

**DESSERT MOBILE COMMERCE APPLICATION**

**BY**

**ANG CHYH DIAN**

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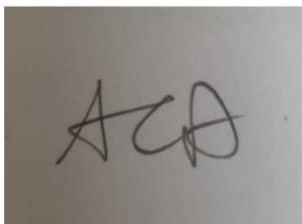
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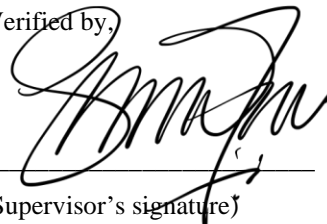
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**Address:**

48, Jalan Jambu Mawar 1,  
Taman Jambu Mawar, Bukit Mertajam,  
14000, Pulau Pinang

ANA NABILAH BINTI SA'UADI

Supervisor's name

**Date:** 23<sup>rd</sup> April 2023

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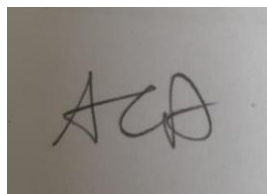
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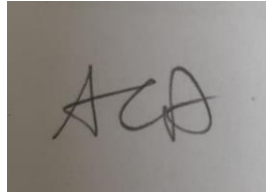


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## **ABSTRACT**

This project is a mobile application designed specifically for small and medium-sized bakeries that want to manage their orders through an online platform. With the ability to upload images, earn points, check order history, and engage in dynamic transactions between sellers and buyers, this app provides an efficient and convenient solution for bakeries impacted by the COVID-19 pandemic. As many businesses struggle to operate outside of their physical locations, this app enables bakeries to continue serving their customers online, earning revenue and maintaining customer loyalty during these challenging times. This mobile commerce application serves as an ideal platform for small and medium-sized bakeries to sell their desserts. It eliminates the need for sellers to use social media platforms such as Instagram and Facebook for product uploads and advertisements. By providing features such as order management, image uploads, and customer engagement, the app offers a hassle-free solution for sellers to streamline their selling process. As a result, bakeries can expand their customer base, increase sales, and generate more revenue.

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# Chapter 1

## Introduction

I will outline the thesis in this chapter and discuss my research's background, goals, and contributions to the field. Mobile commerce, also known as m-commerce, has transformed the way businesses and consumers interact in the digital marketplace. The term refers to the buying and selling of goods and services through mobile devices such as smartphones and tablets. In recent years, the adoption of mobile commerce applications has increased significantly, with many businesses recognizing the potential of this technology to drive sales and increase customer engagement.

One of the key drivers of mobile commerce adoption is the convenience it offers to consumers. With mobile devices, consumers can shop anytime and anywhere, without being tethered to a desktop computer or physical store. Mobile commerce also offers a range of payment options, including mobile wallets and contactless payments, making transactions fast and easy. These features have made mobile commerce a preferred shopping method for many consumers, leading to the growth of the industry.

Mobile commerce applications have also become an essential tool for businesses looking to remain competitive in the digital marketplace. By developing mobile commerce applications, businesses can reach a wider audience, increase customer engagement, and boost sales. Additionally, mobile commerce applications can provide businesses with valuable data on consumer behavior and preferences, enabling them to optimize their marketing strategies. This project dessert mobile e-commerce will be developed to help that small and medium bakery seller to sell their different types of desserts on an online platform [1]. This project dessert mobile e-commerce will be developed to help that small and medium bakery seller to sell their different types of desserts on an online platform. It is rare to see an e-commerce platform sell desserts because most of them are selling groceries, electronic devices, beauty & fashion, and snacks.

## **1.1 Problem Statement and Motivation**

### **1.1.1 Difficulty in finding preferred desserts**

The desserts those selling on the internet or social media faces a problem in helping customers find their preferred desserts. With a wide range of dessert options available, customers may find it challenging to search for specific desserts that cater to their preferences. This difficulty may lead to customer frustration and result in a loss of potential sales for the business. Hence, dessert mobile commerce application platform makes it easier and convenient for them to filter any type of desserts according to their needs and interests.

### **1.1.2 Customer hard to check and track previous purchase**

The second problem with the dessert in internet is the difficulty customers face in tracking their previous purchases. Customers may want to refer to their previous orders for various reasons, such as re-ordering the same desserts or checking their loyalty points. Without an easy-to-use system for tracking previous orders, customers may become disengaged and frustrated with the application. Hence, this project will be developed a order history for consumers to view their previous order easily.

### **1.1.3 Lack of experience in social media management**

The third problem is the business may struggle to create a social media presence that engages and attracts customers. Ineffective social media management may result in limited exposure and fewer potential customers. At one time is quite challenging for the beginners to handle orders from different platform. Hence, a dessert mobile commerce application will help them to solve the problems that they no need have much account management skills to advertise and selling their desserts on this platform easily.

#### **1.1.4 Lack of a point-earning feature**

The fourth problem is dessert mobile commerce application face a problem with customer engagement due to the lack of a point-earning feature. Many modern e-commerce platforms offer customers the ability to earn loyalty points, rewards, or cashback incentives for making purchases. Without such features, the dessert mobile commerce application may struggle to retain customers or encourage repeat purchases. This could lead to a loss of revenue and potential customers as customers may choose to shop elsewhere to earn rewards for their purchases. For instance, the customers can redeem a cup of coffee or a slice of cake when they earn the target number of points. This feature helps to attract more customers. Hence, this point reward claim feature will be developed in this project.

## **Motivation**

The COVID-19 pandemic has had a profound impact on the global economy, causing a significant disruption to the way businesses operate. Small and medium-sized bakeries have been adversely affected, with many struggling to stay afloat during these difficult times. As a result, there is a pressing need for innovative solutions that can help these businesses adapt to the changing market conditions and continue to operate profitably.

The proposed final year project of building a dessert mobile commerce application can be a powerful tool in addressing the challenges faced by small and medium-sized bakeries during the pandemic. By developing a platform that allows these businesses to upload and promote their desserts, the application can help them reach a wider audience and increase their sales. Additionally, by offering features such as the ability for buyers to filter desserts by category, view their purchase history, and earn rewards for their purchases, the application can provide a seamless and engaging shopping experience for customers.

Overall, the project presents an exciting opportunity to build a useful and innovative solution to help small and medium-sized bakeries navigate the challenges of the COVID-19 pandemic. By leveraging the power of mobile commerce, the application can create a win-win situation for both businesses and customers, enabling them to thrive and grow during these difficult times.



## 1.2 Objectives

The objectives of this project are to develop a mobile application that is related to mobile commerce so that customer can be **easy to access by filter the desserts according to category**. This project will be design and develop a user-friendly interface for the dessert mobile commerce application that enables customers to easily browse and filter desserts by category, making it convenient for them to find and purchase the desserts they desire. Then, the customers can **track the order and view the status of the order**. This project will be implementing a real-time order tracking system that enables customers to track the status of their orders, including order progress. It will be developing a detailed order history feature that allows customers to view their past orders and track their spending, which can help to enhance their shopping experience and increase customer loyalty. Next objective is the sellers can **upload information of the dessert to advertise and sell their products**. The project will be design and implement a seller dessert insert form that allows baker to easily upload information about their products, including product images, name, descriptions, category, weight, and pricing. Last objective for this project is the customer can **claim point after completed an order**. This project will be developing a claim point system that rewards customers for engaging with the dessert mobile commerce application. The buyer will earn their point according to their total price for each order.

### **1.3 Project Scope and Direction**

The project will involve the development and launch of a dessert mobile commerce application that allows small and medium bakeries to advertise and sell their products online. The application will be accessible via both iOS and Android devices and will feature a user-friendly interface that enables customers to browse and purchase desserts, as well as track their orders in real-time. In addition to providing a platform for small and medium bakeries to sell their products, the application will also offer marketing and promotion features, such as targeted campaigns, customer loyalty programs, and social media integration. The project will aim to support the sustainability and growth of small and medium bakeries, as well as increase their resilience in the face of the COVID-19 pandemic.

The direction of this project will be following the objectives. This project will be developed a user-friendly and intuitive dessert mobile commerce application that enables customers to easily browse and purchase desserts from small and medium bakeries. Then, the application will be implementing a real-time tracking system that enables customers to track the status of their orders, like order progress. After launch the application, it should continuously monitor and evaluate the application's performance and impact and adjust and improvements as needed to ensure its sustainability and effectiveness in supporting small and medium bakeries.

## 1.4 Contributions

The dessert mobile commerce application is a critical tool that can help small and medium bakeries survive and thrive during the COVID-19 pandemic. The application offers a range of contributions that can significantly benefit the bakery industry and help overcome the challenges presented by the pandemic.

Then, the application provides a platform for small and medium bakeries to advertise and sell their products online, which is essential during a time when physical distancing measures have forced many businesses to close or limit their operations. By enabling bakeries to sell their products through the application, they can continue to generate revenue and serve their customers without relying solely on traditional brick-and-mortar stores.

Besides, the real-time tracking system in the application allows customers to track the status of their orders and view the detail of the order. This feature enhances the customer experience and can increase customer satisfaction, which is especially important during a time when customers may be anxious about the status of their orders.

In conclusion, the dessert mobile commerce application provides numerous contributions that can help small and medium bakeries survive during the COVID-19 pandemic. By providing a platform for online sales, marketing and promotion features and real-time tracking, the application can help bakeries adapt to the changing business landscape and continue to serve their customers in a challenging environment.

## **1.5 Report Organization**

This report is organized into 7 chapters: Chapter 1 Introduction, Chapter 2 Literature Review, Chapter 3 System Methodology/Approach, Chapter 4 System Design, Chapter 5 System Implementation, Chapter 6 System Evaluation and Discussion, and Chapter 7 Conclusion and Recommendation. The first chapter is the introduction of this project which includes problem statement, and motivation, project scope, project objectives, project contribution, and report organization. The second chapter is the literature review about some related background of mobile commerce and carried out on several existing dessert mobile commerce applications in the market to evaluate the strengths and weaknesses of each application. The third chapter is discussing the overall system methodology & approach of this project. The fourth chapter is discussed about the system design of the project. The fifth chapter is regarding the details on how to implement the design of the system like the hardware and software setup. Also, this chapter will show how the application run. Furthermore, the sixth chapter reports the system evaluation and discussion to test the system to achieve bugless goal. Last chapter is report the conclusion and recommendation for this project.

# Chapter 2

## Literature Review

### 2.1 Why Mobile Commerce

Mobile commerce has gained significant attention in recent years due to its numerous advantages for both customers and businesses. Ecommerce is defined as "the buying and selling of goods and services through wireless handheld devices such as smartphones and tablets" [4]. This technology has revolutionized the way businesses conduct their operations and interact with customers, resulting in a more convenient and efficient process. One of the primary advantages of m-commerce is its accessibility. Mobile devices are ubiquitous, with over 5 billion mobile phone users worldwide [2]. This makes it easier for businesses to reach a wider audience, particularly those who do not have access to traditional desktop computers. Mobile devices also provide customers with the flexibility to shop on-the-go, at any time and place, making the purchasing process more convenient. Another advantage of m-commerce is its ability to provide personalized shopping experiences. By analyzing customer data, businesses can offer tailored promotions and recommendations to everyone, improving customer satisfaction and loyalty. A study by Salesforce found that 57% of customers are willing to share personal data with companies in exchange for personalized offers and discounts [3]. In conclusion, the numerous benefits of ecommerce have made it a crucial tool for businesses to reach customers and increase sales. The accessibility, personalization, and efficiency offered by this technology have created a more convenient and seamless process for both customers and businesses.

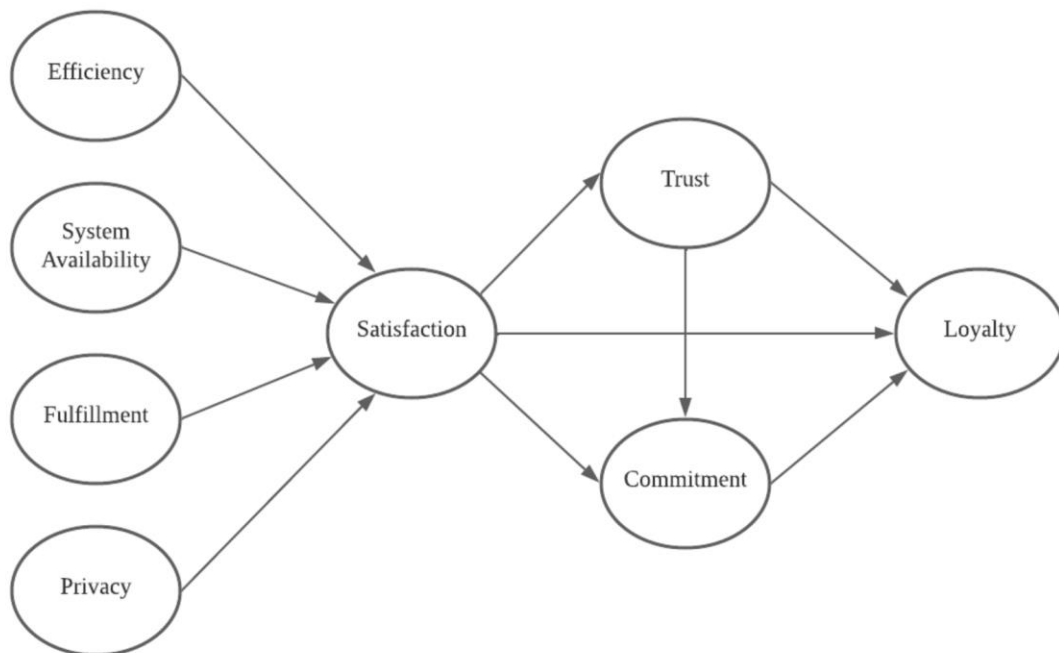
## 2.2 Loyalty towards eCommerce

Loyalty in ecommerce is crucial for businesses to retain customers and maintain long-term relationships with them. It can lead to increased customer satisfaction, repeat purchases, and positive word-of-mouth marketing. According to a study by Bond Brand Loyalty, 73% of consumers are more likely to recommend a brand that has a good loyalty program [5].

To build loyalty in ecommerce, companies often implement loyalty programs, which can include rewards points, special discounts, and exclusive access to products or services. These programs encourage customers to continue purchasing from the same company to earn and redeem rewards. A study by Nielsen found that 72% of consumers are more likely to make a repeat purchase if they are enrolled in a loyalty program [6]. Moreover, businesses can also build loyalty by providing excellent customer service and personalized experiences. According to a survey by Salesforce, 80% of consumers say that the experience a company provides is as important as its products and services [7]. Providing personalized experiences, such as customized product recommendations or personalized marketing messages, can make customers feel valued and increase their loyalty towards a company.

In conclusion, building loyalty in ecommerce is essential for businesses to succeed in the long run. Implementing loyalty programs and providing excellent customer service and personalized experiences can help businesses to retain customers and increase their satisfaction and loyalty towards the brand.

## 2.3 Trend of Mobile Commerce



*Figure 2.3.1 Loyalty of Mobile Commerce Customer*

There are several factors that can affect the success of eCommerce, which can be classified into three categories. The first category pertains to the feeling of safety and reliability, the second pertains to customization and localization, and the third is about the user's convenience. However, among these factors, the most crucial ones for the success of mobile commerce are security and trust [8].

The rise of RFID technology has made mobile payments more convenient and secure. The O2O model, coupled with location-based services (LBS), can lead to market share growth in mobile commerce. The Internet of Things (IoT) is expected to bring about new possibilities for mobile commerce. It is crucial for practitioners to enhance the quality of mobile interfaces, website design, and system to cater to users' needs as they significantly influence consumer purchasing decisions and contribute to societal value. However, practitioners should not solely focus on mobile shopping services from a social perspective; attention must also be given to other applications such as telemedicine, m-tourism, and rescue. It is necessary to implement related laws and regulations to maintain the eCommerce environment. Overall, these four dimensions

are interrelated, and each dimension and its corresponding measures are vital factors in mobile commerce [9].

Mobile devices are a popular choice for shopping due to their convenience in various stages of the purchasing process such as searching, evaluating, possessing, and post-purchase activities [10]. There is a trend of consumers switching from e-channels to mobile channels because of the potential for improved shopping experiences. To stay competitive in the rapidly evolving and multichannel retail industry, retailers must integrate in-store experiences with mobile shopping opportunities [11].

