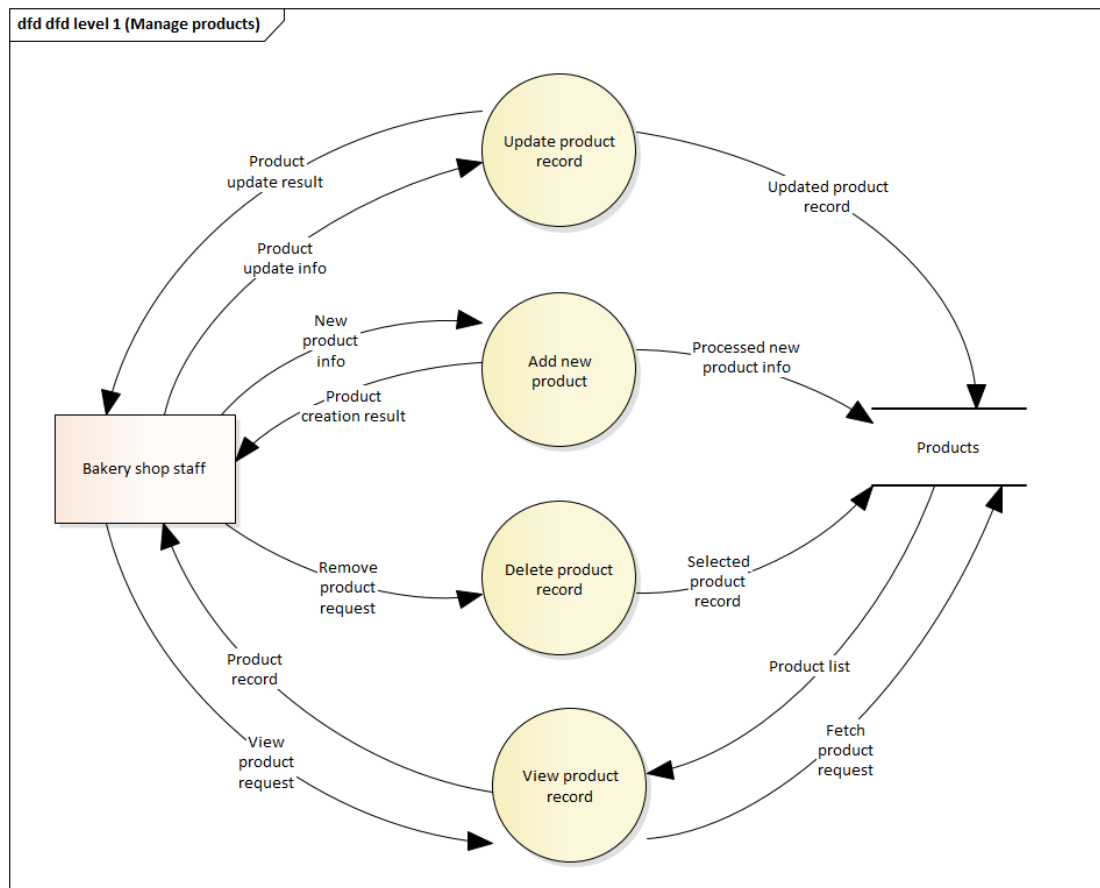


Figure 5.27: Level 1 Data Flow Diagram for Manage Products

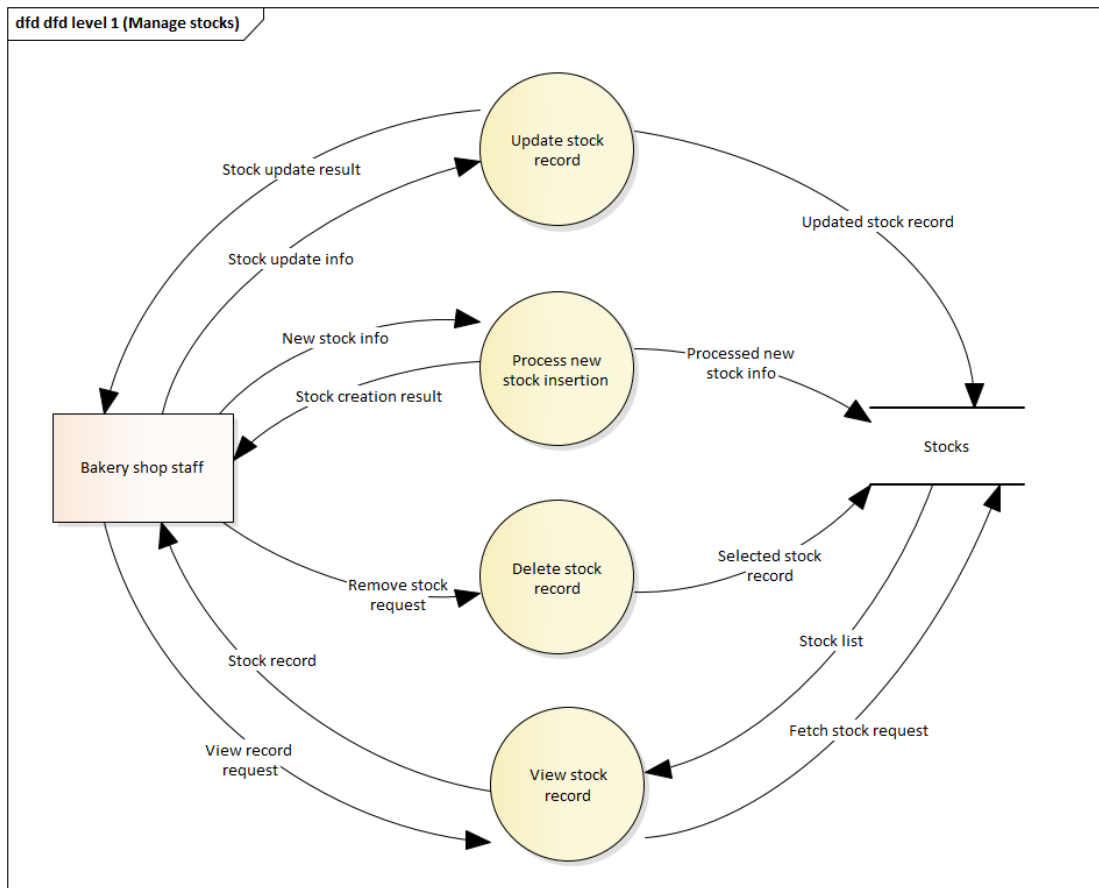


Figure 5.28: Level 1 Data Flow Diagram for Manage Stocks

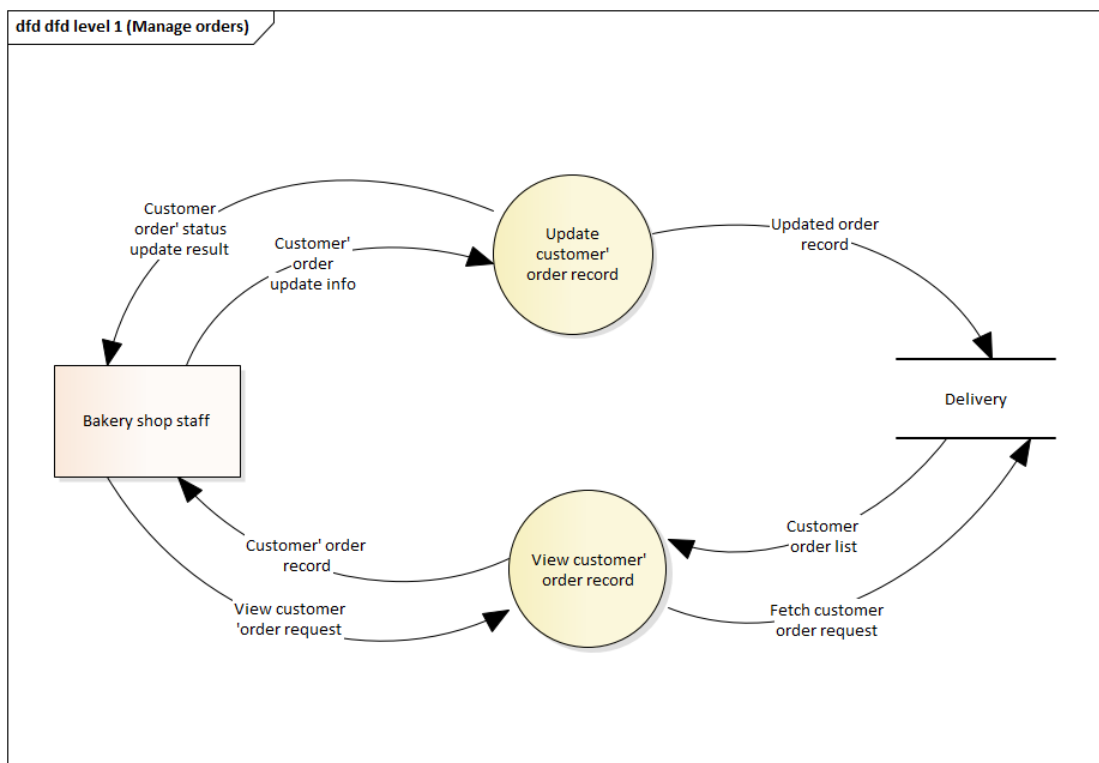


Figure 5.29: Level 1 Data Flow Diagram for Manage Orders

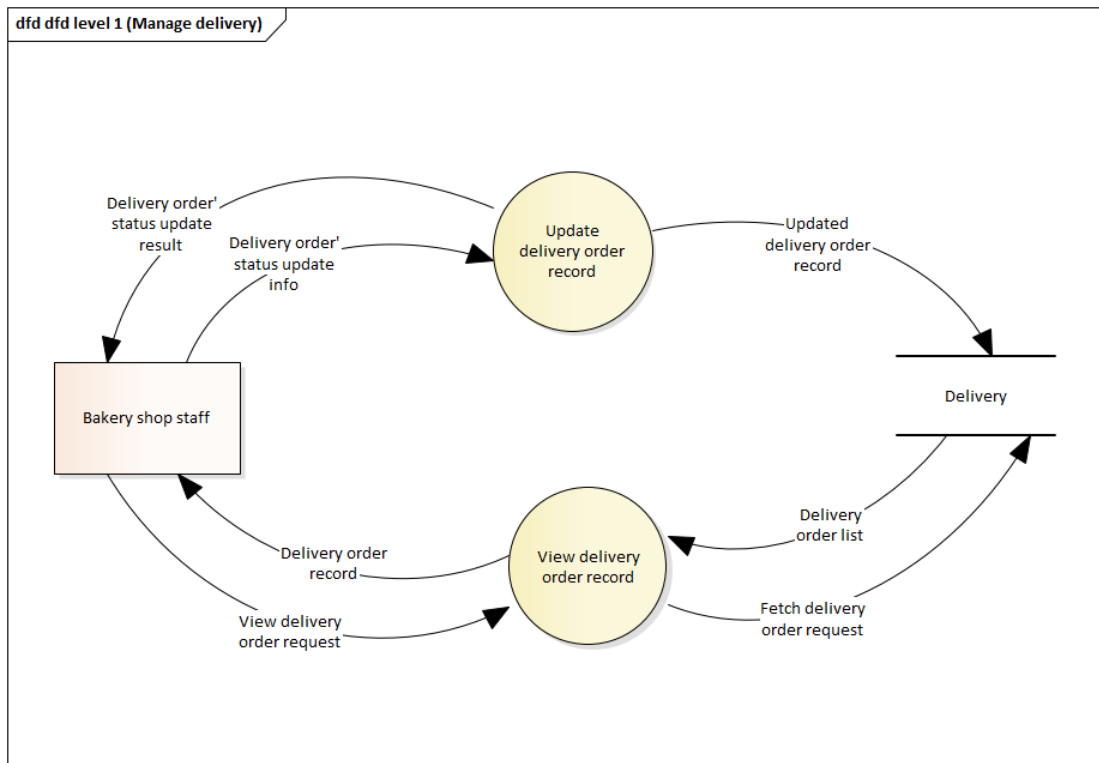


Figure 5.30: Level 1 Data Flow Diagram for Manage Delivery

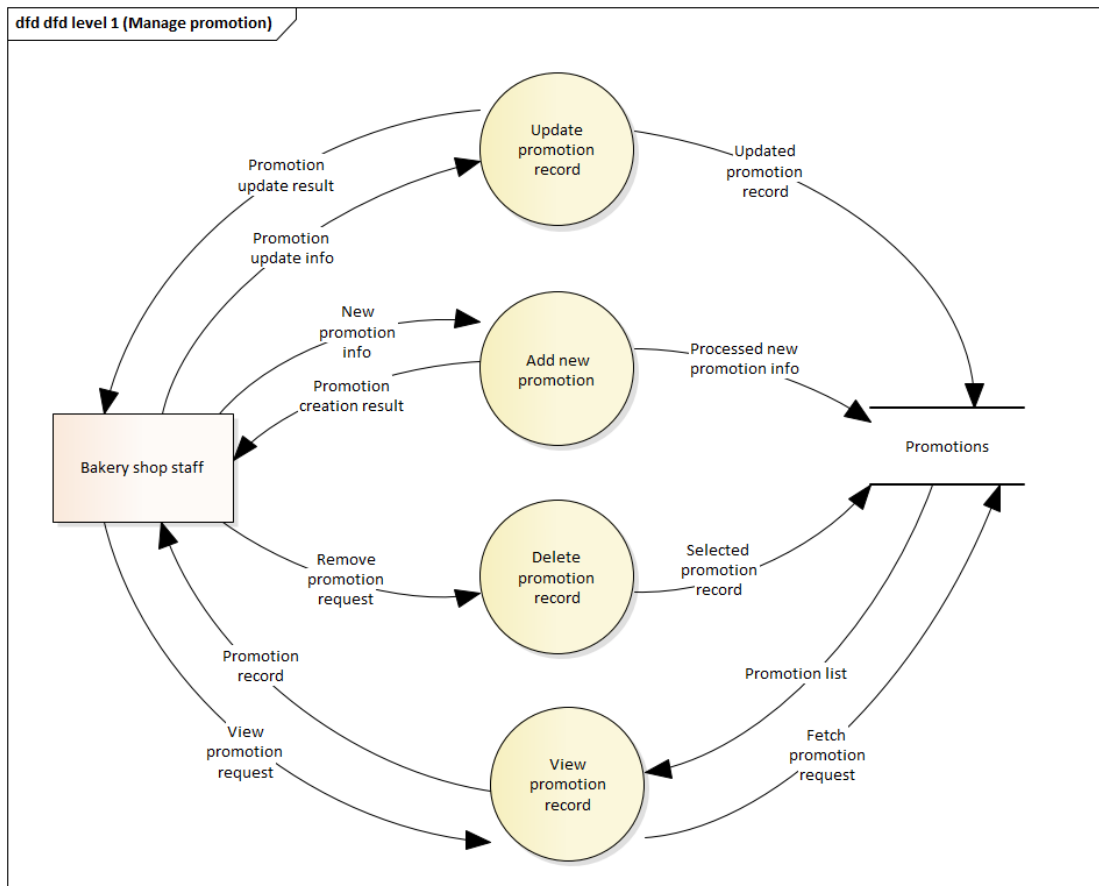


Figure 5.31: Level 1 Data Flow Diagram for Manage Promotions

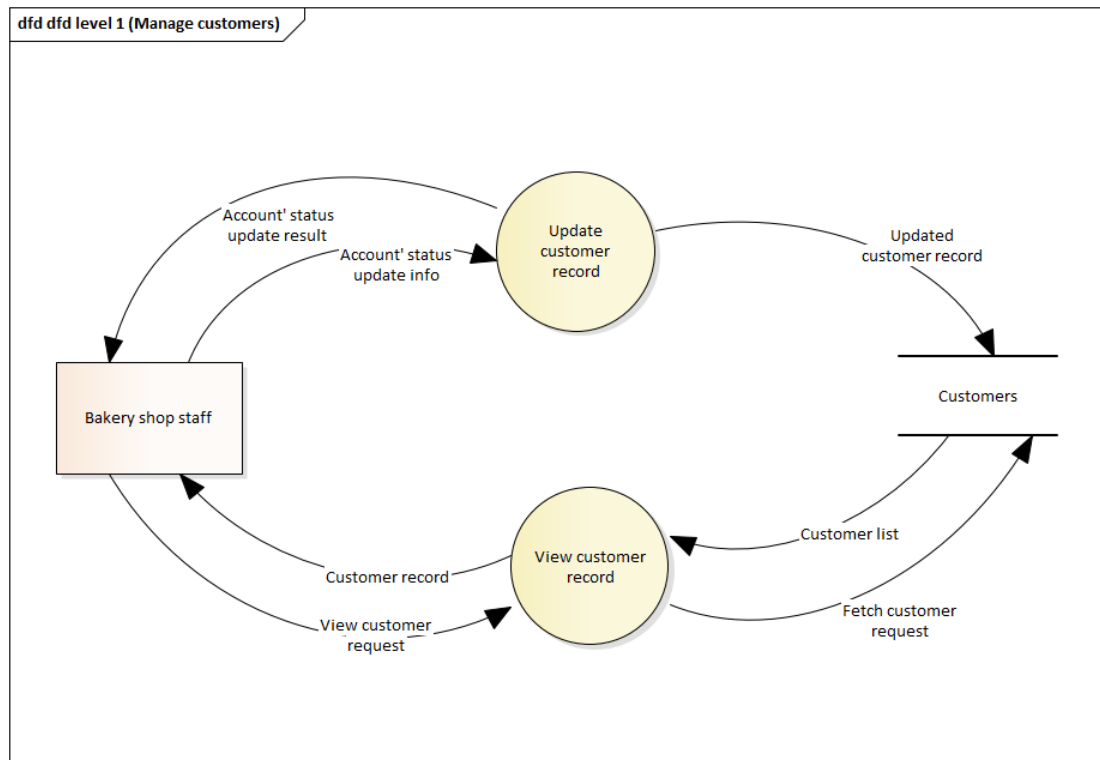


Figure 5.32: Level 1 Data Flow Diagram for Manage Customers

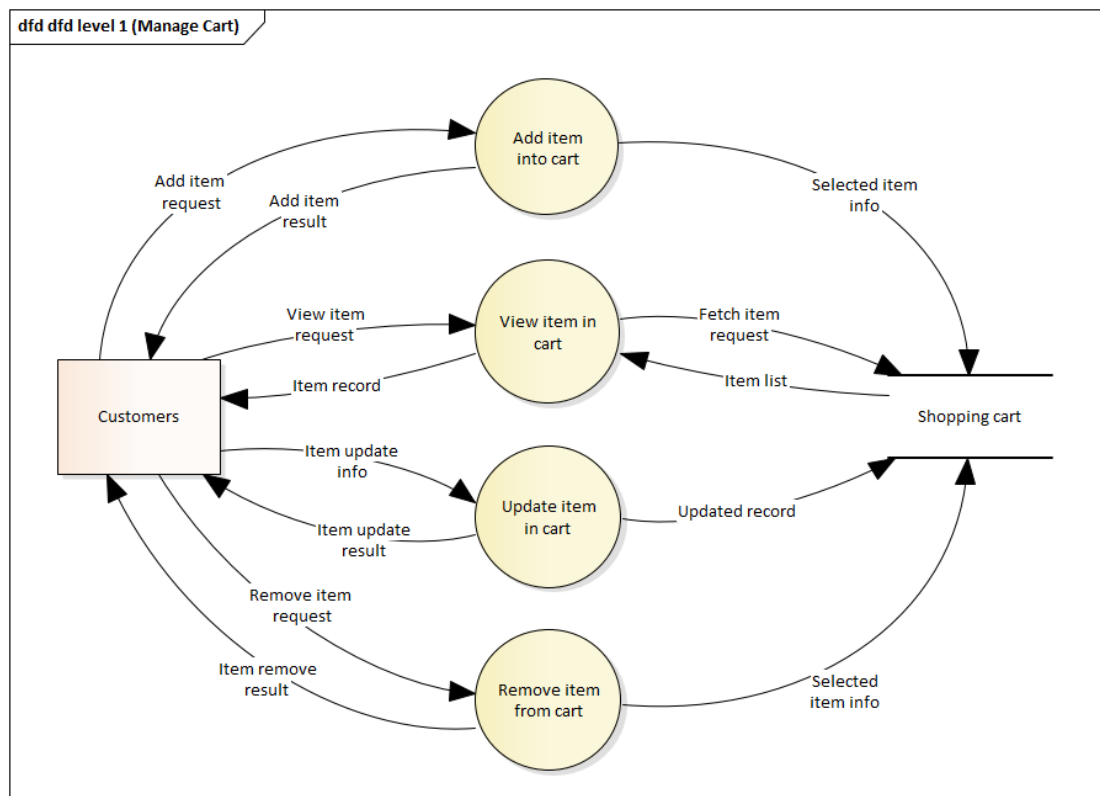


Figure 5.33: Level 1 Data Flow Diagram for Manage Shopping Cart

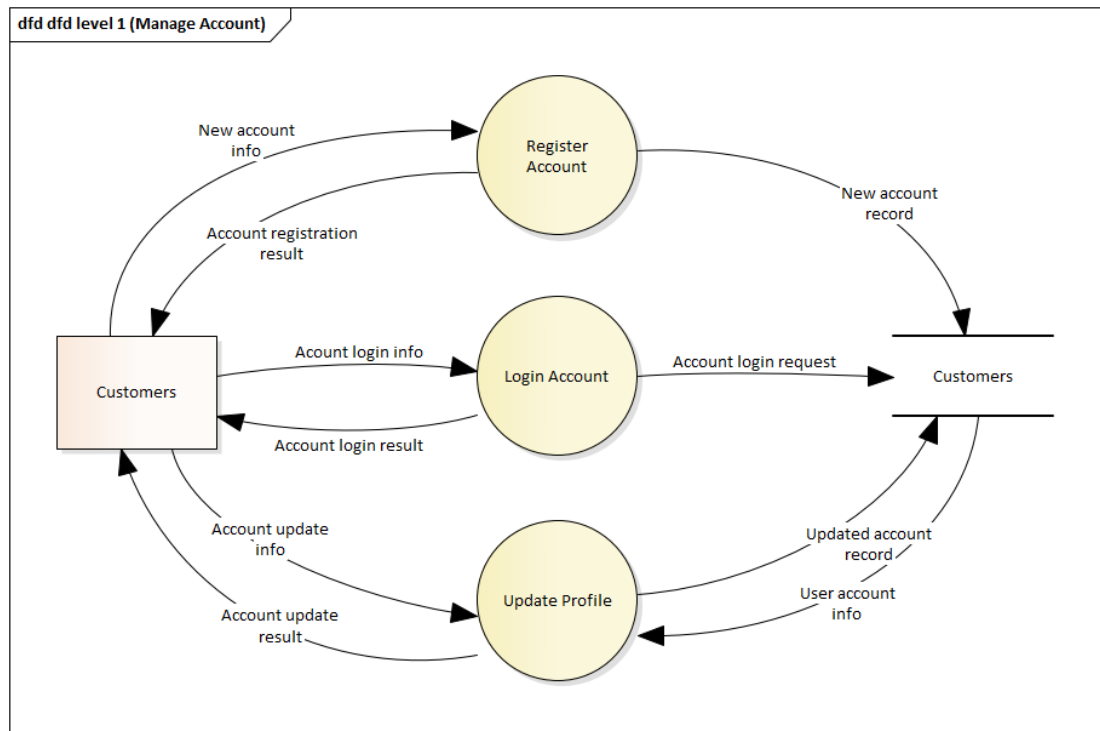


Figure 5.34: Level 1 Data Flow Diagram for Manage Account

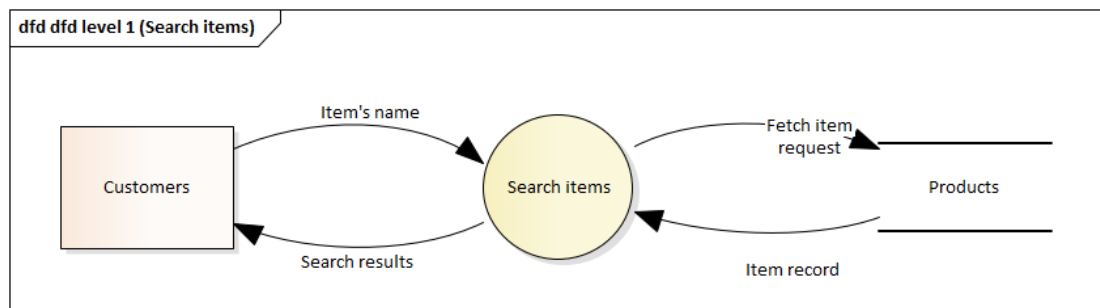


Figure 5.35: Level 1 Data Flow Diagram for Search Items

5.3.4 Page Navigation Flow

5.3.4.1 Mobile-based Application

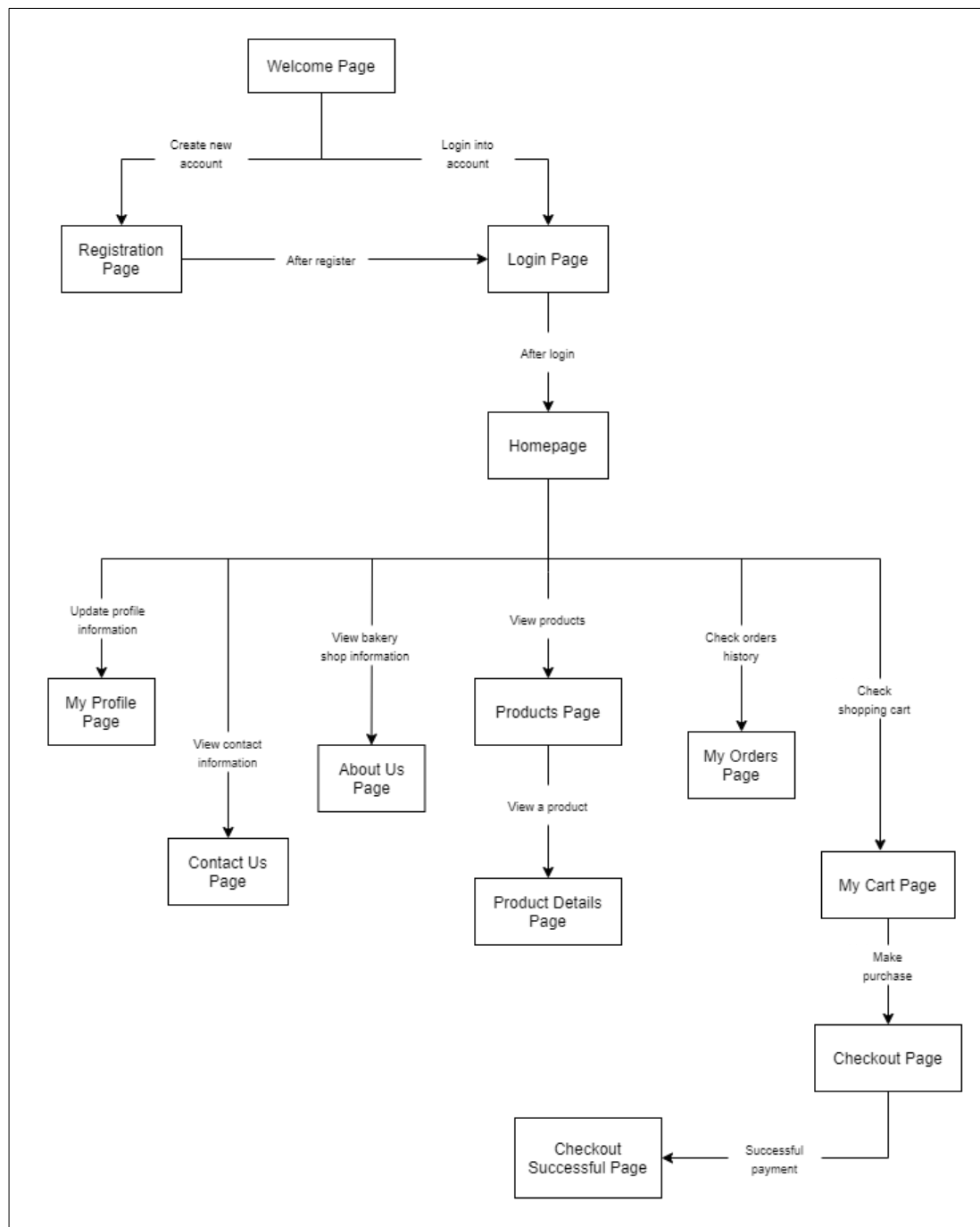


Figure 5.36: Page Navigation Flow for Mobile-based Application

5.3.4.2 Web-based Management System

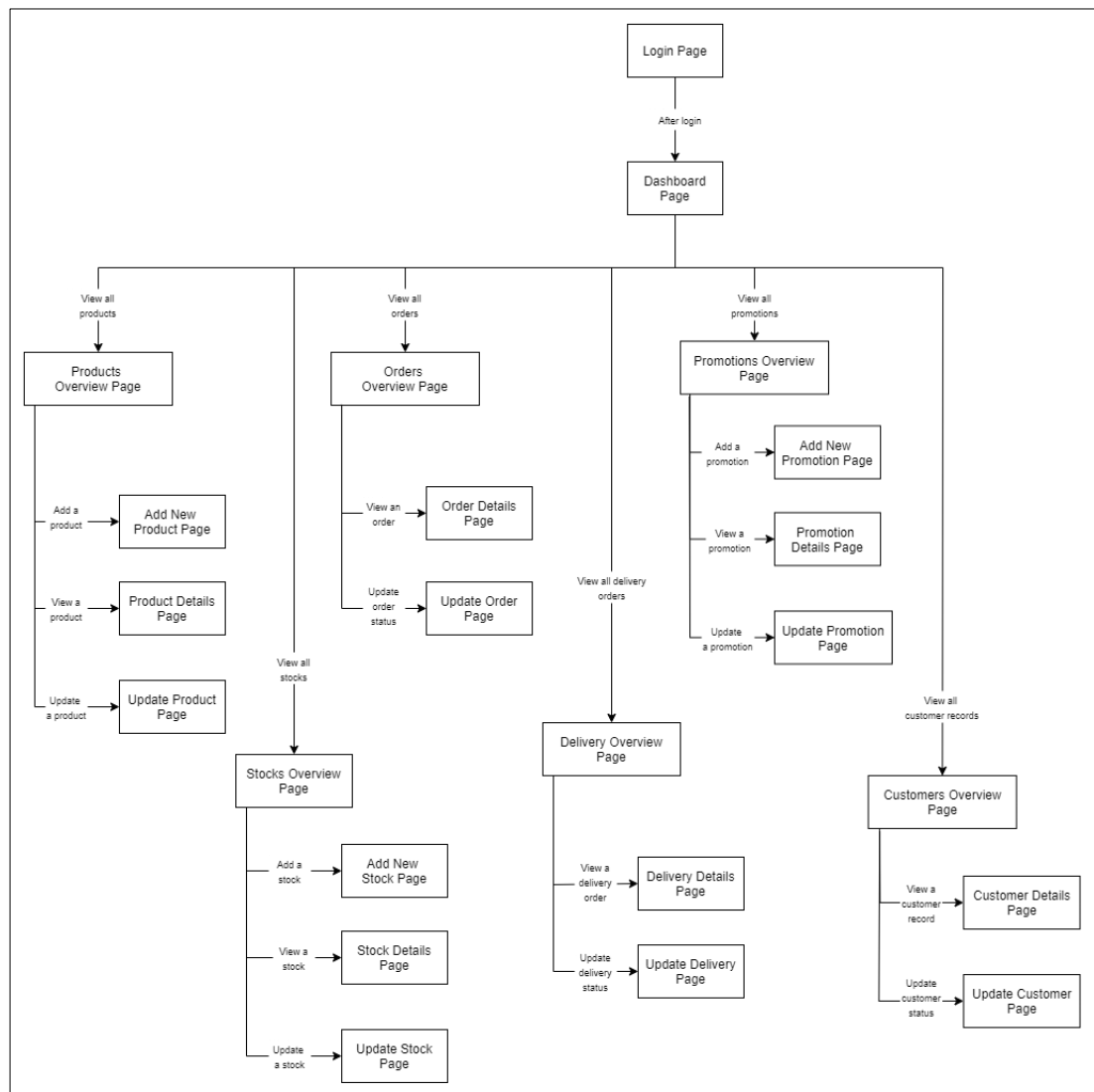


Figure 5.37: Page Navigation Flow for Web-based Management System

5.4 User Interface Design

This section will illustrate the user interfaces for both the mobile-based application and the web-based management system.

5.4.1 UI Design for Mobile-based Application

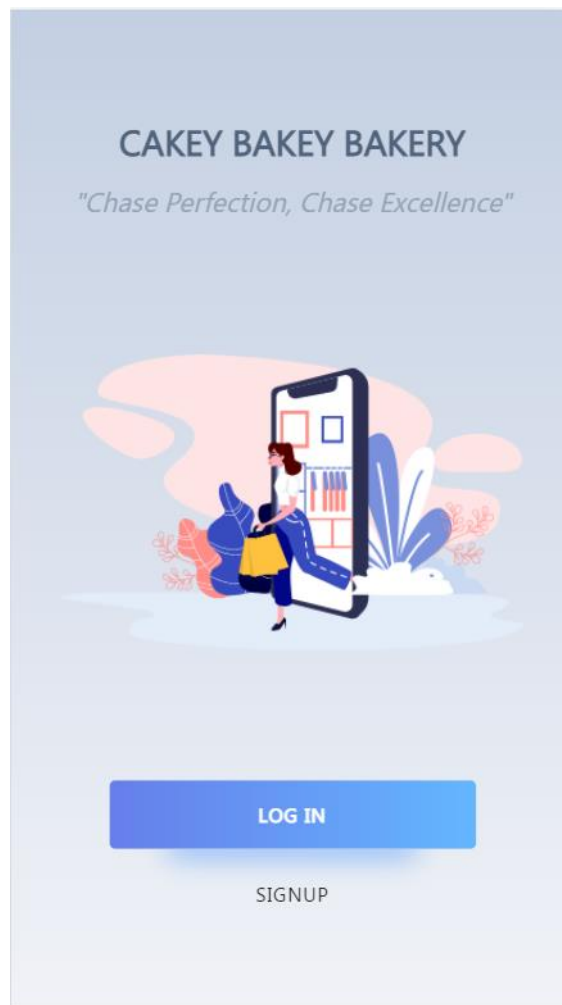
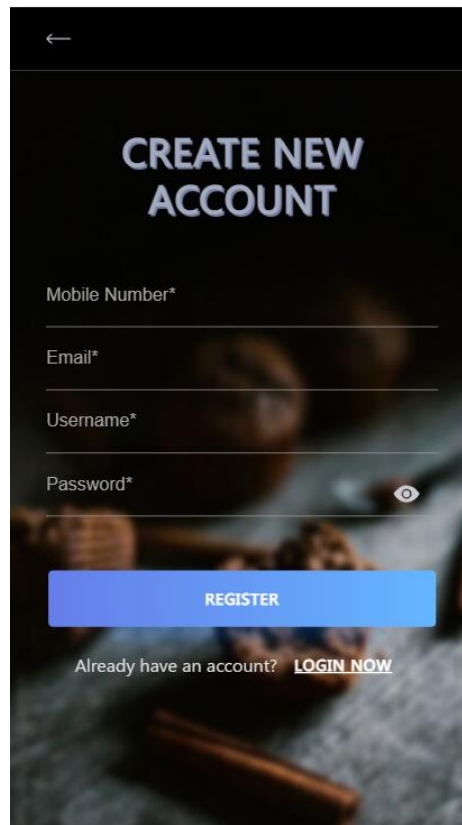


Figure 5.38: UI for Welcome Page

A mobile app registration screen with a dark background and a blurred image of a croissant. At the top left is a back arrow. The main heading is "CREATE NEW ACCOUNT" in white. Below it are four input fields: "Mobile Number*", "Email*", "Username*", and "Password*" (with an eye icon for visibility). A blue "REGISTER" button is centered below the fields. At the bottom, it says "Already have an account? [LOGIN NOW](#)".


←

CREATE NEW ACCOUNT

Mobile Number*

Email*

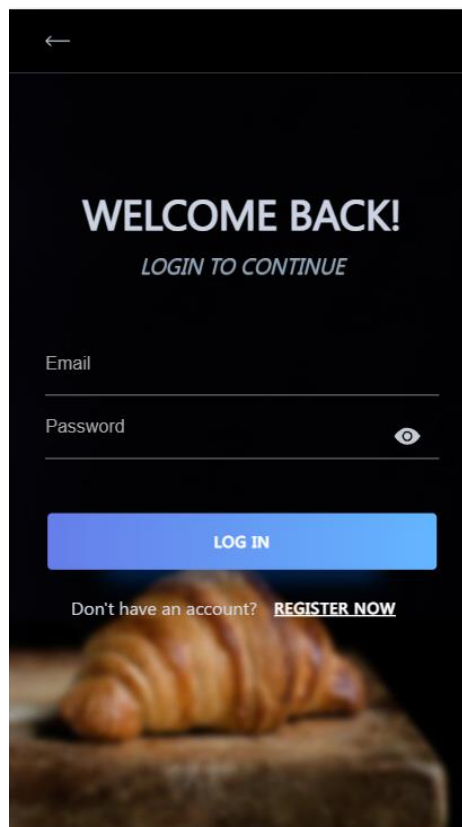
Username*

Password* 

REGISTER

Already have an account? [LOGIN NOW](#)

Figure 5.39: UI for Registration Page


A mobile app login screen with a dark background and a blurred image of a croissant. At the top left is a back arrow. The main heading is "WELCOME BACK!" in white, with the subtitle "LOGIN TO CONTINUE" below it. Below are two input fields: "Email" and "Password" (with an eye icon for visibility). A blue "LOG IN" button is centered below the fields. At the bottom, it says "Don't have an account? [REGISTER NOW](#)".

←

WELCOME BACK!