## **2.4 Mobile commerce during the Covid-19 Pandemic**

The COVID-19 pandemic has caused a significant shift in consumer behavior towards mobile commerce. With the implementation of social distancing guidelines and stay-at-home orders, more people have turned to mobile devices to fulfill their shopping needs. A mobile data and analytics provider, mobile shopping apps saw a 20% increase in usage in the first quarter of 2020, compared to the same period in the previous year. This trend has continued throughout the pandemic, with many consumers preferring to shop from the safety of their homes using their mobile devices [12].

Furthermore, mobile commerce has not only helped consumers but also small businesses during the pandemic. With physical stores forced to close or limit their operations, mobile commerce has provided an alternative way for small businesses to reach their customers and generate revenue. According to a survey by Facebook, 51% of small businesses in the US reported conducting all or most of their sales online during the pandemic, with mobile commerce playing a crucial role in their operations [13].

However, the increase in mobile commerce during the pandemic has also brought attention to the importance of cybersecurity. As more people conduct financial transactions through mobile devices, the risk of cyber threats and scams has increased. Retailers must ensure the security of their mobile commerce platforms to protect their customers' sensitive information and prevent fraud [14].



In conclusion, the COVID-19 pandemic has accelerated the shift towards mobile commerce, providing a safer and more convenient way for consumers to shop, and a lifeline for small businesses. However, retailers must also ensure the security of their mobile commerce platforms to protect against cyber threats and scams.

## **2.5 The Features of Mobile Commerce**

Mobile commerce has become an increasingly popular way for consumers to shop and conduct financial transactions. The rise of smartphones and mobile devices has led to the development of mobile commerce apps and platforms that offer a variety of features to enhance the shopping experience. There are several key features of mobile commerce that make it unique from traditional e-commerce [4].

One of the most important features of mobile commerce is the ability to make payments quickly and easily through mobile devices. Mobile commerce platforms often offer multiple payment options, including credit card payments, mobile payments, and digital wallets. These options provide consumers with greater convenience and flexibility when making purchases on-the-go.

Another key feature of mobile commerce is the ability to receive personalized offers and promotions based on a consumer's shopping habits and preferences. Mobile commerce apps and platforms often use data analytics and artificial intelligence to analyze a consumer's shopping behavior and make personalized recommendations for products or services. This personalized approach can help to build brand loyalty and increase customer satisfaction.

Finally, mobile commerce provides consumers with the ability to shop anytime and anywhere, making it a highly convenient option for busy consumers. Mobile commerce platforms offer 24/7 access to products and services, allowing consumers to shop at their own convenience.

In conclusion, the features of mobile commerce, including fast and flexible payments, personalized offers, and convenience, have made it an increasingly popular way for consumers to shop and conduct financial transactions.

## 2.6 Android Studio (Flutter) to Mobile Commerce

Android Studio is a widely used Integrated Development Environment (IDE) for building mobile applications for Android devices. The platform offers a range of features and tools that make it easier for developers to create high-quality and efficient applications. One of the emerging frameworks for building mobile applications with Android Studio is Flutter. Flutter is an open-source mobile application development framework created by Google that enables the creation of high-performance mobile applications for Android, iOS, and other platforms.

Flutter has gained significant popularity among developers because of its unique features and advantages, such as fast development speed, hot-reload, and customizable widgets. In the context of mobile commerce, Flutter can be a powerful tool for developers to create engaging and efficient applications. Mobile commerce applications developed with Flutter have the advantage of providing a better user experience, thanks to the platform's fast performance and smooth animations.

Developers can take advantage of Flutter's extensive widget catalog to create customized and visually appealing user interfaces for mobile commerce applications. Flutter also provides features such as responsive design, allowing applications to adjust to various screen sizes and orientations. Furthermore, the platform has plugins and libraries that support various payment gateways and APIs, making it easier for developers to integrate payment processing functionalities into their applications.

In conclusion, Android Studio with Flutter provides a robust platform for developing mobile commerce applications. It offers a range of features and tools that allow developers to create highly customized and efficient applications. Mobile commerce applications built with Flutter are fast, responsive, and offer an engaging user experience. With Flutter's extensive widget catalog and payment integration capabilities, developers can create highly customized and efficient mobile commerce applications that meet the unique needs of their users [15].

## 2.7 Review existing dessert e-commerce website

### 2.7.1 Eatcaketoday.com

Eatcaketoday.com is a website for Malaysians to order cakes for birthdays and other occasions. It provides cake delivery from Malaysia's Best Bakers. This is the interface for the user registration page.

**Create Account**

f G t in

Ang Chyh Dian

jasonang814@gmail.com

.....

**Let us know when you were born!**  
An exclusive discount and special offers could be heading your way.

14/08/2001

By submitting your birthday you are agreeing that we may send you an email on or around your birthday.

**Create**

*Figure 2.7.1.1 Eatcaketoday.com Sign-up Page*

the interface is clear and simple but there does not have the feature to allow the user to double confirm the password which will make the password more secure. After the user fills in the information and clicks the 'Create' button, the user needs go to the email to verify the account.

Customer account activation Inbox x



**Eat Cake Today - Cake Delivery from Malaysia's Best Bakers** <hello@eatcaketoday.com>  
to me ▾

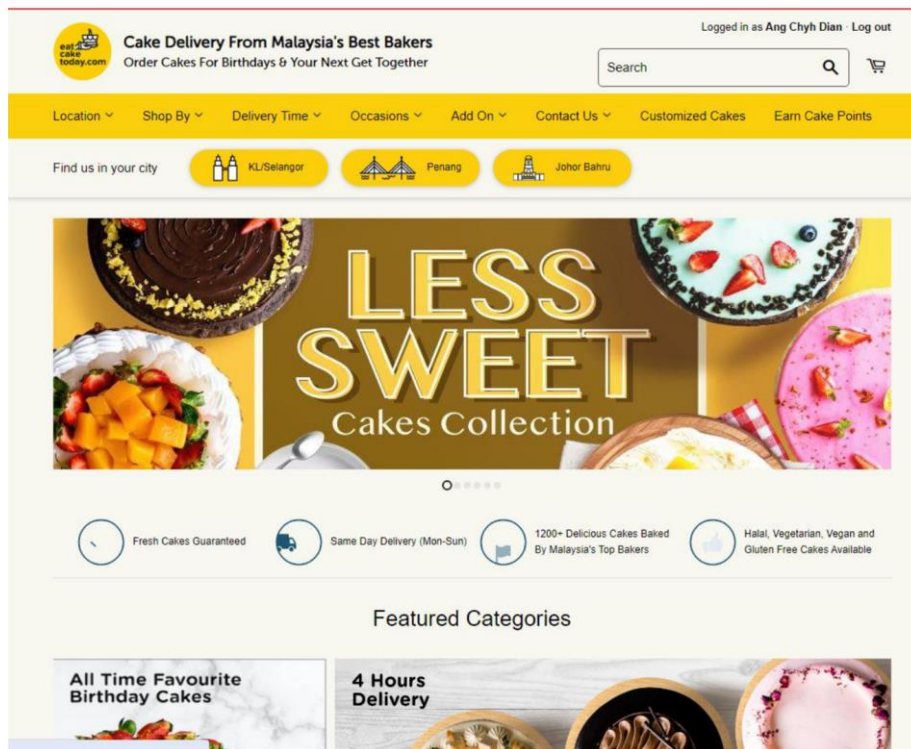


Hey Ang Chyh Dian,

Check out the URL below to activate your account, set your password then shop away.

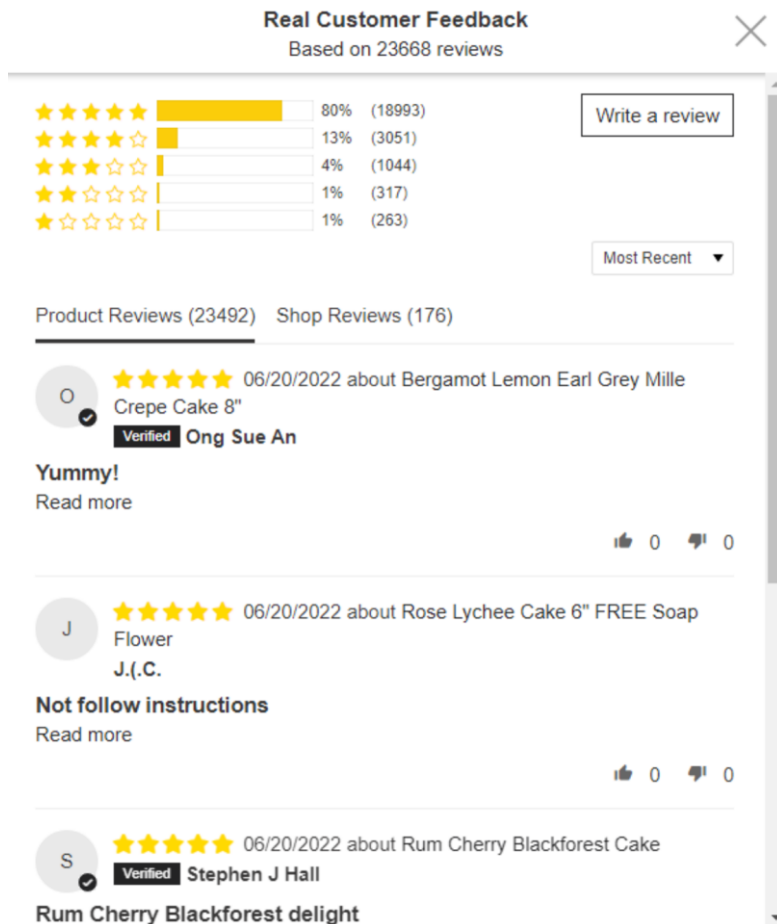
<https://www.eatcaketoday.com/account/activate/5654984294458/51c770b7a7110a5358b13c24c2608b8c-1655743697>

If the account was created in error, you can visit the link above and select "Decline" to decline this invitation.



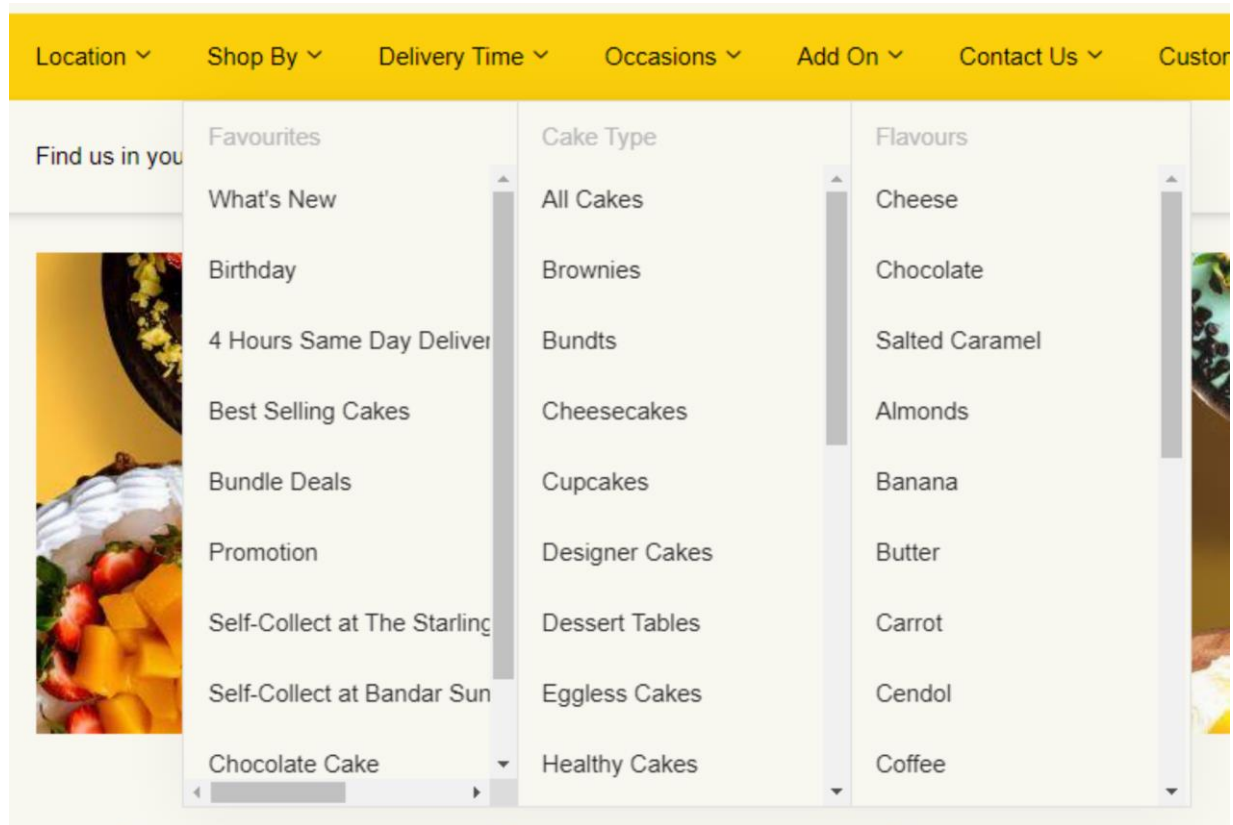
*Figure 2.7.1.2 Eatcaketoday.com main page*

the interface of the main page is clean with yellow color as the theme color. The main target city is at KL, Penang, and Johor Bahru. There will have some attractive cake photos and news to attract customers to click and view.



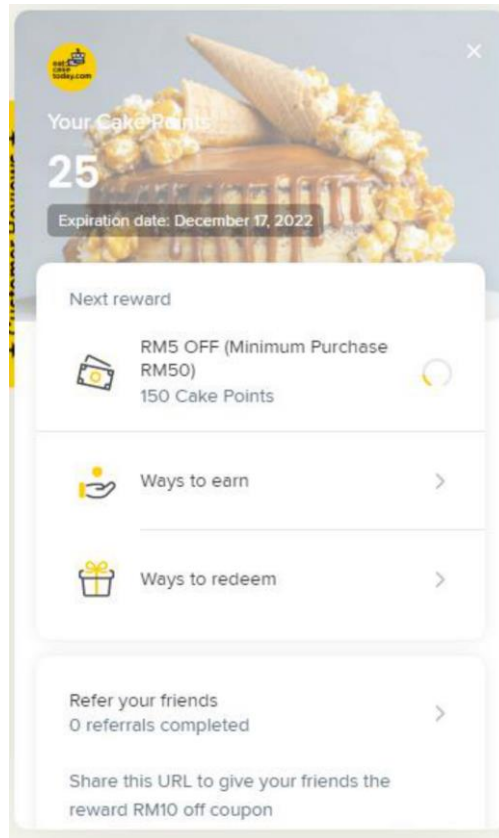
*Figure 2.7.1.3 Eatcaketoday.com review page*

The customers can click a customer review on the left side to view the customer feedback about the website and the condition and experience of the cake purchase from eatcaketoday.com to increase their trust in them. But it is hard for the user to see the button on the left side, so probably the location of the feedback button can place at an eye-catching place.



*Figure 2.7.1.4 Eatcaketoday.com category navigation bar*

Some of the navigation option bars are unstructured and not attractive which will make the customers have a bad experience when looking at the website. It is not user-friendly for the customers to find the cake they are interested in.



*Figure 2.7.1.5 Eatcaketoday.com customer point page*

The website provides a cake point for customers to redeem some vouchers that will benefit them. There will state how to earn and redeem the cake point. Customers can share the post on their social media like Facebook, Instagram, and Twitter to earn the cake point.