LOGIN TO CONTINUE

Email

Password 

LOG IN

Don't have an account? [REGISTER NOW](#)

Figure 5.40: UI for Login Page

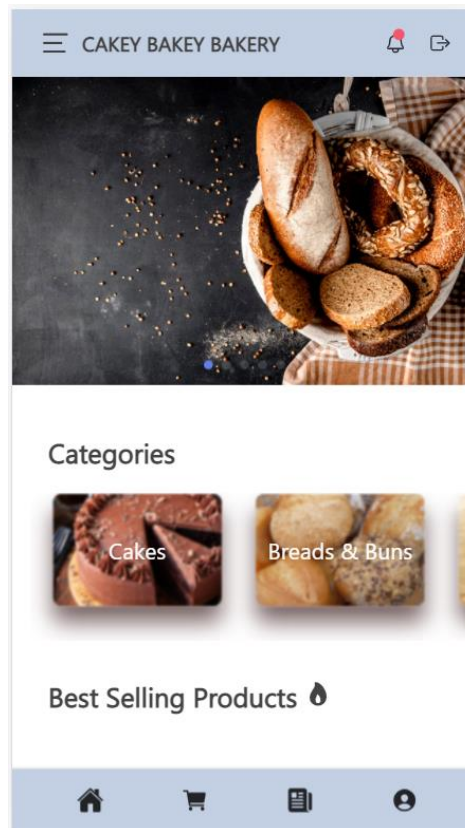


Figure 5.41: UI for Home page

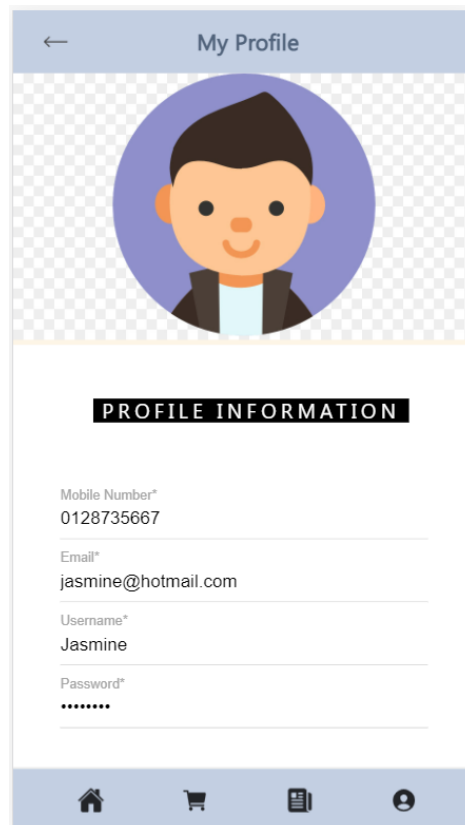


Figure 5.42: UI for Profile Page

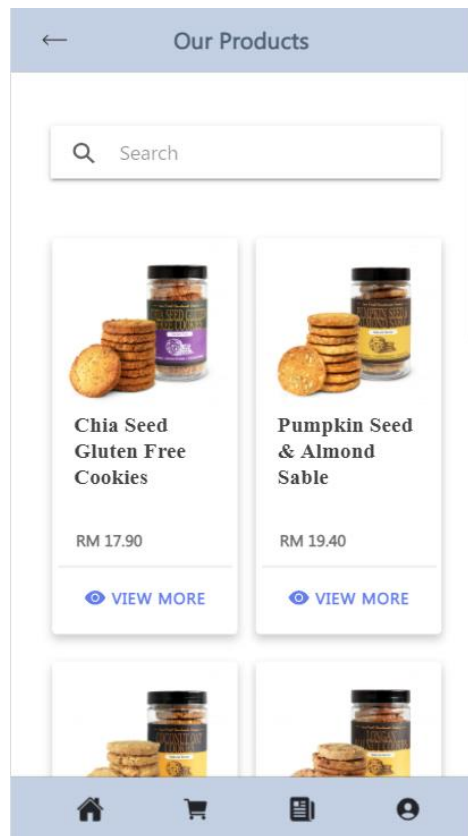


Figure 5.43: UI for Products Page



Figure 5.44: UI for Product Details Page

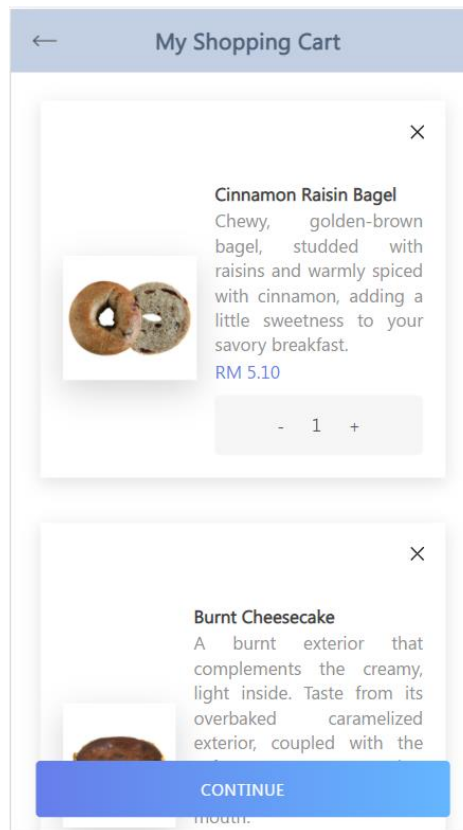


Figure 5.45: UI for My Shopping Cart Page

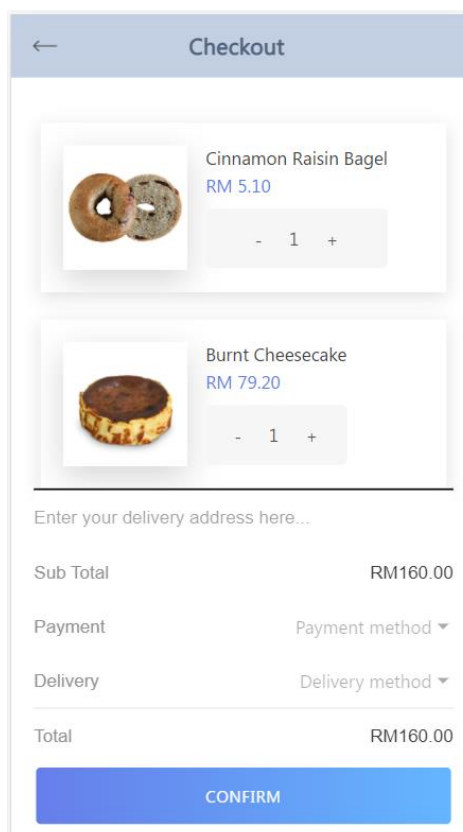


Figure 5.46: UI for Checkout Page

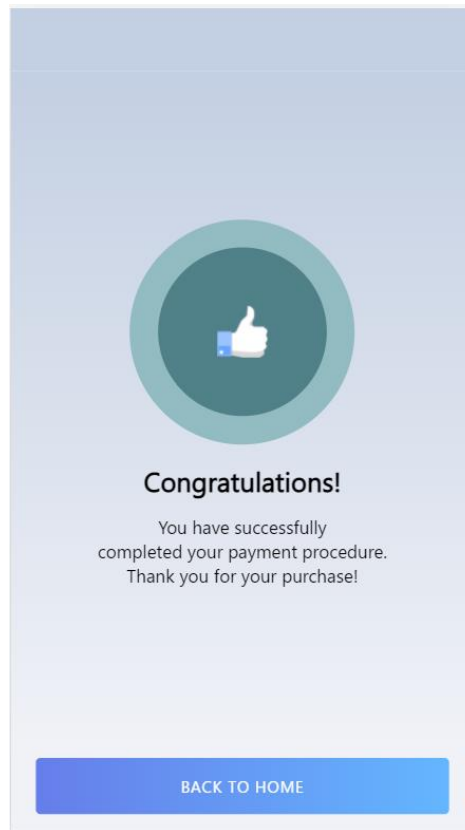


Figure 5.47: UI for Order Successful Page

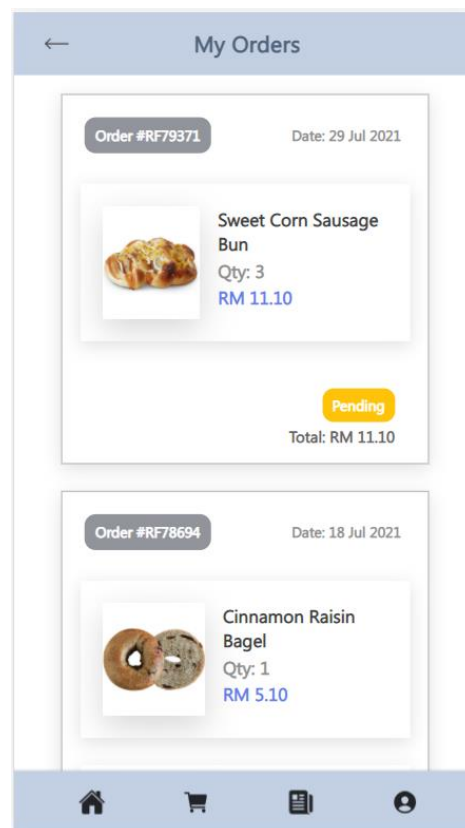


Figure 5.48: UI for My Orders Page

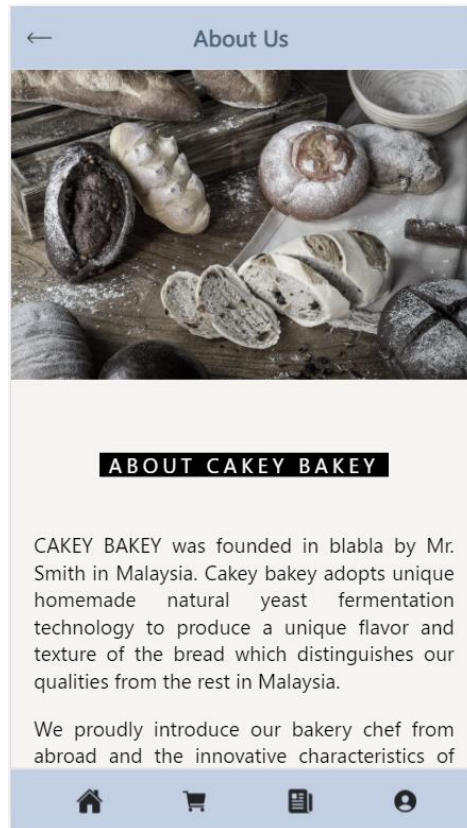


Figure 5.49: UI for About Us Page

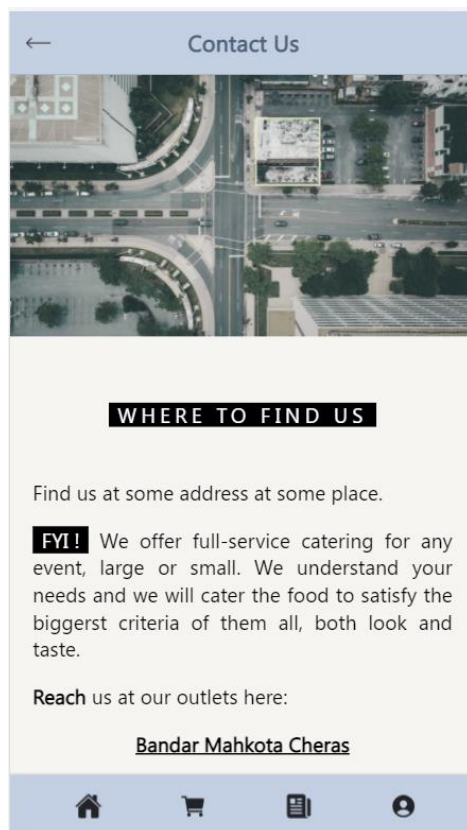


Figure 5.50: UI for Contact Us Page

5.4.2 UI Design for Web-based Management System

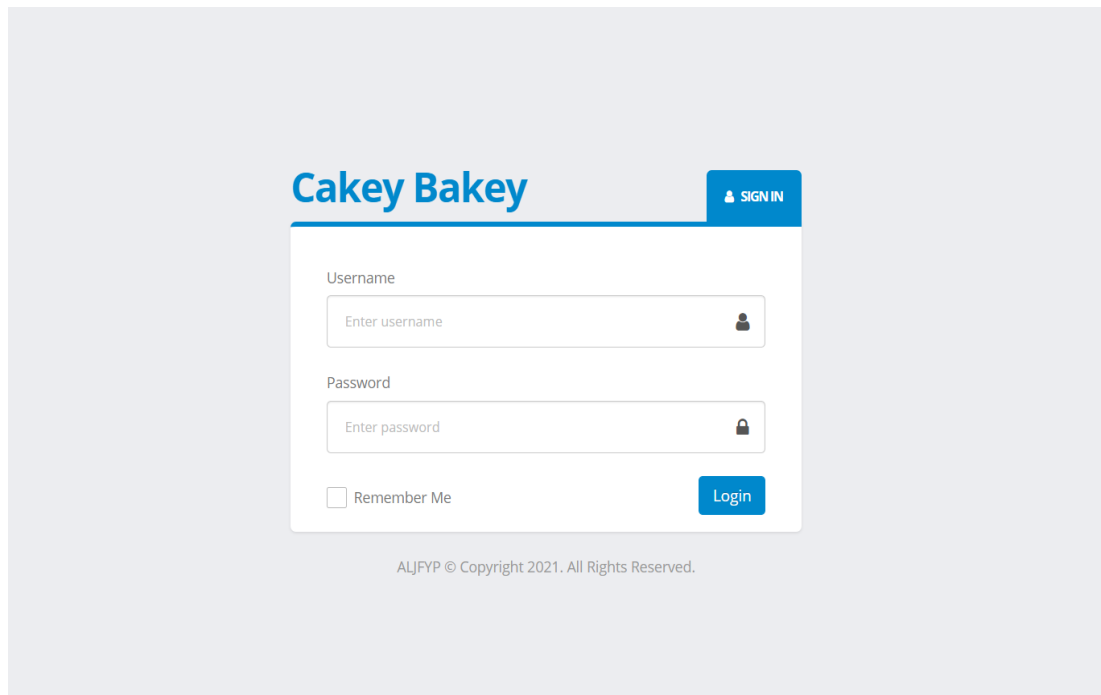


Figure 5.51: UI for Login Page

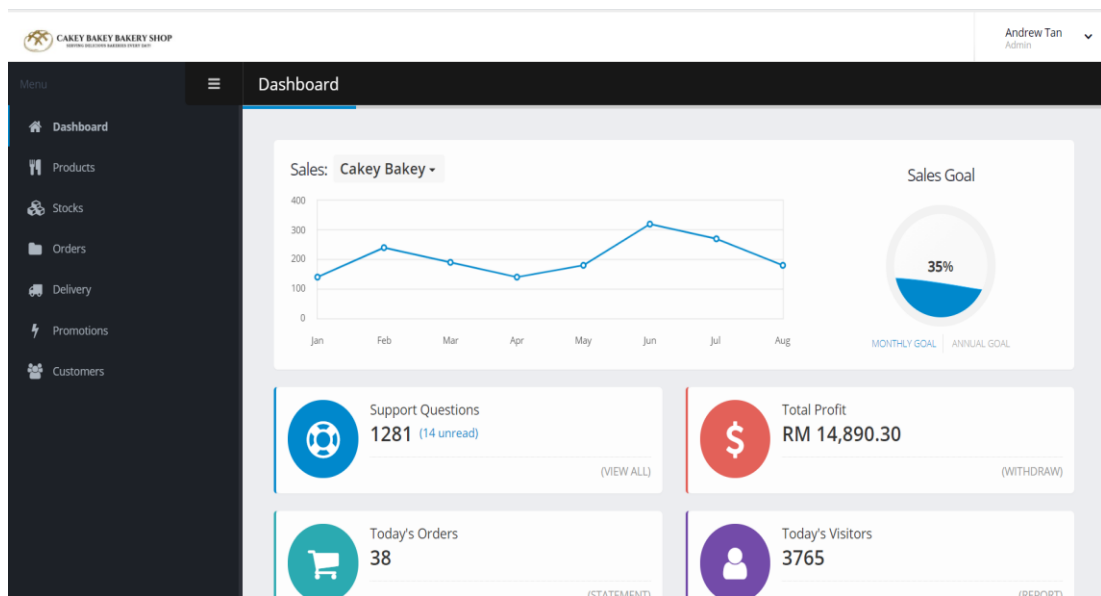


Figure 5.52: UI for Dashboard Page

CAKEY BAKERY SHOP

Andrew Tan Admin

Menu

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers

Products

Products Overview

10 records per page

Search

Date Created	Category	Product	Status	Actions
2021-04-17	Breads & Buns	Original Chicken Floss	Unavailable	View Edit Delete
2021-04-17	Breads & Buns	Pumpkin Bread	Available	View Edit Delete
2021-04-17	Breads & Buns	Spicy Chicken Floss Bun	Available	View Edit Delete
2021-04-17	Breads & Buns	Cheese & Sausage Roll	Unavailable	View Edit Delete
2021-04-17	Breads & Buns	Polo Bun	Available	View Edit Delete
2021-04-17	Breads & Buns	Red Bean Bun	Unavailable	View Edit Delete
2021-04-17	Breads & Buns	Raisin Bun	Available	View Edit Delete
2021-04-17	Breads & Buns	Sweet Corn Sausage Bun	Available	View Edit Delete
2021-06-12	Breads & Buns	Caramel French Bread	Unavailable	View Edit Delete
2021-06-12	Breads & Buns	Mulberry Cream Cheese Bun	Available	View Edit Delete

Showing 1 to 10 of 54 entries

[+ New Entry](#)

1 2 3 4 5

Figure 5.53: UI for Product List Page

CAKEY BAKERY SHOP

Diana Lim Admin

Menu

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers

Products

Add New Product

Product Name

Category

Description & Ingredients

Calory per serving

Price (RM)

Figure 5.54: UI for Add New Product Page

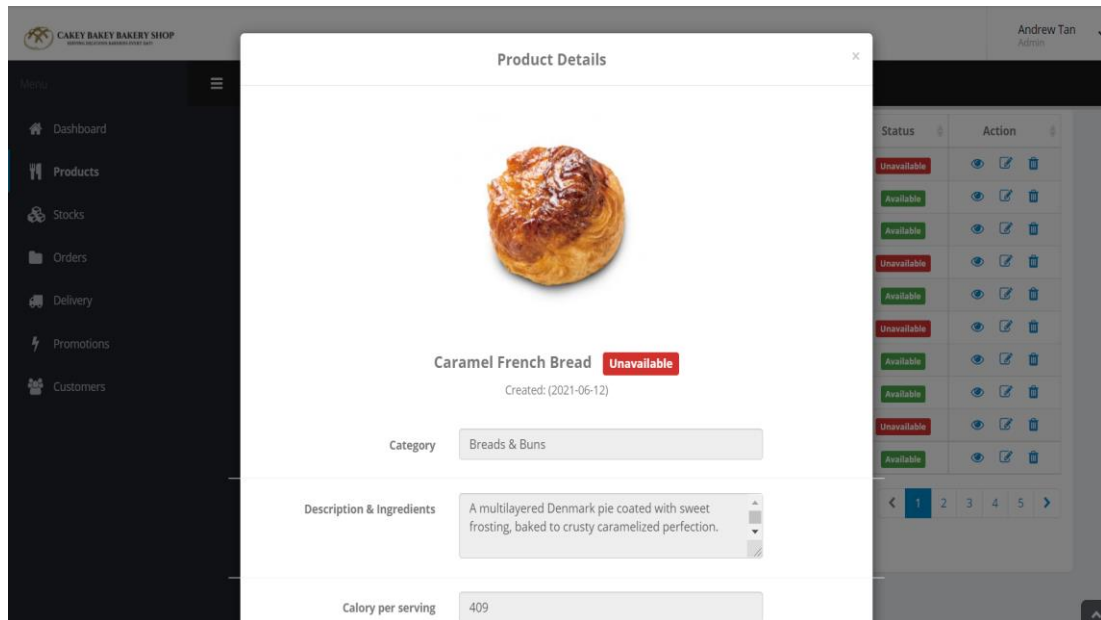


Figure 5.55: UI for Product Details Page

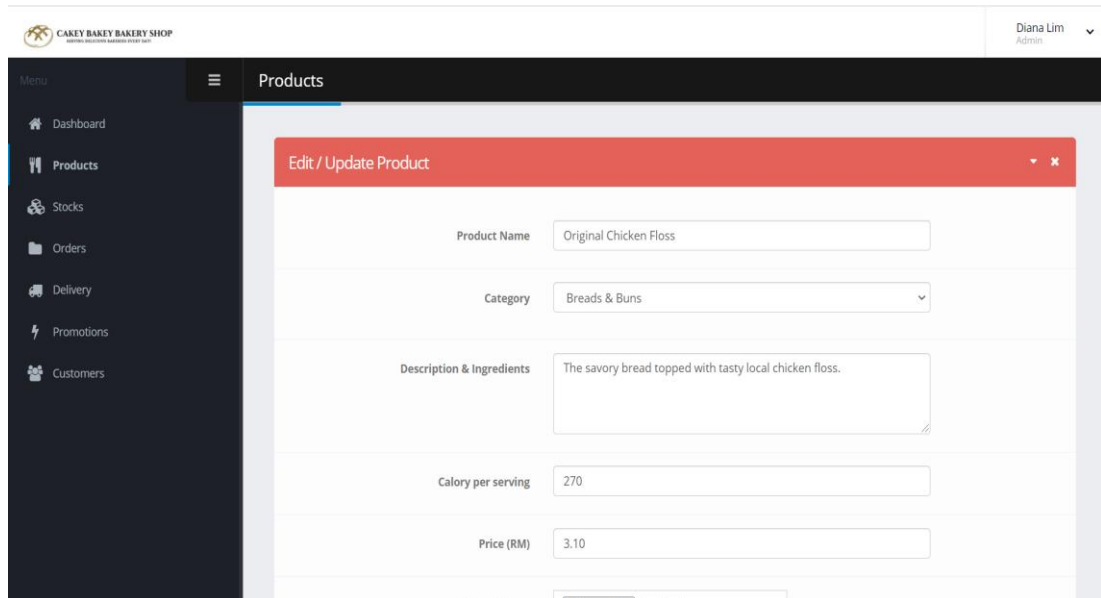


Figure 5.56: UI for Edit Product Page

CAKEY BAKERY SHOP

Andrew Tan Admin

Menu

Dashboard

Products

Stocks

Orders

Delivery

Promotions

Customers

Stocks Overview

10 records per page

Search

Date Created	Stocks	Status	Actions
2021-04-02	Chia Seeds	Out of stock	✎ 🗑️
2021-04-03	Vanilla Bean Paste	Running low	✎ 🗑️
2021-04-06	Parmesan cheese	Out of stock	✎ 🗑️
2021-04-09	Cocoa Powder	Sufficient	✎ 🗑️
2021-04-11	Salt	Running low	✎ 🗑️
2021-04-11	Corn oil	Sufficient	✎ 🗑️
2021-04-11	Milk	Sufficient	✎ 🗑️
2021-04-11	Cheddar Cheese	Out of stock	✎ 🗑️
2021-04-12	Baking Powder	Running low	✎ 🗑️
2021-04-13	Sugar	Sufficient	✎ 🗑️

Showing 1 to 10 of 36 entries

+ New Entry

< 1 2 3 4 >

Figure 5.57: UI for Stock List Page

CAKEY BAKERY SHOP

Andrew Tan Admin

Menu

Dashboard

Products

Stocks

Orders

Delivery

Promotions

Customers

Add New Stock

Stock Name

Status

Sufficient

Running low

Out of stock

Add Close

2021-04-11 Cheddar Cheese Out of stock [✎](#) [🗑️](#)

2021-04-12 Baking Powder Running low [✎](#) [🗑️](#)

2021-04-13 Sugar Sufficient [✎](#) [🗑️](#)

Showing 1 to 10 of 36 entries

+ New Entry

< 1 2 3 4 >

Figure 5.58: UI for Add New Stock Page

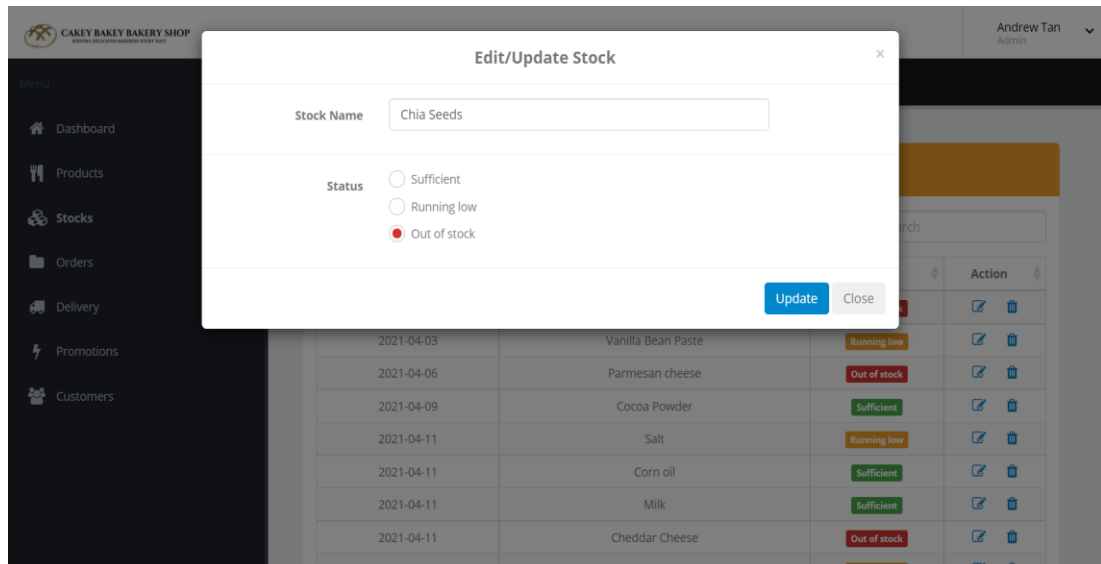


Figure 5.59: UI for Edit Stock Page

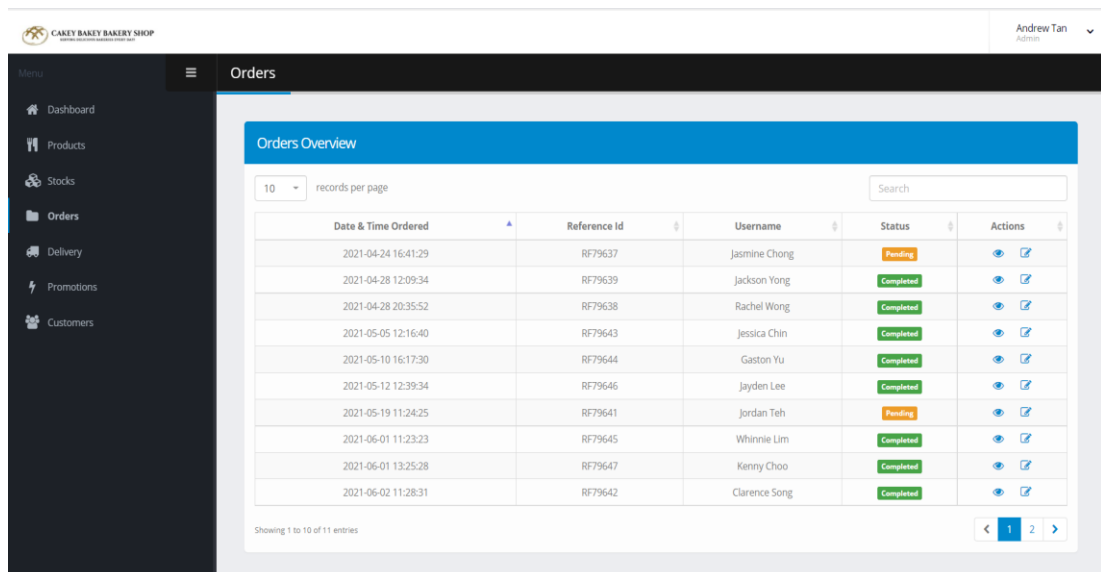


Figure 5.60: UI for Order List Page

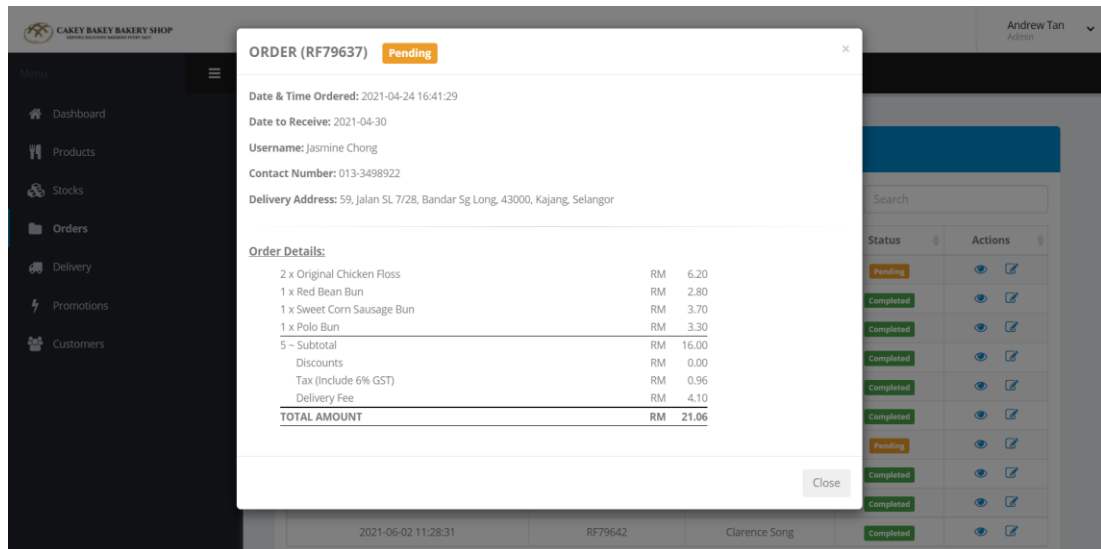


Figure 5.61: UI for Order Details Page

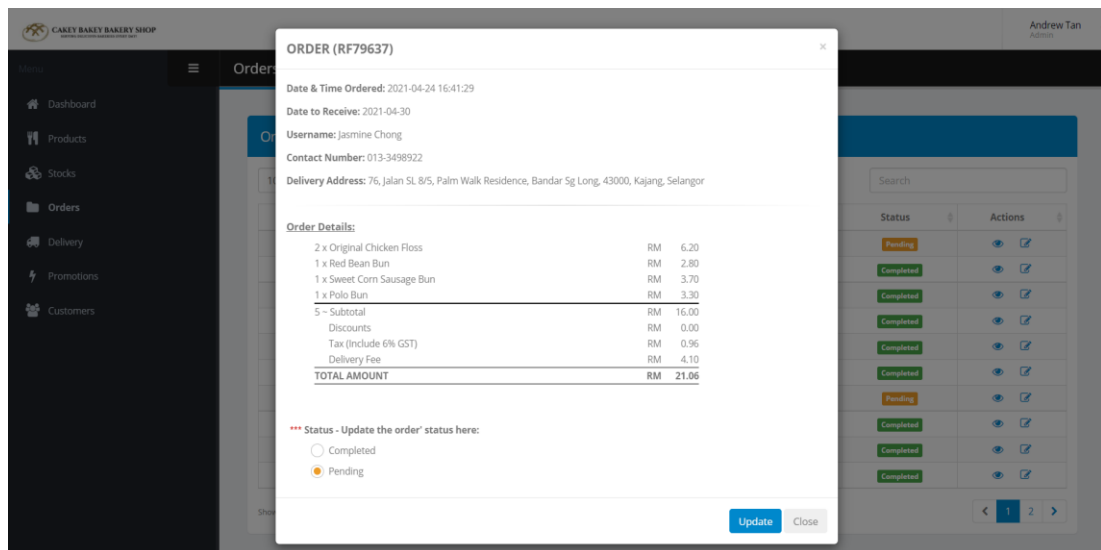


Figure 5.62: UI for Update Product Status Page

CAKEY BAKERY SHOP

Andrew Tan Admin

Delivery

Delivery Order Overview

10 records per page

Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Out for delivery	View Edit
2021-04-28 12:09:34	RF79639	Jackson Yong	Out for delivery	View Edit
2021-04-28 20:35:52	RF79638	Rachel Wong	Delivered	View Edit
2021-05-05 12:16:40	RF79643	Jessica Chin	Delivered	View Edit
2021-05-10 16:17:30	RF79644	Gaston Yu	Delivered	View Edit
2021-05-12 12:39:34	RF79646	Jayden Lee	Delivered	View Edit
2021-05-19 11:24:25	RF79641	Jordan Teh	Pending	View Edit
2021-06-01 11:23:23	RF79645	Whinnie Lim	Delivered	View Edit
2021-06-01 13:25:28	RF79647	Kenny Choo	Delivered	View Edit
2021-06-02 11:28:31	RF79642	Clarence Song	Delivered	View Edit

Showing 1 to 10 of 11 entries

Figure 5.63: UI for Delivery Order List Page

CAKEY BAKERY SHOP

Andrew Tan Admin

DELIVERY ORDER (RF79637) Out for delivery

Date & Time Ordered: 2021-04-24 16:41:29

Date to Receive: 2021-04-30

Username: Jasmine Chong

Contact Number: 013-3498922

Delivery Address: 59, Jalan SL 7/28, Bandar Sg Long, 43000, Kajang, Selangor

Order Details:

2 x Original Chicken Floss	RM	6.20
1 x Red Bean Bun	RM	2.80
1 x Sweet Corn Sausage Bun	RM	3.70
1 x Polo Bun	RM	3.30
5 - Subtotal	RM	16.00
Discounts	RM	0.00
Tax (Include 6% GST)	RM	0.96
Delivery Fee	RM	4.10
TOTAL AMOUNT	RM	21.06

Close

Figure 5.64: UI for Delivery Order Details Page

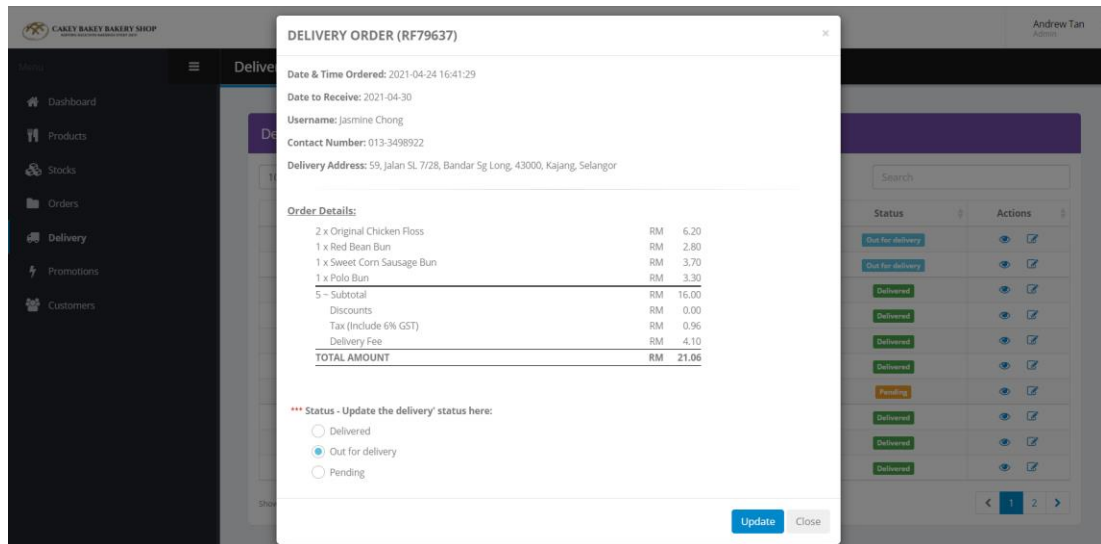


Figure 5.65: UI for Update Delivery Status Page

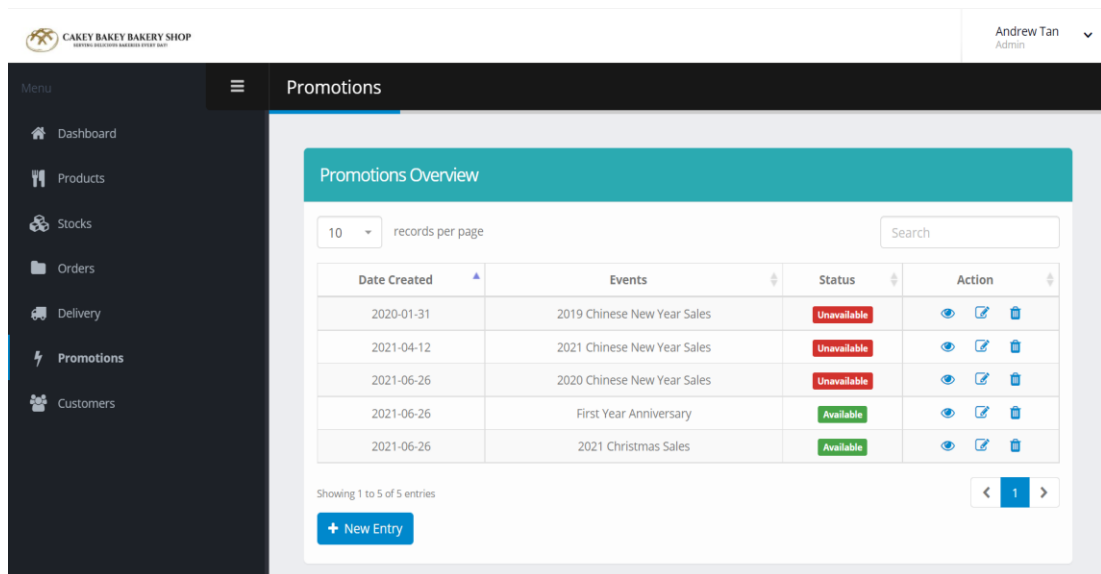


Figure 5.66: UI for Promotion List Page

The screenshot shows the 'Add New Promotion' modal form. The form is titled 'Add New Promotion' and has a close button (X) in the top right corner. It contains the following fields and options:

- Event:** A text input field.
- Promotion Details:** A large text area for entering details.
- Terms & Conditions (if any):** A large text area for entering terms and conditions.
- Start Date:** A date picker with the format 'dd/mm/yyyy --:-- --' and a calendar icon.
- End Date:** A date picker with the format 'dd/mm/yyyy --:-- --' and a calendar icon.
- Status:** Two radio buttons: 'Available' and 'Unavailable'.

At the bottom right of the modal, there are two buttons: 'Add' (in blue) and 'Close' (in grey).

Figure 5.67: UI for Add New Promotion Page

The screenshot shows the 'Promotion Details' modal form for a specific promotion. The modal is titled '2020 Chinese New Year Sales' and has a red 'Unavailable' status indicator in the top right corner. Below the title, it says 'Created: 2020-01-31'. The form contains the following fields:

- Promotion Details:** A text area containing 'Buy 4 Get 1 Free'.
- Terms & Conditions (if any):** A text area containing 'Limited items only'.
- Start Date:** A date and time field showing '01/02/2020 12:00 AM'.
- End Date:** A date and time field showing '15/02/2020 11:59 AM'.

At the bottom right of the modal, there is a 'Close' button in blue.