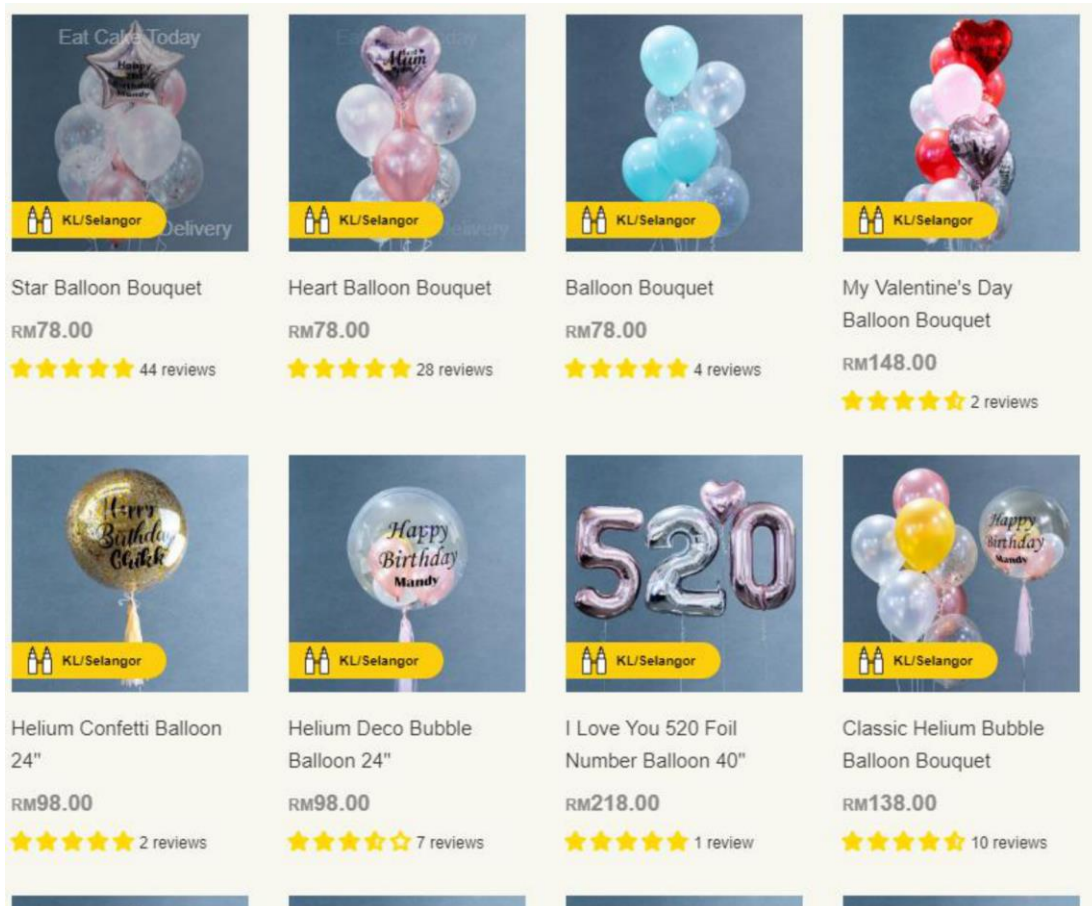


Figure 2.7.1.6 Eatcaketoday.com extra add-on service

Eatcaketoday.com not only provide a cake for the customers, but it also provides balloons, flowers, or gift card for customers to add on if they have a request.



## **2.7.2 Strength and Weakness**

### **Strength**

- It categorizes the cake base on the occasions
- It allows users to set a reminder for the event or birthday
- Several add services for users like balloons, flowers, and gift card

### **Weakness**

- Many and complex sorting options for the user to select
- It cannot let multi-sellers upload their product

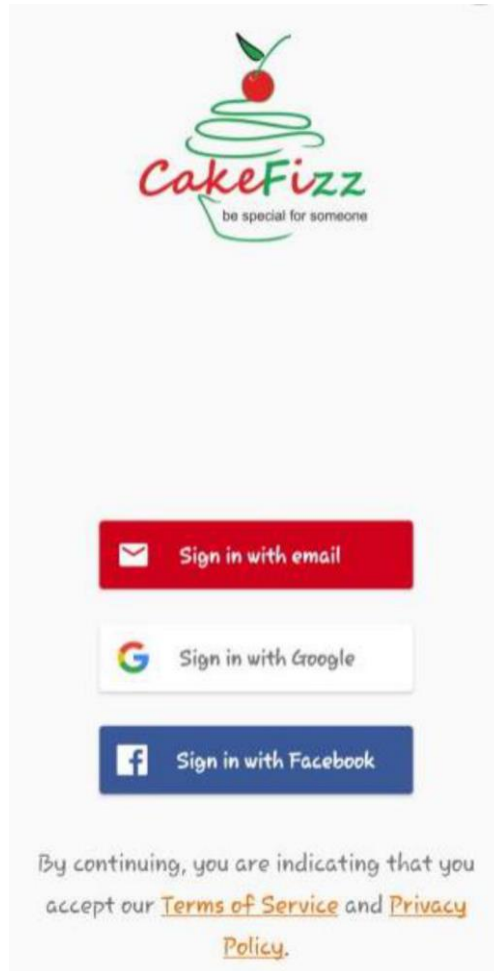
## 2.8 Review existing dessert mobile commerce application

### 2.8.1 CakeFizz



*Figure 2.8.1.1 CakeFizz Logo*

CakeFizz is a dessert mobile commerce app to deliver a cake to the Indians. It can be downloaded in the Google Playstore but it is only available and open for the Indians to place an order.



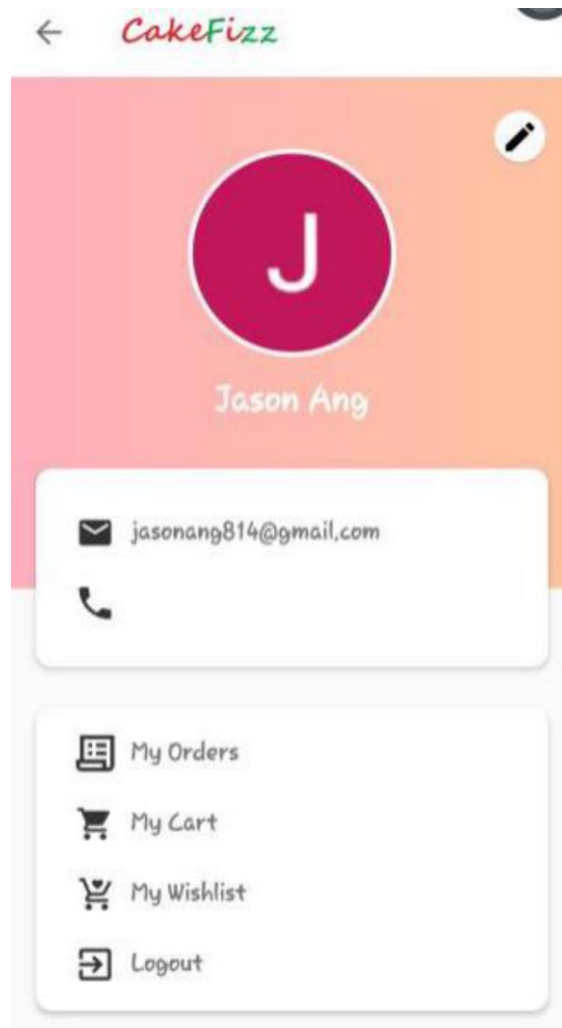
*Figure 2.8.1.2 CakeFizz Login Page*

CakeFizz can straight sign in with 3 different methods which are sign in with email, sign in with Google, and sign in with Facebook. It will make user convenient to create an account because some users will feel bored to fill that personal information when on the registration page.



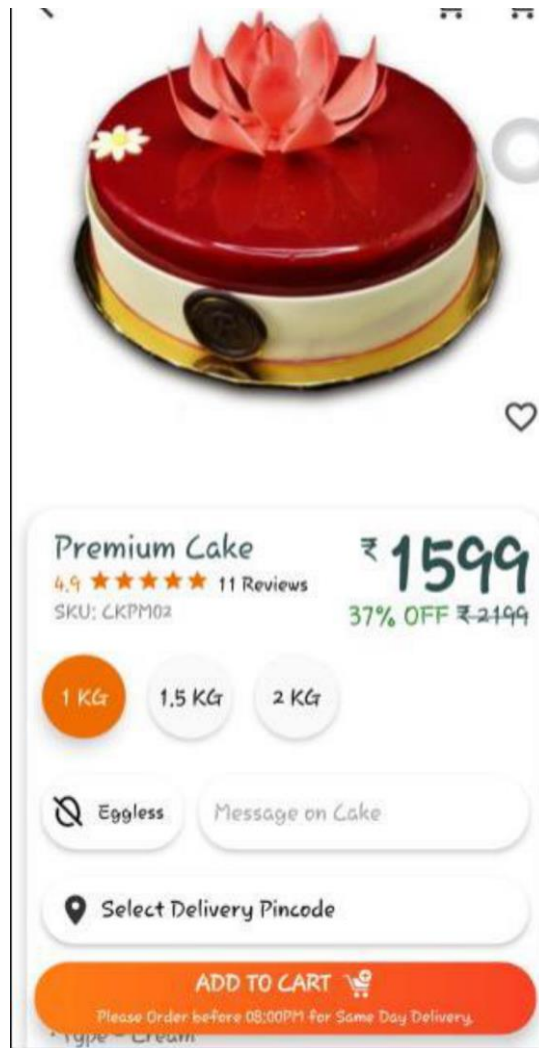
Figure 2.8.1.3 CakeFizz Main Page

The main page interface is bad because the text and pictures are packed together and unstructured. It is hard for customers to view and find the information.



*Figure 2.8.1.4 CakeFizz Consumer Profile Page*

The user can edit and verify the phone number on the profile page. The users can also check and view their orders, cart, and wish list on their profile page.



*Figure 2.8.1.5 CakeFizz Dessert Description*

The interface of details of the dessert is hard to see because when the user scrolls down to see the description and reviews, the picture will also disappear which makes the user difficult to compare the picture with the comments.

## **2.8.2 Strength and Weakness**

### **Strength**

- Allow users to store the interesting dessert in wish-list
- Provide combo service for user
- Provide a message box for the user to leave a note for the customized cake

### **Weakness**

- The main page is too messy with a long scroll
- Do not provide the type of dessert sorting option for the user
- Seller only can upload each photo on each product

## 2.9 Review existing dessert mobile commerce application

### 2.9.1 Sprinkle Cake



*Figure 2.9.1.1 Sprinkle Cake Splash Screen*

Sprinkle Cake is also a cake mobile commerce open for free to Indians to download from Google Playstore.





*Figure 2.9.1.2 Sprinkle Cake Login Page*

It can only log in with phone number verification and google email. Besides, the user can view the products without login into the account. The main activity page has 4 navigation which are Home, Offers, Help, and My Account. It is user-friendly for users to use mobile commerce and find what they want easily.

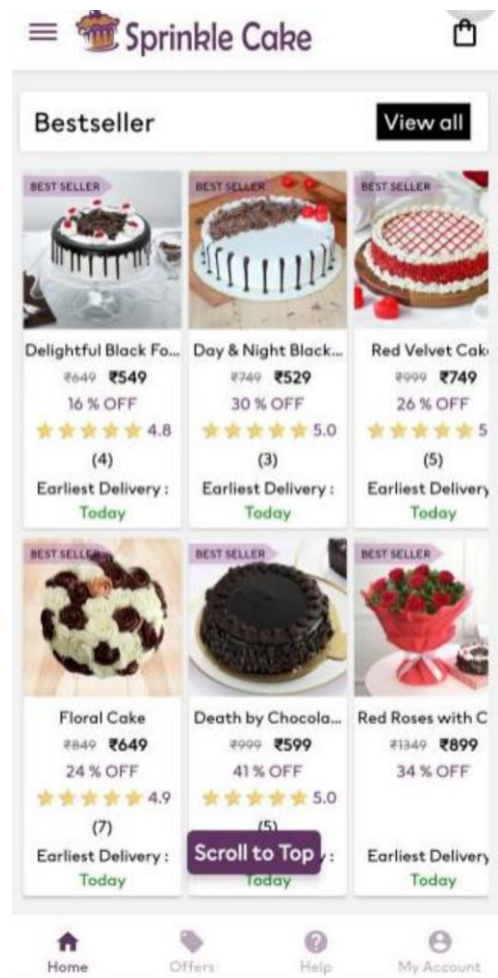
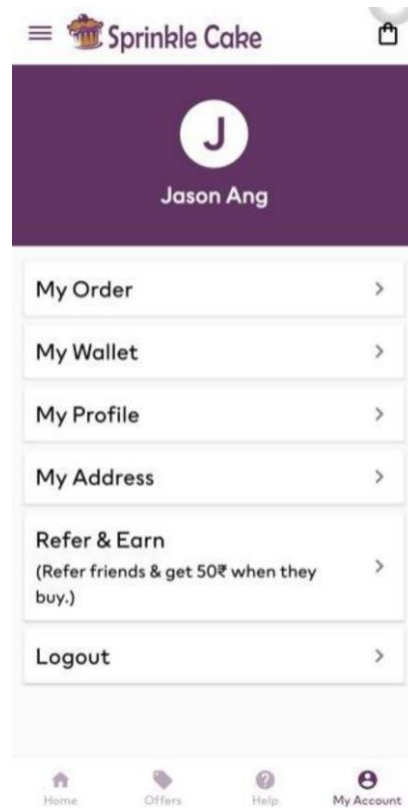


Figure 2.9.1.3 Sprinkle Cake Main Page

The home page is very neat with structure order which can let the user view the overall dessert easily. Every layer has a sub-topic for a user to understand what they should click on to find the specific dessert they want.



*Figure 2.9.1.4 Sprinkle Cake Consumer Profile Page*

The user profile is quite simple without any attractive elements. Sprinkle Cake does not have the wish list feature for users to keep their favorite dessert for future to purchase. It only has a simple point-earn system. Profile only can update the username, email, and phone number.



### FD Semi Fondant Chocolate Cake

₹699 ₹799 (13% OFF)

Half kg 1 kg 2 Kg  
₹699 ₹1299 ₹2399

- Make it eggless (₹50)
- Make in less sugar (₹100)

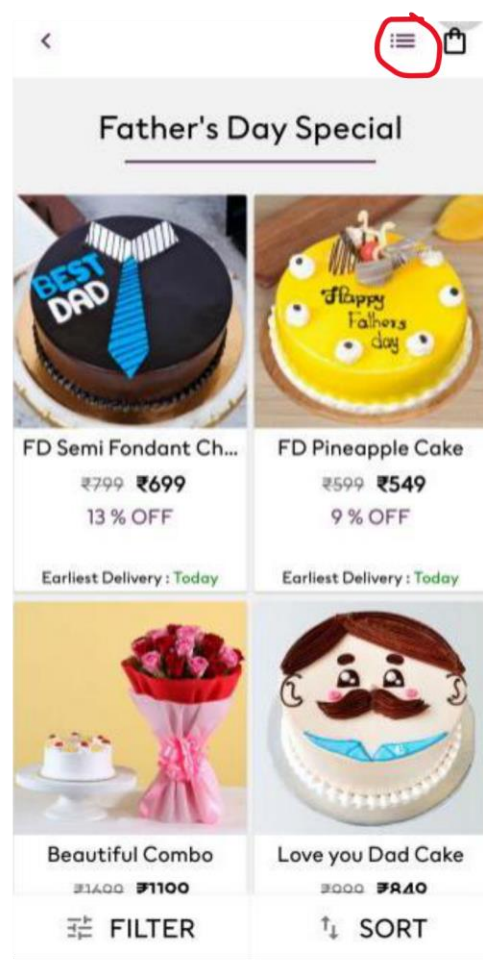
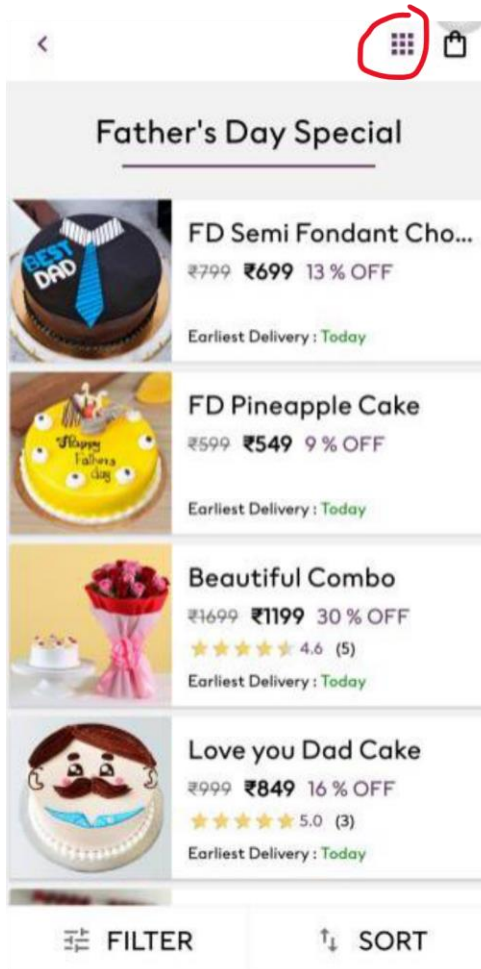
Time Left for today's delivery : 18:11:59

ADD TO CART

BUY NOW

*Figure 2.9.1.5 Sprinkle Cake Description Page*

The details page of the dessert is designed in a simple UI which is not too attractive. It only has a simple button like 'ADD TO CART' and 'BUY NOW'. Users do not have too much interaction and customization by using mobile commerce.



Figure

### 2.9.1.6 Sprinkle Cake Display Layout Button

The user can change the dessert of the grid order of columns on the page according to their preference. Besides, the users also can filter and sort the dessert according to the price range, popularity, and star rating to find the dessert they want easily.

## **2.9.2 Strength and Weakness**

### **Strength**

- Provide a personal wallet for the user to top up their money
- Friendly user interface for the user to find their dessert
- Allow users to set the delivery time to deliver their interesting dessert
- Users can see the recently viewed items from the main page

### **Weakness**

- The user cannot view the previous order history
- Users cannot add an interesting dessert to the wish-list

# Chapter 3

## System Methodology/Approach OR System Model

### 3.1 Design Specification

#### 3.1.1 Methodologies and General Work Procedures

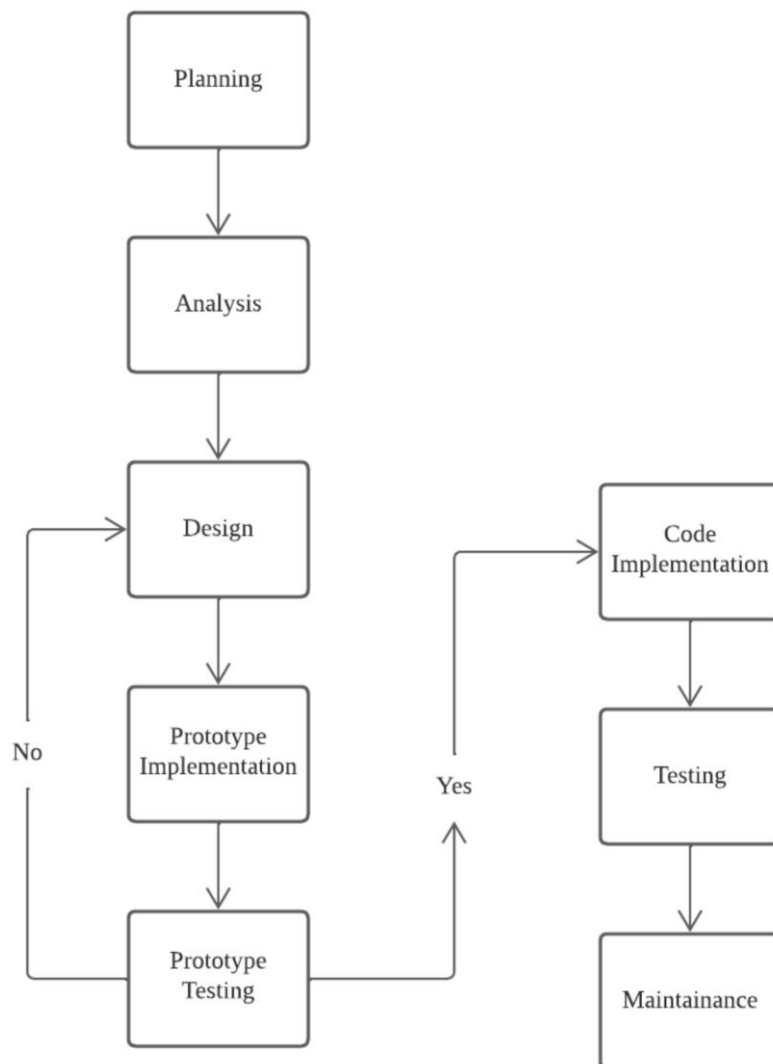


Figure 3.1.1.1 System Methodology for developing Dessert Mobile Commerce Application

Figure 3.1.1.1 illustrates the steps involved in creating a proposed mobile commerce application.

Initially, a set of strategies are developed during the planning stage to guide the execution and closure phases of the senior project. The proposal is evaluated to identify the problems, objectives, and scope of the project. The planning stage also involves developing a plan to manage time, cost, risks, and issues.

The next step is requirements analysis, which involves gathering initial requirements by examining similar applications and previous projects. The pros and cons of existing comparable applications are analyzed and recorded to create a superior application. All requirements are then collected and turned into a comprehensive system design specification during the design stage. Once the design is complete and error-free, a prototype implementation is created and tested.

If any issues arise during prototype testing, the design stage must be revisited, and the project requirements should be reviewed to create a new and successfully finished design. The implementation phase follows once all previous stages are successfully completed. The final testing phase ensures that all components of the application work well together, and any bugs are identified and addressed. Once the application is bug-free, it will be delivered to the user, and feedback will be collected for future maintenance to improve the user experience.



### 3.1.2 Use Case Diagram and Description

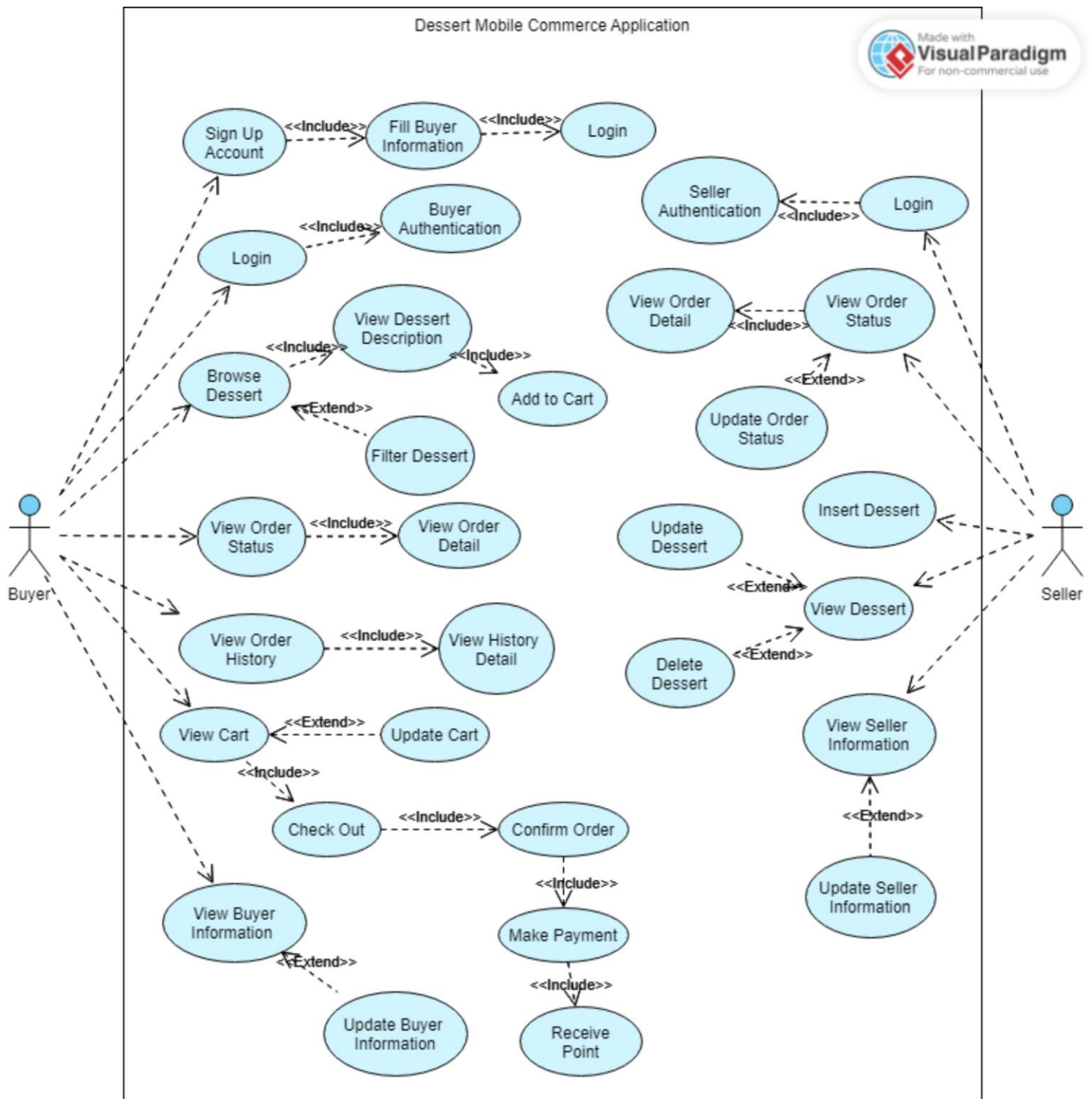


Figure 3.1.2.1 Use Case Diagram of Dessert Mobile Commerce Application

From Figure 3.1.2.1, there are several functions and methods are provided for different roles which are Buyer and Seller.

### Seller

1. Login
  - During the login page, the user can login as a seller if they are the seller staff. But they can login as a normal user to view the dessert seller.
2. Seller Authentication
  - When the user wants to login as a seller user, after they fill in their email and password on the login page, their data will check from the database for verification authentication.
3. View Order Status
  - Seller can view the order status those made by the buyers. All of the orders made by buyers will display there for seller to track the orders.
4. View Order Detail
  - Seller can click in to view the detail of the order. The list of the dessert in the order will display with quantity for seller to prepare. Seller can see the buyer ID, total price of the desserts and the status of the order too.
5. Update Order Status
  - Seller can update the status of the orders made from buyers. When the orders are made by buyers, seller can press accept button to accept the order. Then, seller can press confirm button once they prepared the orders.
6. Insert Dessert
  - Seller can add the dessert that they want to sell from the seller page. The seller needs to provide the information for the dessert like image, name, description, category, weight, and price for the buyer to understand more detail of the dessert.

#### 7. View Dessert

- Seller can view the desserts on the product page after they upload the information of the dessert successfully.

#### 8. Update Dessert

- After inserting the dessert successfully, the dessert will appear on the main page for buyers to view. If the seller gets any change in the details of the dessert, they can update the information of the dessert.

#### 9. Delete Dessert

- If the dessert is out of stock or not available by the seller anymore, seller can delete the dessert from the product page. Then the information about the deleted dessert will not appear on the buyer main page anymore.

#### 10. View Seller Information

- Seller can view their information on the seller profile page. Besides, seller can view their revenue there after every order is done.

#### 11. Update Seller Information

- When the seller has any change for the information on the seller page like profile picture, name, shop name, Instagram, gender, phone number, and location. But seller cannot change their email due to the authentication is using the email.

## Buyer

### 1. Sign Up Account

- For the user who want to buy the dessert on the dessert mobile commerce application, they need to register an account as the buyer. During the registration, the user needs to provide their name, email, and password.

### 2. Fill Buyer Information

- After register the email and password, the buyer needs to fill some personal information like image, name, gender, phone number, and location to done the registration and proceed to login.

### 3. Login

- The user needs to login to the dessert mobile commerce application only can enter the main page to view the list of desserts.

### 4. Buyer Authentication

- When the user wants to log in as a normal buyer user, after they fill in their email and password on the login page, their data will check from the database for verification for authentication.

### 5. Browse Dessert

- After user is registered the account successfully and login to the buyer page. They can browse and view the dessert on the main page.

### 6. View Dessert Descriptions

- Buyers can view the dessert with more detail information once they saw their interesting dessert. They can click the image of the dessert to navigate to another page to show the detail of the dessert like image, name, price, category, weight.

### 7. Add to Cart

- Buyer can set the quantity of the dessert they want to add to the cart. There will showing the total amount price of the dessert before buyer add to cart.

#### 8. View Order Status

- Buyer can view the status of the order after they confirmed to check out the cart. The status will show pending for waiting the seller to accept the order. Once the seller accept the order, the status of the order will turn to processing for waiting the seller to prepare the order.

#### 9. View Order Detail

- Buyer can click in to view the detail of the order. The list of the dessert in the order will display with quantity for seller to prepare. Buyer can see the buyer ID, total price of the desserts and the status of the order too.

#### 10. View Order History

- Buyer can view the order they made previously. Once the order is completed, the order will appear on the history page.

#### 11. View History Detail

- Buyer can click to view the detail of the history order. The list of the dessert in the history order will display with total price.

#### 12. View Cart

- Before the buyer confirms the order and make the payment, they can view the shopping cart and check the quantity of the dessert, or whether the type of the dessert is correct.

#### 13. Update Cart

- The buyer can update the cart once their decision has changed. When they want to update the quantity of the dessert or want to delete the specify dessert.

#### 14. Check Out

- Buyer can press the check out button once they want to proceed to make payment and confirm the order.

#### 15. Confirm Order

- Once all the information about the dessert is correct, the buyer can click the confirm order to place the order.

#### 16. Make Payment

- The buyer can select method of payment like online banking, TnG, Grab pay to make the payment.

#### 17. Receive Point

- Once the order is placed and completed the order, the buyer will receive the point based on the total price of each order.

#### 18. View Buyer Information

- The buyer can view their information on the buyer page. The page will display some simple information about the buyer like, profile picture, name, gender, email address, phone number, and location.

#### 19. Update Buyer Information

- When the buyer has any change for the information on the buyer page like name and profile picture, they can update the information from the buyer profile.

### 3.1.3 Flow Chart Diagram

#### Seller Insert Dessert Process Flow Chart Diagram

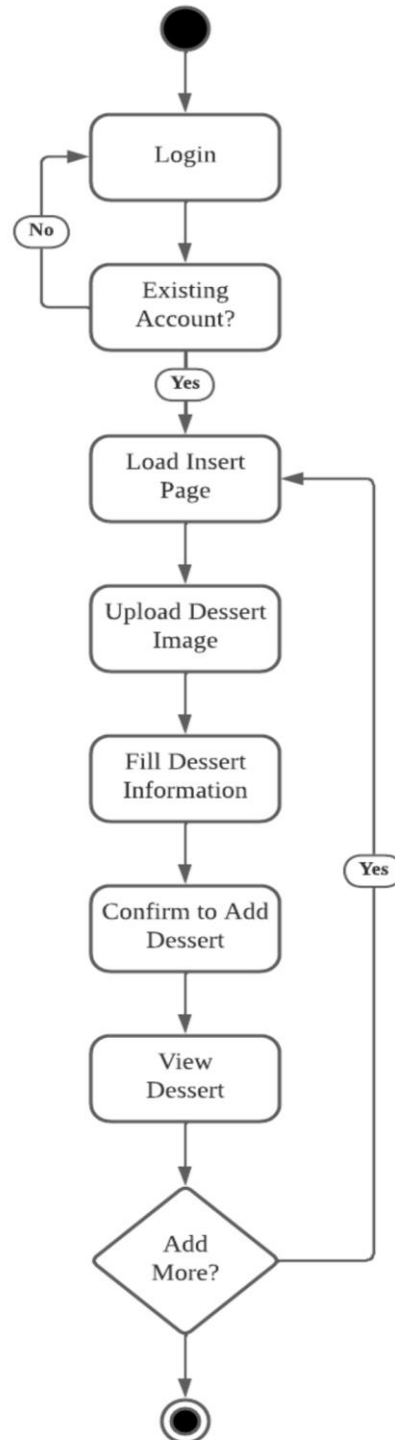


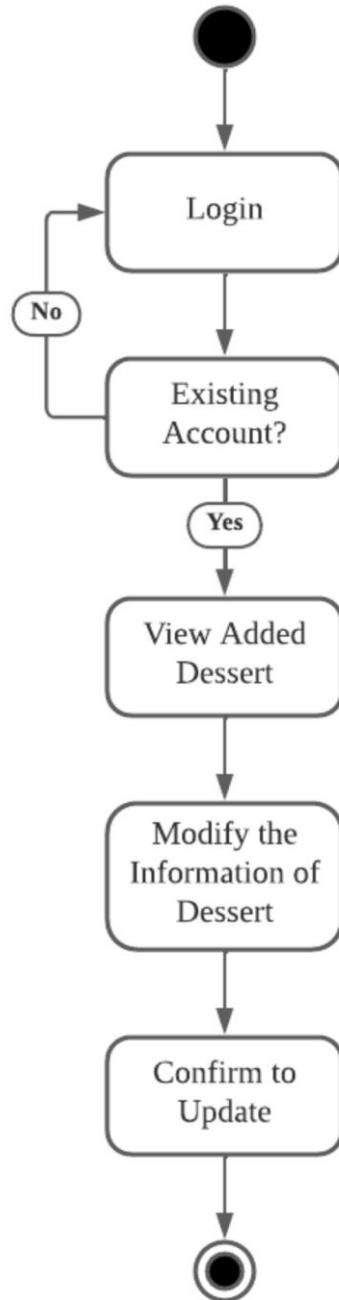
Figure 3.1.3.1 Seller Insert Dessert Process Flow Chart Diagram

Figure 3.1.3.1 show the flow chart diagram for the process of inserting dessert from the seller page.