Figure 5.68: UI for Promotion Details Page

CAKEY BAKERY BAKERY SHOP

Andrew Tan Admin

Edit/Update Promotion

Event: 2020 Chinese New Year Sales

Promotion Details: Buy 4 Get 1 Free

Terms & Conditions (if any): Limited items only

Start Date: 01/02/2020 12:00 AM

End Date: 15/02/2020 11:59 AM

Status:
 Available
 Unavailable

Update Close

Figure 5.69: UI for Edit Promotion Page

CAKEY BAKERY BAKERY SHOP

Andrew Tan Admin

Customers

Customers Overview

10 records per page

Date joined	Account Id	Username	Contact Number	Status	Actions
2021-01-14	AC65364	Jordan Teh	0123984609	Active	View Edit
2021-02-12	AC65370	Jayden Lee	0164930014	Active	View Edit
2021-02-24	AC65366	Clarence Song	0124829842	Active	View Edit
2021-03-18	AC65367	Gaston Yu	0163728334	Active	View Edit
2021-03-18	AC65369	Kenny Choo	0162910332	Active	View Edit
2021-03-23	AC65363	Jessica Chin	0143932082	Active	View Edit
2021-03-30	AC65368	Whinnie Lim	0129302482	Active	View Edit
2021-04-12	AC65362	Jasmine Chong	013-3498922	Inactive	View Edit
2021-04-13	AC65365	Benjamin Beh	0198738664	Active	View Edit
2021-04-18	AC65361	Rachel Wong	012-8853855	Active	View Edit

Showing 1 to 10 of 11 entries

Figure 5.70: UI for Customer List Page

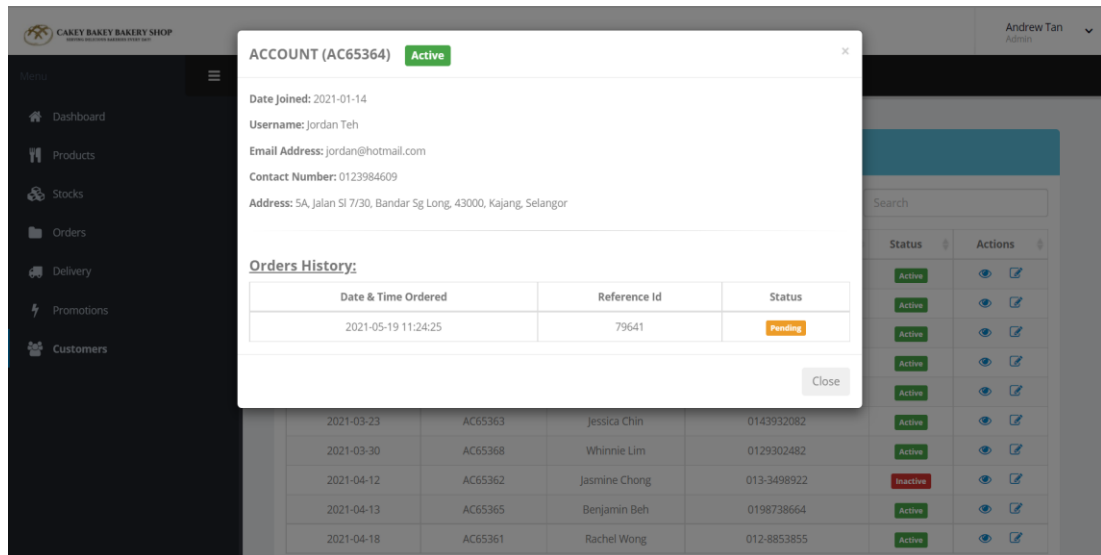


Figure 5.71: UI for Customer Details Page

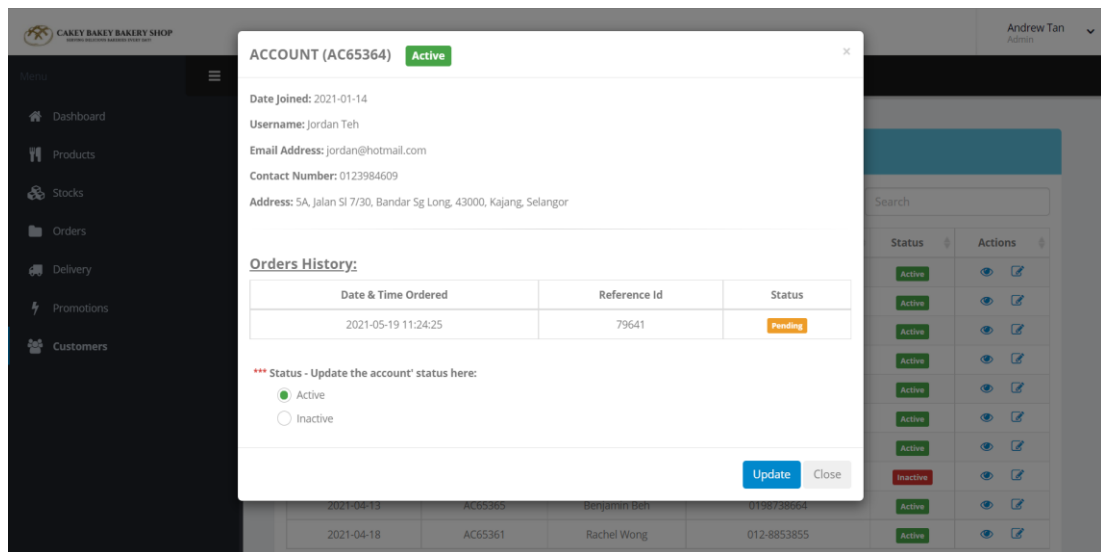


Figure 5.72: UI for Update Account Status Page

CHAPTER 6

SYSTEM IMPLEMENTATION

6.1 Introduction

This chapter presents an overview on the whole system implementation as well as the different types of modules that makes up the system based on the use cases and functional requirements which are defined in the previous chapter. Each of the modules is further elaborated with its respective features and functionalities.

6.2 System Modules

Table 6.1 at below shows all of the modules that are implemented throughout this entire project. As discussed in the previous chapter, this project consists of mainly two systems, which are the mobile-based application that serves the customer as well as a web-based management system that serve the staff. Therefore, all of the modules are categorized according to its target users as below in order to have a clearer picture on the modules implemented in each of the system.

Table 6.1: System Modules

Target User	Module
Customer	Registration
	Products
	Order
	Profile
	Shopping cart
Staff	Products management
	Stocks management
	Orders management
	Delivery management
	Promotions management
	Customers management

6.2.1 Modules in Mobile-based Application

This section includes all of the modules implemented in the front-end system, which is the mobile-based application that serves the customer.

6.2.1.1 Registration Module

Registration module utilizes the firebase authentication functionality to verify the credentials entered by the user with the user database in firebase. The main purpose of implementing firebase authentication is to enhance the security of the system while improving the registration and onboarding user experience. The firebase authentication functionality will retrieve the authentication credentials from the user for the backend services to verify those credentials and return a response to the client.

```

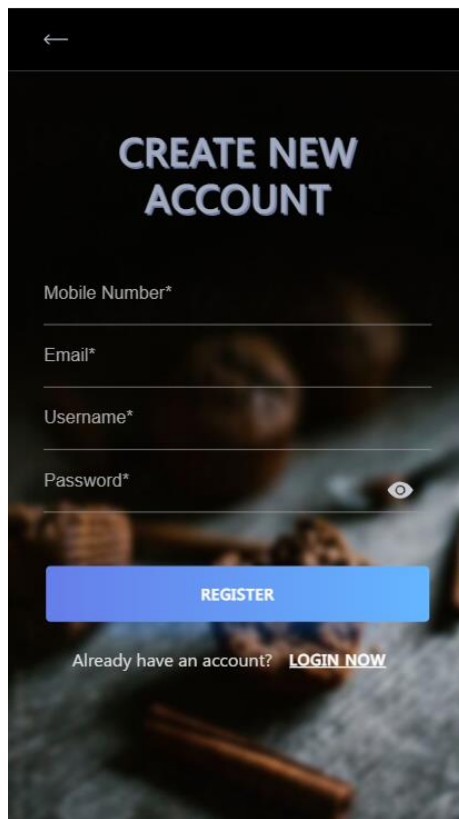
register() {
  this.firebase.auth.createUserWithEmailAndPassword(this.email, this.password)
    .then((res) => {
      if (res.user) {
        this.firebaseService.create_user(this.userForm.value).then(resp => {
          this.userForm.reset();
          this.isSubmitted = false;
          this.presentAlert("Register Successful!", "You can login now.");
          this.router.navigate(['login', {email: this.email, password: this.password,
            username: this.username, mobile: this.mobile}]);
        }).catch(error => {
          let msg = error.message;
          this.presentAlert("Error", msg);
        });
      }
    }).catch((err) => {
      let msg = err.message;
      this.presentAlert("Error", msg);
    })
}

```

Figure 6.1: Code Segment for Register Function

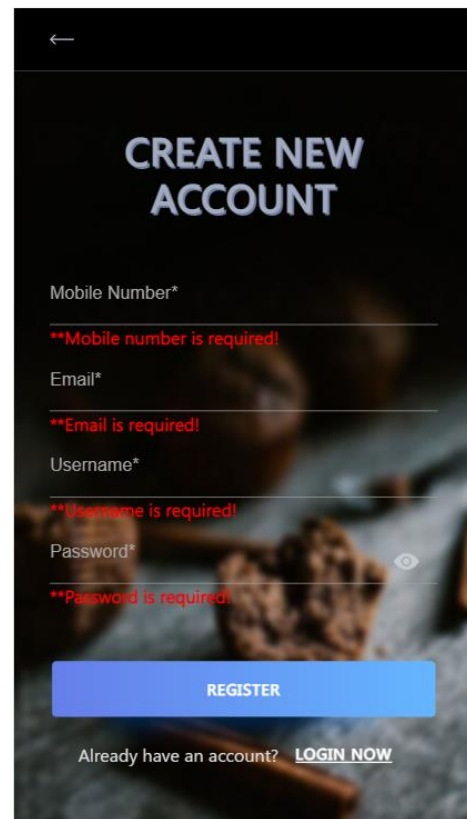
As discussed in the previous chapter, only registered user will be able to access this mobile application. Therefore, every user has to register for an account when the application is first accessed. In order for the user to perform the registration process, the user firstly has to enter four credentials, which include mobile number, email, username and password. All these credentials are required to be entered by the user and each of them has to meet its respective input format. If the user left an input field empty or does not obey the input formats, the system will display an error message to notify the user. Such that there is no error message shown for all of the four

input fields after the user has entered it, the user can proceed by clicking the “REGISTER” button located at bottom of the registration page. After the button is clicked, the registration process will be either successful or fail. If the registration process is successful, the system will display a message to notify the user and the user can proceed to the login page to login into the application. While if the registration process is fail, the system will display a message indicating that the registration is fail follows by the reason such as the account has already exist.



The screenshot shows a mobile application interface for creating a new account. The title is "CREATE NEW ACCOUNT" in white text on a dark background. Below the title are four input fields: "Mobile Number*", "Email*", "Username*", and "Password*". Each field is empty. A blue "REGISTER" button is positioned below the input fields. At the bottom, there is a link that says "Already have an account? [LOGIN NOW](#)".

Figure 6.2: Registration Page



The screenshot shows the same "CREATE NEW ACCOUNT" registration page as Figure 6.2, but with red error messages displayed below each input field. The errors are: "**Mobile number is required!" for Mobile Number, "**Email is required!" for Email, "**Username is required!" for Username, and "**Password is required!" for Password. The blue "REGISTER" button and the "Already have an account? [LOGIN NOW](#)" link are still visible at the bottom.

Figure 6.3: Empty Credentials

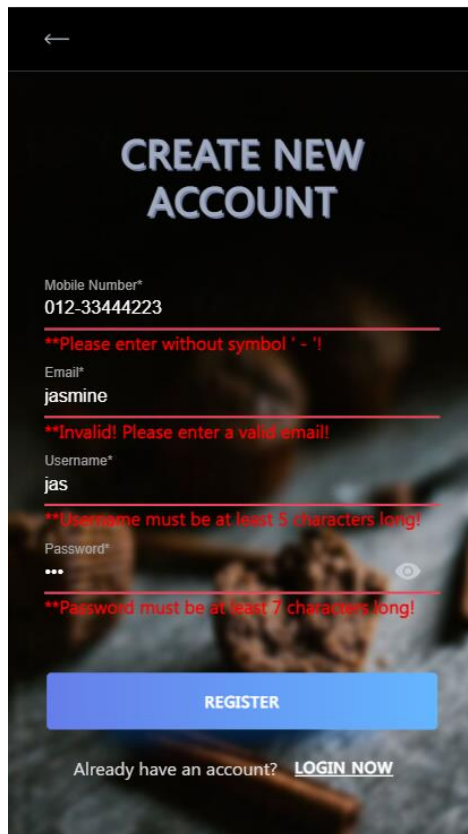


Figure 6.4: Invalid credentials format

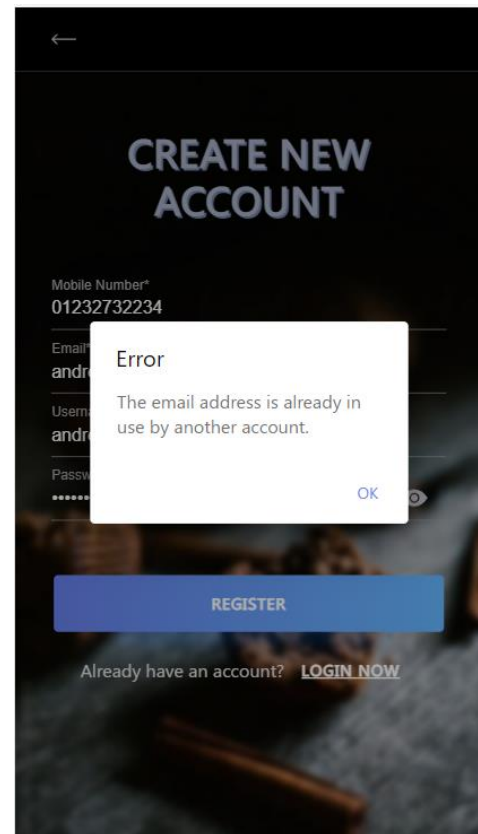


Figure 6.5: Account already exist

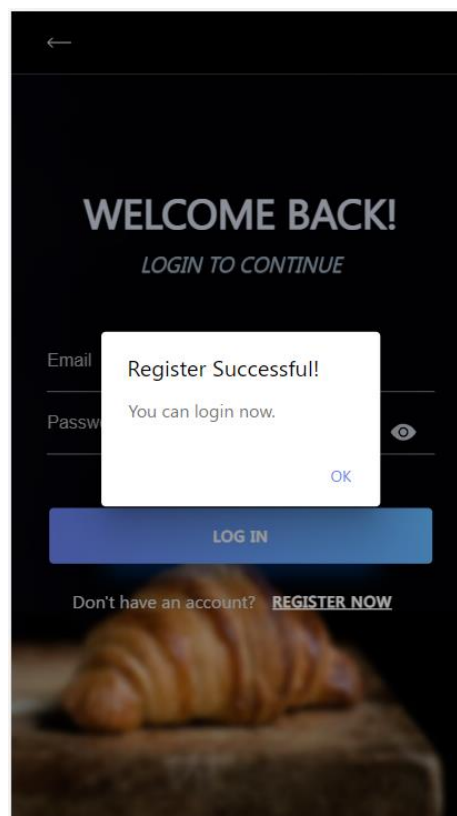


Figure 6.6: Registration Successful

6.2.1.2 Products Module

Products module in the mobile application will show the users a list of bakery products according to the category it belongs to. This is to make the users be able to look for the intended products in a more easier way. Aside from grouping the bakery products according to its category, the products module will also provide a search functionality that allows the users to search for a specific product by using the name of the product. Once the user enters the keywords in the search bar, the search functionality will search for the products in the firebase which the product' name matches or contains the keywords entered. The search functionality will filter the bakery products every time when the user make changes to the input at the search bar and return the bakery products that are matched.

```
filterList(evt) {
  const searchTerm = evt.srcElement.value;
  if (!searchTerm) {
    this.ngOnInit();
    return;
  }else{
    this.productList=this.productList.filter(currentFood => {
      if (currentFood.name && searchTerm) {
        return (currentFood.name.toLowerCase().indexOf(searchTerm.toLowerCase()) > -1);
      }
    });
  }
}
```

Figure 6.7: Code Segment for Search Function

In order to view the details of a bakery product, the user can click the “VIEW MORE” button and the system will direct the user to the product details page whereby all the information related to the specific product will be shown. Additionally, if the user is interested with the specific product, there is an “ADD TO CART” button located at the bottom of the product details page whereby the user can click the button to add the product into his or her shopping cart. Once the button is clicked, an alert message will be displayed to notify the user that the product is successfully added into the shopping cart.

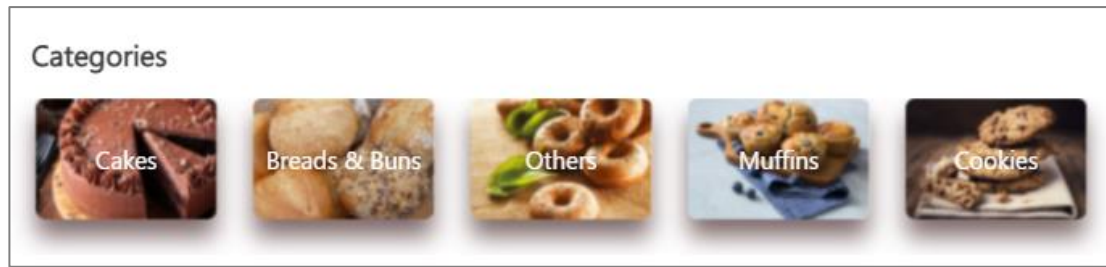


Figure 6.8: Product Categories at Home Page

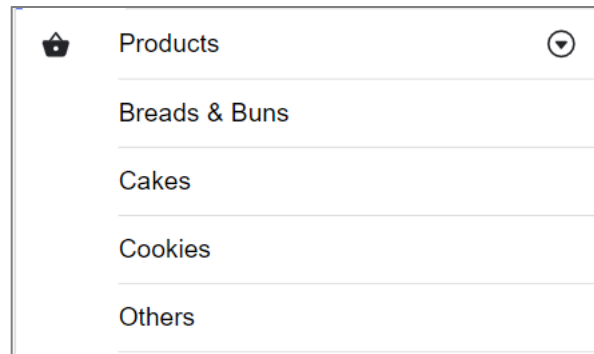


Figure 6.9: Product Categories at Side Navigation Bar

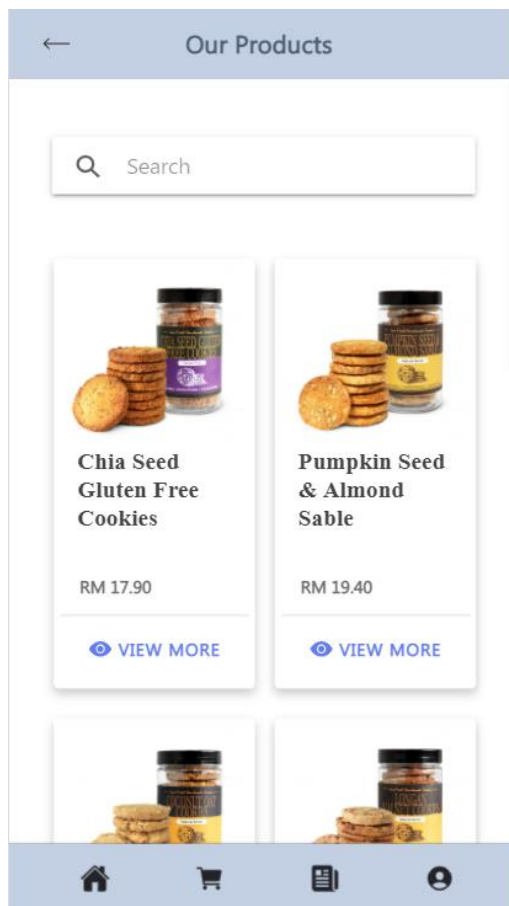


Figure 6.10: Products Page



Figure 6.11: Product Details Page

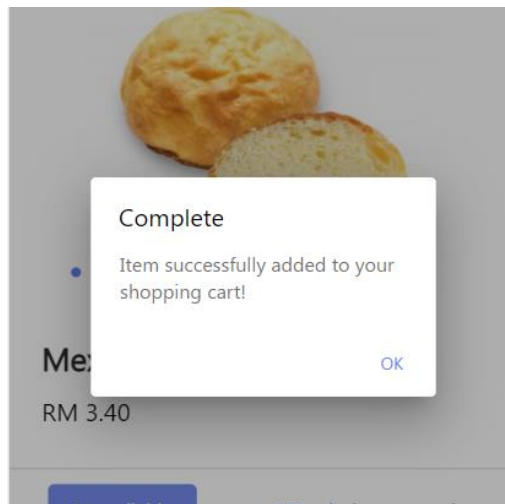


Figure 6.12: Product successfully added into shopping cart

6.2.1.3 Order Module

Order module allows the users to place an order for the items added into the shopping cart. In order for the user to place an order, the user can click the “CONTINUE” button located at the bottom of the shopping cart page. Once the button is clicked, the system will direct the user to the checkout page. However, if the button is clicked under a condition that the shopping cart is empty, the system will display an alert message to the user. At the checkout page, the user will be able to see all the products that are going to be ordered. To continue the order process, the user firstly has to enter the delivery address at the input field provided. Besides from the delivery address, the user also has to select a delivery method as well as the payment method for that order.

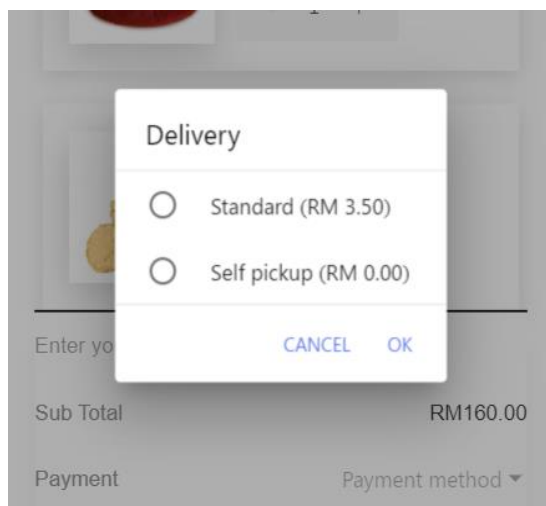


Figure 6.13: Select Delivery Method

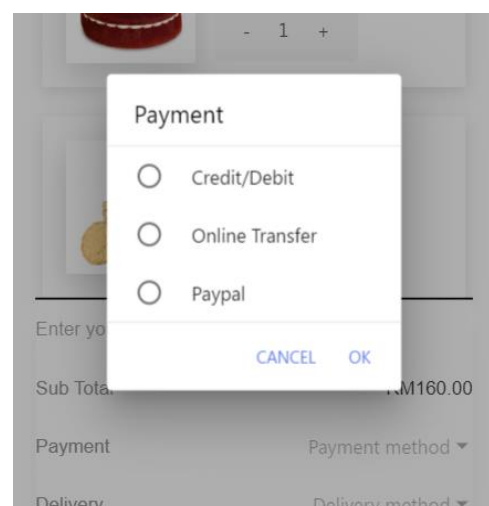


Figure 6.14: Select Payment Method

As mentioned in the previous chapter, the payment module which covers the payment process is not included in the project scope. Therefore, the user can proceed to place the order by clicking the “CONFIRM” button located at the bottom of the checkout page. Assuming that the order is successfully placed, the system will direct the user to the order success page. This page is to indicate and notify the user that the order is successfully placed. and the user can click the “BACK TO HOME” button located at the bottom of the page to exit from the order success page. After that, the user can proceed to check all the orders placed associated with the details of the order by visiting the My Order page from the side navigation bar.

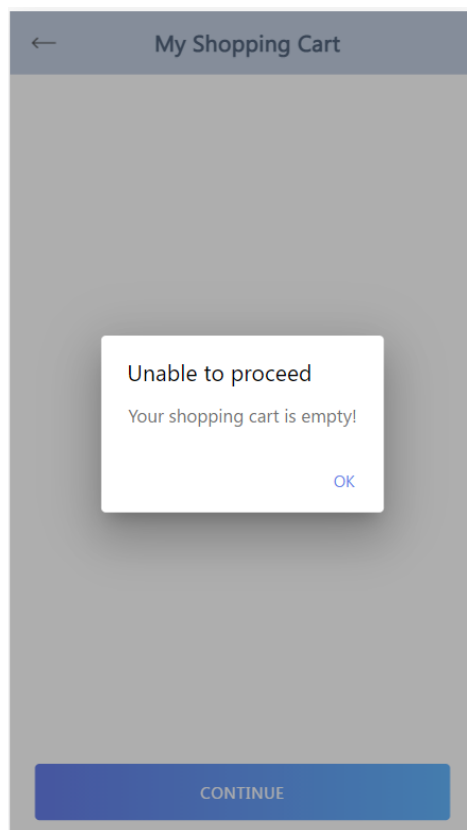


Figure 6.15: Unable to Checkout

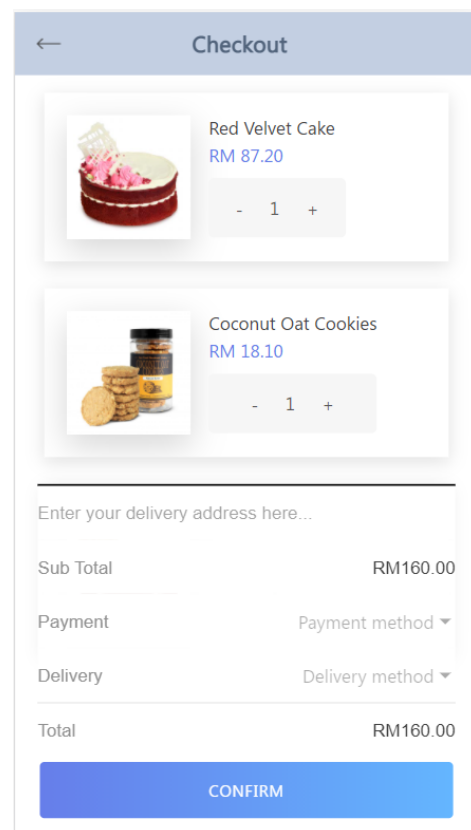


Figure 6.16: Checkout Page

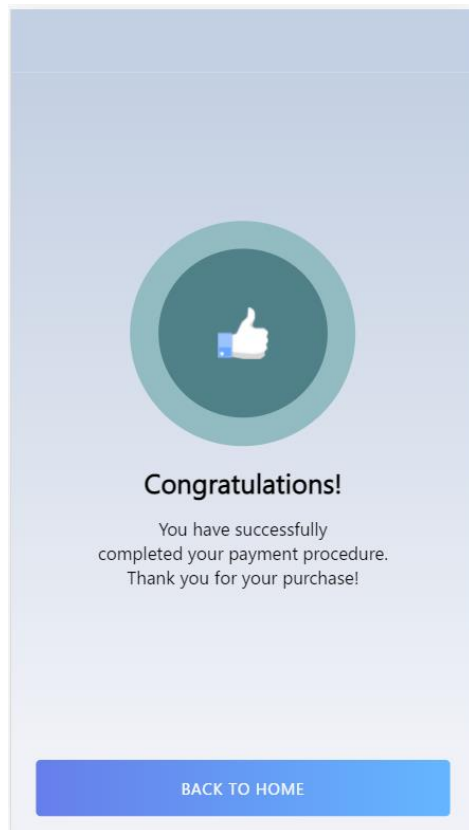


Figure 6.17: Order Success Page

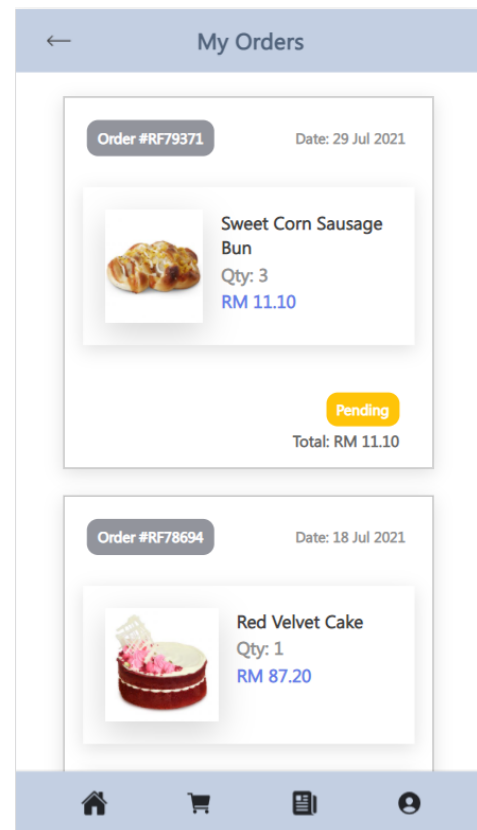


Figure 6.18: My Order Page

6.2.1.4 Profile Module

Profile module allows the users to update their registered account' credentials which include their mobile number, email address, username and password. In this module, the credentials entered by the user are validate by using the Validators method imported from the FormValidation library. Validators method will validate whether all the inputs entered by the user meet the specified input patterns and the system will display an error message if there is any input that does not meet the specified formats. After the user finish editing the account credentials, there is an "UPDATE" button located at the bottom of the Profile page that allows the user to click on it in order to submit the form and update the profile information. Once the profile is updated successfully, the system will display a success message to notify the user on the completion of the actions.

← My Profile

PROFILE INFORMATION

Mobile Number*
0127856445

Email*
andrew@hotmail.com

Username*
Andrew

Password*

Home, Shopping Cart, Document, Profile icons at the bottom.

Figure 6.19: Profile Page

← My Profile

PROFILE INFORMATION

Mobile Number*
0127856445

Email*
andrew@hot

****Invalid! Please enter a valid email!**

Username*
Andrew

Password*

Home, Shopping Cart, Document, Profile icons at the bottom.

Figure 6.20: Invalid Input Formats

```

this.userForm = this.fb.group({
  email: [this.receiveEmail, [Validators.required,
    Validators.pattern('[a-z0-9._%+-]+@[a-z0-9.-]+\.[a-z]{2,3}$')]],
  password: [this.receivePassword, [Validators.required, Validators.minLength(7)]],
  username: [this.receiveUsername, [Validators.required, Validators.minLength(5)]],
  mobile: [this.receiveMobile, [Validators.required, Validators.pattern('[0-9]{10,11}')]],
});

```

Figure 6.21: Code Segment for Form Validation

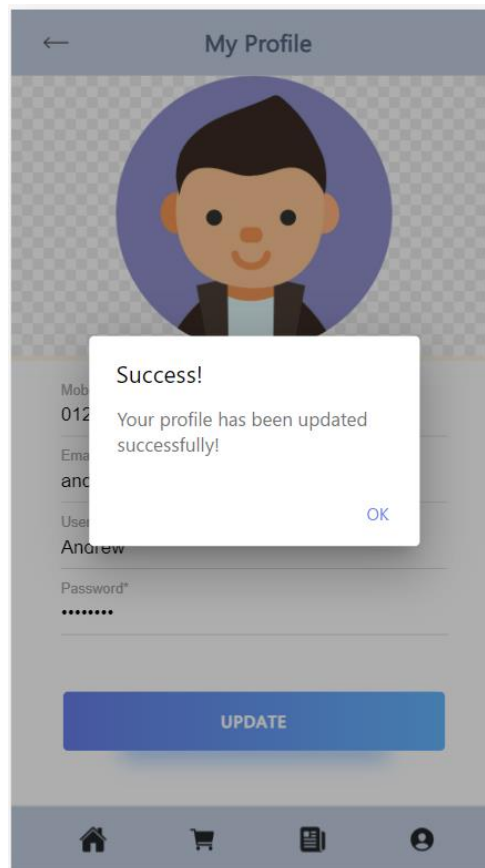


Figure 6.22: Successful Profile Update

6.2.1.5 Shopping Cart Module

Shopping cart module will consist of all the products added by the user into the cart. The shopping cart page will show the user a list of products associated with some brief information of the product. Therefore, the user can click on a product to view more detailed information related to the specific product and the system will direct the user to the item details page. In order for the user to remove an item from the shopping cart, the user just have to click on the “X” icon located at the top right corner of the product and the system will remove it from the list of products.

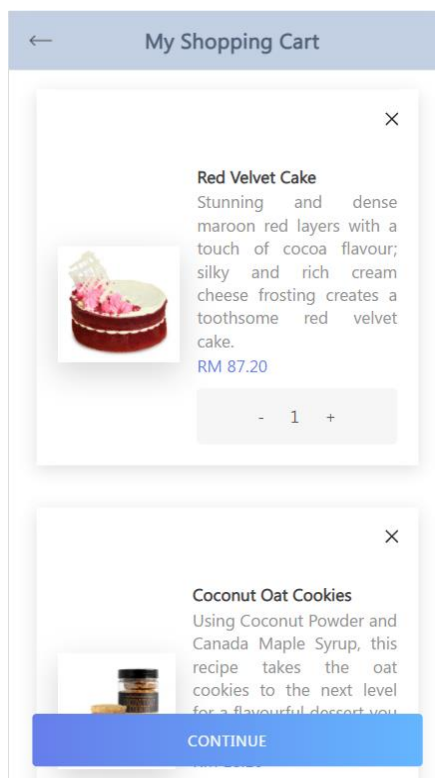


Figure 6.23: Shopping Cart Page

6.2.2 Modules in Web-based Management System

This section includes all of the modules implemented in the back-end system, which is the web-based management system that serves the staff.

6.2.2.1 Products Management Module

Products module in the web-based management system will show the users an overview on all the bakery products in a list. In the products overview page, each row of the products list represents a product record while each column will consist of the product' information which includes the date created, which is the date when the product record is created, category, which is the category that the product belongs to, product, which is the name of the product and the last is status, which is the status of the product whether the product is available or unavailable. At the last column of the products list which is labelled with "Actions", it consists of all the actions that can be performed by the user to each of the product record. This includes firstly the "eye" icon, which indicates the view action; second, the "pen" icon which indicates the edit action; and lastly, the "trash" icon which indicates the delete action. At the right side of the label for each of the columns, there will be a small "up and down arrow" button

whereby the user can click on it to sort the products list according to the respective information. Additionally, the user will be able to search for a specific product record by using the search bar that is located at the top right corner of the products list. On top of that, at the top left corner of the products list, the user can also select the number of records to be displayed in the products list. While at the bottom left corner of the products list, there is a “New Entry” button that allows the user to add a new product record.

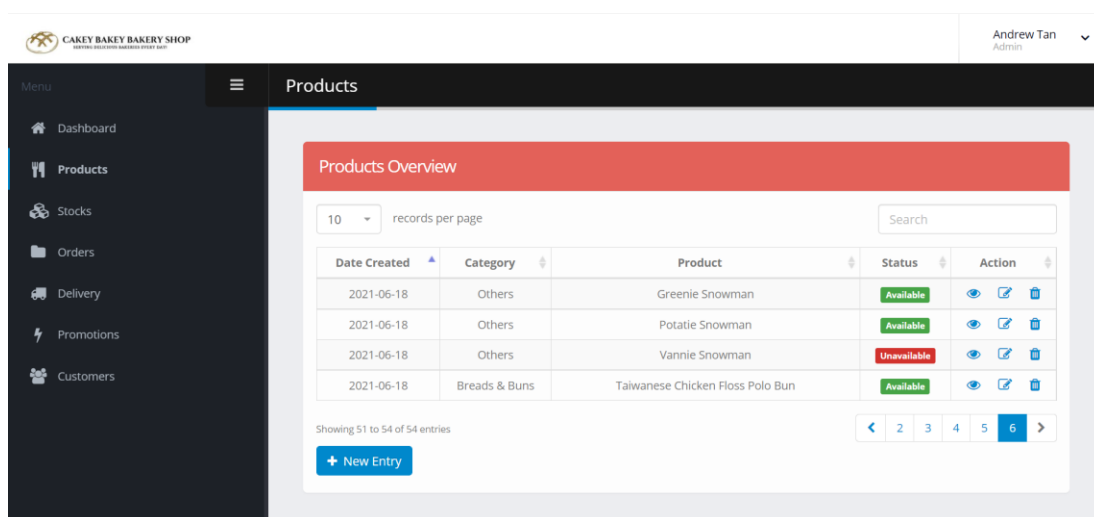
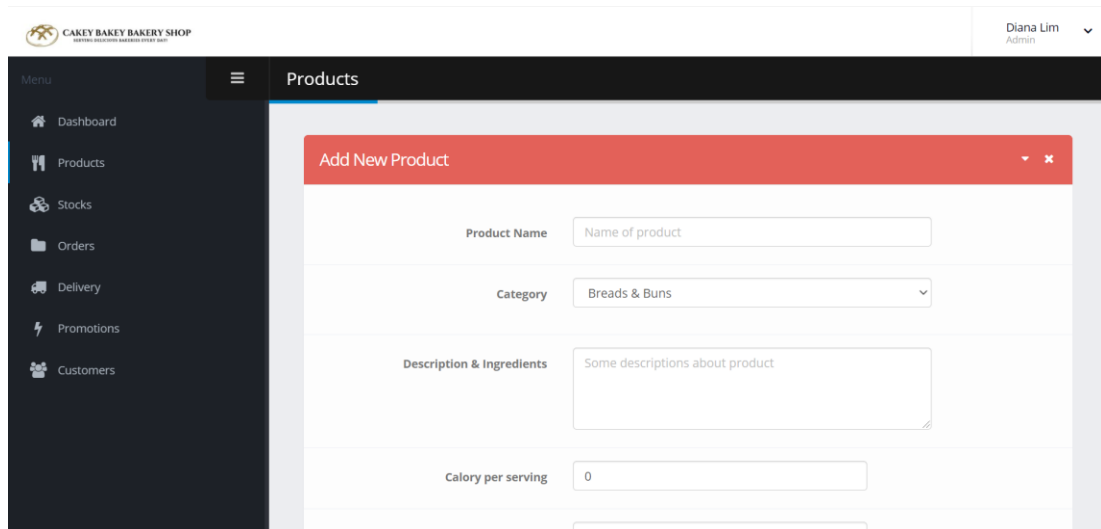


Figure 6.24: Products Overview Page

6.2.2.1.1 Add New Product

In order to add a new product record, the user have to click the “New Entry” button from the products overview page and the system will direct the user to the add product page. At the add product page, the user is required to enter all the information of the new product in the respective input field provided and upload an image of the product. After the user has finished filling in all the inputs, there is an “Add” button located at the bottom of the form which allows the user to click on it in order to submit the form. Also, there is a “Cancel” button beside the “Add” button that allows the user to cancel this add operation. By clicking the “Cancel” button, the system will redirect the user back to the products overview page. All of the input fields in the add form are required fields and therefore, if the user leaves the input field to be empty, an error message of “Please fill out this field.” will pop out after the user submits the form. Besides, the system will also check whether all the inputs entered by the user is valid and match with the specified formats. If the input entered does not match the required format, an

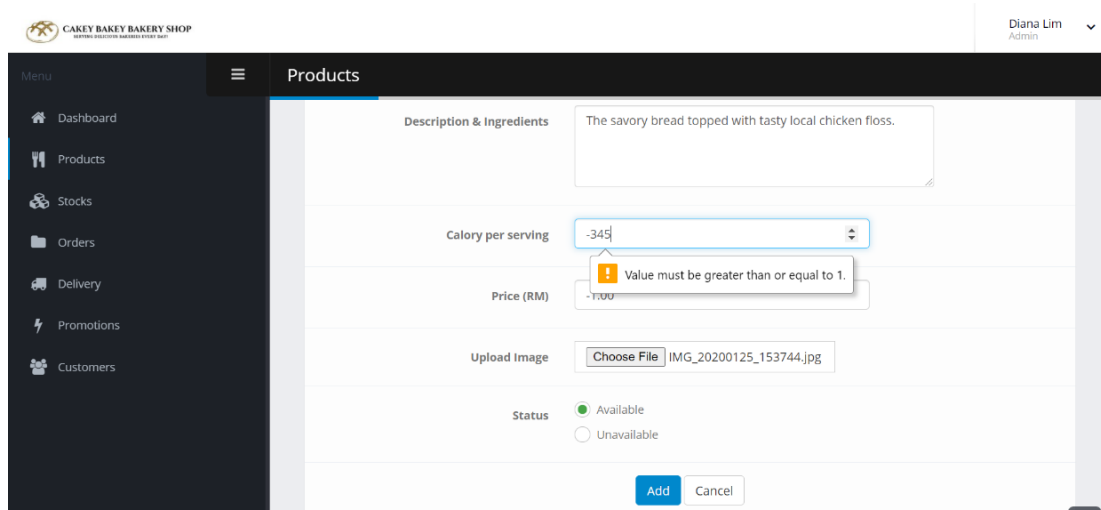
error message will pop out to notify the user on the correct input format. Additionally, the system will check whether the new product record is duplicated with any of the records in the database. If the duplication of record exists, the new product will not be added and the system will notify the user with a message. Once there is no any error, the new record will be created after the user submits the form and the system will display a message to notify the user that the product is successfully added.



The screenshot shows the 'Add New Product' form in the CAKEY BAKERY BAKERY SHOP admin interface. The form is titled 'Add New Product' and is located in the 'Products' section of the admin panel. The form fields are:

- Product Name: Name of product
- Category: Breads & Buns
- Description & Ingredients: Some descriptions about product
- Calory per serving: 0

Figure 6.25: Add Product Page



The screenshot shows the 'Add New Product' form in the CAKEY BAKERY BAKERY SHOP admin interface. The form is titled 'Add New Product' and is located in the 'Products' section of the admin panel. The form fields are:

- Description & Ingredients: The savory bread topped with tasty local chicken floss.
- Calory per serving: -345
- Price (RM): 1.00
- Upload Image: Choose File IMG_20200125_153744.jpg
- Status: Available (selected), Unavailable

An error message is displayed below the 'Calory per serving' field: "Value must be greater than or equal to 1." The 'Add' button is highlighted in blue, and the 'Cancel' button is in grey.

Figure 6.26: Wrong Input Format

Figure 6.27: Empty Field



Figure 6.28: Product Added Successfully

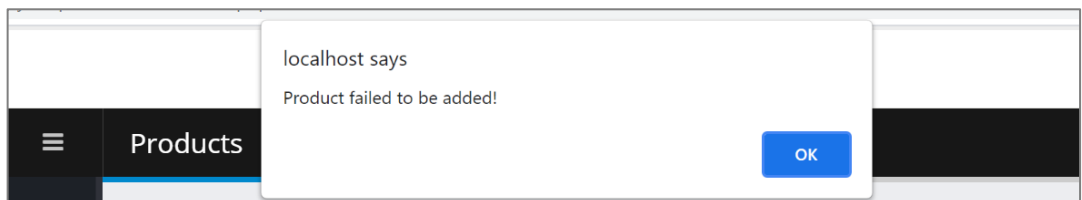


Figure 6.29: Fail to Add Product

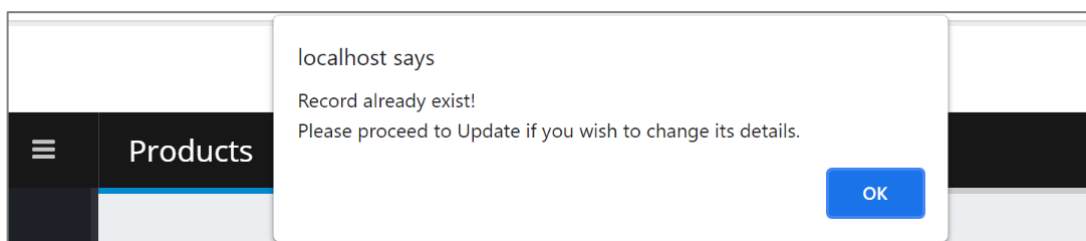


Figure 6.30: Product Already Exists

6.2.2.1.2 View A Product

In order for the user to view a specific product record, the user has to click the “eye” icon located for that record under the Actions column of the products list. Once the “eye” icon for the specific product is clicked, the system will display a modal which

consists of all the details related to that particular product. To close the modal, the user can click the “Close” button located at the bottom right corner of the view modal.






Products Overview				
10	records per page	Search		
Date Created	Category	Product	Status	Actions
2021-06-18	Others	Greenie Snowman	Available	  
2021-06-18	Others	Potatie Snowman	Available	  
2021-06-18	Others	Vannie Snowman	Unavailable	  
2021-06-18	Breads & Buns	Taiwanese Chicken Floss Polo Bun	Available	  

Figure 6.31: Eye Icon in Products List

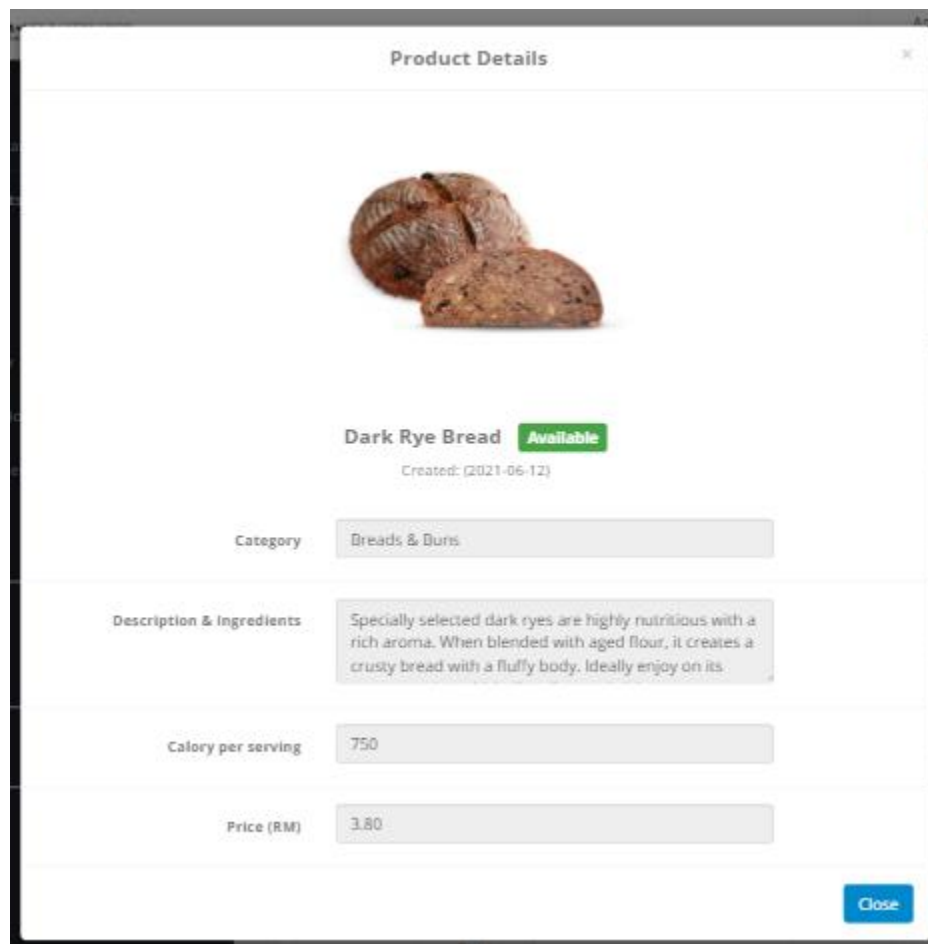



Figure 6.32: Product Details Page

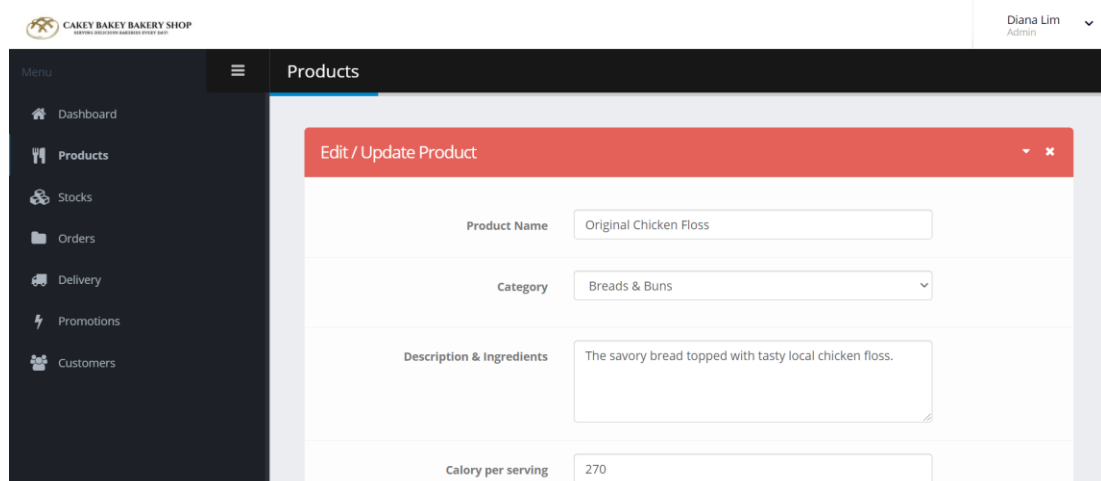
6.2.2.1.3 Edit Product Details

In order for the user to edit the information of a specific product record, the user has to click the “pen” icon located under the Actions column of the products list and the system will direct the user to the edit product page. At the edit product page, all the input fields are already filled in with its respective value. Therefore, the user only has to make changes to those values in order to update the product’s information. After the user has finished editing the intended input field, the user can click the “Update” button located at the bottom of the form to submit the form. Also, there is a “Cancel” button beside the “Update” button that allows the user to cancel this edit operation. By clicking the “Cancel” button, the system will redirect the user back to the products overview page. Once the user submits the form, the system will check if all the inputs entered by the user are valid. If there is no any error, the selected product record will be updated after the user submits the form and the system will display a message to notify the user that the selected product record is successfully updated.



Date Created	Category	Product	Status	Actions
2021-06-18	Others	Greenie Snowman	Available	View, Edit (pen icon), Delete
2021-06-18	Others	Potatie Snowman	Available	View, Edit (pen icon), Delete
2021-06-18	Others	Vannie Snowman	Unavailable	View, Edit (pen icon), Delete

Figure 6.33: Pen Icon in Products List



CAKEY BAKERY BAKERY SHOP

Diana Lim Admin

Menu

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers

Products

Edit / Update Product

Product Name: Original Chicken Floss

Category: Breads & Buns

Description & Ingredients: The savory bread topped with tasty local chicken floss.

Calory per serving: 270

Figure 6.34: Edit Product Page

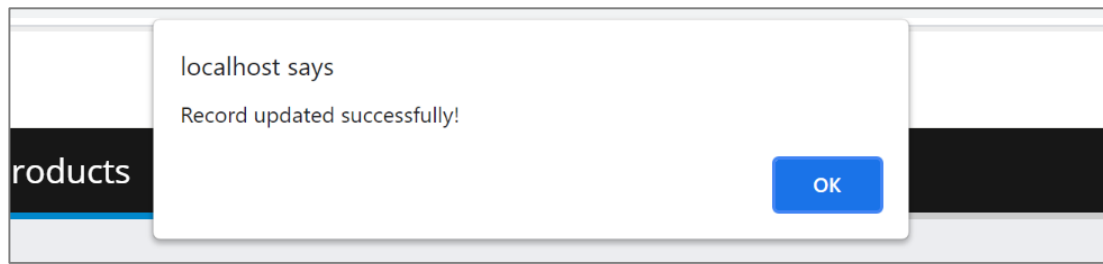


Figure 6.35: Successful Product Update

6.2.2.1.4 Delete A Product

In order to delete a specific product record, the user has to click the “trash” icon located for that record under the Actions column of the products list. Once the user clicks the “trash” icon, the system will remove the selected product record from the database and the products list will be updated. The system will display an alert message to notify the user that the selected record is successfully deleted and the user will be redirect back to the products overview page after the user clicks the “OK” button in the alert message.

Products Overview				
10	records per page	Search		
Date Created	Category	Product	Status	Actions
2021-06-18	Others	Greenie Snowman	Available	  
2021-06-18	Others	Potatie Snowman	Available	  
2021-06-18	Others	Vannie Snowman	Unavailable	  
2021-06-18	Breads & Buns	Taiwanese Chicken Floss Polo Bun	Available	  

Figure 6.36: Trash Icon in Products List

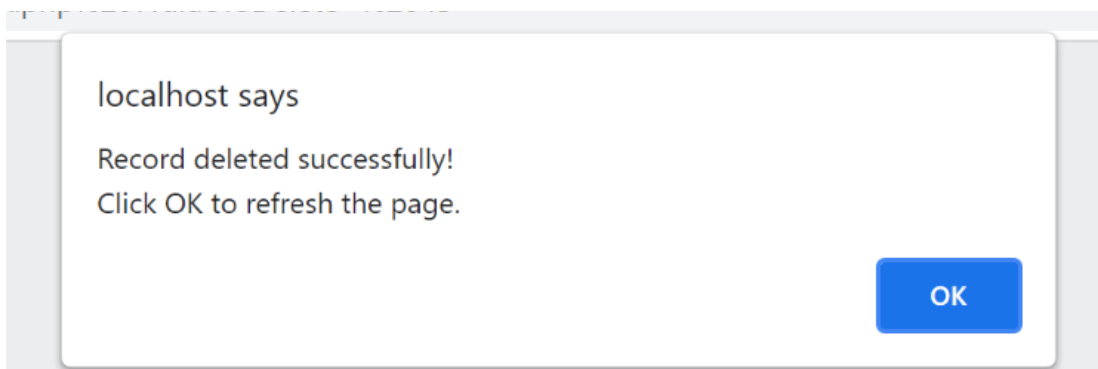
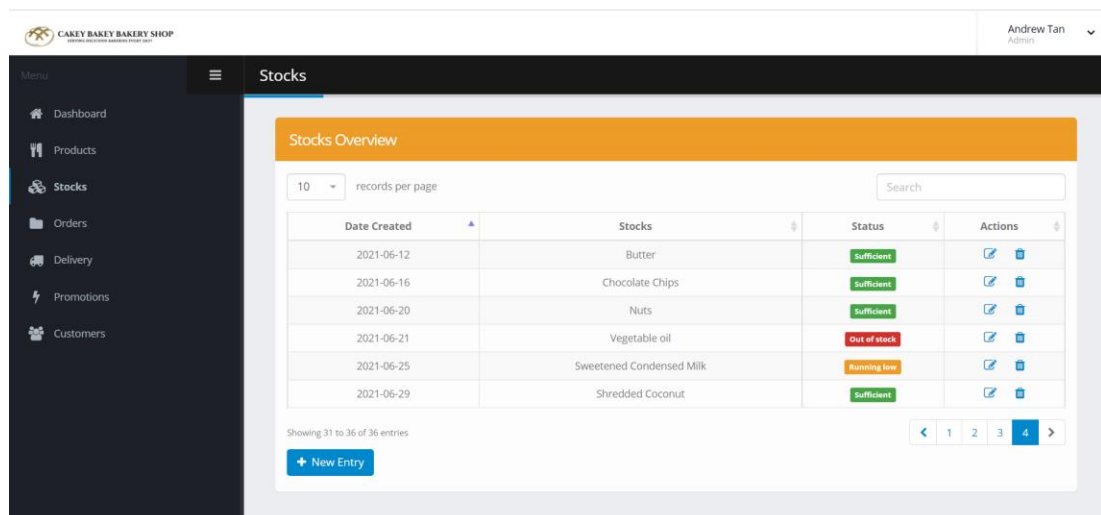


Figure 6.37: Product Successfully Deleted

6.2.2.2 Stocks Management Module

Stocks module in the web-based management system will show the users an overview on all the stocks in a list. In the stocks overview page, each row of the stocks list represents a stock record while each column will consist of the stock' information which includes date created, which is the date when the record is created, stock, which is the name of the stock, and lastly status, which is the status of the stock whether the stock is sufficient, running low or out of stock. At the last column of the stocks list which is labelled with "Actions", it consists of all the actions that can be performed by the user to each of the stock record. This includes the "pen" icon which indicates the edit action, and the "trash" icon which indicates the delete action. At the right side of the label for each of the columns, there will be a small "up and down arrow" button whereby the user can click on it to sort the stocks list according to the respective information. Additionally, the user will be able to search for a specific stock record by using the search bar that is located at the top right corner of the stocks list. On top of that, at the top left corner of the stocks list, the user can also select the number of records to be displayed in the stocks list. While at the bottom left corner of the stocks list, there is a "New Entry" button that allows the user to add a new stock record.



Date Created	Stocks	Status	Actions
2021-06-12	Butter	Sufficient	[Edit] [Delete]
2021-06-16	Chocolate Chips	Sufficient	[Edit] [Delete]
2021-06-20	Nuts	Sufficient	[Edit] [Delete]
2021-06-21	Vegetable oil	Out of stock	[Edit] [Delete]
2021-06-25	Sweetened Condensed Milk	Running low	[Edit] [Delete]
2021-06-29	Shredded Coconut	Sufficient	[Edit] [Delete]

Figure 6.38: Stocks Overview Page

6.2.2.2.1 Add New Stock

In order to add a new stock record, the user have to click the "New Entry" button from the stocks overview page and the system will display the add stock modal to the user.

In the add stock modal, the user is required to enter the name of the new stock in the respective input field provided and select the status of the stock. After the user has finished filling in all the inputs, there is an “Add” button located at the bottom right corner of the modal which allows the user to click on it in order to submit the form. Also, there is a “Cancel” button beside the “Add” button that allows the user to cancel this add operation. By clicking the “Cancel” button, the system will close the add modal and the user will return to the stocks overview page. All of the input fields in the add modal are required fields and therefore, if the user leaves the input field to be empty, an error message of “Please fill out this field.” will pop out after the user submits the form. Additionally, the system will check whether the new record is duplicated with the records in the database. If the duplication of record exists, the new stock will not be added while if there is no any error, the new record will be created after the user submits the form.

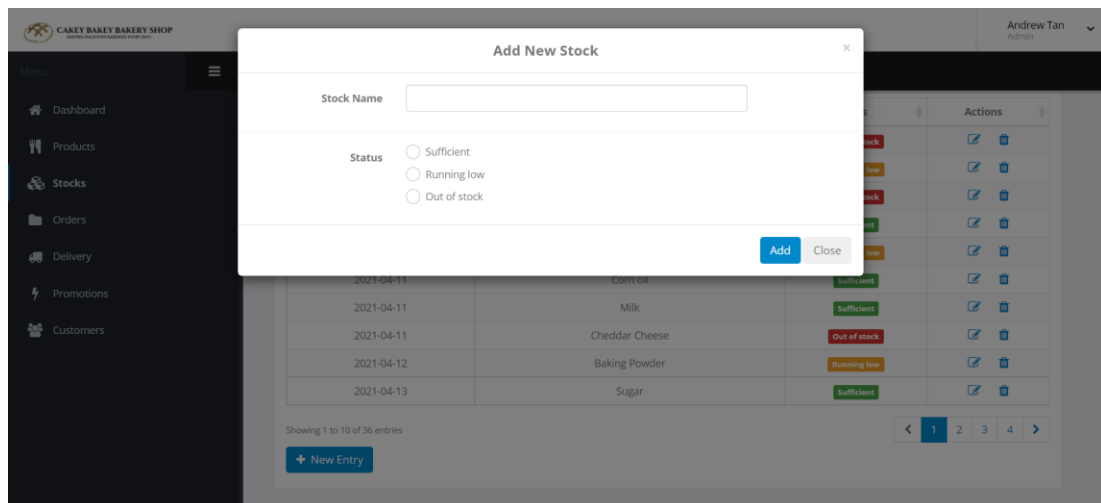


Figure 6.39: Add New Stock Modal

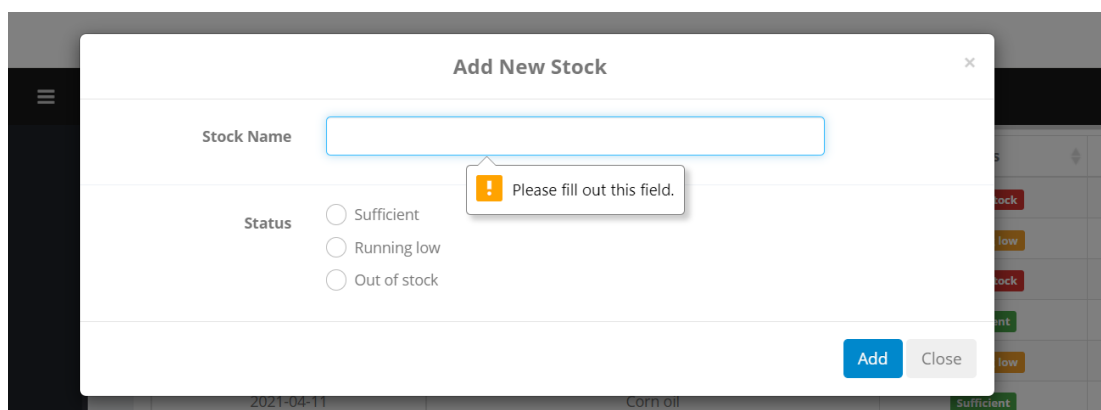
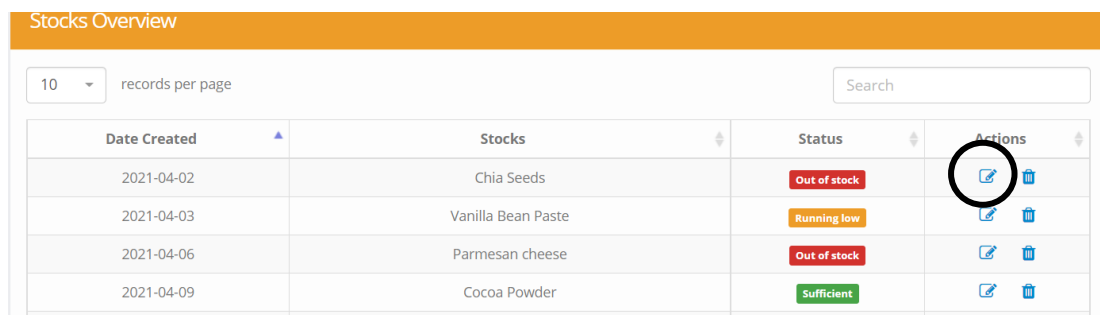


Figure 6.40: Empty Input Field

6.2.2.2 Edit Stock Details

In order for the user to edit the information of a specific stock record, the user has to click the “pen” icon located under the Actions column of the stocks list and the system will display an edit modal to the user. Inside the edit modal, all the input fields are already filled in with its respective value. Therefore, the user only has to make changes to those values in order to update the stock’s information. After the user has finished editing the intended input field, the user can click the “Update” button located at the bottom right corner of the edit modal to submit the form. Also, there is a “Cancel” button beside the “Update” button that allows the user to cancel this edit operation. By clicking the “Cancel” button, the system will close the edit modal and the user will return to the stocks overview page. Once the user submits the form, the system will check if all the inputs entered by the user are valid. If there is no any error, the selected stock record will be updated after the user submits the form.











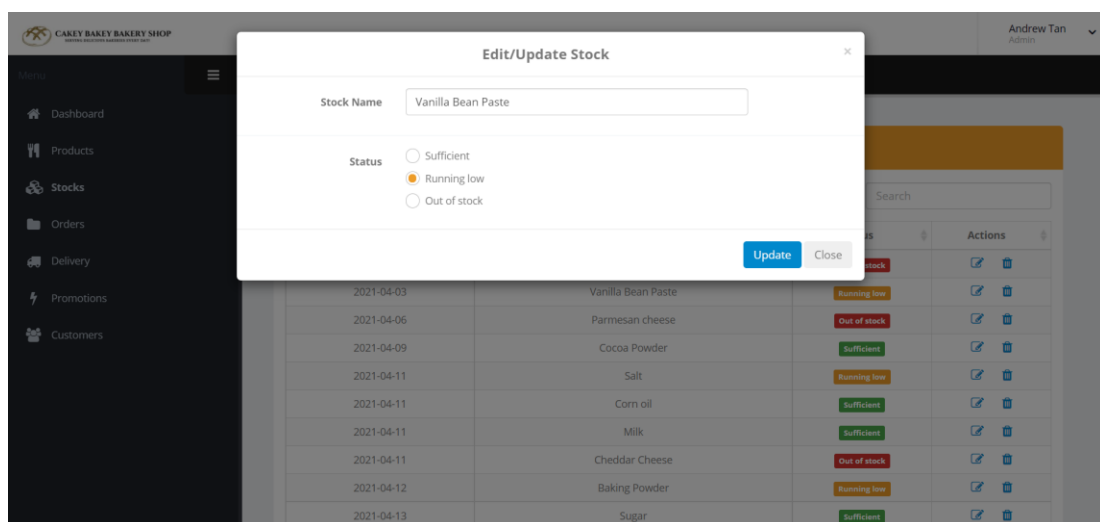
Date Created	Stocks	Status	Actions
2021-04-02	Chia Seeds	Out of stock	 
2021-04-03	Vanilla Bean Paste	Running low	 
2021-04-06	Parmesan cheese	Out of stock	 
2021-04-09	Cocoa Powder	Sufficient	 

Figure 6.41: Pen Icon in Stocks List



Edit/Update Stock

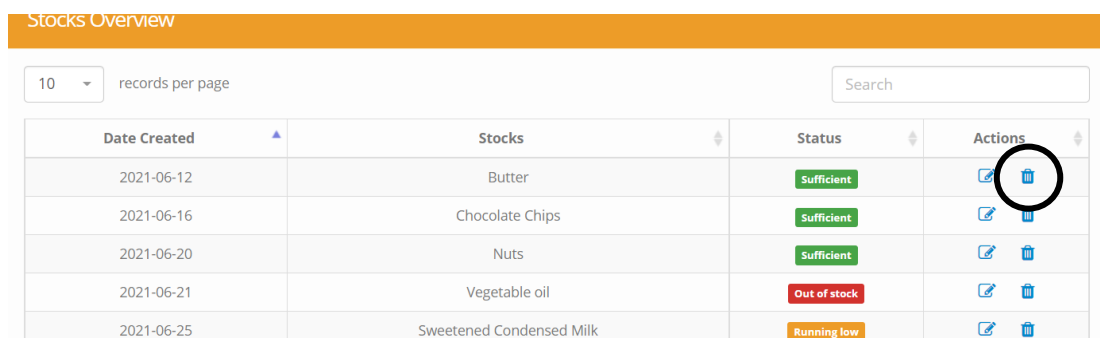
Stock Name:

Status: Sufficient Running low Out of stock

Figure 6.42: Edit Stock Modal

6.2.2.2.3 Delete A Stock

In order to delete a specific stock record, the user has to click the “trash” icon located for that record under the Actions column of the stocks list. Once the user clicks the “trash” icon, the system will remove the selected stock record from the database and the stocks list will be updated. The system will display an alert message to notify the user that the selected record is successfully deleted and the user will be redirect back to the stocks overview page after the user clicks the “OK” button in the alert message.








Date Created	Stocks	Status	Actions
2021-06-12	Butter	Sufficient	
2021-06-16	Chocolate Chips	Sufficient	
2021-06-20	Nuts	Sufficient	
2021-06-21	Vegetable oil	Out of stock	
2021-06-25	Sweetened Condensed Milk	Running low	

Figure 6.43: Trash Icon In Stocks List

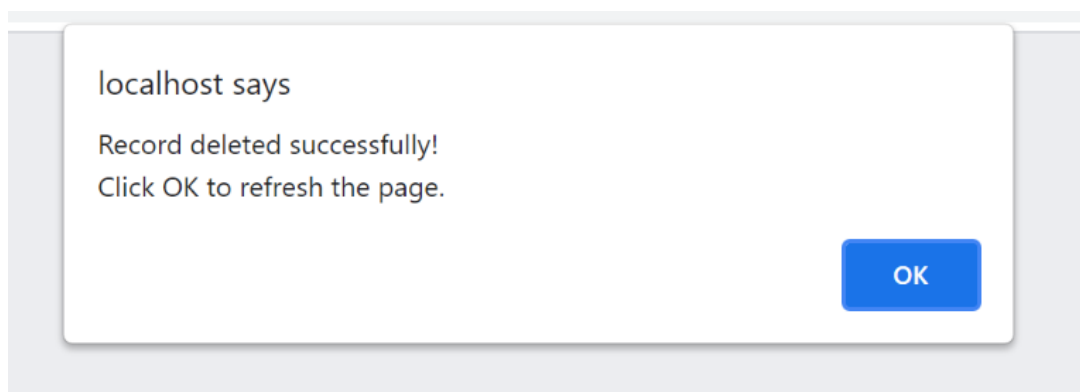
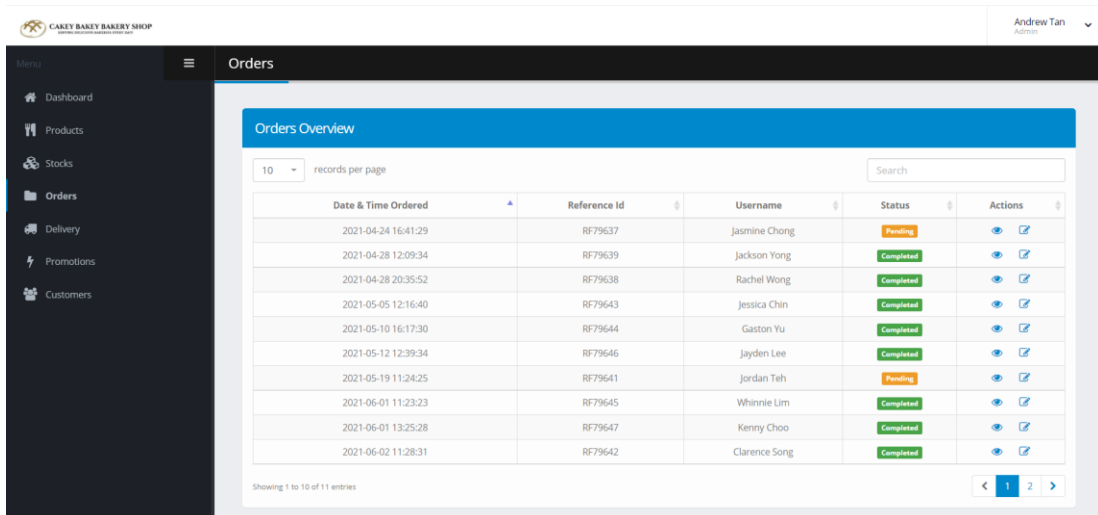


Figure 6.44: Stock Successfully Deleted

6.2.2.3 Orders Management Module

Orders module in the web-based management system will show the users an overview on all the customer orders in a list. In the orders overview page, each row of the orders list represents an order record while each column will consist of the order' information which includes the date and time ordered, which is the date and time when the order is placed, reference id, which is a unique identifier for each of the order, username, and lastly is status, which is the status of the order whether the order is pending or

completed. At the last column of the orders list which is labelled with “Actions”, it consists of all the actions that can be performed by the user to each of the order record. This includes firstly the “eye” icon, which indicates the view action, and second, the “pen” icon which indicates the edit action. At the right side of the label for each of the columns, there will be a small “up and down arrow” button whereby the user can click on it to sort the orders list according to the respective information. Additionally, the user will be able to search for a specific order record by using the search bar that is located at the top right corner of the orders list. On top of that, at the top left corner of the orders list, the user can also select the number of records to be displayed in the orders list.



The screenshot displays the 'Orders Overview' page. At the top left, there is a navigation menu with options: Dashboard, Products, Stocks, Orders, Delivery, Promotions, and Customers. The 'Orders' section is currently selected. The main content area shows a table of orders. At the top of the table, there is a search bar and a dropdown menu for 'records per page' set to 10. The table has the following data:

Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Pending	View Edit
2021-04-28 12:09:34	RF79639	Jackson Yong	Completed	View Edit
2021-04-28 20:35:52	RF79638	Rachel Wong	Completed	View Edit
2021-05-05 12:16:40	RF79643	Jessica Chin	Completed	View Edit
2021-05-10 16:17:30	RF79644	Gaston Yu	Completed	View Edit
2021-05-12 12:39:34	RF79646	Jayden Lee	Completed	View Edit
2021-05-19 11:24:25	RF79641	Jordan Teh	Pending	View Edit
2021-06-01 11:23:23	RF79645	Whinnie Lim	Completed	View Edit
2021-06-01 13:25:28	RF79647	Kenny Choo	Completed	View Edit
2021-06-02 11:28:31	RF79642	Clarence Song	Completed	View Edit

At the bottom of the table, it says 'Showing 1 to 10 of 11 entries'. There is also a pagination control showing page 1 of 2.

Figure 6.45: Orders Overview Page

6.2.2.3.1 View An Order

In order for the user to view a specific order record, the user has to click the “eye” icon located for that record under the Actions column of the orders list. Once the “eye” icon for the specific order is clicked, the system will display a modal which consists of all the details related to that particular order. To close the modal, the user can click the “Close” button located at the bottom right corner of the view modal.









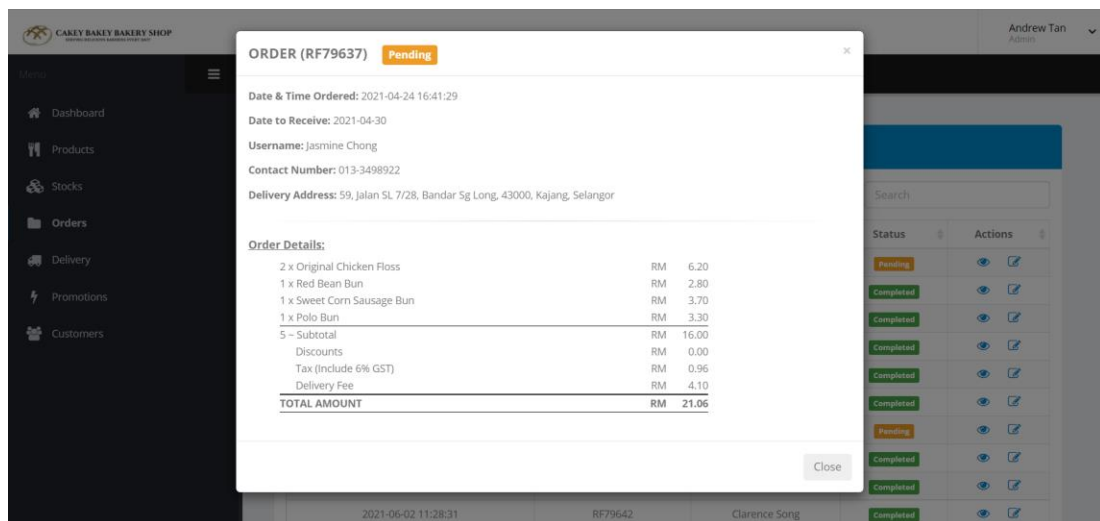
Orders Overview				
10	records per page	Search		
Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Pending	 
2021-04-28 12:09:34	RF79639	Jackson Yong	Completed	 
2021-04-28 20:35:52	RF79638	Rachel Wong	Completed	 
2021-05-05 12:16:40	RF79643	Jessica Chin	Completed	 

Figure 6.46: Eye Icon In Orders List



ORDER (RF79637) Pending

Date & Time Ordered: 2021-04-24 16:41:29
 Date to Receive: 2021-04-30
 Username: Jasmine Chong
 Contact Number: 013-3498922
 Delivery Address: 59, Jalan SL 7/28, Bandar Sg Long, 43000, Kajang, Selangor

Order Details:

2 x Original Chicken Floss	RM	6.20
1 x Red Bean Bun	RM	2.80
1 x Sweet Corn Sausage Bun	RM	3.70
1 x Polo Bun	RM	3.30
5 - Subtotal	RM	16.00
Discounts	RM	0.00
Tax (Include 6% GST)	RM	0.96
Delivery Fee	RM	4.10
TOTAL AMOUNT	RM	21.06

Close

Figure 6.47: View Order Modal

6.2.2.3.2 Update Order Status

In order for the user to update the status of a specific order record, the user has to click the “pen” icon located under the Actions column of the orders list and the system will display an edit modal to the user. Inside the edit modal, the status of the selected order is assigned with its current status and the user only has to select the new status for that order to update the record. After that, the user can click the “Update” button located at the bottom right corner of the edit modal to submit the form. Also, there is a “Cancel” button beside the “Update” button that allows the user to cancel this edit operation. By clicking the “Cancel” button, the system will close the edit modal and the user will return to the orders overview page. Once the user submits the form, the status of the selected order record will be updated in the database.










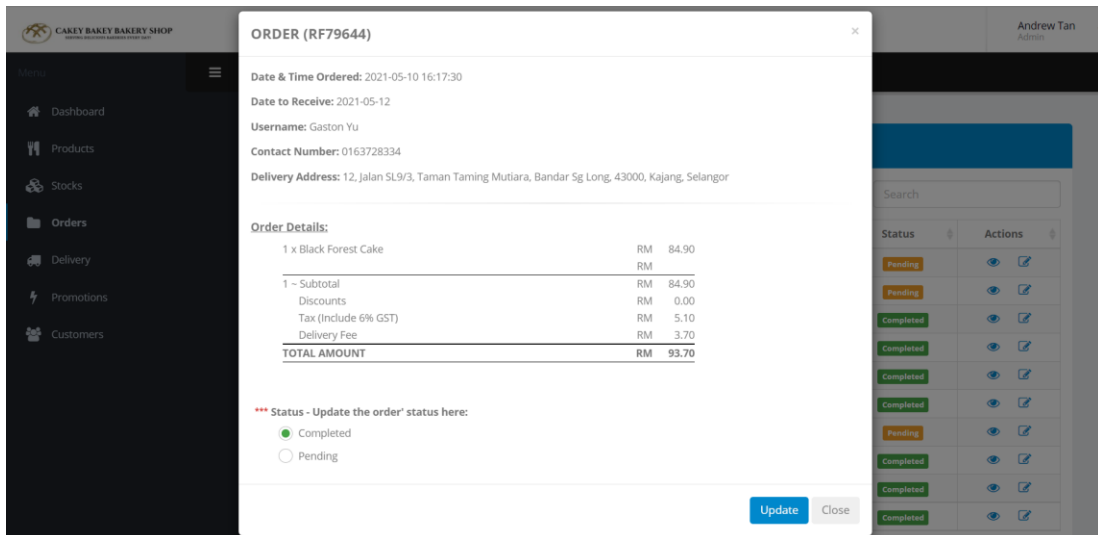
Orders Overview				
10	records per page	Search		
Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Pending	 
2021-04-28 12:09:34	RF79639	Jackson Yong	Pending	 
2021-04-28 20:35:52	RF79638	Rachel Wong	Completed	 
2021-05-05 12:16:40	RF79643	Jessica Chin	Completed	 
2021-05-10 16:17:30	RF79644	Gaston Yu	Completed	 

Figure 6.48: Pen Icon In Orders List



ORDER (RF79644)

Date & Time Ordered: 2021-05-10 16:17:30
 Date to Receive: 2021-05-12
 Username: Gaston Yu
 Contact Number: 0163728334
 Delivery Address: 12, Jalan SL9/3, Taman Taming Mutiara, Bandar Sg Long, 43000, Kajang, Selangor

Order Details:

1 x Black Forest Cake	RM	84.90
	RM	
1 - Subtotal	RM	84.90
Discounts	RM	0.00
Tax (Include 6% GST)	RM	5.10
Delivery Fee	RM	3.70
TOTAL AMOUNT	RM	93.70

*** Status - Update the order' status here:

Completed
 Pending

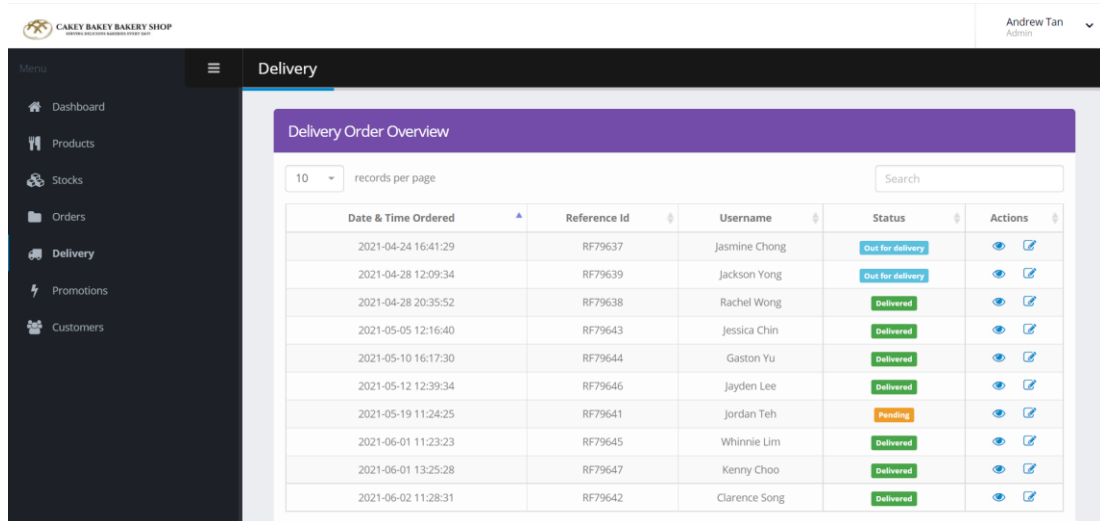
[Update](#) [Close](#)

Figure 6.49: Update Order Status

6.2.2.4 Delivery Management Module

Delivery module in the web-based management system will show the users an overview on all the delivery orders in a list. In the delivery orders overview page, each row of the delivery orders list represents a delivery order record while each column will consist of the delivery order' information which includes the date and time ordered, which is the date and time when the order is placed, reference id, which is a unique identifier for each of the delivery order, username, and lastly is status, which is the delivery status of the delivery order whether the delivery order is pending, out for delivery or delivered. At the last column of the delivery orders list which is labelled with "Actions", it consists of all the actions that can be performed by the user to each of the delivery order record. This includes firstly the "eye" icon, which indicates the view action, and second, the "pen" icon which indicates the edit action. At the right side of the label for each of the columns, there will be a small "up and down arrow"

button whereby the user can click on it to sort the delivery orders list according to the respective information. Additionally, the user will be able to search for a specific delivery order record by using the search bar that is located at the top right corner of the delivery orders list. On top of that, at the top left corner of the delivery orders list, the user can also select the number of records to be displayed in the delivery orders list.