First, seller will login to the account but if the seller type wrongs the email or password, they need to login again with correct email and password. After login to the seller page, seller will load to enter the seller insert page. Seller can upload the image of dessert from his gallery and fill in the information of the dessert like name, description, category, weight, and price. After fill in the information, seller need to press add button to confirm. Then, seller can view the dessert on the dessert page. If seller wan to add more another dessert, he will repeat the process again.



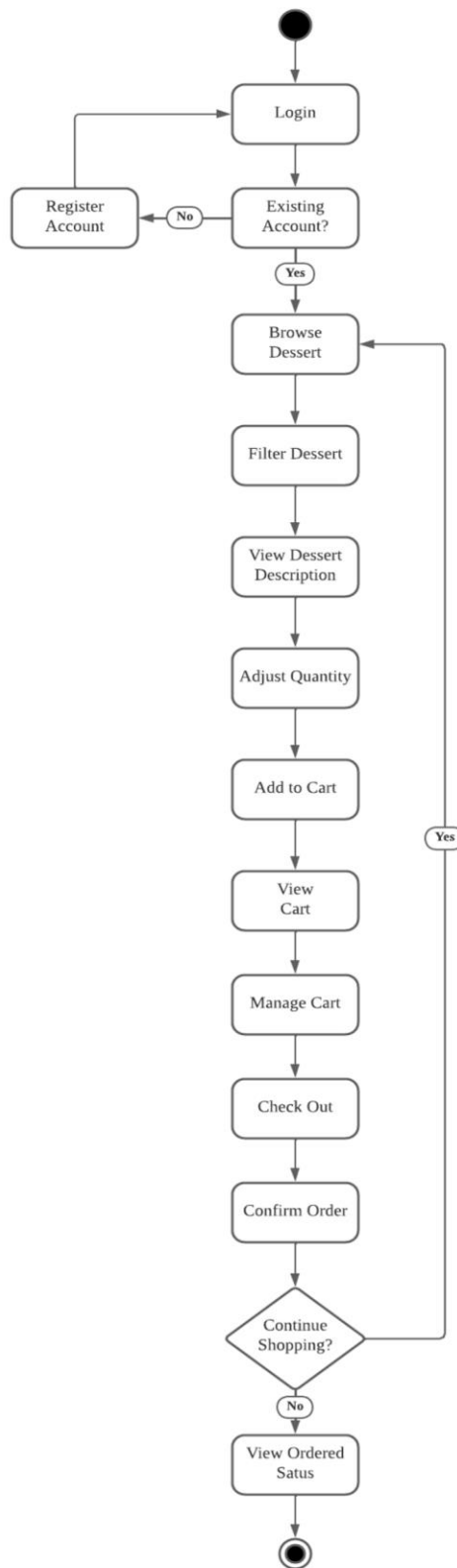
### Seller Update Dessert Process Flow Chart Diagram



*Figure 3.1.3.2 Seller Update Dessert Process Flow Chart Diagram*

The flowchart diagram in Figure 3.1.3.2 illustrates the process of updating dessert information on a seller's account. To begin, the seller must access the dessert commerce application and login a seller account. Once they have logged in, they can view the desserts they have added and make changes to them by clicking on the update button. Finally, the seller can confirm the changes by clicking on the confirm to update button to successfully update the dessert information.

## Buyer Purchase Process Flow Chart Diagram



*Figure 3.1.3.3 Buyer Purchase Process Flow Chart Diagram*

Figure 3.1.3.3 shows the flowchart diagram for the process purchases the dessert from the buyer

part. First, the buyer will browse to the dessert commerce application, if the user does not have the account, then he will need to register as a buyer account, then only can proceed to the login page. After the user login successfully, the consumer can view the dessert on the main page. Buyer can filter the dessert according to the category of dessert like cake, tart, biscuit, pie and others. Then, buyers can press the dessert to view the detail of the dessert and its description when they are interested at it. Buyers can increase or decrease the quantity of the dessert according to their decision. Then, they can press the add to cart button to add the dessert to the shopping cart. After added the dessert to the cart, they can view the cart to check the information and the quantity of dessert they selected. They can manage the cart like adjust the quantity of the dessert or delete the dessert. Once they are confirming the order, they can press to check out button to proceed the payment. If the buyers want to continue shopping, they can back to the dessert page to select their interested dessert again. Once the desserts in the cart are check out, the order will appear on the order page. Buyers can check the status of the order.

### Buyer Update Profile Information Process Flow Chart Diagram

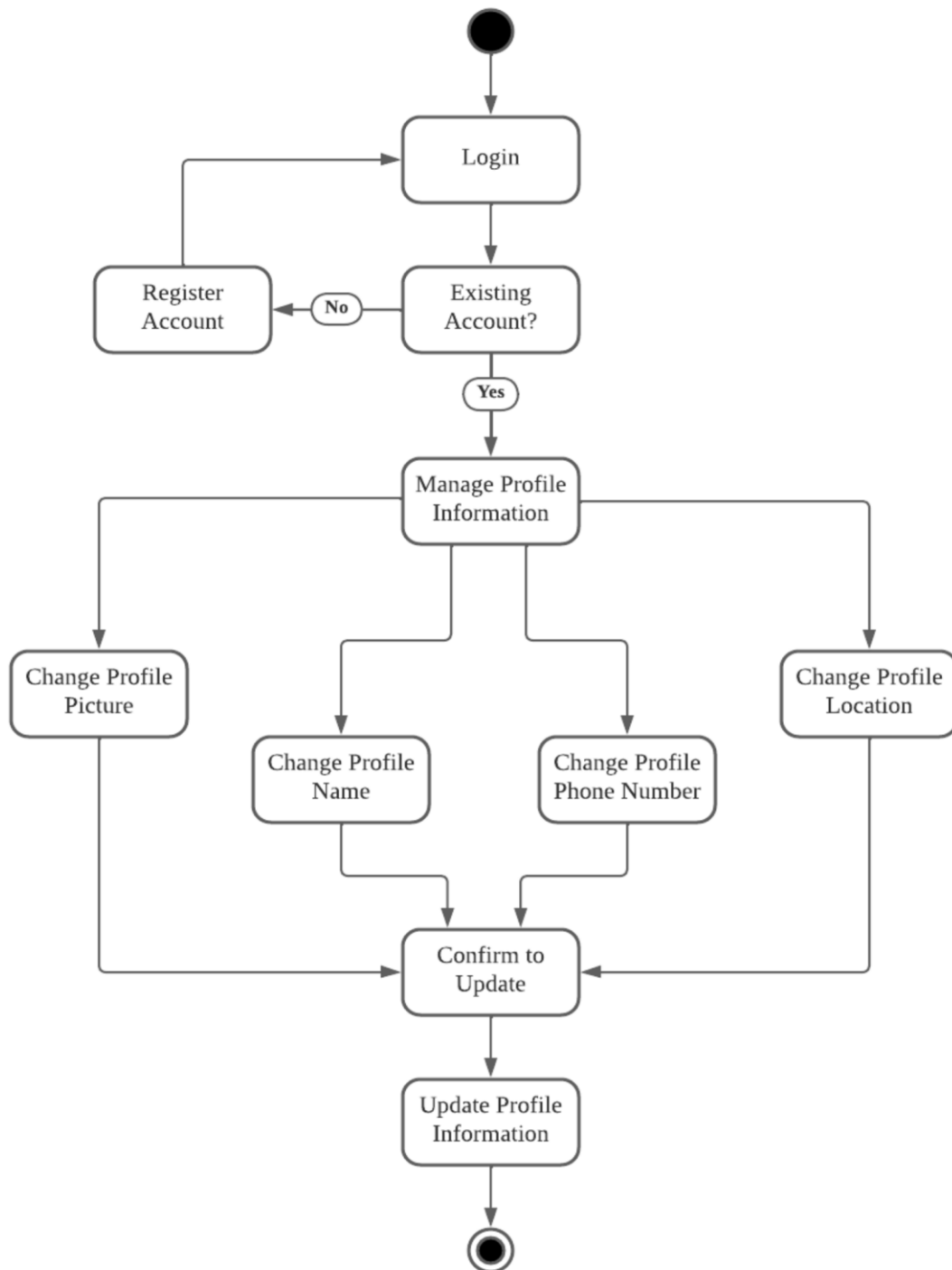
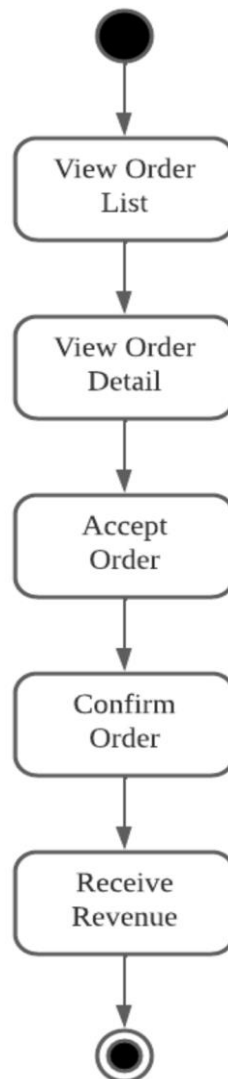


Figure 3.1.3.4 Buyer Update Profile Information Process Flow Chart Diagram

Figure 3.1.3.4 displays the flowchart diagram for updating a buyer's profile information on a dessert commerce application. To begin, the buyer must access the application and register for a buyer account if they do not already have one. Once they have logged in successfully, the buyer can manage their profile information. This includes changing their profile picture, account name, delivery address, and contact number. After ensuring the information is correct, the buyer can click on the confirm button to update their profile information.

### Seller Update the Status of Order Flow Chart Diagram



*Figure 3.1.3.5 Seller Update the Status of Order Flow Chart Diagram*

Figure 3.1.3.5 shows the flowchart diagram for the process update the status of the order. After

the buyer placed the order, the order will display on the seller order page. Seller can view the detail of the order by press the view button to see the list of desserts, buyer ID, total price, and the status of the order. Seller can press the accept button to accept the order and ready to prepare the dessert. Once the desserts are well prepared and delivered to the buyer. They can press the confirm button to complete the order. After the order if completed, the seller will receive the revenue from the total price of the order.

# Chapter 4 System Design

## 4.1.1 Block Diagram

Seller Block Diagram

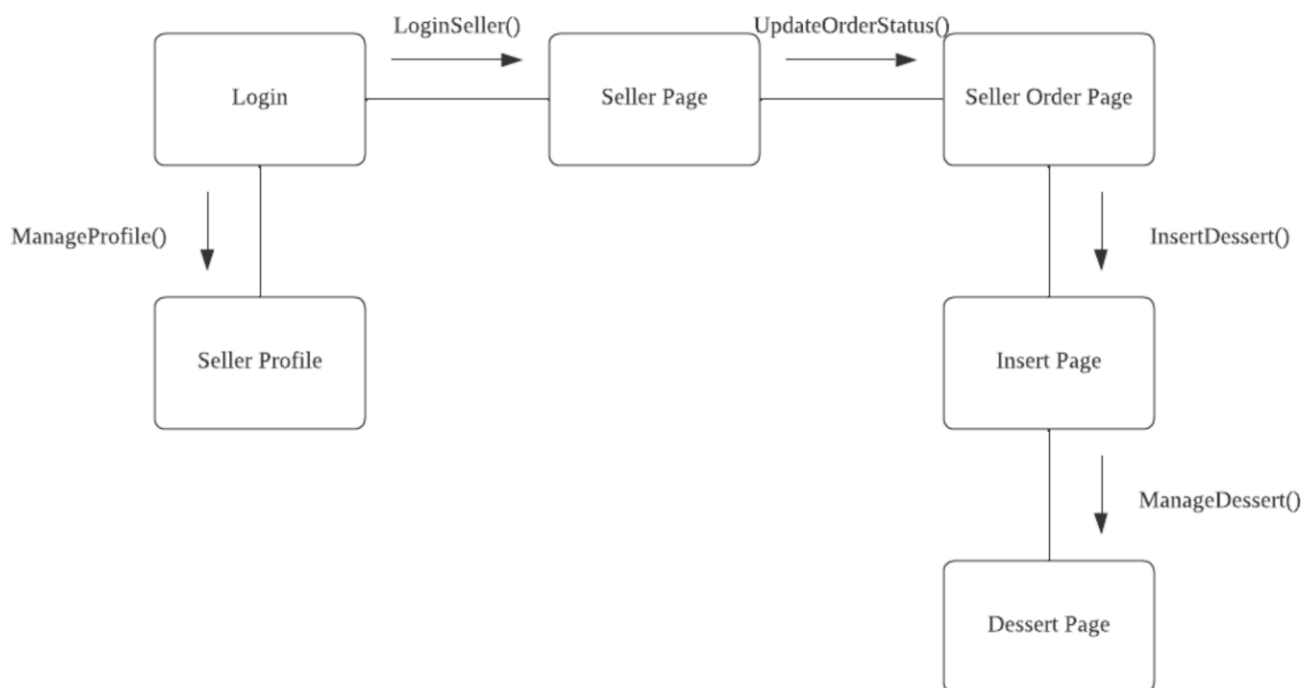


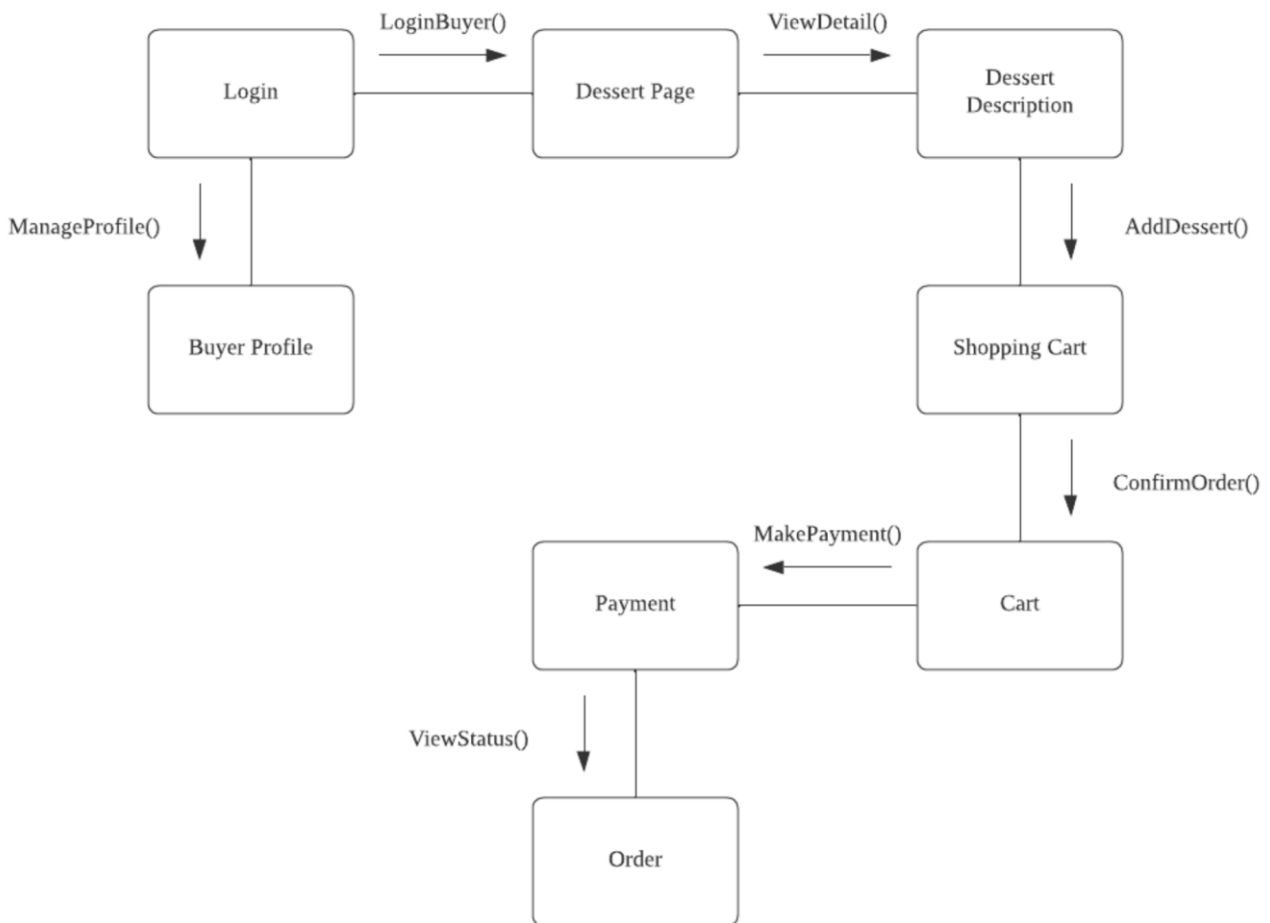
Figure 4.1.1.1 Seller Block Diagram

Figure 4.1.1.1 above shows the block diagram of the dessert mobile commerce application from

the perspective of the seller. The seller needs to have an account to login as a seller to enter the seller page to manage the desserts. After seller login successfully, he can manage the order status like accept the order or confirm the order. Seller can insert dessert they are selling. Seller needs to upload dessert photo and some information like name, description, category, weight, and price. Then, seller can manage their desserts like update the information of the desserts or delete the desserts they are not going to sell. Seller can manage their profile and view their revenue at the profile page too.