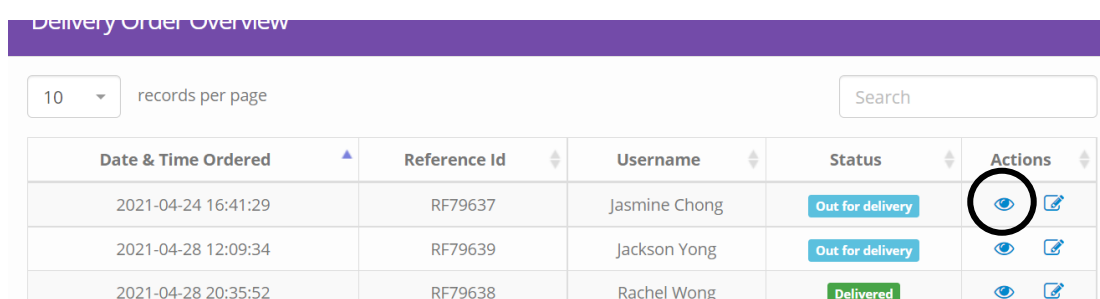


Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Out for delivery	
2021-04-28 12:09:34	RF79639	Jackson Yong	Out for delivery	
2021-04-28 20:35:52	RF79638	Rachel Wong	Delivered	
2021-05-05 12:16:40	RF79643	Jessica Chin	Delivered	
2021-05-10 16:17:30	RF79644	Gaston Yu	Delivered	
2021-05-12 12:39:34	RF79646	Jayden Lee	Delivered	
2021-05-19 11:24:25	RF79641	Jordan Teh	Pending	
2021-06-01 11:23:23	RF79645	Whinnie Lim	Delivered	
2021-06-01 13:25:28	RF79647	Kenny Choo	Delivered	
2021-06-02 11:28:31	RF79642	Clarence Song	Delivered	

Figure 6.50: Delivery Orders Overview Page

6.2.2.4.1 View A Delivery Order

In order for the user to view a specific delivery order record, the user has to click the “eye” icon located for that record under the Actions column of the delivery orders list. Once the “eye” icon for the specific delivery order is clicked, the system will display a modal which consists of all the details related to that particular order. To close the modal, the user can click the “Close” button located at the bottom right corner of the view modal.



Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Out for delivery	
2021-04-28 12:09:34	RF79639	Jackson Yong	Out for delivery	
2021-04-28 20:35:52	RF79638	Rachel Wong	Delivered	

Figure 6.51: Eye Icon In Delivery Orders List

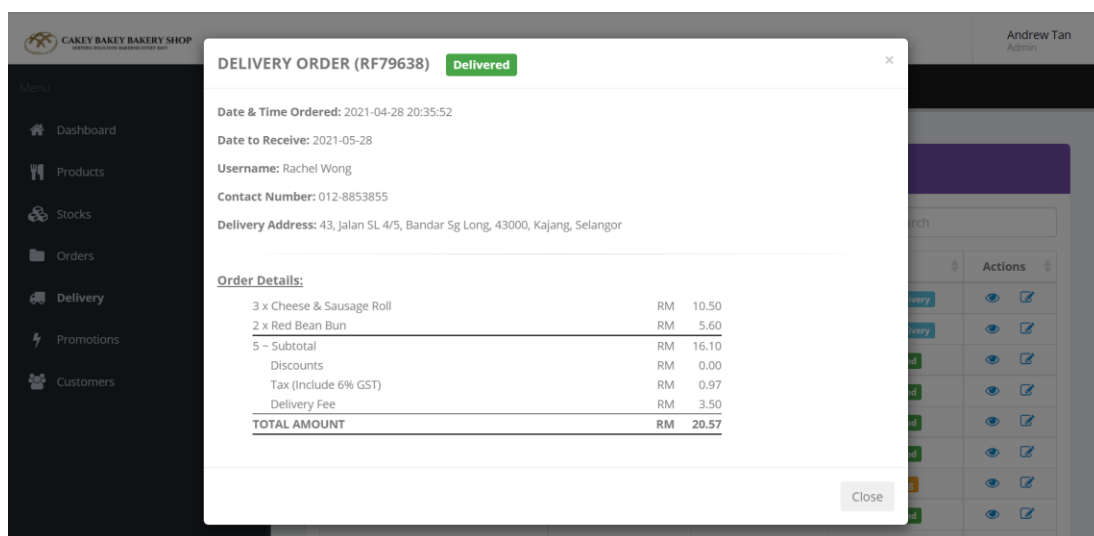


Figure 6.52: View Delivery Order

6.2.2.4.2 Update Delivery Status

In order for the user to update the delivery status of a specific delivery order record, the user has to click the “pen” icon located under the Actions column of the delivery orders list and the system will display an edit modal to the user. Inside the edit modal, the delivery status of the selected delivery order is assigned with its current status and the user only has to select the new delivery status for that delivery order to update the record. After that, the user can click the “Update” button located at the bottom right corner of the edit modal to submit the form. Also, there is a “Cancel” button beside the “Update” button that allows the user to cancel this edit operation. By clicking the “Cancel” button, the system will close the edit modal and the user will return to the delivery orders overview page. Once the user submits the form, the delivery status of the selected delivery order record will be updated in the database.

Delivery Order Overview

10 records per page Search













Date & Time Ordered	Reference Id	Username	Status	Actions
2021-04-24 16:41:29	RF79637	Jasmine Chong	Out for delivery	 
2021-04-28 12:09:34	RF79639	Jackson Yong	Out for delivery	 
2021-04-28 20:35:52	RF79638	Rachel Wong	Delivered	 
2021-05-05 12:16:40	RF79643	Jessica Chin	Delivered	 
2021-05-10 16:17:30	RF79644	Gaston Yu	Delivered	 
2021-05-12 12:39:34	RF79646	lavren Lee	Delivered	 

Figure 6.53: Pen Icon In Delivery Orders List

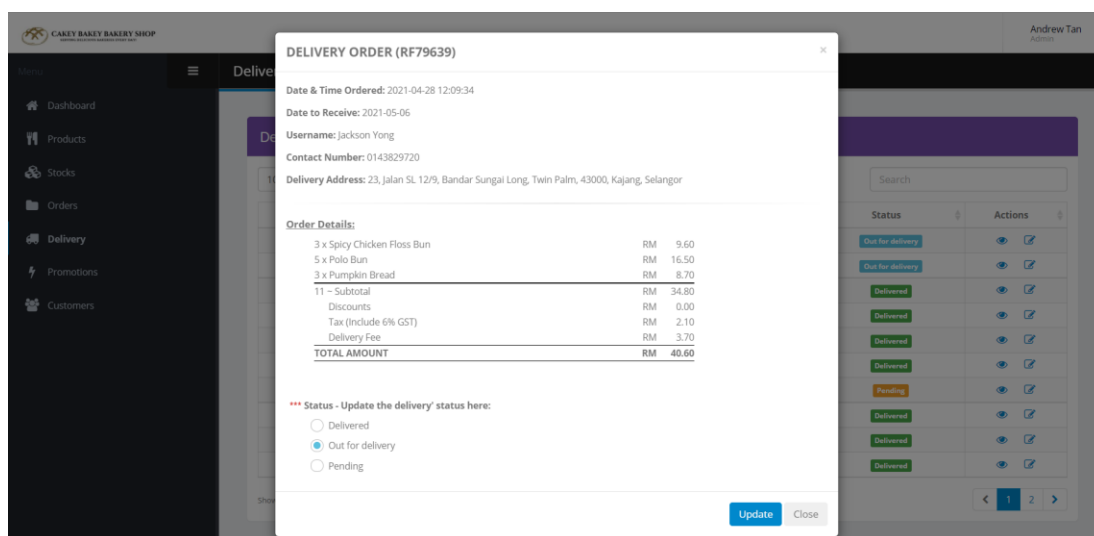


Figure 6.54: Update Delivery Status

6.2.2.5 Promotions Management Module

Promotions module in the web-based management system will show the users an overview on all the promotions in a list. In the promotions overview page, each row of the promotions list represents a promotion record while each column will consist of the promotion' information which includes the date created, which is the date when the promotion record is created, events, which is the name of the event, and the last is status, which is the status of the promotion whether the promotion is available or unavailable. At the last column of the promotions list which is labelled with "Actions", it consists of all the actions that can be performed by the user to each of the promotion record. This includes firstly the "eye" icon, which indicates the view action; second, the "pen" icon which indicates the edit action; and lastly, the "trash" icon which indicates the delete action. At the right side of the label for each of the columns, there will be a small "up and down arrow" button whereby the user can click on it to sort the promotions list according to the respective information. Additionally, the user will be able to search for a specific promotion record by using the search bar that is located at the top right corner of the promotions list. On top of that, at the top left corner of the promotions list, the user can also select the number of records to be displayed in the promotions list. While at the bottom left corner of the promotions list, there is a "New Entry" button that allows the user to add a new promotion record.

The screenshot displays the 'Promotions Overview' page. At the top left, the logo for 'CAKEY BAKERY BAKERY SHOP' is visible. The user's name 'Andrew Tan Admin' is shown at the top right. A dark sidebar on the left contains a menu with options: Dashboard, Products, Stocks, Orders, Delivery, Promotions (highlighted), and Customers. The main content area is titled 'Promotions Overview' and features a search bar and a 'records per page' dropdown set to 10. Below this is a table with the following data:

Date Created	Events	Status	Actions
2020-01-31	2019 Chinese New Year Sales	Unavailable	[Eye] [Edit] [Delete]
2021-04-12	2021 Chinese New Year Sales	Unavailable	[Eye] [Edit] [Delete]
2021-06-26	2020 Chinese New Year Sales	Unavailable	[Eye] [Edit] [Delete]
2021-06-26	First Year Anniversary	Available	[Eye] [Edit] [Delete]
2021-06-26	2021 Christmas Sales	Available	[Eye] [Edit] [Delete]

At the bottom of the table area, it says 'Showing 1 to 5 of 5 entries' and includes a 'New Entry' button and pagination controls.

Figure 6.55: Promotions Overview Page

6.2.2.5.1 Add New Promotion

In order to add a new promotion record, the user have to click the “New Entry” button from the promotions overview page and the system will display an add promotion modal. Inside the add promotion modal, the user is required to enter all the information of the new promotion in the respective input field provided. After the user has finished filling in all the inputs, there is an “Add” button located at the bottom right corner of the modal which allows the user to click on it in order to submit the form. Also, there is a “Cancel” button beside the “Add” button that allows the user to cancel this add operation. By clicking the “Cancel” button, the system will redirect the user back to the promotions overview page. All of the input fields in the add promotion modal are required fields and therefore, if the user leaves the input field to be empty, an error message of “Please fill out this field.” will pop out after the user submits the form. Additionally, the system will check whether the new promotion record is duplicated with any of the records in the database. If the duplication of record exists, the new promotion will not be added and the system will notify the user with a message. Once there is no any error, the new promotion record will be created after the user submits the form.

The screenshot shows the 'Add New Promotion' modal form. The form has the following fields and controls:

- Event:** A text input field.
- Promotion Details:** A large text area.
- Terms & Conditions (if any):** A text area.
- Start Date:** A date picker with the format 'dd/mm/yyyy --:-- --'.
- End Date:** A date picker with the format 'dd/mm/yyyy --:-- --'.
- Status:** Two radio buttons labeled 'Available' and 'Unavailable'.
- Buttons:** 'Add' (blue) and 'Close' (grey) buttons at the bottom right.

Figure 6.56: Add New Promotion

This screenshot shows the same 'Add New Promotion' modal form, but with a validation error. A yellow warning icon with an exclamation mark is positioned over the 'Event' input field, which is empty. A tooltip message reads: 'Please fill out this field.'

Figure 6.57: Empty Input Field

This screenshot shows the 'Add New Promotion' modal form with a confirmation dialog box overlaid. The dialog box contains the following text:

localhost says
Record already exist!
Please proceed to Update if you wish to change its details.

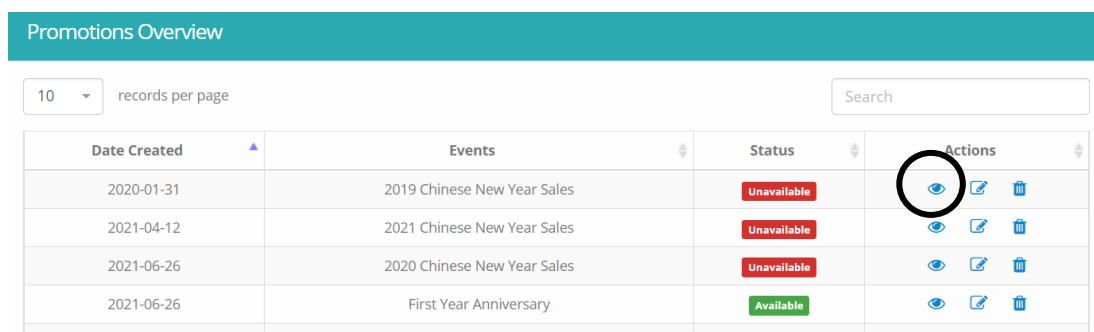
An 'OK' button is visible in the dialog box. In the background, the 'Promotion Details' field contains the text: '30% discounts on purchases over RM 150'.

Figure 6.58: Record Already Exists

6.2.2.5.2 View A Promotion

In order for the user to view a specific promotion record, the user has to click the “eye” icon located for that record under the Actions column of the promotions list. Once the “eye” icon for the specific promotion record is clicked, the system will display a modal which consists of all the details related to that particular promotions. To close the

modal, the user can click the “Close” button located at the bottom right corner of the view modal.















Date Created	Events	Status	Actions
2020-01-31	2019 Chinese New Year Sales	Unavailable	  
2021-04-12	2021 Chinese New Year Sales	Unavailable	  
2021-06-26	2020 Chinese New Year Sales	Unavailable	  
2021-06-26	First Year Anniversary	Available	  

Figure 6.59: Eye Icon In Promotions List

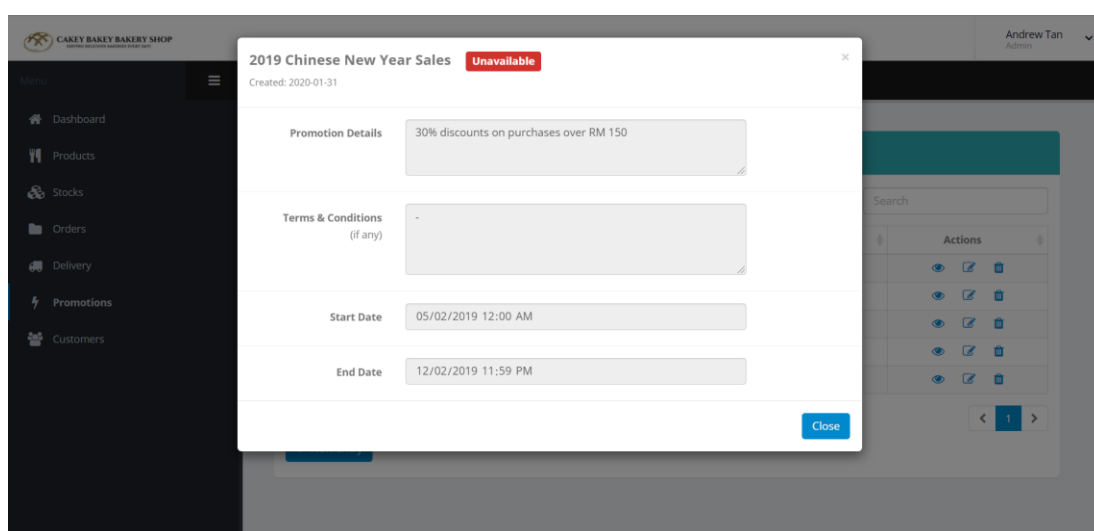


Figure 6.60: View Promotion Modal

6.2.2.5.3 Edit Promotion Details

In order for the user to edit the information of a specific promotion record, the user has to click the “pen” icon located under the Actions column of the promotions list and the system will display an edit modal to the user. Inside the edit modal, all the input fields are already filled in with its respective value. Therefore, the user only has to make changes to those values in order to update the promotion’s information. After the user has finished editing the intended input field, the user can click the “Update” button located at the bottom right corner of the edit modal to submit the form. Also, there is a “Cancel” button beside the “Update” button that allows the user to cancel this edit operation. By clicking the “Cancel” button, the system will close the edit modal and

the user will return to the promotions overview page. Once the user submits the form, the system will check if all the inputs entered by the user are valid. If there is no any error, the selected promotion record will be updated after the user submits the form.













Promotions Overview			
10	records per page	Search	
Date Created	Events	Status	Actions
2020-01-31	2019 Chinese New Year Sales	Unavailable	  
2021-04-12	2021 Chinese New Year Sales	Unavailable	  
2021-06-26	2020 Chinese New Year Sales	Unavailable	  
2021-06-26	First Year Anniversary	Available	  

Figure 6.61: Pen Icon In Promotions List

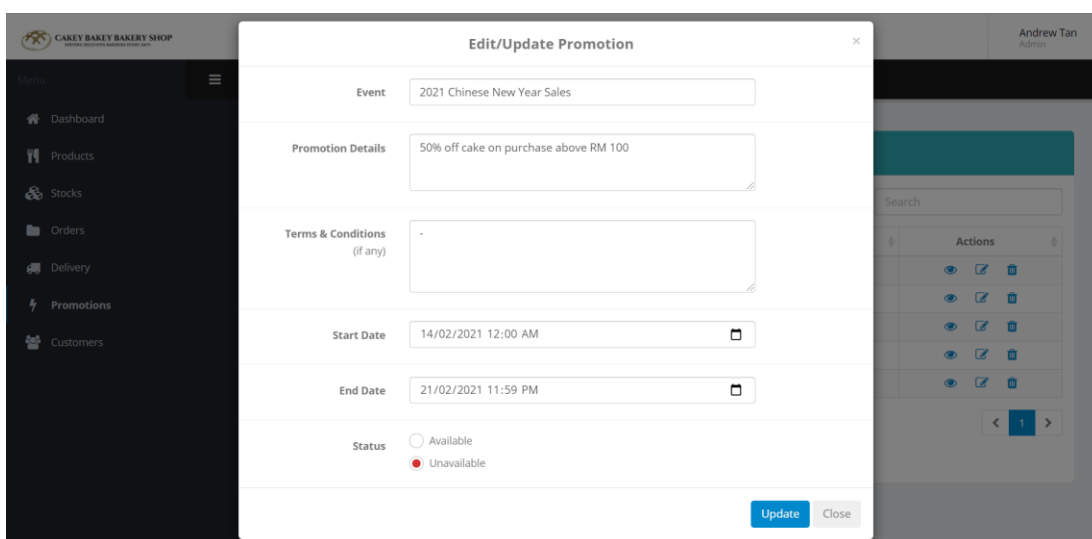


Figure 6.62: Edit Promotion Modal

6.2.2.5.4 Delete A Promotion

In order to delete a specific promotion record, the user has to click the “trash” icon located for that record under the Actions column of the promotions list. Once the user clicks the “trash” icon, the system will remove the selected promotion record from the database and the promotions list will be updated. The system will display an alert message to notify the user that the selected record is successfully deleted and the user will be redirect back to the promotions overview page after the user clicks the “OK” button in the alert message.
















Promotions Overview			
10	records per page	Search	
Date Created	Events	Status	Actions
2020-01-31	2019 Chinese New Year Sales	Unavailable	  
2021-04-12	2021 Chinese New Year Sales	Unavailable	  
2021-06-26	2020 Chinese New Year Sales	Unavailable	  
2021-06-26	First Year Anniversary	Available	  
2021-06-26	2021 Christmas Sales	Available	  

Figure 6.63: Trash Icon In Promotions List

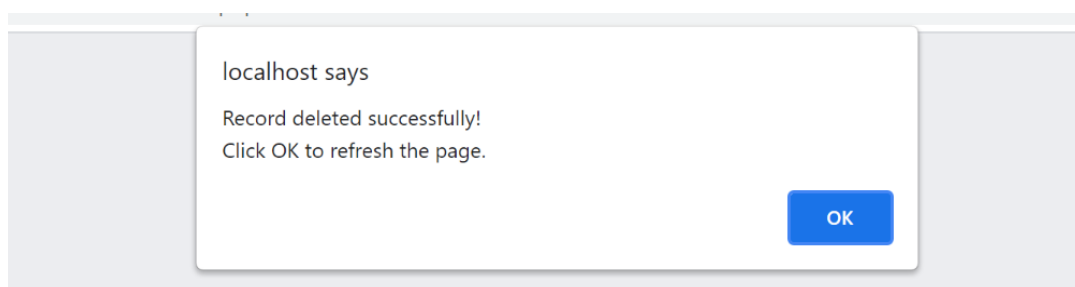
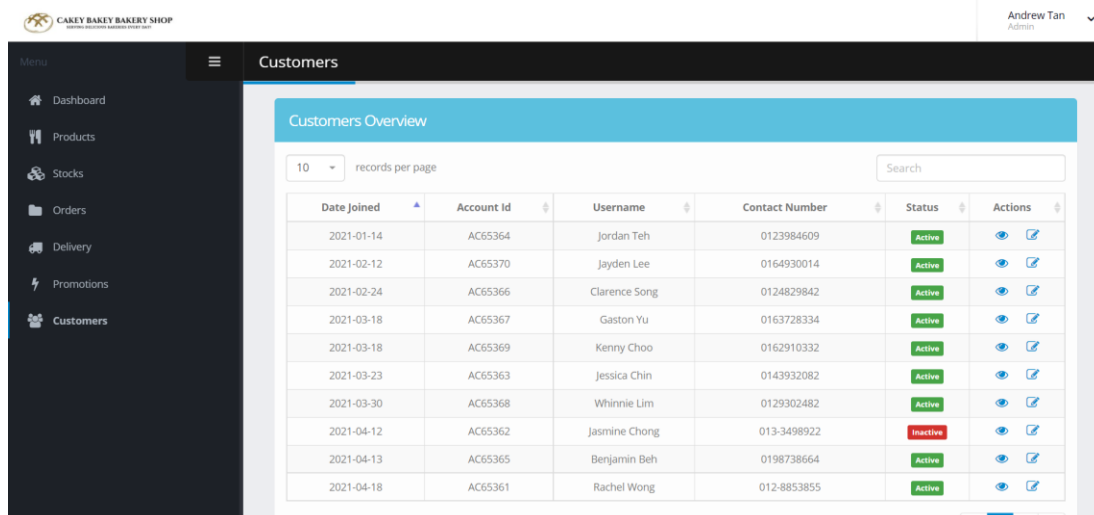


Figure 6.64: Promotion Successfully Deleted

6.2.2.6 Customers Management Module

Customers module in the web-based management system will show the users an overview on all the customer accounts in a list. In the customers overview page, each row of the customers list represents a customer's record while each column will consist of the customer's information which includes the date joined, which is the date when the account is registered, account id, which is a unique identifier for each of the account, username, contact number and lastly is status, which is the status of the account whether the account is active or inactive. At the last column of the customers list which is labelled with "Actions", it consists of all the actions that can be performed by the user to each of the customer record. This includes firstly the "eye" icon, which indicates the view action, and second, the "pen" icon which indicates the edit action. At the right side of the label for each of the columns, there will be a small "up and down arrow" button whereby the user can click on it to sort the customers list according to the respective information. Additionally, the user will be able to search for a specific customer record by using the search bar that is located at the top right corner of the customers list. On top of that, at the top left corner of the customers list, the user can also select the number of records to be displayed in the customers list.



CAKEY BAKERY BAKERY SHOP

Andrew Tan Admin

Customers

Customers Overview

10 records per page

Search






















Date Joined	Account Id	Username	Contact Number	Status	Actions
2021-01-14	AC65364	Jordan Teh	0123984609	Active	 
2021-02-12	AC65370	Jayden Lee	0164930014	Active	 
2021-02-24	AC65366	Clarence Song	0124829842	Active	 
2021-03-18	AC65367	Gaston Yu	0163728334	Active	 
2021-03-18	AC65369	Kenny Choo	0162910332	Active	 
2021-03-23	AC65363	Jessica Chin	0143932082	Active	 
2021-03-30	AC65368	Whinnie Lim	0129302482	Active	 
2021-04-12	AC65362	Jasmine Chong	013-3498922	Inactive	 
2021-04-13	AC65365	Benjamin Beh	0198738664	Active	 
2021-04-18	AC65361	Rachel Wong	012-8853855	Active	 

Figure 6.65: Customers Overview Page

6.2.2.6.1 View A Customer Record

In order for the user to view a specific customer record, the user has to click the “eye” icon located for that record under the Actions column of the customers list. Once the “eye” icon for the specific customer record is clicked, the system will display a modal which consists of all the details related to that particular customer. To close the modal, the user can click the “Close” button located at the bottom right corner of the view modal.



Customers Overview

10 records per page

Search



Date Joined	Account Id	Username	Contact Number	Status	Actions
2021-01-14	AC65364	Jordan Teh	0123984609	Active	 
2021-02-12	AC65370	Jayden Lee	0164930014	Active	 
2021-02-24	AC65366	Clarence Song	0124829842	Active	 
2021-03-18	AC65367	Gaston Yu	0163728334	Active	 
2021-03-18	AC65369	Kenny Choo	0162910332	Active	 
2021-03-23	AC65363	Jessica Chin	0143932082	Active	 
2021-03-30	AC65368	Whinnie Lim	0129302482	Active	 

Figure 6.66: Eye Icon In Customers List

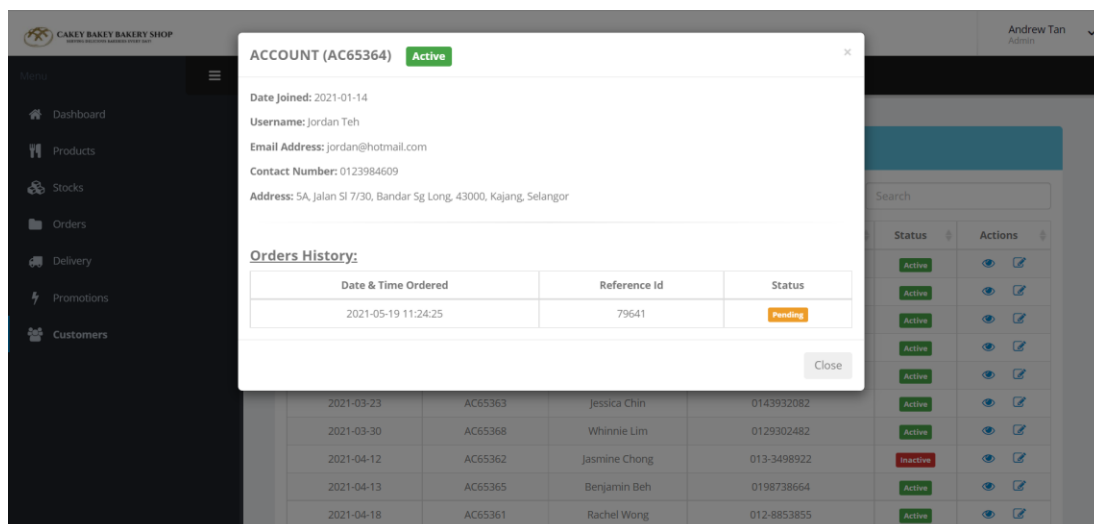


Figure 6.67: View Customer Record

6.2.2.6.2 Update Customers' Account Status

In order for the user to update the account status of a specific customer record, the user has to click the “pen” icon located under the Actions column of the customers list and the system will display an edit modal to the user. Inside the edit modal, the account status of the selected customer record is assigned with its current status and the user only has to select the new status for that account to update the record. After that, the user can click the “Update” button located at the bottom right corner of the edit modal to submit the form. Also, there is a “Cancel” button beside the “Update” button that allows the user to cancel this edit operation. By clicking the “Cancel” button, the system will close the edit modal and the user will return to the customers overview page. Once the user submits the form, the status of the selected account record will be updated in the database.

Customers Overview						
10	records per page	Search				
Date Joined	Account Id	Username	Contact Number	Status	Actions	
2021-01-14	AC65364	Jordan Teh	0123984609	Active		
2021-02-12	AC65370	Jayden Lee	0164930014	Active		
2021-02-24	AC65366	Clarence Song	0124829842	Active		
2021-03-18	AC65367	Gaston Yu	0163728334	Active		
2021-03-18	AC65369	Kenny Choo	0162910332	Active		

Figure 6.68: Pen Icon In Customers List

ACCOUNT (AC65364)

Date joined: 2021-01-14
Username: Jordan Teh
Email Address: jordan@hotmail.com
Contact Number: 0123984609
Address: 5A, Jalan SI 7/30, Bandar Sg Long, 43000, Kajang, Selangor

Orders History:

Date & Time Ordered	Reference Id	Status
2021-05-19 11:24:25	79641	Pending

*** Status - Update the account' status here:

Active
 Inactive

Update **Close**

CAKEY BAKERY BAKERY SHOP

Andrew Tan Admin

Menu

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers

Search

Status	Actions
Active	
Active	
Active	
Active	
Active	
Active	
Inactive	
Active	

2021-04-13	AC69305	Benjamin Ish	0199736604
2021-04-18	AC65361	Rachel Wong	012-8853855

Figure 6.69: Update Account Status

CHAPTER 7

SYSTEM TESTING

7.1 Introduction

This chapter emphasizes on the system testing in order to verify whether the design of the functional and non-functional behaviours of the system is as per the user's specifications, as well as to validate the system is complete and will work as expected. There are three main types of testing that have been done which include unit testing, usability testing and user acceptance test.

7.2 Unit Testing

Unit Testing is the software testing technique where a group of software program components or modules are tested individually (Samantha, 2020). The main goal of performing unit test in this project is to validate that each module of the system performs as expected. Unit testing is an essential step because if it is done correctly, it can help to detect early flaws in the code which may be more difficult to discover it in later testing stages.

7.2.1 Test Case for Mobile-based Application

Table 7.1: Test Case for Registration

Project Name:		Mobile-based Application			Test Designed by:		Ang Li Jing	
Module Name:		Registration			Test Designed date:		01/08/2021	
Pre-conditions:		-			Test executed by:		Ang Li Jing	
					Test execution date:		04/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status
TPD_ REGISTER _01	To verify the registration functionality	Register with all the input fields left empty.	1. Click the “REGISTER” button.	1. Mobile number: <i>null</i> 2. Email: <i>null</i> 3. Username: <i>null</i> 4. Password: <i>null</i>	An error message will be shown at the bottom of each of the input fields respectively.	Registration process failed and account is not registered.	All of the input fields are attached with its respective error message.	PASS

		Register with valid mobile number, email, username and password.	<ol style="list-style-type: none"> 1. Enter the mobile number. 2. Enter the email address. 3. Enter the username. 4. Enter the password. 5. Click the “REGISTER” button. 	<ol style="list-style-type: none"> 1. Mobile number: <i>0126732887</i> 2. Email: <i>jasmine@gmail.com</i> 3. Username: <i>Jasmine</i> 4. Password: <i>jasmine123</i> 	An alert message of “Register Successful! You can login now.” will be shown to user.	Account is successfully registered and user can proceed to login.	“Register Successful! You can login now.” message is shown to user.	PASS
		Register with invalid mobile number.	<ol style="list-style-type: none"> 1. Enter the mobile number. 2. Enter the email address. 3. Enter the username. 4. Enter the 	<ol style="list-style-type: none"> 1. Mobile number: <i>012-6732887</i> 2. Email: <i>jasmine@gmail.com</i> 3. Username: <i>Jasmine</i> 	An error message of “Please enter without symbol ‘ - ’!” will be shown to user.	Registration process failed and account is not registered.	An error message of “Please enter without symbol ‘ - ’!” is shown at the bottom of the	PASS

			password. 5. Click the “REGISTER” button.	4. Password: <i>jasmine123</i>			mobile number input field.	
		Register with invalid email.	1. Enter the mobile number. 2. Enter the email address. 3. Enter the username. 4. Enter the password. 5. Click the “REGISTER” button.	1. Mobile number: <i>0126732887</i> 2. Email: <i>jasmine</i> 3. Username: <i>Jasmine</i> 4. Password: <i>jasmine123</i>	An error message of “Invalid! Please enter a valid email!” will be shown to user.	Registration process failed and account is not registered.	An error message of “Invalid! Please enter a valid email!” is shown at the bottom of the email input field.	PASS

		Register with invalid username.	<ol style="list-style-type: none"> 1. Enter the mobile number. 2. Enter the email address. 3. Enter the username. 4. Enter the password. 5. Click the “REGISTER” button. 	<ol style="list-style-type: none"> 1. Mobile number: <i>0126732887</i> 2. Email: <i>jasmine@gmail.com</i> 3. Username: <i>Jas</i> 4. Password: <i>jasmine123</i> 	An error message of “Username must be at least 5 characters long!” will be shown to user.	Registration process failed and account is not registered.	An error message of “Username must be at least 5 characters long!” is shown at the bottom of the username input field.	PASS
		Register with invalid password.	<ol style="list-style-type: none"> 1. Enter the mobile number. 2. Enter the email address. 3. Enter the username. 4. Enter the 	<ol style="list-style-type: none"> 1. Mobile number: <i>0126732887</i> 2. Email: <i>jasmine@gmail.com</i> 3. Username: <i>Jasmine</i> 	An error message of “Password must be at least 7 characters long!” will be show to user.	Registration process failed and account is not registered.	An error message of “Password must be at least 7 characters long!” is	PASS

			password. 5. Click the “REGISTER” button.	4. Password: <i>jasm</i>			shown at the bottom of the password input field.	
--	--	--	----------------------------------------------	--------------------------	--	--	--------------------------------------------------	--

Table 7.2: Test Case for Products

Project Name:	Mobile-based Application				Test Designed by:	Ang Li Jing		
Module Name:	Products				Test Designed date:	01/08/2021		
Pre-conditions:	The user has login into his/her account.				Test executed by:	Ang Li Jing		
					Test execution date:	04/08/2021		
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status
TPD_ PRODUCT S_01	To verify the products functionality	Search for a bakery product.	1. Enter the name of product.	1. Name: <i>Polo Bun</i>	All the bakery products with name matches and contains “Polo Bun” will be shown	The product list is filtered.	Two bakery products with name contains “Polo Bun” are shown to the user.	PASS

					to the user.			
		View list of products according to its category.	1. Select a product category named "Cakes".	-	All the products under the category of "Cakes" will be shown to the user.	The user will be able to see all the cakes product.	All the products with category of "Cakes" are displayed to the user.	PASS
		View the details of a specific product.	1. Select a product category. 2. Select a specific product from the list. 3. Click the "VIEW MORE" button.	1. Product category: <i>Breads & Buns</i> 2. Product name: <i>Pumpkin Bun</i>	All the details related to the product will be shown to the user.	The user will be able to see all the details related to the particular product.	All the details of the product are displayed to the user.	PASS

		Add a product into the shopping cart.	<ol style="list-style-type: none"> 1. Select a product category. 2. Search for a specific product. 3. Click the “VIEW MORE” button. 4. Click the “ADD TO CART” button. 	<ol style="list-style-type: none"> 1. Product category: <i>Breads & Buns</i> 2. Product name: <i>Chocolate Danish</i> 	The product will be added into his/her shopping cart after the button is clicked.	The user will be able to see the product in the “My Cart” page.	The product is added into his/her shopping cart.	PASS
--	--	---------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-----------------------------------------------------------------	--------------------------------------------------	------

Table 7.3: Test Case for Manage Profile

Project Name:	Mobile-based Application				Test Designed by:	Ang Li Jing		
Module Name:	Profile				Test Designed date:	01/08/2021		
Pre-conditions:	The user has login into his/her account.				Test executed by:	Ang Li Jing		
					Test execution date:	04/08/2021		
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status

TPD_ PROFILE_0 1	To verify the manage profile functionality	Update the profile information.	1. Enter new mobile number. 2. Click the “UPDATE” button.	1. Mobile number: <i>0135763877</i>	A message of “Success! Your profile has been updated successfully” will be shown to user after the form is submitted.	User will be able to see the updated profile information.	The new mobile number is successfully updated.	PASS
------------------------	-----------------------------------------------------	---------------------------------------	--------------------------------------------------------------------------	----------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------	------------------------------------------------------------	------

Table 7.4: Test Case for Manage Shopping Cart

Project Name:		Mobile-based Application			Test Designed by:		Ang Li Jing	
Module Name:		Shopping cart			Test Designed date:		01/08/2021	
Pre-conditions:		The user has login into his/her account.			Test executed by:		Ang Li Jing	
					Test execution date:		04/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status

TPD_ SHOPPING _CART_01	To verify the manage shopping cart functionality	View the details of items added into the shopping cart.	1. Click the item named “Potatie Snowman” in the shopping cart.	-	All the details related to the product will be shown to the user.	The user will be able to see all the details related to the product.	All the details of the product are displayed to the user.	PASS
		Delete an item from the shopping cart.	1. Click the “X” icon for a product named “Lemon Sable”.	-	The product will be removed from the shopping cart.	The product is unavailable on the list of products in the shopping cart.	The product is successfully remove from the shopping cart.	PASS

Table 7.5: Test Case for Orders

Project Name:		Mobile-based Application			Test Designed by:		Ang Li Jing	
Module Name:		Order			Test Designed date:		01/08/2021	
Pre-conditions:		The user has login into his/her account.			Test executed by:		Ang Li Jing	
					Test execution date:		04/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status

TPD_ ORDER_01	To verify the order functionality	Place an order.	<ol style="list-style-type: none"> 1. Click the “CONTINUE” button in the shopping cart page. 2. Enter delivery address. 3. Select a payment method. 4. Select a delivery method. 5. Click the “CONFIRM” button. 	<ol style="list-style-type: none"> 1. Delivery address: <i>23, Jalan Sl 7/9, Bandar Sg Long, 43000, Kajang</i> 2. Payment method: <i>Credit/Debit</i> 3. Delivery method: <i>Standard (RM 3.50)</i> 	Order is successfully placed and user will be directed to the order success page.	The user will be able to check the order placed in the “My Order” page.	User is directed to a page showing that the order is successfully placed.	PASS
------------------	-----------------------------------	-----------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	-------------------------------------------------------------------------	---------------------------------------------------------------------------	------

		Check the orders placed.	1. Go to “My Order” page.	-	All the details related to the order will be show to the user.	The user will be able to see a list of orders placed.	All the orders placed are displayed to the user.	PASS
--	--	--------------------------	---------------------------	---	----------------------------------------------------------------	-------------------------------------------------------	--------------------------------------------------	------

7.2.2 Test Case for Web-based Management System

Table 7.6: Unit Test Case for Manage Products

Project Name:	Web-based Management System				Test Designed by:	Ang Li Jing		
Module Name:	Manage Products				Test Designed date:	01/08/2021		
Pre-conditions:	The user have login into admin account.				Test executed by:	Ang Li Jing		
					Test execution date:	05/08/2021		
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status

TPD_ MANAGE_ PRODUCT S_01	Manage products	Add a new product.	<ol style="list-style-type: none"> 1. Click the “New Entry” button. 2. Enter the name of product. 3. Select the product category. 4. Enter the description and ingredients. 5. Enter the calory per serving. 6. Enter the price. 7. Upload an image of the 	<ol style="list-style-type: none"> 1. Product Name : <i>Pumpkin Bread</i> 2. Category : <i>Breads & Buns</i> 3. Description & Ingredients : <i>15 pounds of pumpkins condensed into 5 pounds of savoury filling, contains rich carotene and fibre, a highly nutritious breakfast for the little ones.</i> 4. Calory per serving : <i>266</i> 	A dialog box will pop out after the “New Entry” button is clicked, and the new product will be created after the form is submitted.	The new product will be available on the list of products.	New product is successfully added.	PASS
------------------------------------	-----------------	--------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------	------------------------------------	------

			<p>product.</p> <p>8. Select the status of the product.</p> <p>9. Click the “Add” button.</p>	<p>5. Price : <i>2.90</i></p> <p>6. Image : <i><pumpkin_bread.jpg></i></p> <p>7. Status : <i>Unavailable</i></p>				
		View a specific product record.	1. Click the “eye icon” for a product named “Raisin Bun”.	-	A dialog box with all the details of the product will pop out after the “eye” icon is clicked.	The user will be able to see all the details of the product.	The details of the product are displayed to the user.	PASS
		Update the status for a specific product.	1. Click the “pen” icon for a product named “Pumpkin Bread”.	<p>1. Product Name : <i>Pumpkin Bread</i></p> <p>2. Category : <i>Breads & Buns</i></p> <p>3. Description &</p>	A dialog box will pop out after the “pen” icon is clicked, and the status	The updated product will be available on the list of products.	The status of the product is successfully updated.	PASS

			<p>2. Select the status of the product.</p> <p>3. Click the “Save Changes” button.</p>	<p>Ingredients : <i>15 pounds of pumpkins condensed into 5 pounds of savoury filling, contains rich carotene and fibre, a highly nutritious breakfast for the little ones.</i></p> <p>4. Calory per serving : <i>266</i></p> <p>5. Price : <i>2.90</i></p> <p>6. Image : <i><pumpkin_bread.jpg></i></p> <p>7. Status :</p>	<p>of the product will be updated after the form is submitted.</p>			
--	--	--	----------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------	--	--	--

				<i>Available</i>				
		<p>Edit the details of a specific product.</p>	<ol style="list-style-type: none"> 1. Click the “pen” icon for a product named “Pumpkin Bread”. 2. Edit any details of the product. 3. Click the “Save Changes” button. 	<ol style="list-style-type: none"> 1. Product Name : <i>Pumpkin Bread</i> 2. Category : <i>Breads & Buns</i> 3. Description & Ingredients : <i>15 pounds of pumpkins condensed into 5 pounds of savoury filling, contains rich carotene and fibre, a highly nutritious</i> 	<p>An alert message of “Record updated successfully!” will be shown to user.</p>	<p>The updated product will be available on the list of products.</p>	<p>The details of the product is successfully updated.</p>	<p>PASS</p>

				<i>breakfast for the little ones.</i> 4. Calory per serving : 286 5. Price : 3.10 6. Image : <pumpkin_brea d.jpg> 7. Status : Available				
		Delete a specific product record.	1. Click the “trash” icon for a product named “Polo Bun”.	-	An alert message “Record deleted successfully! Click OK to refresh the page.” will be	The product is removed from the list of products.	The product is successfully deleted.	PASS

					shown to user.			
--	--	--	--	--	----------------	--	--	--

Table 7.7: Unit Test Case for Manage Stocks

Project Name:		Web-based Management System			Test Designed by:		Ang Li Jing	
Module Name:		Manage Stocks			Test Designed date:		01/08/2021	
Pre-conditions:		The user have login into admin account.			Test executed by:		Ang Li Jing	
					Test execution date:		05/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status
TPD_ MANAGE_ STOCKS _01	Manage stocks	Add a new stock.	<ol style="list-style-type: none"> Click the “New Entry” button. Enter the name of stock. Select the status of the 	<ol style="list-style-type: none"> Name : <i>Salt</i> Status : <i>Sufficient</i> 	A dialog box will pop out after the “New Entry” button is clicked, and the new stock	The new stock record will be available on the list of stocks.	New stock record is successfully created.	PASS

			stock. 4. Click the “Add” button.		will be created after the form is submitted.			
		View a specific stock record.	1. Click the “eye icon” for a stock named “Baking Powder”.	-	A dialog box with all the details of the stock will pop out after the “eye” icon is clicked.	The user will be able to see all the details of the stock.	The details of the stock are displayed to the user.	PASS
		Update the status for a specific stock.	1. Click the “pen” icon for a stock named “Salt”. 2. Select the status of the stock. 3. Click the “Update” button.	1. Name : <i>Salt</i> 2. Status : <i>Running low</i>	A dialog box will pop out after the “pen” icon is clicked, and the status of the stock will be updated after the form	The updated stock record will be available on the list of stocks.	The status of the stock is successfully updated.	PASS

					is submitted.			
		<p>Edit the name of a specific stock.</p>	<ol style="list-style-type: none"> 1. Click the “pen” icon for a stock named “Sugar”. 2. Edit the name of the stock. 3. Click the “Update” button. 	<ol style="list-style-type: none"> 1. Name : <i>Sugar</i> 2. Status : <i>Sufficient</i> 	<p>A dialog box will pop out after the “pen” icon is clicked, and the name of the stock will be updated after the form is submitted.</p>	<p>The edited stock record will be available on the list of stocks.</p>	<p>The name of the stock is successfully updated.</p>	PASS
		<p>Delete a specific stock record.</p>	<ol style="list-style-type: none"> 1. Click the “trash” icon for a stock named “Parmesan Cheese”. 	-	<p>An alert message of “Record deleted successfully! Click OK to</p>	<p>The stock record is removed from the list of stocks.</p>	<p>The stock record is successfully deleted.</p>	PASS

					refresh the page.” will be shown to user.			
--	--	--	--	--	-------------------------------------------	--	--	--

Table 7.8: Unit Test Case for Manage Orders

Project Name:		Web-based Management System			Test Designed by:		Ang Li Jing	
Module Name:		Manage Orders			Test Designed date:		01/08/2021	
Pre-conditions:		The user have login into admin account.			Test executed by:		Ang Li Jing	
					Test execution date:		05/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status
TPD_ MANAGE_ ORDERS_0 1	Manage orders	View a customer' order.	1. Click the “eye icon” for an order record with ID of “RF79637”.	-	A dialog box with all the details of the order will pop out after the “eye” icon is	The user will be able to see all the details of the order.	The details of the customer order are displayed to the user.	PASS

					clicked.			
		Update the status for a specific order.	<ol style="list-style-type: none"> 1. Click the “pen” icon for an order record with ID of “RF79641”. 2. Select the status of the order. 3. Click the “Update” button. 	1. Status : <i>Completed</i>	A dialog box will pop out after the “pen” icon is clicked, and the status of the order will be updated after the form is submitted.	The updated order will be available on the list of orders.	The status of the order is successfully updated.	PASS

Table 7.9: Unit Test Case for Manage Delivery

Project Name:	Web-based Management System	Test Designed by:	Ang Li Jing
Module Name:	Manage Delivery	Test Designed date:	01/08/2021
Pre-conditions:	The user have login into admin account.	Test executed by:	Ang Li Jing

					Test execution date:	05/08/2021		
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status
TPD_ MANAGE_ DELIVERY _01	Manage delivery	View a delivery order.	1. Click the “eye icon” for a delivery order with ID of “RF79644”.	-	A dialog box with all the details of the delivery order will pop out after the “eye” icon is clicked.	The user will be able to see all the details of the delivery order.	The details of the delivery order are displayed to the user.	PASS
		Update the status for a specific delivery order.	1. Click the “pen” icon for a delivery order with ID of “RF79639”. 2. Select the status of the delivery order.	1. Status : <i>Delivered</i>	A dialog box will pop out after the “pen” icon is clicked, and the status of the delivery order will be updated after the form is	The updated delivery order will be available on the list of delivery orders.	The status of the delivery order is successfully updated.	PASS

			3. Click the “Update” button.		submitted.			
--	--	--	-------------------------------	--	------------	--	--	--

Table 7.10: Unit Test Case for Manage Promotions

Project Name:		Web-based Management System			Test Designed by:		Ang Li Jing	
Module Name:		Manage Promotions			Test Designed date:		01/08/2021	
Pre-conditions:		The user have login into admin account.			Test executed by:		Ang Li Jing	
					Test execution date:		05/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status
TPD_ MANAGE_ PROMOTI ONS _01	Manage promotions	Add a new promotion.	<ol style="list-style-type: none"> Click the “New Entry” button. Enter the name of event. Enter the promotion 	<ol style="list-style-type: none"> Event : <i>2021 Chinese New Year Sales</i> Promotion details : <i>50% off cake on purchase above</i> 	A dialog box will pop out after the “New Entry” button is clicked, and the new	The new promotion record will be available on the list of promotions.	New promotion record is successfully created.	PASS

			<p>details.</p> <p>4. Select the promotion start date.</p> <p>5. Select the promotion end date.</p> <p>6. Select the status of the promotion.</p> <p>7. Click the “Add” button.</p>	<p><i>RM 100</i></p> <p>3. <i>Start date :</i> <i>14/02/2021</i> <i>12:00AM</i></p> <p>4. <i>End date :</i> <i>21/02/2021</i> <i>11:59PM</i></p> <p>5. <i>Status :</i> Unavailable</p>	promotion will be created after the form is submitted.			
		View a specific promotion record.	1. Click the “eye icon” for a promotion with event name of “2021 Chinese New Year Sales”.	-	A dialog box with all the details of the promotion will pop out after the “eye” icon is clicked.	The user will be able to see all the details of the promotion.	The details of the promotion are displayed to the user.	PASS

		Update the status for a specific promotion.	<ol style="list-style-type: none"> 1. Click the “pen” icon for a promotion record with event name of “2021 Chinese New Year Sales”. 2. Select the status of the promotion. 3. Click the “Update” button. 	<ol style="list-style-type: none"> 1. Event : <i>2021 Chinese New Year Sales</i> 2. Promotion details : <i>50% off cake on purchase above RM 100</i> 3. Start date : <i>14/02/2021 12:00AM</i> 4. End date : <i>21/02/2021 11:59PM</i> 5. Status : <i>Available</i> 	A dialog box will pop out after the “pen” icon is clicked, and the status of the promotion will be updated after the form is submitted.	The updated promotion record will be available on the list of promotions.	The status of the promotion is successfully updated.	PASS
--	--	---------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------	------------------------------------------------------	------

		<p>Edit the details of a specific promotion.</p>	<ol style="list-style-type: none"> 1. Click the “pen” icon for a promotion record with event name of “2021 Chinese New Year Sales”. 2. Edit any details of the promotion. 3. Click the “Update” button. 	<ol style="list-style-type: none"> 1. Event : <i>2021 Chinese New Year Sales</i> 2. Promotion details : <i>30% off cake on purchase above RM 150</i> 3. Start date : <i>14/02/2021 12:00AM</i> 4. End date : <i>21/02/2021 11:59PM</i> 5. Status : <i>Available</i> 	<p>A dialog box will pop out after the “pen” icon is clicked, and the details of the promotion will be updated after the form is submitted.</p>	<p>The updated promotion record will be available on the list of promotions.</p>	<p>The details of the promotion is successfully updated.</p>	<p>PASS</p>
--	--	--------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------	--------------------------------------------------------------	-------------

		Delete a specific promotion record.	1. Click the “trash” icon for a promotion with event name of “2021 Chinese New Year Sales”.	-	An alert message of “Record deleted successfully! Click OK to refresh the page.” will be shown to user.	The promotion record is removed from the list of promotions.	The promotion record is successfully deleted.	PASS
--	--	-------------------------------------	---------------------------------------------------------------------------------------------	---	---------------------------------------------------------------------------------------------------------	--------------------------------------------------------------	-----------------------------------------------	------

Table 7.11: Unit Test Case for Manage Customers

Project Name:		Web-based Management System			Test Designed by:		Ang Li Jing	
Module Name:		Manage Customers			Test Designed date:		01/08/2021	
Pre-conditions:		The user have login into admin account.			Test executed by:		Ang Li Jing	
					Test execution date:		05/08/2021	
Test Case #	Test Scenario	Test Case	Test steps	Test Data	Expected result	Post condition	Actual result	Status

TPD_ MANAGE_ CUSTOME RS_01	Manage customers	View a customer record.	1. Click the “eye icon” for a customer record with account ID of “AC65367”.	-	A dialog box with all the details of the customer will pop out after the “eye” icon is clicked.	The user will be able to see all the details of the customer.	The details of the customer are displayed to the user.	PASS
		Update the account status for a specific customer.	1. Click the “pen” icon for a customer record with account ID of “AC65368”. 2. Select the account status of the customer. 3. Click the “Update” button.	1. Status : <i>Inactive</i>	A dialog box will pop out after the “pen” icon is clicked, and the account status of the customer will be updated after the form is submitted.	The updated customer record will be available on the list of customers.	The account status of the customer is successfully updated.	PASS

7.3 Usability Test

In order to evaluate the usability of the system, a standardized metric, System Usability Scale (SUS) is used in this project. The objectives of this usability test is to evaluate 3 main criteria which include effectiveness, based on whether the users are able to successfully achieve their objectives; efficiency, based on how much effort and resource is expended in achieving those objectives; and lastly satisfaction, which is based on whether the users are satisfy with the experience of using the system.

7.3.1 System Usability Scale Template

System Usability Scale (SUS) is a standard questionnaire that measures the overall usability of a system (Brooke, 1996). SUS score will be able to tell the usability performance in the aspects of effectiveness, efficiency, and overall ease of use. It is generally used after the respondent has had an opportunity to use the system being evaluated, but before any debriefing or discussion takes place. Respondents are asked to record their immediate response to each item, rather than thinking about items for a long time. It includes of 10 questions whereby the respondents will rank each question from 1 to 5 based on how much they agree with the statement they are reading. 5 means they strongly agree while 1 means they strongly disagree. If a respondent feels that they cannot respond to a particular item, they should mark the centre point of the scale. The Figure 7.1 below shows the SUS template based on Thomas (n.d.), which is used for usability testing in this project.

Please enter your participant number: _____

System Usability Scale (SUS)

This is a standard questionnaire that measures the overall usability of mobile-based application. On a scale between Strongly Agree to Strongly Disagree, please rate the answer that best expresses how you feel about each statement after using the application.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. I think I would like to use this mobile application frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I found the mobile application unnecessarily complex.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the mobile application was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I think that I would need the support of a technical person to be able to use this application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this mobile application were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I thought there was too much inconsistency in this mobile application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this mobile application very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I found the mobile application very cumbersome to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using the web application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this mobile application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How likely are you to recommend this application to others? (please circle your answer)

Not at all likely 0 1 2 3 4 5 6 7 8 9 10 Extremely likely

Figure 7.1: System Usability Scale Template

The System Usability Scale assessment was conducted by distributing the SUS to be filled up by 5 users. The users have ranked each of the 10 questions above from 1 to 5, based on their level of agreement. The SUS assessment result of each of the respondents can be referred at appendix C. SUS scores have a range of 0 to 100 and each of the questions has a weight of 10 points. Even though a SUS score can range from 0 to 100, it is not a percentage. While it is technically correct that a SUS score of 70 out of 100 represents 70% of the possible maximum score, it suggests the score is at the 70th percentile.

In order to calculate the SUS score based on Smyk (2020), the score contributions from each item are firstly summed up. Each item's score contribution will range from 0 to 4. As odd-numbered questions are all in a positive tone, the score contribution is the scale position minus by 1 for each of the odd-numbered questions. Vice versa, for the even-numbered questions in a negative tone, the contribution is 5 minus the scale position. After which, the sum of the scores is multiplied by 2.5 to obtain the overall value of system usability. Table 7.12 at below shows the summarized score for the conducted System Usability Scale assessment.

Table 7.12: Summarized System Usability Scale (SUS) Score

Question	Participants					Average
	1	2	3	4	5	
1	3	2	3	3	3	2.8
2	4	4	4	3	4	3.8
3	4	3	4	4	4	3.8
4	4	4	3	4	4	3.8
5	4	4	4	4	4	4.0
6	3	4	4	4	4	3.8
7	3	3	4	3	4	3.4
8	4	4	4	4	4	4.0
9	3	4	3	3	3	3.2
10	4	4	4	4	4	4.0
SUS Score	90.0	90.0	92.5	90.0	95.0	91.5

According to Sauro (2011), the average System Usability Scale score is 68. A SUS score above a 68 would be considered above average and anything below 68 is below average. If the score is 80.3 or higher, it indicates that people like the web application and will recommend it to their friends, while if the score is 51 or below, it indicates that there are probably serious problems with the web application whereby the problem should be fix immediately and make usability as priority. Table 7.13 at below shows the general guideline on the interpretation of SUS score:

Table 7.13: SUS Grading Scale

SUS Score	Grade	Percentile Range	Adjective Rating
84.1 - 100	A+	96 – 100	Excellent
80.8 -84	A	90 – 95	
78.9 – 80.7	A-	85 – 89	
77.2 – 78.8	B+	80 – 84	Good
74.1 – 77.1	B	70 – 79	
72.6 – 74	B-	65 – 69	
71.1 – 72.5	C+	60 – 64	Okay
65 – 71	C	41 – 59	
63.7 – 64.9	C-	35 – 40	
51.7 – 62.6	D	15 – 34	Poor
0 – 51.7	F	0 - 14	Awful

7.4 Requirements Traceability Matrix

Requirements Traceability Matrix (RTM) is a document that maps and traces user requirements with test cases (Simplilearn, 2021). The main purpose of requirement traceability matrix is to validate that all the functional requirements are achieved via test cases such that no any functionality is missed out during software testing. It is very essential as it also improves the test coverage by mapping test cases back to each functional requirement defined in previous chapter. In short, traceability matrix is essential in order to verify that all the functionality has been implemented and working properly.

7.4.1 Use Case Reference

Table 7.14 at below shows the use case ID and its use case name for all the use cases defined for both of the system in the previous chapter. This use case table will serve as a reference for Table 7.17.

Table 7.14: Use Case Reference Table

System	Use Case ID	Use Case Name
Mobile-based Application	UC01	Register Account
	UC02	Search Items

	UC03	Manage Profile
	UC04	Make Purchase
	UC05	Manage Cart
	UC06	Check Orders
Web-based Management System	UC07	Manage Products
	UC08	Manage Stocks
	UC09	Manage Promotions
	UC10	Manage Delivery
	UC11	Manage Orders
	UC12	Manage Customer Records

7.4.2 Functional Requirements Reference

Table 7.15 at below shows the functional requirements' ID and its description for all the functional requirements defined for both of the system in the previous chapter. This functional requirements reference table will serve as a reference for Table 7.17.

Table 7.15: Functional Requirements Reference Table

System	Functional Requirement ID	Functional Requirements
Mobile-based Application	SRS01	The system must allow customers to register a new account.
	SRS02	The system must display a list of bakery products according to the product category.
	SRS03	The system must allow customers to search for bakery products using keywords.
	SRS04	The system must allow customers to view all the details of a specific bakery product.
	SRS05	The system must allow customers to add a bakery product into the shopping cart.
	SRS06	The system must allow customers to place an order based on the items in the shopping cart.

	SRS07	The system must allow customers to select the delivery method for each of the order placed.
	SRS08	The system must allow customers to select the payment method for each of the order placed.
	SRS09	The system must allow customers to specify the delivery address for each of the order placed.
	SRS10	The system must allow the customers to trace the status of all their placed orders.
	SRS11	The system must allow customers to update their profile's information.
	SRS12	The system must allow customers to remove a selected bakery product from the shopping cart.
	SRS13	The system must allow customers to view the details of the items added in the shopping cart.
Web-based Management System	SRS14	The system must allow the staff to view all the customers' record associated with the account information and the purchase records.
	SRS15	The system must allow the staff to update the account status for each of the customer.
	SRS16	The system must display a list of customer's orders.
	SRS17	The system must allow the staff to view all the customer's orders associated with the details of the order.
	SRS18	The system must allow the staff to search for a customer's order.

	SRS19	The system must allow the staff to update the status for an order.
	SRS20	The system must display a list of stocks.
	SRS21	The system must allow the staff to view all the stocks associated with the details of the stock.
	SRS22	The system must allow the staff to add a new stock.
	SRS23	The system must allow the staff to search for a stock.
	SRS24	The system must allow the staff to update the status for each of the stock.
	SRS25	The system must allow the staff to delete a stock.
	SRS26	The system must display a list of delivery records.
	SRS27	The system must allow the staff to view all the delivery records associated with the details of the record.
	SRS28	The system must allow the staff to search for a delivery record.
	SRS29	The system must allow the staff to update the delivery status for each of the customer orders.
	SRS30	The system must display a list of bakery products according to its category.
	SRS31	The system must allow the staff to view all the bakery products associated with the information of the product.
	SRS32	The system must allow the staff to create a new product.
	SRS33	The system must allow the staff to search for a bakery product.

	SRS34	The system must allow the staff to delete a bakery product.
	SRS35	The system must allow the staff to update all the information associated with the product.
	SRS36	The system must display a list of promotions.
	SRS37	The system must allow the staff to view all the promotions associated with the information of the promotion.
	SRS38	The system must allow the staff to create a new promotion.
	SRS39	The system must allow the staff to search for a promotion.
	SRS40	The system must allow the staff to delete a promotion.
	SRS41	The system must allow the staff to update all the information associated with the promotion.

7.4.3 Test Case Reference

Table 7.16 at below shows the test case ID and its description for both of the system. This test case reference table will serve as a reference for Table 7.17.

Table 7.16: Test Case Reference Table

System	Test Case ID	Test Case Description
Mobile-based Application	UAT-01	Register a new account.
	UAT-02	View list of products according to its category.
	UAT-03	Search bakery products using keywords.
	UAT-04	View the details of a bakery product.
	UAT-05	Add a product into the shopping cart.
	UAT-06	Place an order for the items in the shopping cart.
	UAT-07	Check the status of order placed.
	UAT-08	Update profile information.

	UAT-09	Remove bakery product from shopping cart.
	UAT-10	View the details of item in the shopping cart.
Web-based Management System	UAT-11	View the details of a specific product.
	UAT-12	Edit the details of a specific product.
	UAT-13	Add a new product.
	UAT-14	Delete a specific product.
	UAT-15	View the details of a specific stock.
	UAT-16	Update the status of a specific stock.
	UAT-17	Add a new stock.
	UAT-18	Delete a specific stock.
	UAT-19	View the details of a specific order.
	UAT-20	Update the status of a specific order.
	UAT-21	View the details of a specific delivery order.
	UAT-22	Update the status of a specific delivery order.
	UAT-23	View the details of a specific promotion.
	UAT-24	Update the status of a specific promotion.
	UAT-25	Add a new promotion.
	UAT-26	Delete a specific promotion.
	UAT-27	View the details of a customer.
	UAT-28	Update the account status of a customer.

7.4.4 Traceability Matrix

Traceability Matrix for all of the testings conducted according to the functional requirements and use cases specified for both of the systems in the previous chapter is shown in the Table 7.17 at below.

Table 7.17: Traceability Matrix

Test Case ID	Functional Requirement ID	Use Case ID
UAT-01	SRS01	UC01
UAT-02	SRS02	UC04
UAT-03	SRS03	UC02
UAT-04	SRS04	UC04

UAT-05	SRS05	UC04
UAT-06	SRS06, SRS07, SRS08, SRS09	UC04
UAT-07	SRS10	UC06
UAT-08	SRS11	UC03
UAT-09	SRS12	UC05
UAT-10	SRS13	UC05
UAT-11	SRS30, SRS31, SRS33	UC07
UAT-12	SRS35	UC07
UAT-13	SRS32	UC07
UAT-14	SRS34	UC07
UAT-15	SRS20, SRS21, SRS23	UC08
UAT-16	SRS24	UC08
UAT-17	SRS22	UC08
UAT-18	SRS25	UC08
UAT-19	SRS16, SRS17, SRS18	UC11
UAT-20	SRS19	UC11
UAT-21	SRS26, SRS27, SRS28	UC10
UAT-22	SRS29	UC10
UAT-23	SRS36, SRS37, SRS39	UC09
UAT-24	SRS41	UC09
UAT-25	SRS38	UC09
UAT-26	SRS40	UC09
UAT-27	SRS14	UC12
UAT-28	SRS15	UC12

7.5 User Acceptance Test (UAT)

User Acceptance Testing (UAT) is a type of testing performed by the end user or the client to verify the software system before moving the software application to the production environment (Elazar, 2021). In another words, UAT test aims to ensure that the final product is accepted by the end-user. The end-users will test the final product, ensure that all the features and functionalities developed are correspond to the requirements, as well as determine whether it is able to carry out the required tasks that was designed to address the real-world situations.

In order to ensure that the features and functionalities developed met the user's requirements, five users were invited to perform the user acceptance test for this project. Each of the users was given a list of UAT test cases as shown in Table 7.19 and Table 7.20 whereby they will perform all the listed test cases according to the outlined test procedures. The table below shows the template of UAT test form for the use of examiners.

Table 7.18: Template of UAT Test Form for Examiners Use

Test Form Index:		Test Case ID:	
Test Executed by:		Participant Name:	
Test Priority (Low/Medium/High):		Test Execution date:	
Starting Time:		Ending Time:	
Module Name:			
Test Case		Status (Pass/Fail)	Comments (if any)

7.5.1 UAT Test Cases

The Table 7.19 and Table 7.20 at below shows a list of UAT test cases associated with its test case ID as well as the test form index. Each of the test cases is described with the test procedures and its expected results.

Table 7.19: UAT Test Cases for Mobile-based Application

Test Case ID	Test Form Index	Test Case Description
UAT-01	TF-01, TF-29, TF-57, TF-85, TF-113	Register a new account. <u>Test procedures:</u> 1. Visit registration page. 2. Register with the following credentials:

		<p>Mobile number: 0127834778</p> <p>Email: <i>denise@gmail.com</i></p> <p>Username: <i>Denise Goh</i></p> <p>Password: <i>denise23</i></p> <p>3. Click the “REGISTER” button.</p> <p><u>Expected Results:</u></p> <p>Account is successfully registered.</p>
UAT-02	TF-02, TF-30, TF-58, TF-86, TF-114	<p>View list of products according to its category.</p> <p><u>Test procedures:</u></p> <p>1. Visit Bread & Buns page.</p> <p><u>Expected Results:</u></p> <p>All the products under category Breads & Buns are displayed.</p>
UAT-03	TF-03, TF-31, TF-59, TF-87, TF-115	<p>Search bakery products using keywords.</p> <p><u>Test procedures:</u></p> <p>1. Visit Cakes page.</p> <p>2. Enter “Polo” in the search bar.</p> <p><u>Expected Results:</u></p> <p>All the products with name that match or contain “Polo” are displayed.</p>
UAT-04	TF-04, TF-32, TF-60, TF-88, TF-116	<p>View the details of a bakery product.</p> <p><u>Test procedures:</u></p> <p>1. Visit Cookies page.</p> <p>2. Enter “Lemon Sable” in the search bar.</p> <p>3. Click the “VIEW MORE” button for that product.</p>

		<p><u>Expected Results:</u></p> <p>All the details related to the product are displayed.</p>
UAT-05	TF-05, TF-33, TF-61, TF-89, TF-117	<p>Add a product into the shopping cart.</p> <p><u>Test procedures:</u></p> <ol style="list-style-type: none"> 1. Visit Cookies page. 2. Enter “Lemon Sable” in the search bar. 3. Click the “VIEW MORE” button for that product. 4. Click the “ADD TO CART” button. <p><u>Expected Results:</u></p> <p>All the details related to the product are displayed.</p>
UAT-06	TF-06, TF-34, TF-62, TF-90, TF-118	<p>Place an order for the items in the shopping cart.</p> <p><u>Test procedures:</u></p> <ol style="list-style-type: none"> 1. Visit My Cart page. 2. Click the “CONTINUE” button. 3. Enter “34, Jalan SL8/9, Bandar Sg Long, 43000, Kajang” for the delivery address. 4. Select “Credit/Debit” for the payment method. 5. Select “Standard (RM3.50)” for the delivery method. 6. Click the “CONFIRM” button. <p><u>Expected Results:</u></p> <p>The order is successfully placed.</p>

UAT-07	TF-07, TF-35, TF-63, TF-91, TF-119	<p>Check the status of order placed.</p> <p><u>Test procedures:</u></p> <ol style="list-style-type: none"> 1. Visit My Order page. <p><u>Expected Results:</u></p> <p>All the orders placed associated with its details are displayed.</p>
UAT-08	TF-08, TF-36, TF-64, TF-92, TF-120	<p>Update profile information.</p> <p><u>Test procedures:</u></p> <ol style="list-style-type: none"> 1. Visit My Profile page. 2. Edit the following credentials: Mobile number: 0127835345 3. Click the “UPDATE” button. <p><u>Expected Results:</u></p> <p>Profile information is successfully updated.</p>
UAT-09	TF-09, TF-37, TF-65, TF-93, TF-121	<p>Remove bakery product from shopping cart.</p> <p><u>Test procedures:</u></p> <ol style="list-style-type: none"> 1. Visit My Cart page. 2. Click the “X” icon for a product named “Potatie Snowman”. <p><u>Expected Results:</u></p> <p>The product is removed from the shopping cart.</p>
UAT-10	TF-10, TF-38, TF-66, TF-94, TF-122	<p>View the details of item in the shopping cart.</p> <p><u>Test procedures:</u></p> <ol style="list-style-type: none"> 1. Visit My Cart page.

		<p>2. Click a product named “Burnt Cheesecake”.</p> <p><u>Expected Results:</u> All the details of the item are displayed.</p>
--	--	------------------------------------------------------------------------------------------------------------------------------------

Table 7.20: UAT Test Cases for Web-based Management System

Test Case ID	Test Form Index	Test Case Description
UAT-11	TF-11, TF-39, TF-67, TF-95, TF-123	<p>View the details of a specific product.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/products.php</i> 2. Enter “Original” in the search bar. 3. Click the “eye” icon located under the “Actions” column for a product named “Original Chicken Floss”. <p><u>Expected Results:</u> All the details of the products will be shown.</p>
UAT-12	TF-12, TF-40, TF-68, TF-96, TF-124	<p>Edit the details of a specific product.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/products.php</i> 2. Click the “pen” icon located under the “Actions” column for a product named “Original Chicken Floss”. 3. Edit the following details: Price: 3.30 Status: <i>Unavailable</i>

		<p>4. Click the “Save Changes” button.</p> <p><u>Expected Results:</u> A message of “Record updated successfully!” will be shown and the details of the product is successfully updated.</p>
UAT-13	TF-13, TF-41, TF-69, TF-97, TF-125	<p>Add a new product.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> Please visit: <i>http://localhost/BakeryShop/HTML/products.php</i> Click the “New Entry” button. Enter the following details: Product name: <i>Spicy Chicken Floss Bun</i> Category: <i>Breads & Buns</i> Description & Ingredients: <i>The savory bread topped with tasty local spicy chicken floss.</i> Calory per serving: <i>270</i> Price: <i>3.20</i> Status: <i>Available</i> Upload an image of the product. Click the “Add” button. <p><u>Expected Results:</u> A message of “Product added successfully!” will be shown and the product is successfully created.</p>
UAT-14	TF-14, TF-42, TF-70, TF-98, TF-126	<p>Delete a specific product.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> Please visit: <i>http://localhost/BakeryShop/HTML/products.php</i>

		<p>2. Click the “trash” icon located under the “Actions” column for a product named “Original Chicken Floss”.</p> <p><u>Expected Results:</u> The product is successfully removed.</p>
UAT-15	TF-15, TF-43, TF-71, TF-99, TF-127	<p>View the details of a specific stock.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/stocks.php</i> 2. Enter “Sug” in the search bar. 3. Click the “eye” icon located under the “Actions” column for a stock named “Sugar”. <p><u>Expected Results:</u> All the details of the stock will be shown.</p>
UAT-16	TF-16, TF-44, TF-72, TF-100, TF-128	<p>Update the status of a specific stock.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/stocks.php</i> 2. Click the “pen” icon located under the “Actions” column for a product named “Salt”. 3. Update the following details: Status: <i>Unavailable</i> 4. Click the “Update” button. <p><u>Expected Results:</u> The status of the stock is successfully updated.</p>
UAT-17	TF-17, TF-45,	<p>Add a new stock.</p> <p><u>Test Procedures:</u></p>

	TF-73, TF-101, TF-129	<ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/stocks.php</i> 2. Click the “New Entry” button. 3. Enter the following details: Ingredient Name: <i>Parmesan Cheese</i> Status: <i>Available</i> 4. Click the “Add” button. <p><u>Expected Results:</u> A stock named “Parmesan Cheese” is successfully created.</p>
UAT-18	TF-18, TF-46, TF-74, TF-102, TF-130	<p>Delete a specific stock.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/stocks.php</i> 2. Click the “trash” icon located under the “Actions” column for a stock named “Salt”. <p><u>Expected Results:</u> The product is successfully removed.</p>
UAT-19	TF-19, TF-47, TF-75, TF-103, TF-131	<p>View the details of a specific order.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/orders.php</i> 2. Enter “7963” in the search bar. 3. Click the “eye” icon located under the “Actions” column for an order with Id of “RF79638”. <p><u>Expected Results:</u> All the details of the order will be shown.</p>

UAT-20	TF-20, TF-48, TF-76, TF-104, TF-132	<p>Update the status of a specific order.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/orders.php</i> 2. Click the “pen” icon located under the “Actions” column for an order with Id of “RF79641”. 3. Update the following details: Status: <i>Completed</i> 4. Click the “Update” button. <p><u>Expected Results:</u></p> <p>The status of the order is successfully updated.</p>
UAT-21	TF-21, TF-49, TF-77, TF-105, TF-133	<p>View the details of a specific delivery order.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/delivery.php</i> 2. Enter “79644” in the search bar. 3. Click the “eye” icon located under the “Actions” column for a delivery order with Id of “RF79644”. <p><u>Expected Results:</u></p> <p>All the details of the delivery order will be shown.</p>
UAT-22	TF-22, TF-50, TF-78, TF-106, TF-134	<p>Update the status of a specific delivery order.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/delivery.php</i> 2. Click the “pen” icon located under the “Actions” column for a delivery order with Id of “RF79639”. 3. Update the following details: Status: <i>Delivered</i> 4. Click the “Update” button.

		<p><u>Expected Results:</u></p> <p>The status of the delivery order is successfully updated.</p>
UAT-23	TF-23, TF-51, TF-79, TF-107, TF-135	<p>View the details of a specific promotion.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/promotions.php</i> 2. Enter “2020 Chinese” in the search bar. 3. Click the “eye” icon located under the “Actions” column for a promotion named “2020 Chinese New Year Sales”. <p><u>Expected Results:</u></p> <p>All the details of the promotion will be shown.</p>
UAT-24	TF-24, TF-52, TF-80, TF-108, TF-136	<p>Update the status of a specific promotion.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/promotions.php</i> 2. Click the “pen” icon located under the “Actions” column for a promotion named “2020 Chinese New Year Sales”. 3. Update the following details: Status: <i>Available</i> 4. Click the “Update” button. <p><u>Expected Results:</u></p> <p>The status of the promotion is successfully updated.</p>
UAT-25	TF-25, TF-53, TF-81,	<p>Add a new promotion.</p> <p><u>Test Procedures:</u></p>

	TF-109, TF-137	<p>1. Please visit: <i>http://localhost/BakeryShop/HTML/promotions.php</i></p> <p>2. Click the “New Entry” button.</p> <p>3. Enter the following details: Event: <i>2021 Deepavali Sales</i> Promotion Details: <i>20% off on selected cakes</i> Terms & Conditions: <i>For purchase above RM 150</i> Start Date: <i>14/07/2021 12:00AM</i> End Date: <i>23/07/2021 11:59PM</i> Status: <i>Unavailable</i></p> <p>4. Click the “Add” button.</p> <p><u>Expected Results:</u> A promotion named “<i>2021 Deepavali Sales</i>” is successfully created.</p>
UAT-26	TF-26, TF-54, TF-82, TF-110, TF-138	<p>Delete a specific promotion.</p> <p><u>Test Procedures:</u></p> <p>1. Please visit: <i>http://localhost/BakeryShop/HTML/promotions.php</i></p> <p>2. Click the “trash” icon located under the “Actions” column for a promotion named “<i>2020 Chinese New Year Sales</i>”.</p> <p><u>Expected Results:</u> The promotion is successfully removed.</p>
UAT-27	TF-27, TF-55, TF-83, TF-111, TF-139	<p>View the details of a customer.</p> <p><u>Test Procedures:</u></p> <p>1. Please visit: <i>http://localhost/BakeryShop/HTML/customers.php</i></p> <p>2. Click the “eye” icon located under the “Actions” column for a customer named “<i>Jasmine Chong</i>”.</p>

		<p><u>Expected Results:</u> All the details of the customer will be shown.</p>
UAT-28	TF-28, TF-56, TF-84, TF-112, TF-140	<p>Update the account status of a customer.</p> <p><u>Test Procedures:</u></p> <ol style="list-style-type: none"> 1. Please visit: <i>http://localhost/BakeryShop/HTML/customers.php</i> 2. Click the “pen” icon located under the “Actions” column for a customer named “Kenny Choo”. 3. Update the following details: Status: <i>Inactive</i> 4. Click the “Update” button. <p><u>Expected Results:</u> The account status of the customer is successfully updated.</p>

7.5.2 User Acceptance Test (UAT) Result

All of the individual assessments of the UAT performed by each of the users can be referred to appendix D. The table below summarizes the UAT results performed by the users.