## Buyer Block Diagram



*Figure 4.1.1.2 Buyer Block Diagram*

Figure 4.1.1.2 above shows the block diagram of the dessert mobile commerce application from the

perspective of the buyer. Users need to register an account to login as a buyer user. After login successfully, they can browse the dessert and view all the images and simple information like name, weight, category, and price about the dessert on the main page those uploaded by sellers. If the buyer saw any dessert they are interested in, they can click the dessert to proceed to view the description of the dessert. Once, they are decided to buy the dessert, they can straight set the quantity they want and add it to the shopping cart. They can manage the cart by modifying the quantity of the dessert or delete it. After all the details are correct and checked, they can confirm the order to proceed with the payment session. Once the order placement is completed, they can view the status of the order. At the order page, there will show pending for waiting

the seller to accept the order, after the seller accepted the order, the status will turn to processing for waiting seller to prepare the order and deliver. Once the buyer received the items, the order status will be confirmed by seller and buyer will earn the point for after purchase. Buyer can manage their profile and view their point at the profile page too.

#### 4.1.2 ERD

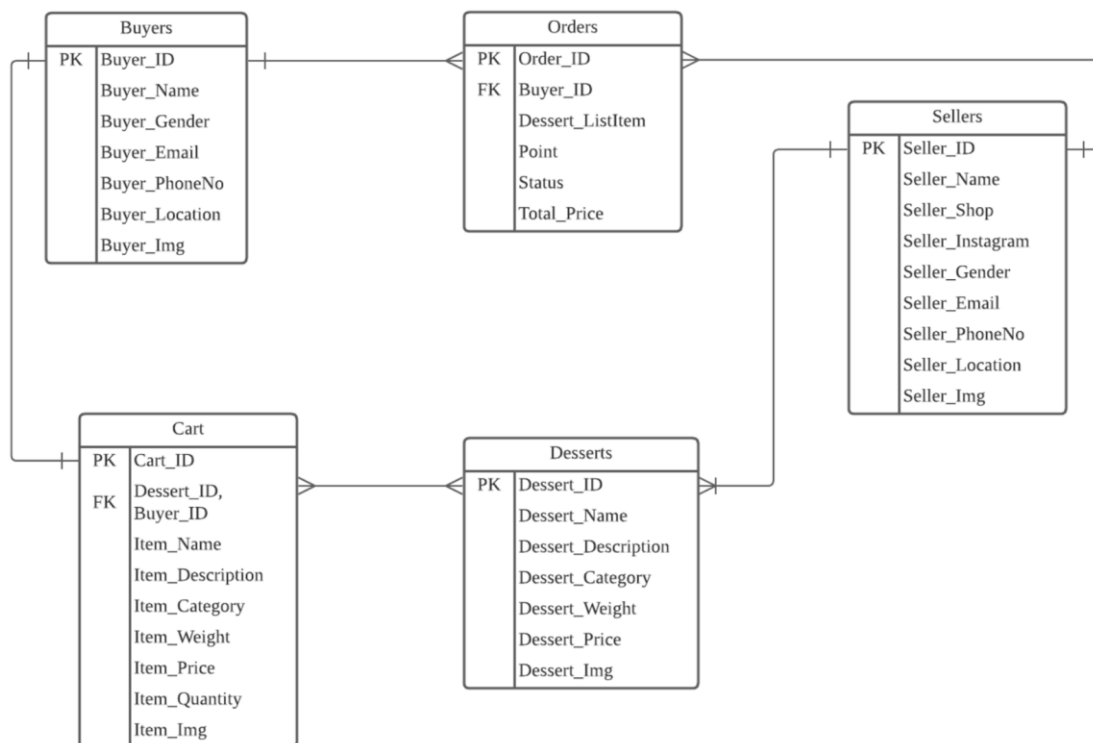


Figure 4.1.2.1 Dessert Mobile Commerce Application ERD

# Chapter 5 System Implementation

## 5.1 Hardware Setup

The hardware involved in this project is a laptop, emulator, and Samsung S22.

*Table 5.1.1 Specifications of laptop*

Description	Specifications
Model	TUF Gaming FX505DY_FX505A
Processor	AMD Ryzen 5 3550H
Operating System	Windows 10
Graphic	Radeon RX 560X
Memory	24GB
Storage	1TB SATA HDD & 240GB SSD

*Table 5.1.2 Specifications of emulator*

Description	Specifications
Model	Pixel 4 XL
System Image	API 33
Operating System	Android
Graphic	Hardware – GLES 2.0
CPU	4 multi-cores
Memory	4GB
Storage	10GB

*Table 5.1.3 Specifications of Samsung S22*

Description	Specifications
Model	Samsung S22
Processor	2.4GHz Octa-Core
Operating System	Android
Memory	8GB
Storage	256GB

## 5.2 Software Setup

### Android Studio

Android Studio is a powerful Integrated Development Environment (IDE) for developing Android applications. It is an official development tool for Android, created by Google. It provides developers with a comprehensive set of tools and features to design, build, and test mobile applications for the Android platform. To develop a mobile commerce application using Android Studio, programmer can start by creating a new Android project and selecting the appropriate project settings, such as the minimum Android SDK version, the target SDK version, and the project name. Android Studio provides a layout editor that allows programmer to create user interfaces using drag-and-drop components. Programmer can also use XML code to customize the layout of the application. The IDE comes with a range of built-in tools and features to help programmer develop and test the application, including a code editor, a debugger, and an emulator. Programmer can also use Android Studio to access the Android Software Development Kit (SDK), which includes a range of libraries, APIs, and tools to help programmer develop your application. Overall, Android Studio provides a comprehensive development environment that allows developers to create high-quality mobile commerce applications for the Android platform.

### Firebase

Firebase is a mobile and web application development platform, owned by Google, that provides developers with a suite of tools and services to build high-quality, scalable, and secure applications. It is often used in the development of mobile commerce applications due to its robust and flexible backend services. Firebase provides a range of features, including real-time database, cloud storage, authentication, analytics, and messaging. These features allow developers to create responsive and dynamic applications that can securely store user data, send push notifications, and analyze user behavior. In the context of mobile commerce applications, Firebase can be used to implement features such as product catalogs, shopping carts, user authentication, and payment processing. Firebase also provides an easy-to-use API that allows developers to integrate their application with third-party services and tools. Overall, Firebase is a powerful and flexible platform that can help developers build high-quality mobile commerce applications quickly and easily. Its range of features and easy-to-use API make it an attractive option for developers looking to build secure and scalable applications.

## **Flutter**

Flutter is an open-source mobile app development framework created by Google that allows developers to build high-quality, cross-platform mobile applications for Android, iOS, and other platforms using a single codebase. It uses the Dart programming language and provides a rich set of widgets and tools that help developers create beautiful, responsive, and fast applications. In the context of mobile commerce applications, Flutter provides a range of features that can help developers create engaging and interactive user interfaces, including customizable widgets, animation, and gesture recognition. Flutter also provides plugins and packages that can be used to integrate with various backend services such as Firebase, which is commonly used in the development of mobile commerce applications. Flutter's "hot reload" feature allows developers to quickly iterate and make changes to their code and see the results in real-time, which can speed up the development process. Additionally, Flutter's performance is fast and efficient, making it ideal for building mobile commerce applications that require quick loading times and smooth animations. Overall, Flutter is a powerful and flexible framework that can help developers build high-quality, cross-platform mobile commerce applications quickly and efficiently. Its rich set of widgets and tools, along with its fast performance and easy-to-use features, make it an attractive option for developers looking to build engaging and responsive mobile commerce applications.

## 5.3 Language

### Dart

Dart is a general-purpose programming language created by Google, specifically designed to build high-performance, scalable, and maintainable applications. It is used as the primary programming language for developing mobile applications using the Flutter framework. In the context of mobile commerce applications, Dart provides developers with a range of features that can help them build robust and secure applications. Dart is an object-oriented language that supports features such as classes, interfaces, and inheritance, making it easy to write reusable and maintainable code. It also provides a strong type system that allows developers to catch errors at compile-time, reducing the likelihood of bugs and improving the overall quality of the code. Dart provides a range of built-in libraries and APIs that can be used to perform common tasks such as HTTP requests, JSON parsing, and encryption. Additionally, Dart can be used to write server-side code, allowing developers to create backend services that can be used to power their mobile commerce applications. Overall, Dart is a powerful and flexible language that can help developers build high-quality, scalable, and maintainable mobile commerce applications. Its object-oriented features, strong type system, and built-in libraries and APIs make it an attractive option for developers looking to build robust and secure applications.

## **5.4 Setting and Configuration**

Before starting to develop the dessert mobile commerce application, there are two software needed to be installed and downloaded in my laptop:1. Visual Studio 2019 Enterprise Edition v16.11.18, SDK2. Android Studio Chipmunk 2021.2.1

## 5.5 System Operation

### Application Icon



*Figure 5.5.1 Heaven Dessert Application Icon*

After developed and launcher the dessert mobile commerce application, it is the icon with the name on the mobile page.

### Heaven Dessert Splash Screen



*Figure 5.5.2 Splash Screen*

This is the splash screen after the user start and run the dessert mobile commerce application.

### Heaven Dessert Role Selection

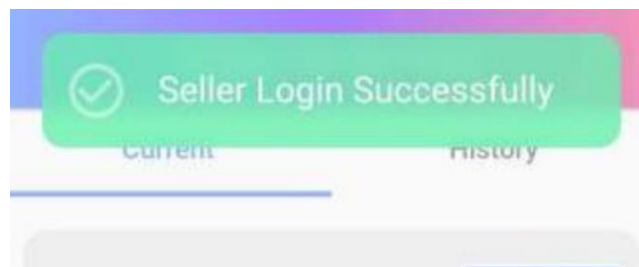
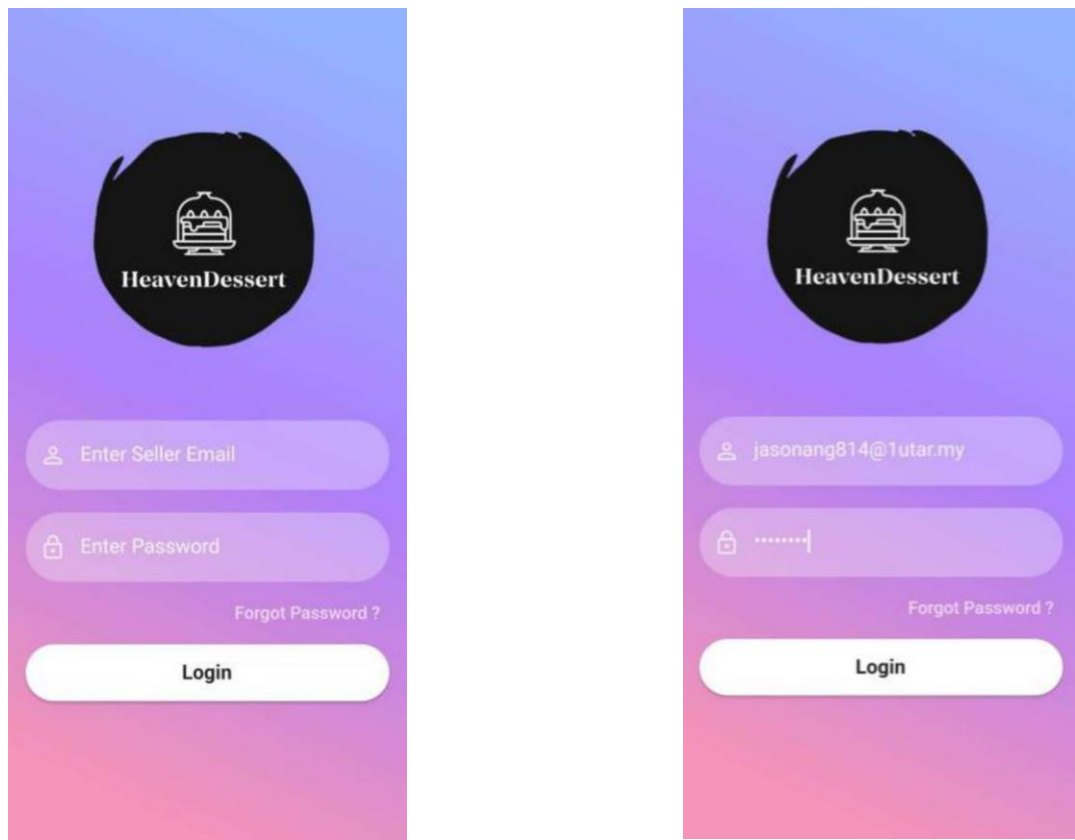




*Figure 5.5.3 Role Section*

This page is for user to select they want to login as buyer or seller.

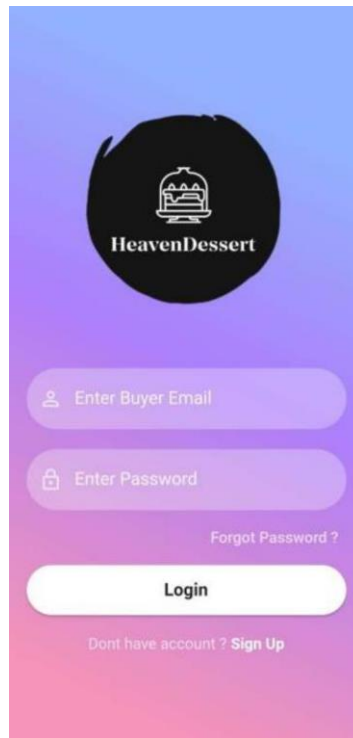
## Seller Authentication System



*Figure 5.5.4 Seller Login Page*

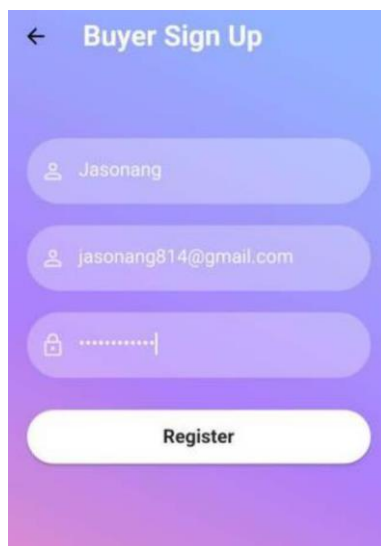
If the user chooses to login as seller, then he will proceed to the seller login page. After he fill in the email and password and press the login button. If the account is existing and valid in the Firebase Authentication record, then he will login to the seller page successfully.

## Buyer Authentication System



*Figure 5.5.5 Buyer Login Page*

If the user chooses to login as seller, then he will proceed to the seller login page.



*Figure 5.5.6 Buyer Sign Up Page*

The application will have a sign-up page for the seller to type the email and password for user authentication. The seller can fill in the username, email, and password, then the Firebase Authentication will store the email and password. The user can click the “Register” button to save the email and password and proceed to the next section.