Table 7.21: Summary of User Acceptance Test (UAT) Result

Total number of users tested: 5					
Module	ID	Test Cases	Status		Comments
			Pass	Fail	
Registration	UAT-01	Register a new account.	5	0	-
Products	UAT-02	View list of products according to its category.	5	0	-

	UAT-03	Search bakery products using keywords.	5	0	-
	UAT-04	View the details of a bakery product.	5	0	-
	UAT-05	Add a product into the shopping cart.	5	0	-
Order	UAT-06	Place an order for the items in the shopping cart.	5	0	-
	UAT-07	Check the status of order placed.	5	0	-
Profile	UAT-08	Update profile information.	5	0	-
Shopping cart	UAT-09	Remove bakery product from shopping cart.	5	0	-
	UAT-10	View the details of item in the shopping cart.	5	0	-
Products	UAT-11	View the details of a specific product.	5	0	-
	UAT-12	Edit the details of a specific product.	5	0	-
	UAT-13	Add a new product.	5	0	-

	UAT-14	Delete a specific product.	5	0	-
Stocks	UAT-15	View the details of a specific stock.	5	0	-
	UAT-16	Update the status of a specific stock.	5	0	-
	UAT-17	Add a new stock.	5	0	-
	UAT-18	Delete a specific stock.	5	0	-
Orders	UAT-19	View the details of a specific order.	5	0	-
	UAT-20	Update the status of a specific order.	5	0	-
Delivery	UAT-21	View the details of a specific delivery order.	5	0	-
	UAT-22	Update the status of a specific delivery order.	5	0	-
Promotions	UAT-23	View the details of a specific promotion.	5	0	-
	UAT-24	Update the status of a specific promotion.	5	0	-
	UAT-25	Add a new promotion.	5	0	-

	UAT-26	Delete a specific promotion.	5	0	-
Customers	UAT-27	View the details of a customer.	5	0	-
	UAT-28	Update the account status of a customer.	5	0	-

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

This chapter presents the conclusions from the findings and discussions presented in the previous chapters followed by the potential limitations present in this project and some recommendations for further enhancement.

8.2 Achievement of Objectives

Every project must come to a conclusion, and project completion is the last step of the project life cycle. The entire purpose of this project is to fulfil the goals set forth at the beginning. With the completion of this project, all the four objectives specified in the preceding chapter were achieved successfully.

The first objective was to conduct a literature review on cross-platform application development, software development methodologies, research methodologies as well as similar existing bakery shop applications. Research on cross-platform application development was conducted in order to have a better understanding on the development of mobile and web application as well as the review of various software development methodologies with the rapid application development being chosen and applied in this project. Besides, research methodologies reviewed include qualitative and quantitative methodology whereby quantitative research methodology is selected to be applied in this project with conduct of survey questionnaire. Lastly, some similar existing bakery shop applications such as Fergusson Plarre Bakehouses, Bakerdays, Bread History, and Tong Kee Bakery were reviewed to understand the similarities and differences between each of the applications. Through reviewing these similar existing applications, the features and functionalities to be included in the mobile-based application were determined by comparing and evaluating the strengths and weaknesses in each of these application.

Next, the second objective achieved in this project was to develop a mobile bakery shop application that allows customers to do online bakery products ordering and reservation. This objective was successfully achieved through the development of mobile application by using the Ionic framework. The mobile application is developed with the presence of all the functionalities and features specified in the functional

requirements. Therefore, this mobile application will provide the customers a quick, convenient and twenty-four-seven way to place orders by using a mobile phone without having to call or drive to the bakery shop. Besides, customers will also be able to choose the items interested without having to be crowded with others especially during this pandemic as this mobile application will show the users all the bakery products available associated with the details of the products. Therefore, customers will experience an efficient and convenient ordering process.

Besides, the third objective achieved was to design and develop an web-based management system that allows the bakery shop staff to manage the records and information from selling products, customer orders to delivery. By referring to the functional requirements specified, this web-based management system was successfully developed and contains of six main modules which are products module, stocks module, orders module, delivery module, promotions module as well as customers module. This web-based management system helps to improve the staff efficiency with the integration of features that allow the staff to manage products, stocks, orders, delivery, promotions and customers accurately and efficiently. In other words, the functionalities included in this web-based management system will make the staff' jobs easier especially on recording and tracking of various type of records at the same time helps to streamline the management in business.

Additionally, the last objective is to evaluate both mobile and online bakery shop applications through a series of testing. Testings that have been carried out in this project include unit testing, usability testing and user acceptance test. The primary objective that the testings are conducted is to discover as many as possible the potential defects in both the mobile-based application and web-based management system. On top of that, these testings are conducted in order to ensure that development of both of the systems satisfy the user requirements defined. To achieve this objective, test cases were developed and executed to ensure the verification of all the functionalities. In other words, series of testings are conducted to evaluate both systems to find defects so that it can be fixed before delivering it to users hence delivering a quality product.

8.3 Limitations and Recommendations

All the areas discussed at the previous chapters so far, however, suffer from the fact that this project does consist a number of limitations. Therefore, this section will briefly discuss the limitations in the perspective of the features and functionalities of

both the systems as well as some recommendations for the implementation of further research based on each of the limitations specified.

Table 8.1: Limitations and Recommendations

No.	Limitations	Recommendations
1	No suggestions for search	Search suggestions will keep a list of search terms that users have been looking for on the application. When the users type a query, a dropdown of predictions of more popular and specific queries appear. The benefit of autocomplete recommendations is that they direct users to better queries rather than speeding up the typing process. When auto-suggestions are done correctly, they show users what sorts of queries to make, show them proper domain terminology, assist them in avoiding mistakes, and help them choose the ideal search scope. This is also a great way for the business to keep track of what is the most popular products are and able to place these products nearer the top of search results.
2	Unable to track the real-time update of delivery process	Customers may expect to be able to track their orders at all times during the delivery process. They may want to know where their orders are in real time. Customers who are unable to monitor their orders are frequently concerned about where they are and when they will arrive. They may also suffer from buyer's remorse and consider cancelling their order because they are unsure when it will come. A real-time delivery tracking system provides customers with precise anticipated arrival times as well as real-time notifications if there are any unexpected delivery delays. It keeps the buyer

		<p>informed about the status of orders as they proceed from conception to fulfilment. Sellers can provide a better shopping experience and satisfy consumer expectations during the shipping process in this manner. As a result, consumers will be able to determine the delivery's most likely arrival time, allowing them to plan accordingly.</p>
3	Payment gateways is not integrated	<p>Payment gateways will connect the transaction with the payment processors which are the financial institutions. This is due to security constraints preventing the application from connecting directly to financial institutions. As a result, the payment gateway will serve as a mediator between these two stages of the transaction. It aids in the encryption of payments in order to offer users with safe transactions and personal data processing. Therefore, a payment gateway need to be integrated in order to provide the customers an easy and secure way to make payments.</p>
4	Limited searching and filtering options	<p>This application offers the user types in the keyword and that keyword is only checked against the products' name under the selected category. However, customers always want to find what they want quickly and without any hassle. They do not want to waste time searching through the collections to find the product they want and they do not want to spend time only to find a product that is unavailable. Therefore, the product search should be refined based on multiple product attributes. Additionally, this application should offer both category-specific filtering and allow</p>

		users to filter the products by the attributes displayed in the list item such as price, discount, ratings, calory and so on. Any product specification that is important enough to be shown in the product list should also be available as a filter. This is because the information in the product list are the product attributes that the users care the most about.
5	No ratings and reviews feature	Ratings and reviews are not only an essential part of the customers decision-making process, but also an invaluable source of feedback to the business owner. Customers have the freedom to discuss what they think about the product and what they believe is important for others to know before making a purchase choice. Customers will seek for feedback before making a purchase choice, thus positive or negative reviews may have a big influence on sales. They will most likely listen to the reviews if they find them relevant and accurate. Customers want to bond with the reviewers, they want to hear from individuals who look and act like them, even if they are strangers. Businesses will also know what to enhance, what details to modify, and what selling product benefits to promote and focus if they have opinions. Even negative feedbacks are beneficial in that they reveal what has to be changed in order to provide a better product.
6	Limited registration and login method	With a variety of scenario demands, such as some users dislike of disclosing their mobile phone number, some users lack of a personal e-mail, some users dislike of complex registration processes,

		<p>some users refuse to install third-party accounts, and so on, the most reasonable measure should be to provide multiple registration and login methods for the user, preferably with all of them. First of all, To begin with, separation of the registration and login processes may cause the user to become bored with such a complicated method, and the user's attention will be consumed during the registration phase. Alternatively, if the registration and login processes have been merged, the user can log in through mobile phone verification code. Such method firstly does not necessitate a lengthy registration process, nor does it require the user to remember their password. In comparison to self-owned account systems, third-party account systems will be more comfortable and quick to use since they will leverage major social platform authorization logins like WeChat, Facebook, Instagram, and others to save users time on registration. Finally, e-mail box registration has the advantage over mobile phone number registration in that the e-mail box address may be kept indefinitely without the hassle of a changing mobile phone number.</p>
7	Manual ways to update the status of stocks	<p>Automation is a superior alternative for helping the bakery shop staff to keep track of stocks and monitor stock levels rather than having the staff to update the status of the stocks manually through the web-based management system. This is due to the reason that as the number of stocks grows, manually tracking of the stock levels become challenging, which might lead to mistakes.</p>

		<p>Therefore, the web-based management system should allow the staff to set the re-order level for each stock whereby when the re-order level of a specific stock is reached, the system will automatically update the status of the stock to running low, thereby reminding the staff to refill the stock. In short, allowing automation to take over this tedious process automates the whole work of keeping track of stocks and receiving notifications at the exact point when it is needed, allowing everyday operations to run more efficiently by increasing accuracy and speed.</p>
--	--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

REFERENCES

- Ascarelli, S., 2020. *Life at a small bakery amid coronavirus: open just 2 days a week and struggling to survive*, [online]. Available at: <https://www.marketwatch.com/story/life-at-a-small-bakery-amid-coronavirus-open-just-2-days-a-week-and-struggling-to-survive-2020-03-21> [Accessed 24 February 2021].
- Austin, Z. and Sutton, J., 2014. Qualitative Research: Getting Started. *The Canadian Journal of Hospital Pharmacy*, [e-journal] 67(6), pp.436-440. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4275140/> [Accessed 27 February 2021].
- BakerDays, n.d. *BakerDays*, [online] Available at: <https://www.bakerdays.com/> [Accessed 26 February 2021].
- Basias, N. and Pollalis, Y., n.d. Quantitative and Qualitative Research in Business & Technology: Justifying a Suitable Research Methodology. *Review of Integrative Business and Economics Research*, [online] 7(1). Available at: http://buscompress.com/uploads/3/4/9/8/34980536/riber_7-s1_sp_h17-083_91-105.pdf [Accessed 16 February 2021].
- Bhatia, M., 2018. *A Complete Guide to Quantitative Research Methods*. [online] Available at: <https://humansofdata.atlan.com/2018/06/quantitative-research-methods/> [Accessed 16 February 2021].
- Bread History, n.d. *ABOUT US*, [online] Available at: <https://breadhistory.com.my/brand-story/about-us/> [Accessed 26 February 2021].
- Brooke, J., 1996. *SUS: a 'quick and dirty' usability scale*. In P.W.Jordan, B. Thomas, B.A. Weerdmeester, and I.L. McClelland (Eds.) *Usability Evaluation in Industry* (189-194). London: Taylor and Francis. Available at: https://www.researchgate.net/publication/228593520_SUS_A_quick_and_dirty_usability_scale [Accessed 21 July 2021].
- Caroll, B., 2020. *What is Rapid Application Development (RAD)?*. [online] Available at: <https://codebots.com/app-development/what-is-rapid-application-development-rad> [Accessed 29 February 2021].
- Ciligot, C., 2020. *Mobile App Vs. Mobile Website : A UX Comparison – Which Is The Better Option?* Clearbridge Mobile, [blog] 9 July. Available at: <https://clearbridgemobile.com/mobile-app-vs-mobile-website-which-is-the-better-option/> [Accessed 21 June 2021].
- Creswell, J.W., 2020. Quantitative Methods Overview. *Quantitative Research and Analysis*, [e-journal]. Available through: Le Tourneau University Library website <https://lib-guides.letu.edu/quantresearch> [Accessed 1 March 2021].
- Davies, P.D., Carne, C., Mackay, H. and Tudhope, D., 1999. Rapid application development (RAD): an empirical review. *European Journal of Information Systems*.

8(3), pp. 211-223. Available at: https://www.researchgate.net/publication/31978101_Rapid_application_development_RAD_An_empirical_review [Accessed 25 February 2021].

Elazar, E., 2021. *WHAT IS UAT TESTING?* Panaya, [blog] 10 February. Available at: <https://www.panaya.com/blog/testing/what-is-uat-testing/> [Accessed 22 July 2021].

Ferguson Plarre Bakehouses, n.d. *About Us*, [online]. Available at: <https://www.fergusonplarre.com.au/> [Accessed 21 February 2021].

Flora, H. K. and Chande, S. V., 2014. A Systematic Study on Agile Software Development Methodologies and Practices. *International Journal of Computer Science and Information Technologies*. 5(3), pp. 3626-3637. Available at: https://www.researchgate.net/publication/266742256_A_Systematic_Study_on_Agile_Software_Development_Methodologies_and_Practices [Accessed 21 February 2021].

Habsy, A.A., 2014. *6 critical phases of the Systems Development Life Cycle*. Unitanzania, [blog] 4 June. Available at: <https://unitanzania.com/the-systems-development-life-cycle-sdlc/> [Accessed 25 February 2021].

Half, R., 2021. *6 basic SDLC methodologies: Which one is best?* Employers blog, [blog] January 2021. Available at: <https://www.roberthalf.com.au/blog/employers/6-basic-sdlc-methodologies-which-one-best> [Accessed 2 March 2021].

Jansen, D. and Warren, K., 2020. What (Exactly) is Research Methodology? *Grad Coach blog*, [blog] 20 June. Available at: <https://gradcoach.com/what-is-research-methodology/> [Accessed 19 February 2021].

Jenkins, K., 2020. *What Is Overstocking? 7 Causes, Consequences, and How to Avoid It*, [online]. Available at: <https://www.shopify.my/retail/overstocking-causes-and-prevention> [Accessed 26 February 2021].

Luenendonk, M., 2020. *7 Basic Software Development Life Cycle (SDLC) Methodologies: Which One is Best?*. [online] Available at: <https://www.cleverism.com/software-development-life-cycle-sdlc-methodologies/> [Accessed 22 February 2021].

Nelson, A., 2020. *Bakers detail supplier needs during COVID-19*, [online]. Available at: <https://www.bakingbusiness.com/articles/50810-bakers-detail-supplier-needs-during-covid-19> [Accessed 27 February 2021].

Nicholson, S., 2020. *Agile Scrum Roles And Responsibilities*. Information Technology blog, [blog] 6 July. Available at: <https://www.knowledgehut.com/blog/agile/agile-scrum-roles-responsibilities> [Accessed 25 February 2021].

Samantha, 2020. *Unit Testing – What is Its Importance in Software Testing?* TestingXperts, [blog] 09 February. Available at: <https://www.testingxperts.com/blog/unit-testing> [Accessed 23 July 2021].

Sami, M., 2012. *Software Development Life Cycle Models and Methodologies*. Software Engineering & Architecture Practices, [blog] 15 March. Available at: <https://melsatar.blog/2012/03/15/software-development-life-cycle-models-and-methodologies/> [Accessed 17 February 2021].

Sauro, J., 2011. *Measuring Usability With the System Usability Scale (SUS)*. [online] Available at: <https://measuringu.com/sus/> [Accessed 21 July 2021].

Shiklo, B., 2017. *Four things to watch for when building both web and mobile apps in One Go*. ITWC, [blog] 26 May. Available at: <https://www.itworldcanada.com/blog/draft-four-things-to-watch-for-when-building-both-web-and-mobile-apps-in-one-go/393314> [Accessed 21 June 2021].

Simplilearn, 2021. *Requirements Traceability Matrix (RTM)*. [online] Available at: <https://www.simplilearn.com/project-management-and-the-requirements-traceability-matrix-article> [Accessed 25 June 2021].

Smyk, A., 2020. *The System Usability Scale & How it's Used in UX*. [online] Available at : <https://medium.com/thinking-design/the-system-usability-scale-how-its-used-in-ux-b823045270b7> [Accessed 21 July 2021].

Teherani, A., Martimianakis, T., Hayes, T., Wadhwa, A. and Varpio, L., 2015. Choosing a Qualitative Research Approach. *Journal of Graduate Medical Education*, [e-journal] 7(4), pp.669-670. <https://doi.org/10.4300/JGME-D-15-00414.1> [Accessed 24 March 2021].

Thomas, N., n.d. *How To Use The System Usability Scale (SUS) To Evaluate The Usability Of Your Website*. [online] Available at : <https://usabilitygeek.com/how-to-use-the-system-usability-scale-sus-to-evaluate-the-usability-of-your-website/> [Accessed 21 July 2021].

TK Bakery, n.d. *About Us*, [online]. Available at: <https://www.tk2you.com/en/contact-us> [Accessed 21 February 2021].

Visual Studio Code, n.d. *Why did we build Visual Studio Code?* [online] Available at: <https://code.visualstudio.com/docs/editor/whyvscode> [Accessed 21 February 2021].

Zima, D., 2015. MODERN METHODS OF SOFTWARE DEVELOPMENT. *Task Quarterly*, 19(4), pp.481-493. Available at: <http://docplayer.net/8769254-Modern-methods-of-software-development.html> [Accessed 18 February 2021].

APPENDICES

APPENDIX A: Survey Questionnaire

3/10/2021

Online Bakery Shop Application Survey

Online Bakery Shop Application Survey

Thank you for agreeing to participate in this survey. I am Ang Li Jing, a final year software engineering student from Universiti Tunku Abdul Rahman. I am currently working on my final year project which is to develop an online bakery shop application. The purpose of this questionnaire is to collect some relevant data that can be used to demonstrate some of the statistical methods for analyzing quantitative data. The aim of this study is to determine whether the online bakery shop application will bring any convenience to all of us. The individual responses will be anonymous and the data collected will be used for only this final year project. Your participation is entirely voluntary. If there is any question that makes you feel uncomfortable, please skip them. Thank you in advance for your cooperation.

* Required

1. What is your gender *

Mark only one oval.

Male

Female

2. What is your age? *

Mark only one oval.

Under 18

18 - 24

24 - 39

40 - 60

61 or above

3/10/2021

Online Bakery Shop Application Survey

3. What is your current occupation? *

Mark only one oval.

- Student
- Part-time employed
- Full-time employed
- Unemployed
- Self-employed
- Retired
- Other: _____

4. How often do you purchase bakery products? *

Mark only one oval.

- Daily
- Weekly
- Biweekly
- Monthly
- Less than once a month
- Less than once a year

5. Do you find out that making orders or reservation of bakery products physically at bakery shops or through phone call is difficult? *

Mark only one oval.

- Yes *Skip to question 6*
- No *Skip to question 7*

Difficulty in making orders physically

3/10/2021

Online Bakery Shop Application Survey

6. If yes, what could be the reason? You may choose more than one answer. *

Check all that apply.

- Inconvenient
- Time-consuming
- Miscommunication
- Crowded and long queues
- Not answering/Line busy
- Shop not operating during holidays

Other: _____

Skip to question 7

Online Bakery Shop Application

7. Have you ever installed any bakery shop application? *

Mark only one oval.

- Yes *Skip to question 8*
- No *Skip to question 10*

Have installed online bakery shop application

8. If yes, state the name of the application(s) that you have downloaded. *

3/10/2021

Online Bakery Shop Application Survey

9. How would you rate your experience in using the application(s) that you have downloaded on a scale of 1-5? *

Mark only one oval.

- 1 (Very dissatisfied)
- 2 (Dissatisfied)
- 3 (Neither satisfied nor dissatisfied)
- 4 (Satisfied)
- 5 (Very satisfied)

Skip to question 11

Never installed online bakery shop application

10. If no, what are the reasons? You may choose more than one answer. *

Check all that apply.

- Has a concern on additional service charges
- Do not own a payment card such as credit or debit card
- Concerns about payment security
- Has a concern of complex and long checkout process
- Has a concern of complicated navigation within the application
- Preference to shop in person, see and touch the product
- Trust concerns about receiving or returning products.

Other: _____

Skip to question 11

Importance and features of an online bakery shop application

11. Do u think that it is helpful to have a online bakery shop application to make orders? *

Mark only one oval.

- Yes
- No

3/10/2021

Online Bakery Shop Application Survey

12. As a consumer, how likely are you to use an online application to order and purchase bakeries? *

Mark only one oval.

- 1 (Very Unlikely)
 2 (Unlikely)
 3 (Neutral)
 4 (Likely)
 5 (Very Likely)

13. When you are looking for a bakery product, what kind of information do you expect from the shop owner? You may choose more than one answer. *

Check all that apply.

- Product name
 Product type (cake, bread, muffin, etc)
 Price per quantity
 Calory per serving
 Decriptions & Ingredients
 Product images
 Availability
 Best selling

Other: _____

3/10/2021

Online Bakery Shop Application Survey

14. Based on your recent online shopping experience, please rate below features/functionalities based on how important they are for you. *

Mark only one oval per row.

	Not important	Slightly important	Moderately important	Important	Very important
Profile creation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Products categorization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shopping cart	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search product	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Order history	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Notifications (e.g. news on promotions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Profile settings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Points accumulation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer ratings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. (Optional) Do you have any extra features/functionalities that you would like to suggest? If yes, please list down your suggestion at below.

This content is neither created nor endorsed by Google.



APPENDIX B: Low-Fidelity Prototypes

Mobile-based Application:

" CHASE PERFECTION, CATCH EXCELLENCE "

CAKEY BAKERY BAKERY

IT'S THE SIMPLE PLEASURES IN LIFE...
WARM BREAD FOR DINNER, SLICES FOR
BREAKFAST, THIN CRISPS FOR SNACKS

GET STARTED

This is a hand-drawn sketch of a mobile application's welcome page. It features a rounded rectangular border. At the top, there is a quote: " CHASE PERFECTION, CATCH EXCELLENCE ". Below the quote is the brand name "CAKEY BAKERY BAKERY" in a stylized, hand-drawn font. Underneath the brand name is a short paragraph of text: "IT'S THE SIMPLE PLEASURES IN LIFE... WARM BREAD FOR DINNER, SLICES FOR BREAKFAST, THIN CRISPS FOR SNACKS". At the bottom center, there is a rounded rectangular button with the text "GET STARTED".

Welcome Page

CREATE NEW ACCOUNT

MOBILE NUMBER

EMAIL ADDRESS

USERNAME

PASSWORD

CONFIRM PASSWORD

REGISTER

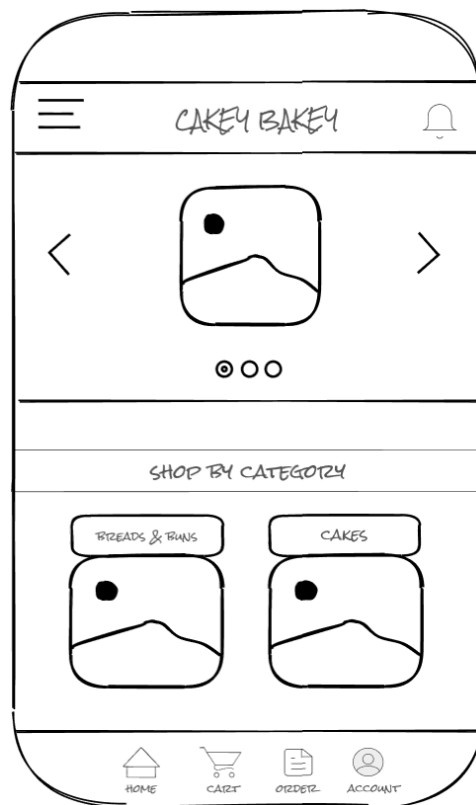
ALREADY HAVE AN ACCOUNT? [LOGIN NOW](#)

This is a hand-drawn sketch of a mobile application's registration screen. It features a rounded rectangular border. At the top, there is the text "CREATE NEW ACCOUNT". Below this are five horizontal input fields, each with a label: "MOBILE NUMBER", "EMAIL ADDRESS", "USERNAME", "PASSWORD", and "CONFIRM PASSWORD". At the bottom center, there is a rounded rectangular button with the text "REGISTER". At the very bottom, there is a line of text: "ALREADY HAVE AN ACCOUNT? [LOGIN NOW](#)".

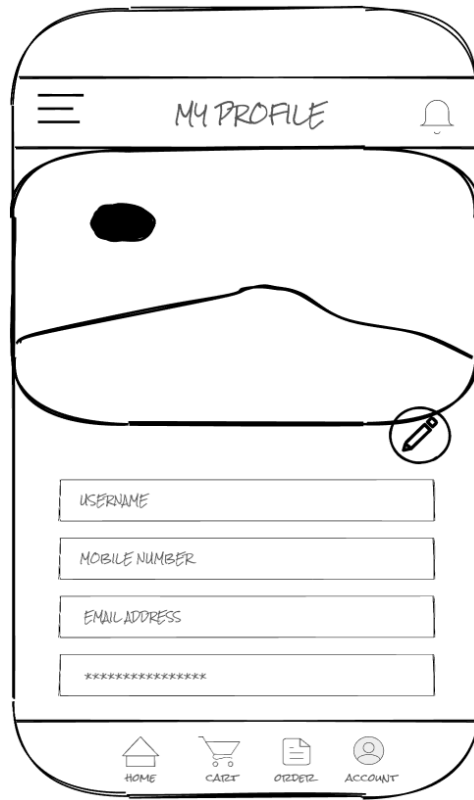
Registration Screen



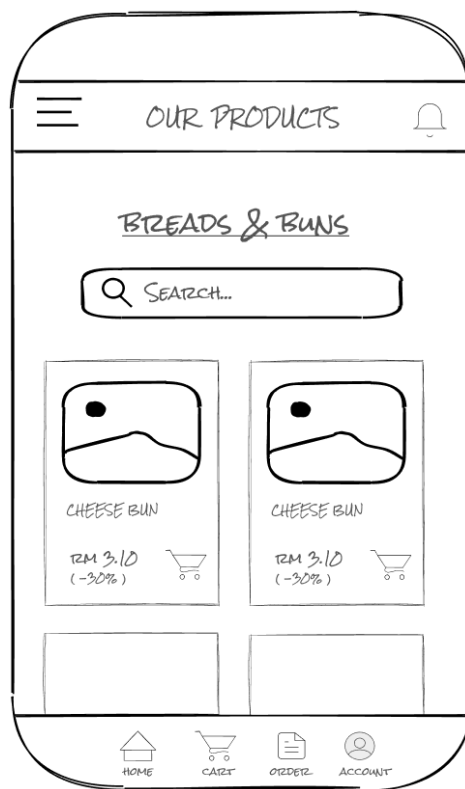
Login Screen



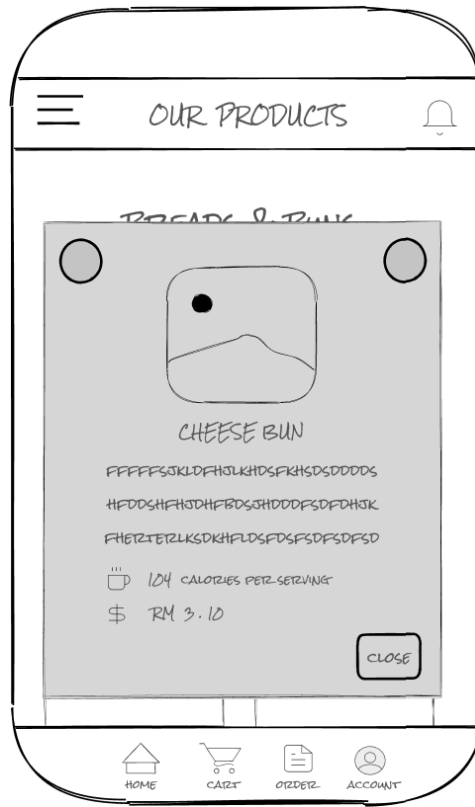
Home Screen



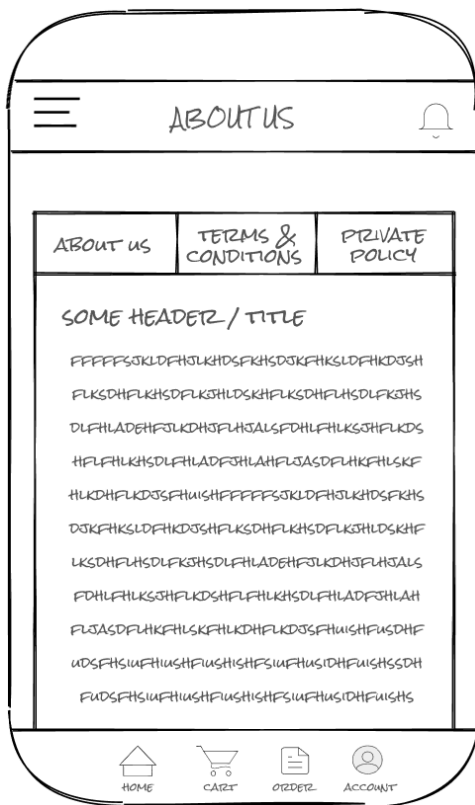
Update Profile Information Screen



Products Screen



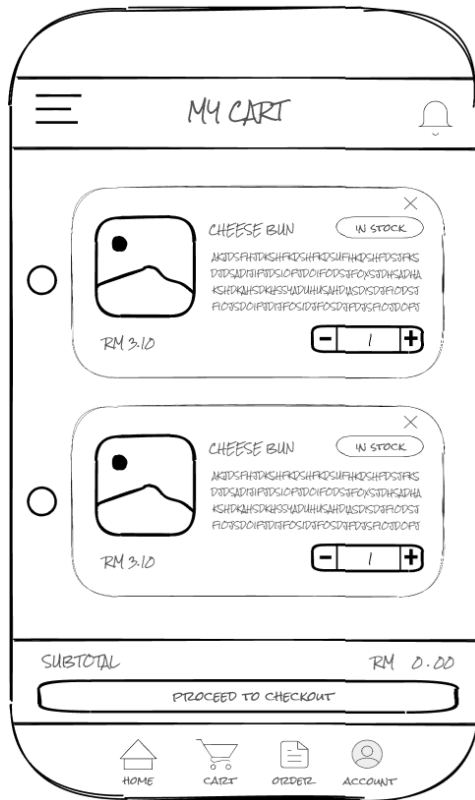
Product Details Screen



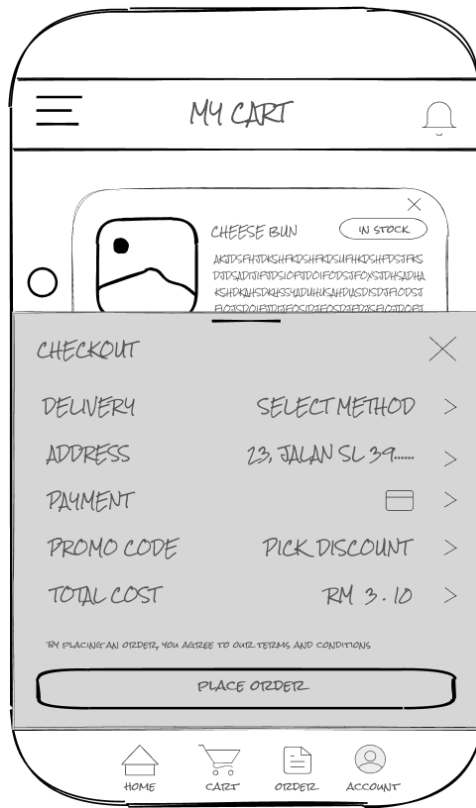
About Us Screen



Contact Us Screen



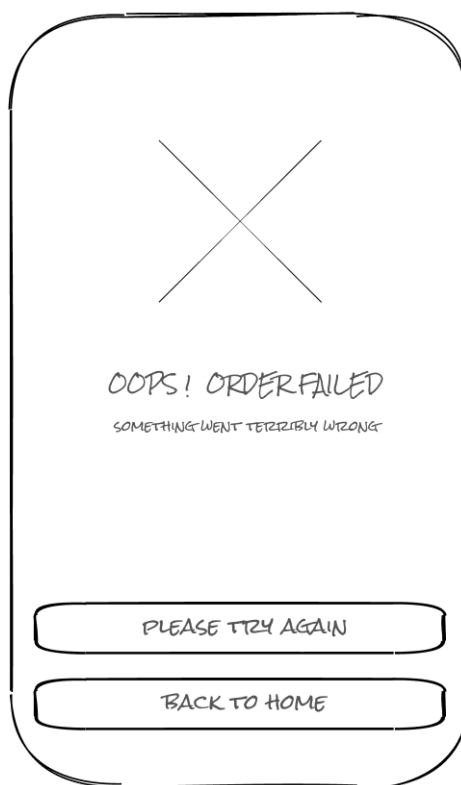
Shopping Cart Screen



Checkout Payment Screen



Order Successfully Placed Screen



Failed to Place Order Screen



Track Order Screen

Web-based Management System:

The screenshot shows a web browser window with the URL www.lofiwireframekit.com. The main content area features a large octagonal placeholder icon at the top. Below it, the text "LOGIN TO ADMIN ACCOUNT" is centered. Underneath, there are two input fields: the first is labeled "USERNAME" and the second is labeled "PASSWORD". To the left of these fields are icons representing a user and a lock. A blue "LOG IN" button is positioned below the password field.

Login Page

The screenshot displays a web browser window with the URL www.cakeybakey.com. The page title is "ONLINE BAKERY SHOP MANAGEMENT SYSTEM". In the top right corner, the user "Diana Lim Admin" is logged in. A left-hand navigation menu includes options for Dashboard, Products, Stocks, Orders, Delivery, Promotions, and Customers. The main dashboard area shows a bar chart with 15 bars, where three bars are highlighted in blue. Below the chart, there are four blue rectangular panels, each containing a heart icon and the text "Vertical Tab".

Dashboard Page

The screenshot shows the 'Manage Products Page' of an 'ONLINE BAKERY SHOP MANAGEMENT SYSTEM'. The browser address bar displays 'www.cakeybakey.com'. The user is logged in as 'Diana Lim Admin'. The left sidebar menu includes 'Dashboard', 'Products' (highlighted), 'Stocks', 'Orders', 'Delivery', 'Promotions', and 'Customers'. The main content area is titled 'PRODUCTS OVERVIEW' and features a table with columns for 'Date Created', 'Product Category', 'Total Products', and 'Actions'. The table contains five rows of placeholder data. A search bar and a dropdown menu set to '10' are positioned above the table. Below the table, there is a pagination control showing 'Showing 1 to 10 of 100 entries' and a 'New Entry' button.

Manage Products Page

The screenshot shows the 'View Product Details Page' of the 'ONLINE BAKERY SHOP MANAGEMENT SYSTEM'. The browser address bar displays 'www.cakeybakey.com'. The user is logged in as 'Diana Lim Admin'. The left sidebar menu is the same as in the previous screenshot. The main content area is titled 'PRODUCTS OVERVIEW'. A modal window titled 'CHEESE BUN' is open, displaying a hand-drawn illustration of a cheese bun and some placeholder text. The modal has a 'Close' button. The background table and pagination controls are visible behind the modal.