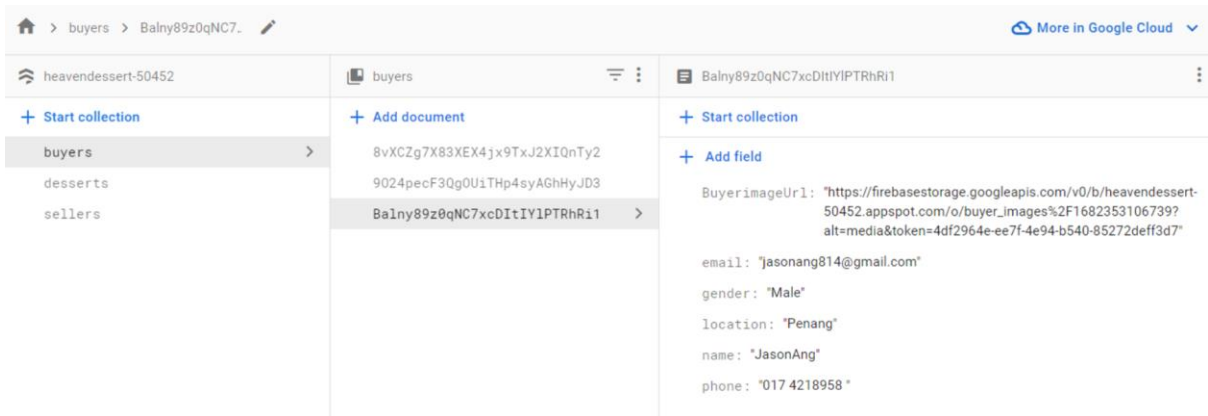
Identifier	Providers	Created ↓	Signed in	User UID
jasonang814@gmail.com		25 Apr 2023	25 Apr 2023	Balny89z0qNC7xcDITIYIPTRhRi1

*Figure 5.5.7 Firebase Authentication*

After clicking the register button, the email and password will be stored in the Firebase Authentication storage.

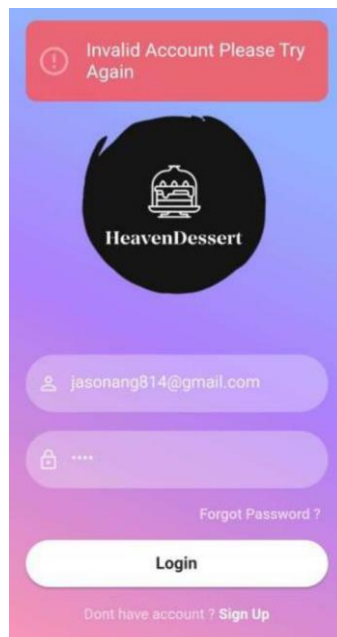
*Figure 5.5.8 Buyer Information Form*

Once the buyers click the register button, they will jump to the next section which is the buyer information form for them to fill in the personal details like buyer name, gender, email, phone number, and location.



*Figure 5.5.9 Firebase Database Seller Information*

Once the buyer clicks the next button, that information will be stored in the Firestore Database which was implemented before in the Android Studio. Then the buyer will enter main page of the application



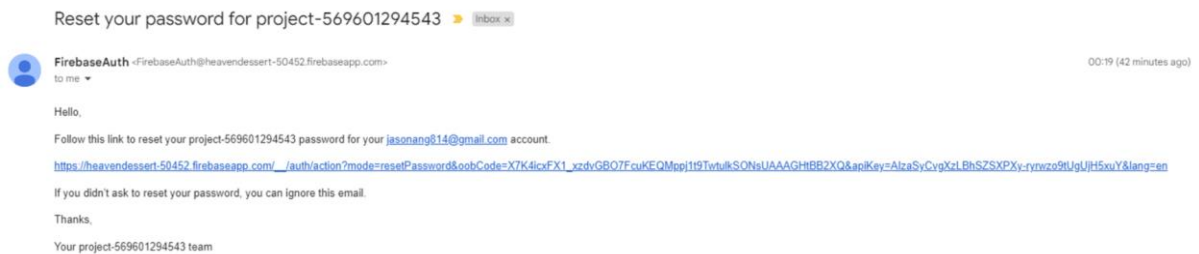
*Figure 5.5.10 Invalid Account Warning*

If the user enters the wrong email or password, then the system will pop out the invalid account warning to ask the user the refill the email and password again.

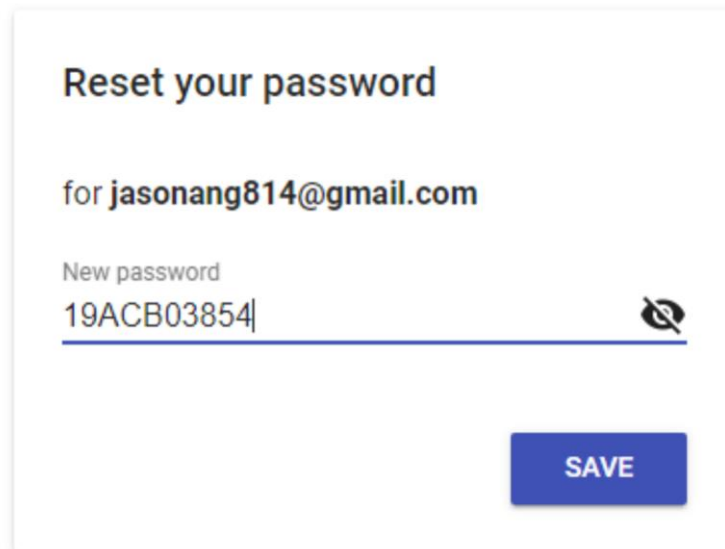


*Figure 5.5.11 Reset Password Page*

If the users forget their password, they can just click the “forgot password?” enter their registered email and click reset password.




*Figure 5.5.12 Email for Reset Password*



Reset your password

for **jasonang814@gmail.com**

New password

19ACB03854| 

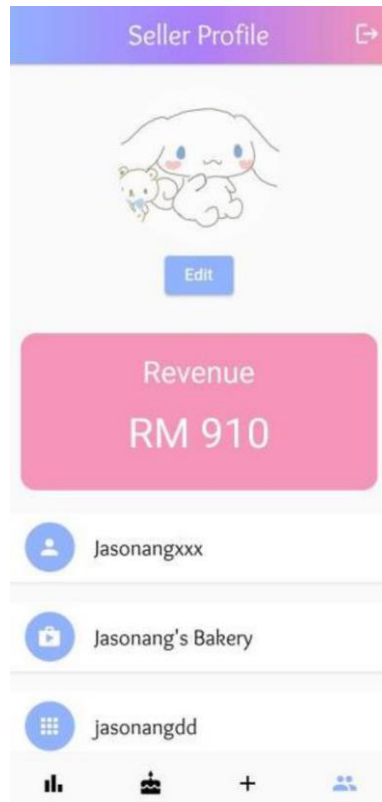
**SAVE**

*Figure 5.5.13 Password Reset Form*



Then the Firebase Authentication feature will send an email to the user's account to reset the password. Once the seller has reset the password. The user can login with the new password.

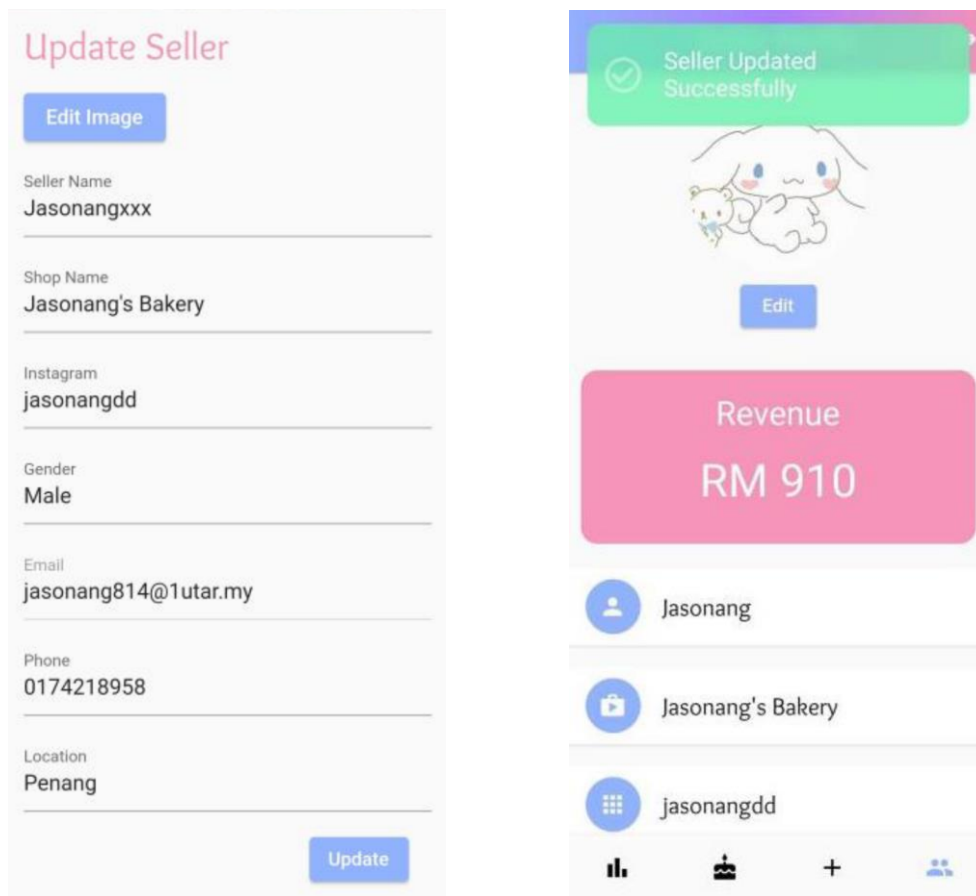
## Seller Profile Page



*Figure 5.5.14 Seller Profile Page*

For the seller profile page, the information will be displayed as those stored in the Firestore Database. The seller can also view and check their revenue after they completed the order. The seller can log out of the account by clicking the top right log out icon button.





*Figure 5.5.15 Update the Information of Seller*

If the seller wants to edit the information, he can press the edit the button and modify the details of seller. But the seller cannot change their email due to the email need to be fixed for the account authentication.

## Seller Insert Dessert

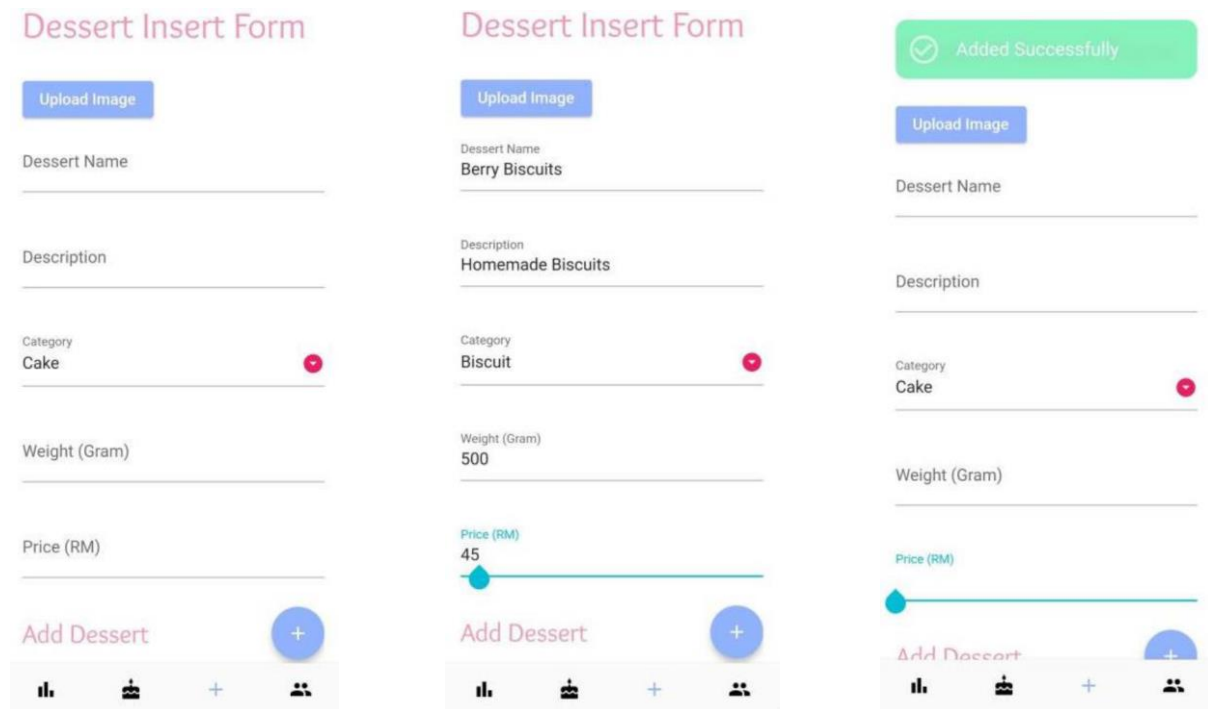


Figure 5.5.16 Dessert Upload Form

The seller can upload the dessert he wants to sell at the dessert insert page. There will have a form for the seller to upload the photo and fill in the information about the dessert that they want to upload to the public and view by the buyers.

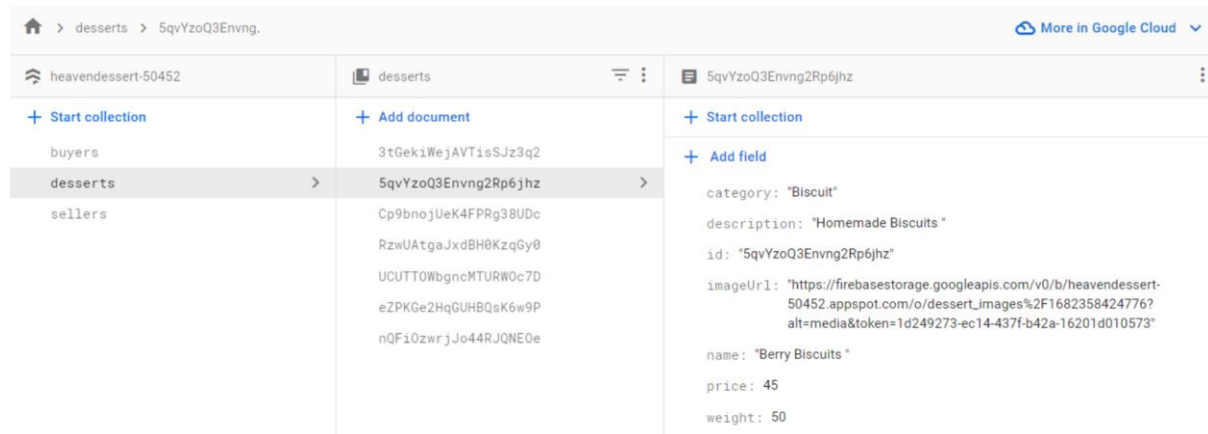
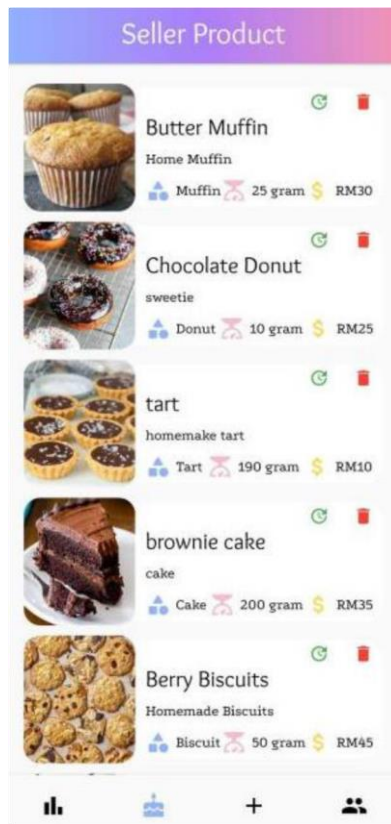