View Product Details Page

www.cakeybakey.com

ONLINE BAKERY SHOP MANAGEMENT SYSTEM

Diana Lim Admin

MENU

- Dashboard
- Products
- Stocks**
- Orders
- Delivery
- Promotions
- Customers

STOCKS

STOCKS OVERVIEW

10 Search

Date Created	Ingredients	Status	Actions
----	----	----	
----	----	----	
----	----	----	
----	----	----	
----	----	----	

Showing 1 to 10 of 100 entries

< 1 >

+ New Entry

Manage Stocks Page

www.cakeybakey.com

ONLINE BAKERY SHOP MANAGEMENT SYSTEM

Diana Lim Admin

MENU

- Dashboard
- Products
- Stocks**
- Orders
- Delivery
- Promotions
- Customers

STOCKS

STOCKS OVERVIEW

10 Search

Add New Ingredient ×

INGREDIENT NAME :

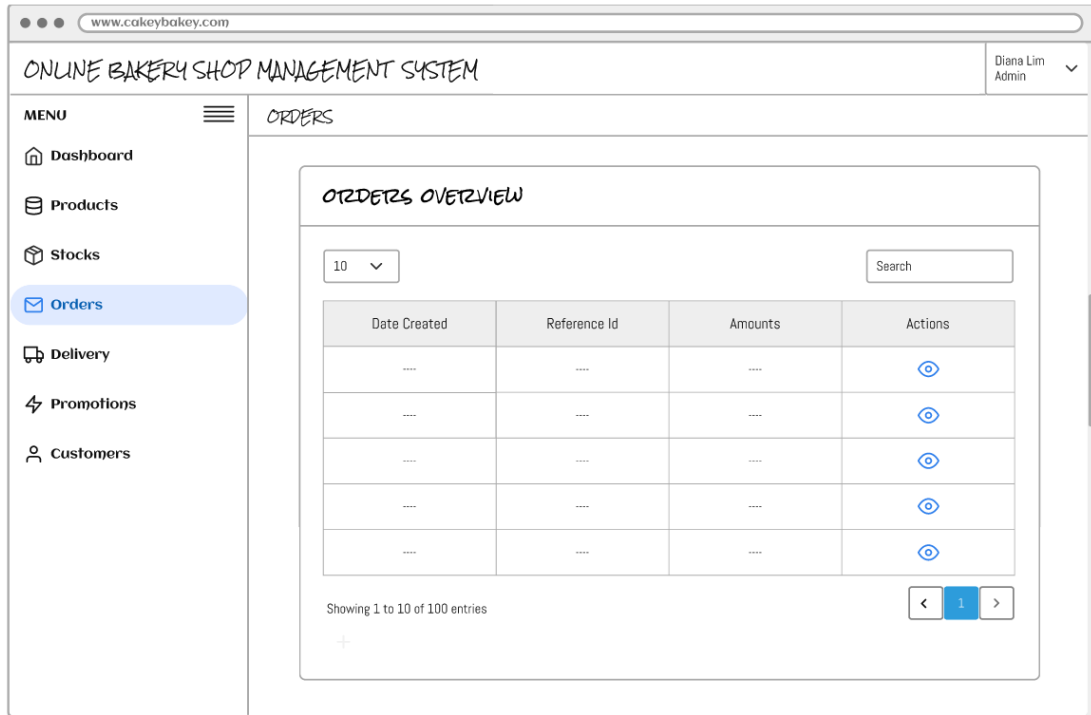
INGREDIENT STATUS : SUFFICIENT RUNNING LOW OUT OF STOCK

Showing 1 to 10 of 100 entries

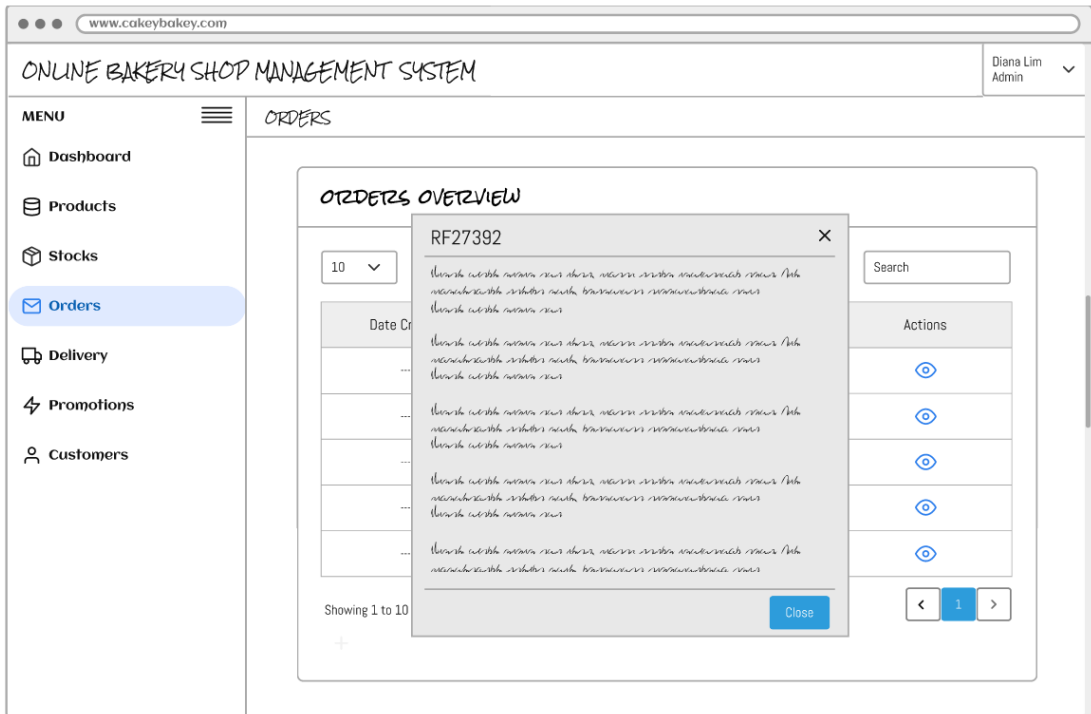
< 1 >

+ New Entry

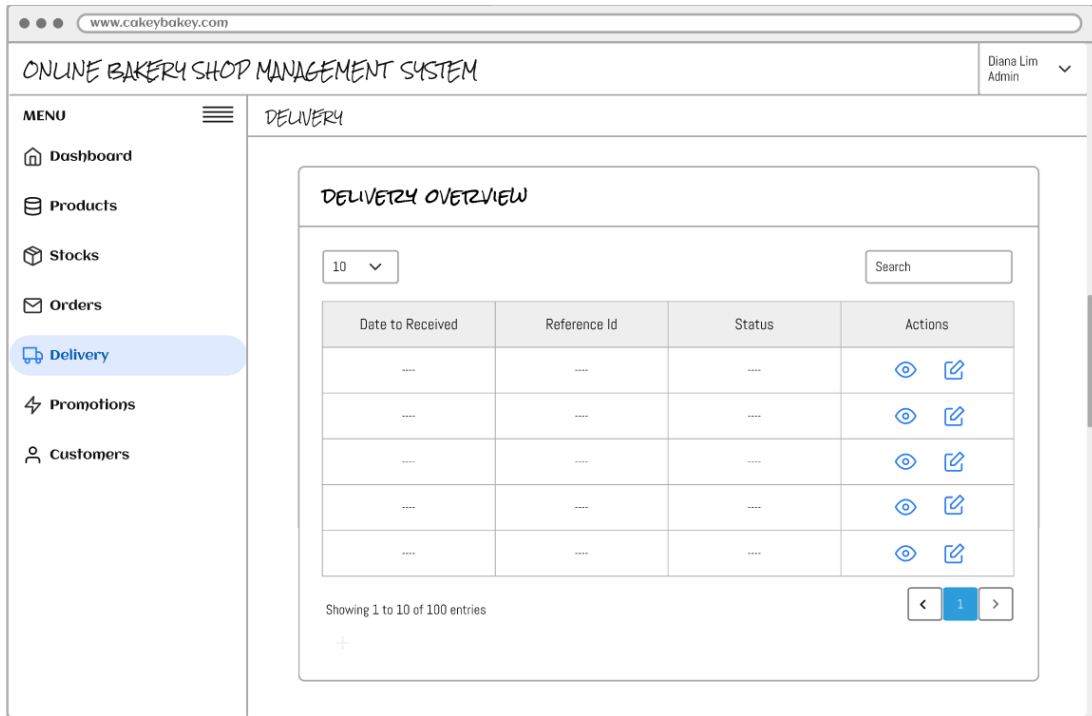
Add New Stock Page



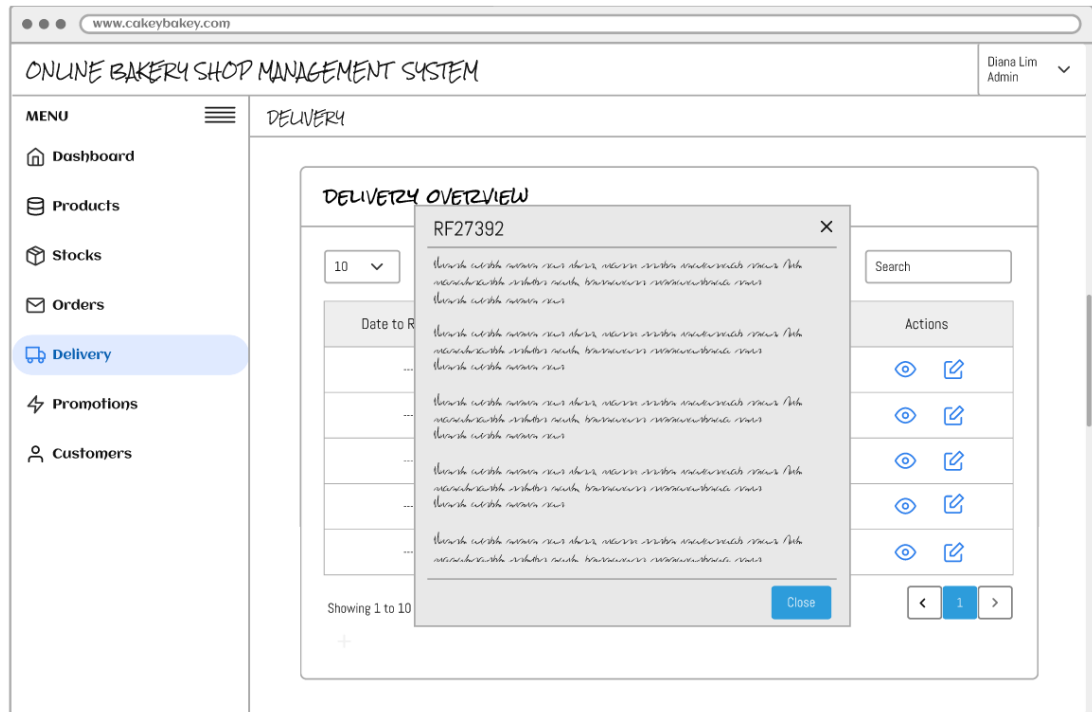
Manage Orders Page



View Order Details Page



Manage Delivery Page



View Delivery Details Page

The screenshot shows the 'DELIVERY' section of the management system. A modal window titled 'DELIVERY OVERVIEW' is open, displaying details for delivery RF27392. The modal includes a search bar, a table with columns for 'Date to Rec' and 'Actions', and a 'Delivery Status' section with radio buttons for 'Undelivered', 'Out for delivery', and 'Delivered'. The 'Out for delivery' status is selected. There are 'Update' and 'Cancel' buttons at the bottom of the modal. The background shows the 'DELIVERY OVERVIEW' table with 10 entries, a search bar, and a 'Showing 1 to 10 of' indicator.

Update Delivery Status Page

The screenshot shows the 'PROMOTIONS' section of the management system. A modal window titled 'PROMOTIONS OVERVIEW' is open, displaying a table with columns for 'Date Created', 'Promotions', 'Events', and 'Actions'. The table contains 5 rows of data. The 'Actions' column contains eye and edit icons. There is a 'Search' bar and a 'Showing 1 to 10 of 100 entries' indicator. A '+ New Entry' button is located at the bottom left of the modal. The background shows the 'PROMOTIONS OVERVIEW' table with 10 entries, a search bar, and a 'Showing 1 to 10 of 100 entries' indicator.

Manage Promotions Page

The screenshot shows the 'ONLINE BAKERY SHOP MANAGEMENT SYSTEM' interface. The user is logged in as 'Diana Lim Admin'. The left sidebar contains a 'MENU' with options: Dashboard, Products, Stocks, Orders, Delivery, Promotions (highlighted), and Customers. The main content area is titled 'PROMOTIONS' and displays a 'PROMOTIONS OVERVIEW' table. A modal window titled 'Event A : XYSIWP' is open, showing a table with columns for 'Date Created' and 'Actions'. The table contains three rows of placeholder text. The modal also has a 'Close' button and a search bar. Below the table, it says 'Showing 1 to 10 of 100 entries' and has a '+ New Entry' button.

View Promotion Details Page

The screenshot shows the 'ONLINE BAKERY SHOP MANAGEMENT SYSTEM' interface. The user is logged in as 'Diana Lim Admin'. The left sidebar contains a 'MENU' with options: Dashboard, Products, Stocks, Orders, Delivery, Promotions (highlighted), and Customers. The main content area is titled 'PROMOTIONS' and displays a 'PROMOTIONS OVERVIEW' table. A modal window titled 'Edit Promotion' is open, showing a form with fields for 'Event', 'Promotions', 'Start Date', 'End Date', and 'Terms & Conditions'. There are also radio buttons for 'Promotion Status' with options 'Available', 'Pending', and 'Unavailable'. The modal has 'Update' and 'Cancel' buttons. Below the table, it says 'Showing 1 to 10' and has a '+ New Entry' button.

Update Promotion Details Page

www.cakeybakey.com

ONLINE BAKERY SHOP MANAGEMENT SYSTEM

Diana Lim Admin

MENU

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers**

CUSTOMERS

CUSTOMERS OVERVIEW

10 Search

Date Created	Account Id	Account Status	Actions
----	----	----	
----	----	----	
----	----	----	
----	----	----	
----	----	----	

Showing 1 to 10 of 100 entries

< 1 >

Manage Customers Record Page

www.cakeybakey.com

ONLINE BAKERY SHOP MANAGEMENT SYSTEM

Diana Lim Admin

MENU

- Dashboard
- Products
- Stocks
- Orders
- Delivery
- Promotions
- Customers**

CUSTOMERS

CUSTOMERS OVERVIEW

10 Search

Date Cr	Account Id	Account Status	Actions
----	----	----	
----	----	----	
----	----	----	
----	----	----	
----	----	----	

Showing 1 to 10

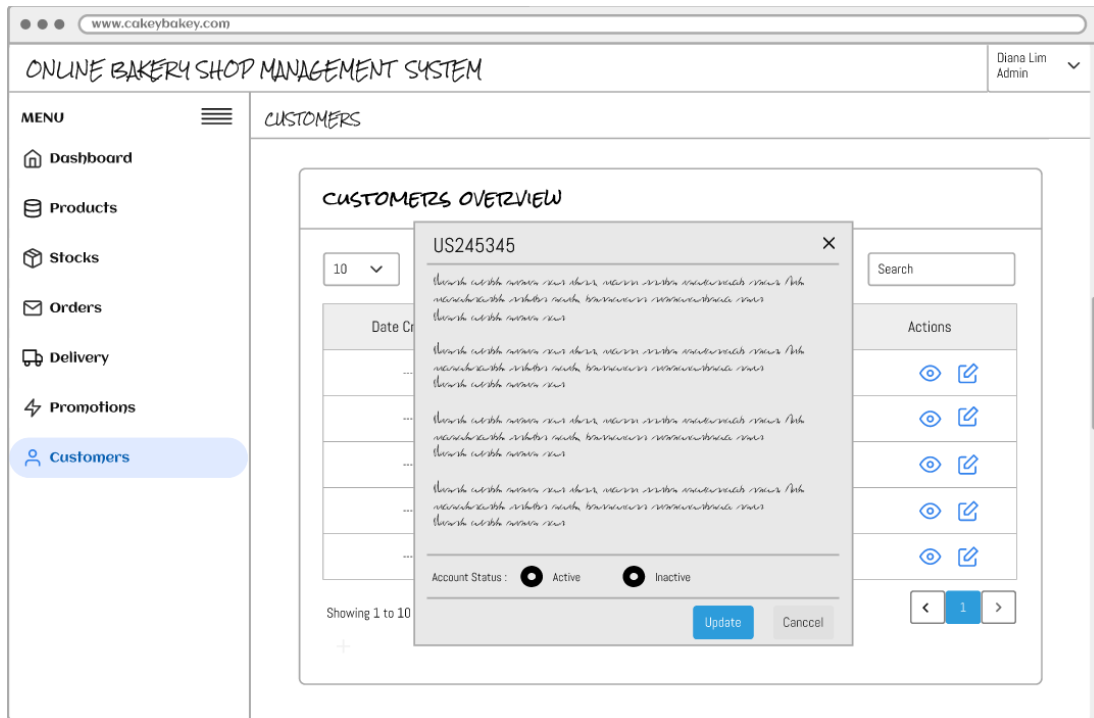
US245345

Search

Close

< 1 >

View Customer Record Page



Update Customer Record Page

APPENDIX C: SUS Assessment Result by User

Please enter your participant number: 1

System Usability Scale (SUS)

This is a standard questionnaire that measures the overall usability of mobile-based application. On a scale between Strongly Agree to Strongly Disagree, please rate the answer that best expresses how you feel about each statement after using the application.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. I think I would like to use this mobile application frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found the mobile application unnecessarily complex.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the mobile application was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. I think that I would need the support of a technical person to be able to use this application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this mobile application were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this mobile application.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this mobile application very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found the mobile application very cumbersome to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using the web application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How likely are you to recommend this application to others? (please circle your answer)

Not at all likely 0 1 2 3 4 5 6 7 **8** 9 10 Extremely likely

Please enter your participant number: 2

System Usability Scale (SUS)

This is a standard questionnaire that measures the overall usability of mobile-based application. On a scale between Strongly Agree to Strongly Disagree, please rate the answer that best expresses how you feel about each statement after using the application.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. I think I would like to use this mobile application frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I found the mobile application unnecessarily complex.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the mobile application was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. I think that I would need the support of a technical person to be able to use this application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this mobile application were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this mobile application very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found the mobile application very cumbersome to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using the web application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How likely are you to recommend this application to others? (please circle your answer)

Not at all likely 0 1 2 3 4 5 6 7 8 9 10 Extremely likely

Please enter your participant number: 3

System Usability Scale (SUS)

This is a standard questionnaire that measures the overall usability of mobile-based application. On a scale between Strongly Agree to Strongly Disagree, please rate the answer that best expresses how you feel about each statement after using the application.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. I think I would like to use this mobile application frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found the mobile application unnecessarily complex.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the mobile application was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. I think that I would need the support of a technical person to be able to use this application.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this mobile application were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this mobile application very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. I found the mobile application very cumbersome to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using the web application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How likely are you to recommend this application to others? (please circle your answer)

Not at all likely 0 1 2 3 4 5 6 7 8 9 10 Extremely likely

Please enter your participant number: 4

System Usability Scale (SUS)

This is a standard questionnaire that measures the overall usability of mobile-based application. On a scale between Strongly Agree to Strongly Disagree, please rate the answer that best expresses how you feel about each statement after using the application.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. I think I would like to use this mobile application frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found the mobile application unnecessarily complex.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the mobile application was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. I think that I would need the support of a technical person to be able to use this application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this mobile application were well integrated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this mobile application very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. I found the mobile application very cumbersome to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using the web application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How likely are you to recommend this application to others? (please circle your answer)

Not at all likely 0 1 2 3 4 5 6 **7** 8 9 10 Extremely likely

Please enter your participant number: 5

System Usability Scale (SUS)

This is a standard questionnaire that measures the overall usability of mobile-based application. On a scale between Strongly Agree to Strongly Disagree, please rate the answer that best expresses how you feel about each statement after using the application.

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. I think I would like to use this mobile application frequently.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. I found the mobile application unnecessarily complex.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I thought the mobile application was easy to use.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. I think that I would need the support of a technical person to be able to use this application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I found the various functions in this mobile application were well integrated.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. I thought there was too much inconsistency in this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I would imagine that most people would learn to use this mobile application very quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. I found the mobile application very cumbersome to use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I felt very confident using the web application.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. I needed to learn a lot of things before I could get going with this mobile application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How likely are you to recommend this application to others? (please circle your answer)

Not at all likely 0 1 2 3 4 5 6 7 8 9 10 Extremely likely

APPENDIX D: User Acceptance Test (UAT) Result

Participant 1:

Test Form Index:	TF-01	Test Case ID:	UAT-01
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:23AM	Ending Time:	10:26AM
Module Name:	Registration		
Test Case		Status (Pass/Fail)	Comments (if any)
Register a new account.		Pass	-

Test Form Index:	TF-02	Test Case ID:	UAT-02
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:27AM	Ending Time:	10:27AM
Module Name:	Product		
Test Case		Status (Pass/Fail)	Comments (if any)
View list of products according to its category.		Pass	-

Test Form Index:	TF-03	Test Case ID:	UAT-03
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:28AM	Ending Time:	10:28AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Search bakery products using keywords.		Pass	-

Test Form Index:	TF-04	Test Case ID:	UAT-04
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:28AM	Ending Time:	10:28AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a bakery product.		Pass	-

Test Form Index:	TF-05	Test Case ID:	UAT-05
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:29AM	Ending Time:	10:29AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a product into the shopping cart.		Pass	-

Test Form Index:	TF-06	Test Case ID:	UAT-06
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:31AM	Ending Time:	10:36AM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Place an order for the items in the shopping cart.		Pass	-

Test Form Index:	TF-07	Test Case ID:	UAT-07
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:37AM	Ending Time:	10:37AM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Check the status of order placed.		Pass	-

Test Form Index:	TF-08	Test Case ID:	UAT-08
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:37AM	Ending Time:	10:40AM
Module Name:	Profile		
Test Case		Status (Pass/Fail)	Comments (if any)
Update profile information.		Pass	-

Test Form Index:	TF-09	Test Case ID:	UAT-09
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:41AM	Ending Time:	10:42AM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
Remove bakery product from shopping cart.		Pass	-

Test Form Index:	TF-10	Test Case ID:	UAT-10
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	10:42AM	Ending Time:	10:42AM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of item in the shopping cart.		Pass	-

Test Form Index:	TF-11	Test Case ID:	UAT-11
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:37AM	Ending Time:	11:38AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific product.		Pass	-

Test Form Index:	TF-12	Test Case ID:	UAT-12
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:40AM	Ending Time:	11:43AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Edit the details of a specific product.		Pass	-

Test Form Index:	TF-13	Test Case ID:	UAT-13
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:45AM	Ending Time:	11:50AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new product.		Pass	-

Test Form Index:	TF-14	Test Case ID:	UAT-14
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:51AM	Ending Time:	11:51AM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific product.		Pass	-

Test Form Index:	TF-15	Test Case ID:	UAT-15
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:52AM	Ending Time:	11:53AM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific stock.		Pass	-

Test Form Index:	TF-16	Test Case ID:	UAT-16
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:54AM	Ending Time:	11:55AM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific stock.		Pass	-

Test Form Index:	TF-17	Test Case ID:	UAT-17
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:56AM	Ending Time:	11:57AM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new stock.		Pass	-

Test Form Index:	TF-18	Test Case ID:	UAT-18
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	11:58AM	Ending Time:	11:58AM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific stock.		Pass	-

Test Form Index:	TF-19	Test Case ID:	UAT-19
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:00PM	Ending Time:	12:00PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific order.		Pass	-

Test Form Index:	TF-20	Test Case ID:	UAT-20
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:01PM	Ending Time:	12:02PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific order.		Pass	-

Test Form Index:	TF-21	Test Case ID:	UAT-21
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:03PM	Ending Time:	12:03PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific delivery order.		Pass	-

Test Form Index:	TF-22	Test Case ID:	UAT-22
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:04PM	Ending Time:	12:05PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific delivery order.		Pass	-

Test Form Index:	TF-23	Test Case ID:	UAT-23
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:06PM	Ending Time:	12:06PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific promotion.		Pass	-

Test Form Index:	TF-24	Test Case ID:	UAT-24
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:07PM	Ending Time:	12:08PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific promotion.		Pass	-

Test Form Index:	TF-25	Test Case ID:	UAT-25
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:09PM	Ending Time:	12:12PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new promotion.		Pass	-

Test Form Index:	TF-26	Test Case ID:	UAT-26
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:13PM	Ending Time:	12:13PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific promotion.		Pass	-

Test Form Index:	TF-27	Test Case ID:	UAT-27
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:15PM	Ending Time:	12:16PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a customer.		Pass	-

Test Form Index:	TF-28	Test Case ID:	UAT-28
Test Executed by:	Ang Li Jing	Participant Name:	Kuah Xin Pei
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	12:17PM	Ending Time:	12:18PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the account status of a customer.		Pass	-

Participant 2:

Test Form Index:	TF-29	Test Case ID:	UAT-01
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	4:54PM	Ending Time:	4:56PM
Module Name:	Registration		
Test Case		Status (Pass/Fail)	Comments (if any)
Register a new account.		Pass	-

Test Form Index:	TF-30	Test Case ID:	UAT-02
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	4:56PM	Ending Time:	4:56PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View list of products according to its category.		Pass	-

Test Form Index:	TF-31	Test Case ID:	UAT-03
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	4:57PM	Ending Time:	4:58PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Search bakery products using keywords.		Pass	-

Test Form Index:	TF-32	Test Case ID:	UAT-04
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	4:59PM	Ending Time:	5:00PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a bakery product.		Pass	-

Test Form Index:	TF-33	Test Case ID:	UAT-05
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:01PM	Ending Time:	5:03PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a product into the shopping cart.		Pass	-

Test Form Index:	TF-34	Test Case ID:	UAT-06
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:04PM	Ending Time:	5:10PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Place an order for the items in the shopping cart.		Pass	-

Test Form Index:	TF-35	Test Case ID:	UAT-07
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:10PM	Ending Time:	5:11PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Check the status of order placed.		Pass	-

Test Form Index:	TF-36	Test Case ID:	UAT-08
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:12PM	Ending Time:	5:17PM
Module Name:	Profile		
Test Case		Status (Pass/Fail)	Comments (if any)
Update profile information.		Pass	-

Test Form Index:	TF-37	Test Case ID:	UAT-09
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:18PM	Ending Time:	5:18PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
Remove bakery product from shopping cart.		Pass	-

Test Form Index:	TF-38	Test Case ID:	UAT-10
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:19PM	Ending Time:	5:19PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of item in the shopping cart.		Pass	-

Test Form Index:	TF-39	Test Case ID:	UAT-11
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:20PM	Ending Time:	5:20PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific product.		Pass	-

Test Form Index:	TF-40	Test Case ID:	UAT-12
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:21PM	Ending Time:	5:23PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Edit the details of a specific product.		Pass	-

Test Form Index:	TF-41	Test Case ID:	UAT-13
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:24PM	Ending Time:	5:28PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new product.		Pass	-

Test Form Index:	TF-42	Test Case ID:	UAT-14
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:29PM	Ending Time:	5:29PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific product.		Pass	-

Test Form Index:	TF-43	Test Case ID:	UAT-15
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:31PM	Ending Time:	5:31PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific stock.		Pass	-

Test Form Index:	TF-44	Test Case ID:	UAT-16
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:32PM	Ending Time:	5:32PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific stock.		Pass	-

Test Form Index:	TF-45	Test Case ID:	UAT-17
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:33PM	Ending Time:	5:33PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new stock.		Pass	-

Test Form Index:	TF-46	Test Case ID:	UAT-18
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:34PM	Ending Time:	5:34PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific stock.		Pass	-

Test Form Index:	TF-47	Test Case ID:	UAT-19
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:36PM	Ending Time:	5:37PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific order.		Pass	-

Test Form Index:	TF-48	Test Case ID:	UAT-20
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:38PM	Ending Time:	5:39PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific order.		Pass	-

Test Form Index:	TF-49	Test Case ID:	UAT-21
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:41PM	Ending Time:	5:41PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific delivery order.		Pass	-

Test Form Index:	TF-50	Test Case ID:	UAT-22
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:42PM	Ending Time:	5:43PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific delivery order.		Pass	-

Test Form Index:	TF-51	Test Case ID:	UAT-23
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:45PM	Ending Time:	5:46PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific promotion.		Pass	-

Test Form Index:	TF-52	Test Case ID:	UAT-24
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:47PM	Ending Time:	5:48PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific promotion.		Pass	-

Test Form Index:	TF-53	Test Case ID:	UAT-25
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:49PM	Ending Time:	5:53PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new promotion.		Pass	-

Test Form Index:	TF-54	Test Case ID:	UAT-26
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:55PM	Ending Time:	5.55PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific promotion.		Pass	-

Test Form Index:	TF-55	Test Case ID:	UAT-27
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:56PM	Ending Time:	5:57PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a customer.		Pass	-

Test Form Index:	TF-56	Test Case ID:	UAT-28
Test Executed by:	Ang Li Jing	Participant Name:	Li Xin Qi
Test Priority (Low/Medium/High):	High	Test Execution date:	02/08/2021
Starting Time:	5:58PM	Ending Time:	5:58PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the account status of a customer.		Pass	-

Participant 3:

Test Form Index:	TF-57	Test Case ID:	UAT-01
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:46PM	Ending Time:	12:48PM
Module Name:	Registration		
Test Case		Status (Pass/Fail)	Comments (if any)
Register a new account.		Pass	-

Test Form Index:	TF-58	Test Case ID:	UAT-02
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:48PM	Ending Time:	12:49PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View list of products according to its category.		Pass	-

Test Form Index:	TF-59	Test Case ID:	UAT-03
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:50PM	Ending Time:	12:50PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Search bakery products using keywords.		Pass	-

Test Form Index:	TF-60	Test Case ID:	UAT-04
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:51PM	Ending Time:	12:51PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a bakery product.		Pass	-

Test Form Index:	TF-61	Test Case ID:	UAT-05
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:52PM	Ending Time:	12:53PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a product into the shopping cart.		Pass	-

Test Form Index:	TF-62	Test Case ID:	UAT-06
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:54PM	Ending Time:	12:58PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Place an order for the items in the shopping cart.		Pass	-

Test Form Index:	TF-63	Test Case ID:	UAT-07
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	12:59PM	Ending Time:	1:00PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Check the status of order placed.		Pass	-

Test Form Index:	TF-64	Test Case ID:	UAT-08
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:01PM	Ending Time:	1:03PM
Module Name:	Profile		
Test Case		Status (Pass/Fail)	Comments (if any)
Update profile information.		Pass	-

Test Form Index:	TF-65	Test Case ID:	UAT-09
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:04PM	Ending Time:	1:04PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
Remove bakery product from shopping cart.		Pass	-

Test Form Index:	TF-66	Test Case ID:	UAT-10
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:05PM	Ending Time:	1:05PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of item in the shopping cart.		Pass	-

Test Form Index:	TF-67	Test Case ID:	UAT-11
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:15PM	Ending Time:	1:17PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific product.		Pass	-

Test Form Index:	TF-68	Test Case ID:	UAT-12
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:18PM	Ending Time:	1:20PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Edit the details of a specific product.		Pass	-

Test Form Index:	TF-69	Test Case ID:	UAT-13
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:21PM	Ending Time:	1:26PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new product.		Pass	-

Test Form Index:	TF-70	Test Case ID:	UAT-14
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:29PM	Ending Time:	1:29PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific product.		Pass	-

Test Form Index:	TF-71	Test Case ID:	UAT-15
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:30PM	Ending Time:	1:31PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific stock.		Pass	-

Test Form Index:	TF-72	Test Case ID:	UAT-16
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:32PM	Ending Time:	1:32PM
Module Name:	Stocks		
Test Case	Status (Pass/Fail)	Comments (if any)	
Update the status of a specific stock.	Pass	-	

Test Form Index:	TF-73	Test Case ID:	UAT-17
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:33PM	Ending Time:	1:34PM
Module Name:	Stocks		
Test Case	Status (Pass/Fail)	Comments (if any)	
Add a new stock.	Pass	-	

Test Form Index:	TF-74	Test Case ID:	UAT-18
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:36PM	Ending Time:	1:36PM
Module Name:	Stocks		
Test Case	Status (Pass/Fail)	Comments (if any)	
Delete a specific stock.	Pass	-	

Test Form Index:	TF-75	Test Case ID:	UAT-19
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:37PM	Ending Time:	1:37PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific order.		Pass	-

Test Form Index:	TF-76	Test Case ID:	UAT-20
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:38PM	Ending Time:	1:39PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific order.		Pass	-

Test Form Index:	TF-77	Test Case ID:	UAT-21
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:40PM	Ending Time:	1:40PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific delivery order.		Pass	-

Test Form Index:	TF-78	Test Case ID:	UAT-22
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:41PM	Ending Time:	1:42PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific delivery order.		Pass	-

Test Form Index:	TF-79	Test Case ID:	UAT-23
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:44PM	Ending Time:	1:45PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific promotion.		Pass	-

Test Form Index:	TF-80	Test Case ID:	UAT-24
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:46PM	Ending Time:	1:47PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific promotion.		Pass	-

Test Form Index:	TF-81	Test Case ID:	UAT-25
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:48PM	Ending Time:	1:52PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new promotion.		Pass	-

Test Form Index:	TF-82	Test Case ID:	UAT-26
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:53PM	Ending Time:	1:53PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific promotion.		Pass	-

Test Form Index:	TF-83	Test Case ID:	UAT-27
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:54PM	Ending Time:	1:55PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a customer.		Pass	-

Test Form Index:	TF-84	Test Case ID:	UAT-28
Test Executed by:	Ang Li Jing	Participant Name:	Tan Zi Xian
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	1:56PM	Ending Time:	1:56PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the account status of a customer.		Pass	-

Participant 4:

Test Form Index:	TF-85	Test Case ID:	UAT-01
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	2:50PM	Ending Time:	2:53PM
Module Name:	Registration		
Test Case		Status (Pass/Fail)	Comments (if any)
Register a new account.		Pass	-

Test Form Index:	TF-86	Test Case ID:	UAT-02
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	2:54PM	Ending Time:	2:54PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View list of products according to its category.		Pass	-

Test Form Index:	TF-87	Test Case ID:	UAT-03
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	2:55PM	Ending Time:	2:56PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Search bakery products using keywords.		Pass	-

Test Form Index:	TF-88	Test Case ID:	UAT-04
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	2:58PM	Ending Time:	2:59PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a bakery product.		Pass	-

Test Form Index:	TF-89	Test Case ID:	UAT-05
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	2:59PM	Ending Time:	3:00PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a product into the shopping cart.		Pass	-

Test Form Index:	TF-90	Test Case ID:	UAT-06
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:01PM	Ending Time:	3:05PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Place an order for the items in the shopping cart.		Pass	-

Test Form Index:	TF-91	Test Case ID:	UAT-07
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:06PM	Ending Time:	3:06PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Check the status of order placed.		Pass	-

Test Form Index:	TF-92	Test Case ID:	UAT-08
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:07PM	Ending Time:	3:09PM
Module Name:	Profile		
Test Case		Status (Pass/Fail)	Comments (if any)
Update profile information.		Pass	-

Test Form Index:	TF-93	Test Case ID:	UAT-09
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:10PM	Ending Time:	3:10PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
Remove bakery product from shopping cart.		Pass	-

Test Form Index:	TF-94	Test Case ID:	UAT-10
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:11PM	Ending Time:	3:12PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of item in the shopping cart.		Pass	-

Test Form Index:	TF-95	Test Case ID:	UAT-11
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:26PM	Ending Time:	3:28PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific product.		Pass	-

Test Form Index:	TF-96	Test Case ID:	UAT-12
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:29PM	Ending Time:	3:32PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Edit the details of a specific product.		Pass	-

Test Form Index:	TF-97	Test Case ID:	UAT-13
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:33PM	Ending Time:	3:39PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new product.		Pass	-

Test Form Index:	TF-98	Test Case ID:	UAT-14
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:40PM	Ending Time:	3:40PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific product.		Pass	-

Test Form Index:	TF-99	Test Case ID:	UAT-15
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:42PM	Ending Time:	3:44PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific stock.		Pass	-

Test Form Index:	TF-100	Test Case ID:	UAT-16
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:45PM	Ending Time:	3:46PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific stock.		Pass	-

Test Form Index:	TF-101	Test Case ID:	UAT-17
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:47PM	Ending Time:	3:48PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new stock.		Pass	-

Test Form Index:	TF-102	Test Case ID:	UAT-18
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:49PM	Ending Time:	3:49PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific stock.		Pass	-

Test Form Index:	TF-103	Test Case ID:	UAT-19
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:41PM	Ending Time:	3:43PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific order.		Pass	-

Test Form Index:	TF-104	Test Case ID:	UAT-20
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:44PM	Ending Time:	3:46PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific order.		Pass	-

Test Form Index:	TF-105	Test Case ID:	UAT-21
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:47PM	Ending Time:	3:49PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific delivery order.		Pass	-

Test Form Index:	TF-106	Test Case ID:	UAT-22
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:40PM	Ending Time:	3:41PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific delivery order.		Pass	-

Test Form Index:	TF-107	Test Case ID:	UAT-23
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:43PM	Ending Time:	3:45PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific promotion.		Pass	-

Test Form Index:	TF-108	Test Case ID:	UAT-24
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:46PM	Ending Time:	3:48PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific promotion.		Pass	-

Test Form Index:	TF-109	Test Case ID:	UAT-25
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:49PM	Ending Time:	3:55PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new promotion.		Pass	-

Test Form Index:	TF-110	Test Case ID:	UAT-26
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:56PM	Ending Time:	3:56PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific promotion.		Pass	-

Test Form Index:	TF-111	Test Case ID:	UAT-27
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:57PM	Ending Time:	3:58PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a customer.		Pass	-

Test Form Index:	TF-112	Test Case ID:	UAT-28
Test Executed by:	Ang Li Jing	Participant Name:	Tan Yien Mee
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	3:59PM	Ending Time:	4:01PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the account status of a customer.		Pass	-

Participant 5:

Test Form Index:	TF-113	Test Case ID:	UAT-01
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	7:56PM	Ending Time:	7:57PM
Module Name:	Registration		
Test Case		Status (Pass/Fail)	Comments (if any)
Register a new account.		Pass	-

Test Form Index:	TF-114	Test Case ID:	UAT-02
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	7:58PM	Ending Time:	7:58PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View list of products according to its category.		Pass	-

Test Form Index:	TF-115	Test Case ID:	UAT-03
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	7:59PM	Ending Time:	8:00PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Search bakery products using keywords.		Pass	-

Test Form Index:	TF-116	Test Case ID:	UAT-04
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:01PM	Ending Time:	8:01PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a bakery product.		Pass	-

Test Form Index:	TF-117	Test Case ID:	UAT-05
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:02PM	Ending Time:	8:02PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a product into the shopping cart.		Pass	-

Test Form Index:	TF-118	Test Case ID:	UAT-06
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:03PM	Ending Time:	8:05PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Place an order for the items in the shopping cart.		Pass	-

Test Form Index:	TF-119	Test Case ID:	UAT-07
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:06PM	Ending Time:	8:06PM
Module Name:	Order		
Test Case		Status (Pass/Fail)	Comments (if any)
Check the status of order placed.		Pass	-

Test Form Index:	TF-120	Test Case ID:	UAT-08
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:07PM	Ending Time:	8:08PM
Module Name:	Profile		
Test Case		Status (Pass/Fail)	Comments (if any)
Update profile information.		Pass	-

Test Form Index:	TF-121	Test Case ID:	UAT-09
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:09PM	Ending Time:	8:09PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
Remove bakery product from shopping cart.		Pass	-

Test Form Index:	TF-122	Test Case ID:	UAT-10
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:10PM	Ending Time:	8:10PM
Module Name:	Shopping cart		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of item in the shopping cart.		Pass	-

Test Form Index:	TF-123	Test Case ID:	UAT-11
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:36PM	Ending Time:	8:37PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific product.		Pass	-

Test Form Index:	TF-124	Test Case ID:	UAT-12
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:38PM	Ending Time:	8:40PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Edit the details of a specific product.		Pass	-

Test Form Index:	TF-125	Test Case ID:	UAT-13
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:41PM	Ending Time:	8:47PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new product.		Pass	-

Test Form Index:	TF-126	Test Case ID:	UAT-14
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:48PM	Ending Time:	8:48PM
Module Name:	Products		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific product.		Pass	-

Test Form Index:	TF-127	Test Case ID:	UAT-15
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:49PM	Ending Time:	8:50PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific stock.		Pass	-

Test Form Index:	TF-128	Test Case ID:	UAT-16
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:51PM	Ending Time:	8:51PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific stock.		Pass	-

Test Form Index:	TF-129	Test Case ID:	UAT-17
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:52PM	Ending Time:	8:54PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new stock.		Pass	-

Test Form Index:	TF-130	Test Case ID:	UAT-18
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:55PM	Ending Time:	8:55PM
Module Name:	Stocks		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific stock.		Pass	-

Test Form Index:	TF-131	Test Case ID:	UAT-19
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:57PM	Ending Time:	8:58PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific order.		Pass	-

Test Form Index:	TF-132	Test Case ID:	UAT-20
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	8:59PM	Ending Time:	9:00PM
Module Name:	Orders		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific order.		Pass	-

Test Form Index:	TF-133	Test Case ID:	UAT-21
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:02PM	Ending Time:	9:03PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific delivery order.		Pass	-

Test Form Index:	TF-134	Test Case ID:	UAT-22
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:04PM	Ending Time:	9:05PM
Module Name:	Delivery		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific delivery order.		Pass	-

Test Form Index:	TF-135	Test Case ID:	UAT-23
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:07PM	Ending Time:	9:08PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a specific promotion.		Pass	-

Test Form Index:	TF-136	Test Case ID:	UAT-24
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:09PM	Ending Time:	9:11PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the status of a specific promotion.		Pass	-

Test Form Index:	TF-137	Test Case ID:	UAT-25
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:12PM	Ending Time:	9:16PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Add a new promotion.		Pass	-

Test Form Index:	TF-138	Test Case ID:	UAT-26
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:17PM	Ending Time:	9:17PM
Module Name:	Promotions		
Test Case		Status (Pass/Fail)	Comments (if any)
Delete a specific promotion.		Pass	-

Test Form Index:	TF-139	Test Case ID:	UAT-27
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:18PM	Ending Time:	9:19PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
View the details of a customer.		Pass	-

Test Form Index:	TF-140	Test Case ID:	UAT-28
Test Executed by:	Ang Li Jing	Participant Name:	Foong Lai Mun
Test Priority (Low/Medium/High):	High	Test Execution date:	03/08/2021
Starting Time:	9:20PM	Ending Time:	9:21PM
Module Name:	Customers		
Test Case		Status (Pass/Fail)	Comments (if any)
Update the account status of a customer.		Pass	-