Figure 5.5.17 Firebase Database Dessert Information

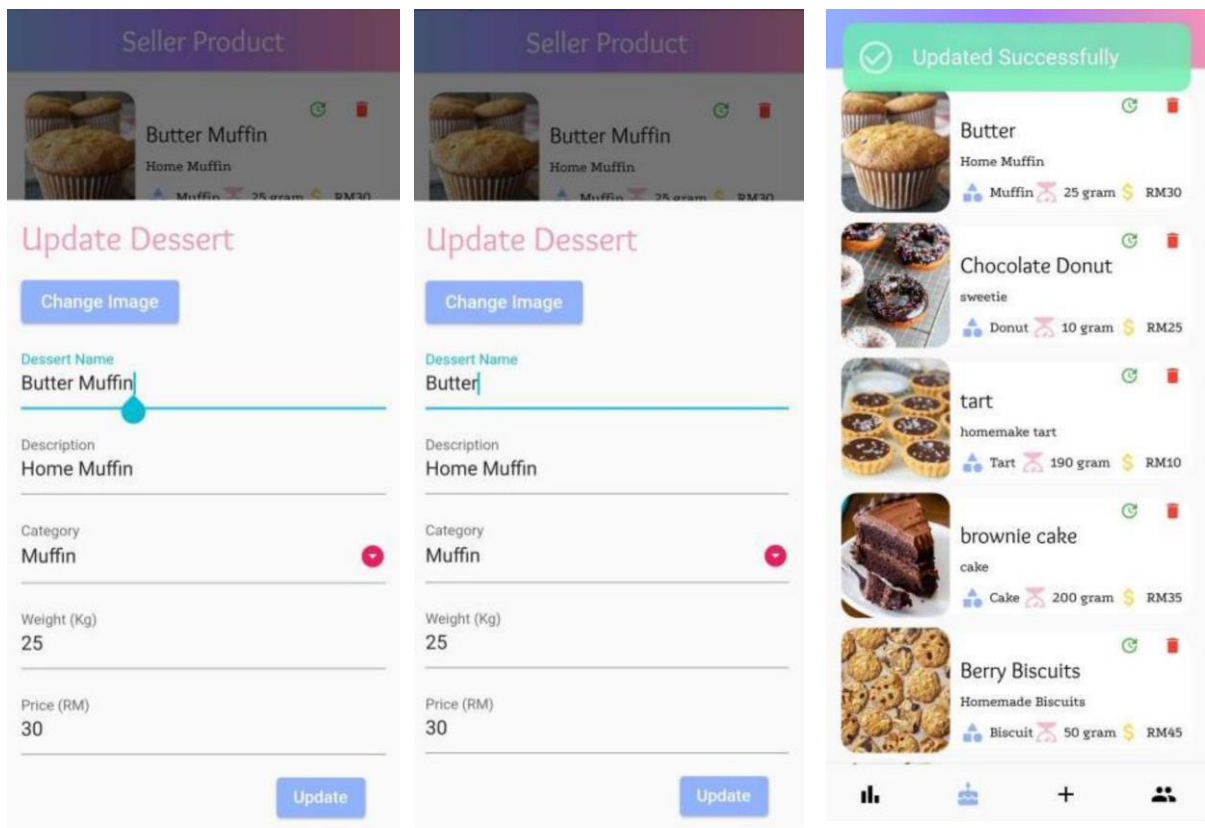
After filled in the information, the information will be stored in the Firestore Database and will be display on the page of the seller's dessert page.

### Seller Dessert Modify



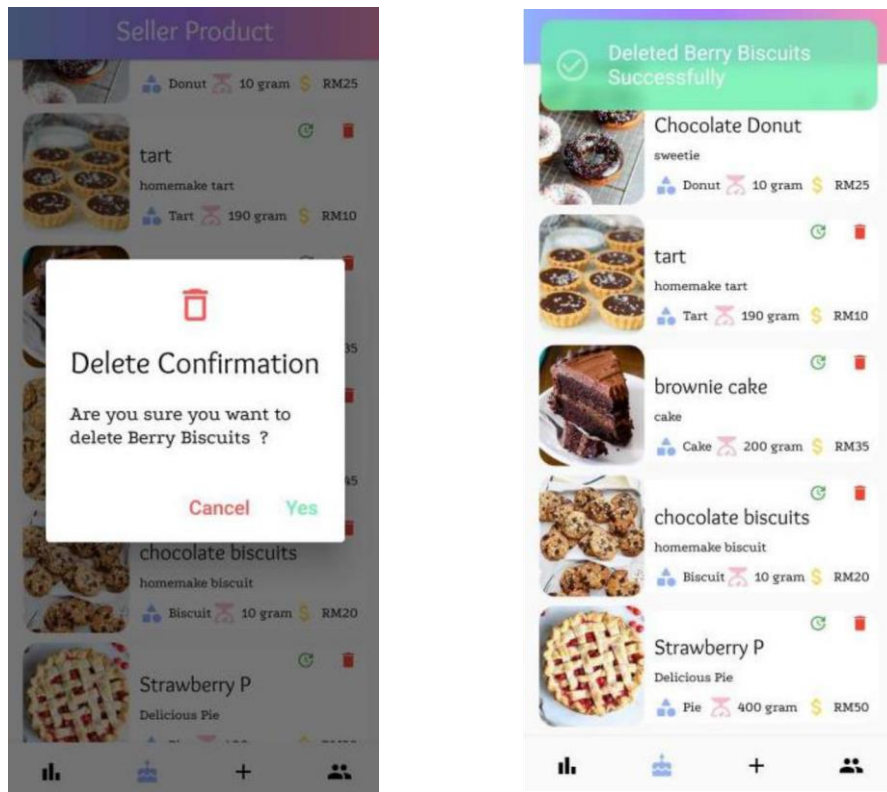
*Figure 5.5.18 Seller Product Page*

The dessert that added by seller will display on the seller product page. The seller can modify and manage the desserts here.



*Figure 5.5.19 Dessert Update Form*

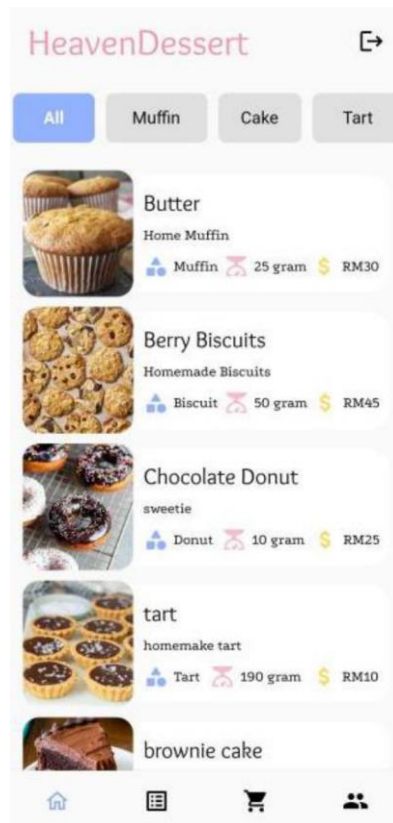
The seller is allowed to modify the details of the dessert by clicking the top right corner green update button of the dessert. After the seller modified the information, then they just need to click the update button and the information will be updated successfully in the Firestore Database too.



*Figure 5.5.20 Seller Delete Dessert*

The seller can also click the red dustbin button to delete the dessert that is not available currently.

## Buyer Purchase Dessert Process



*Figure 5.5.21 Buyer Main Page*

The desserts those uploaded by the seller will display on the buyer main page to let them view. The desserts will display in the list with the image and the information of dessert like name, description, category, weight, and price.

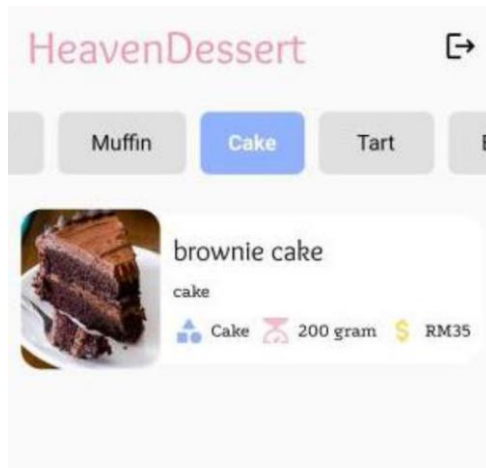


Figure 5.5.22 Filter Feature

The buyer can filter the dessert list according to the type of category. The buyer can press the tab button on the top to filter the dessert.

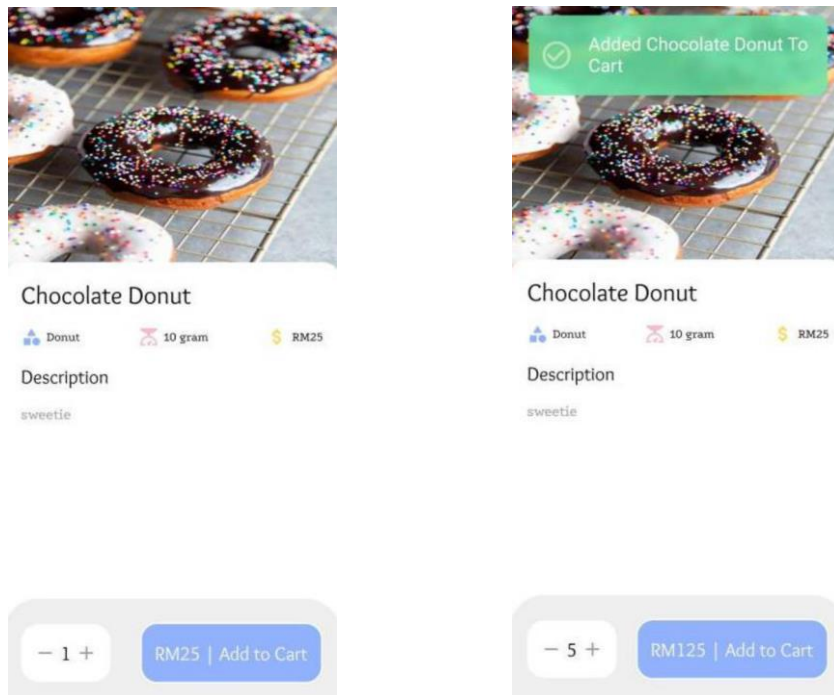
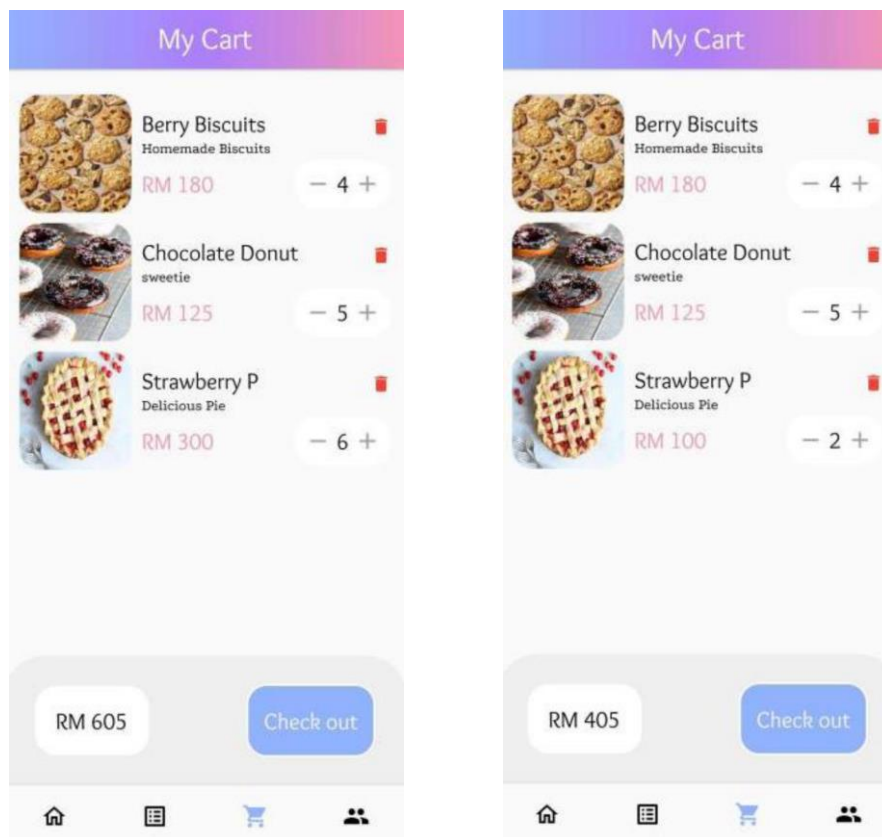


Figure 5.5.23 Dessert Description Page

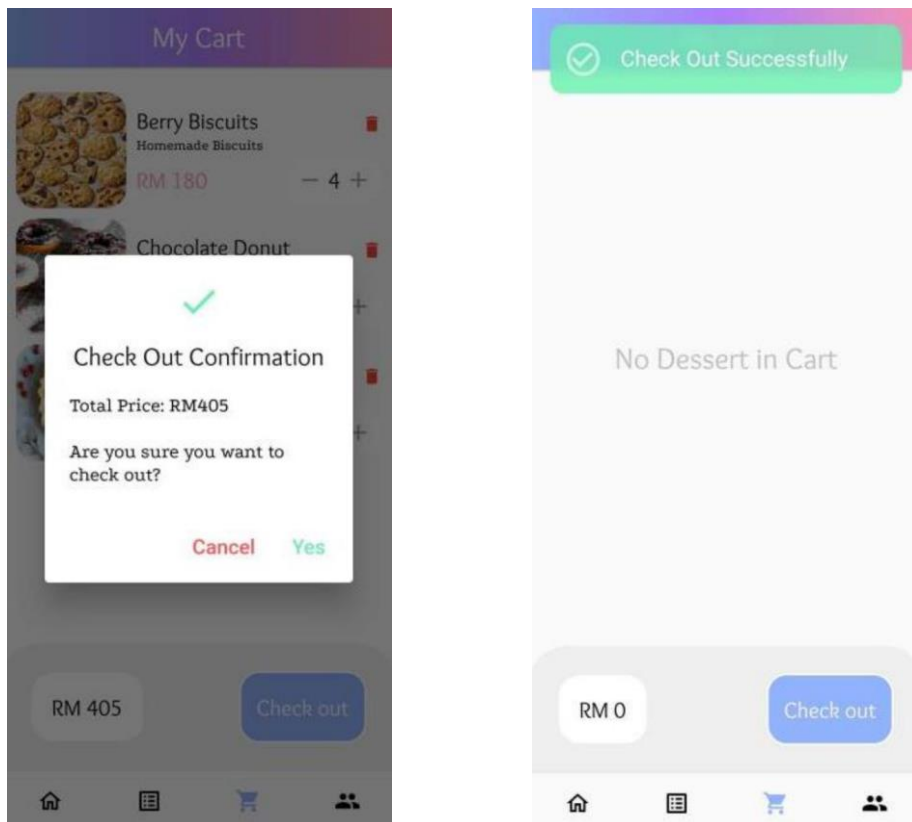
On the dessert page, the buyer can click the dessert to route another page to show more information about the specify dessert. The buyer can decide to set the quantity of the dessert and consider adding to the cart.



*Figure 5.5.24 Buyer Cart*

After the buyer add those interested dessert in the cart, the cart will show all the desserts in a list order and calculate total price for buyer to see. The buyer can modify the number of the quantity in the cart too.

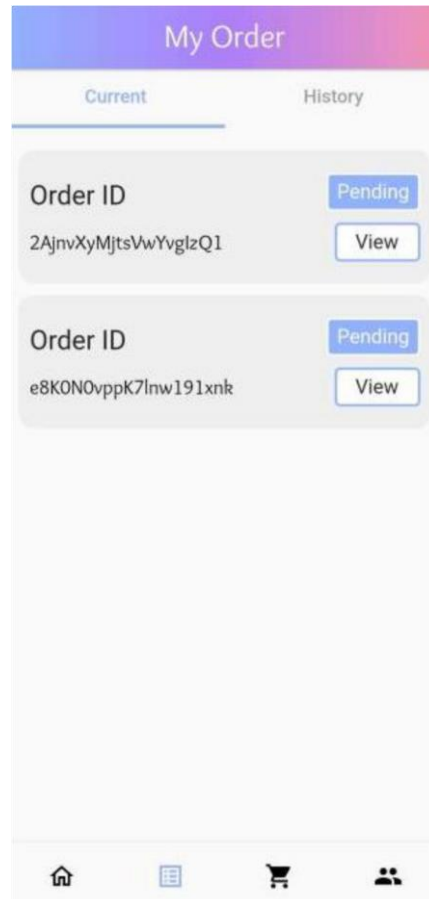




*Figure 5.5.25 Check Out Cart*

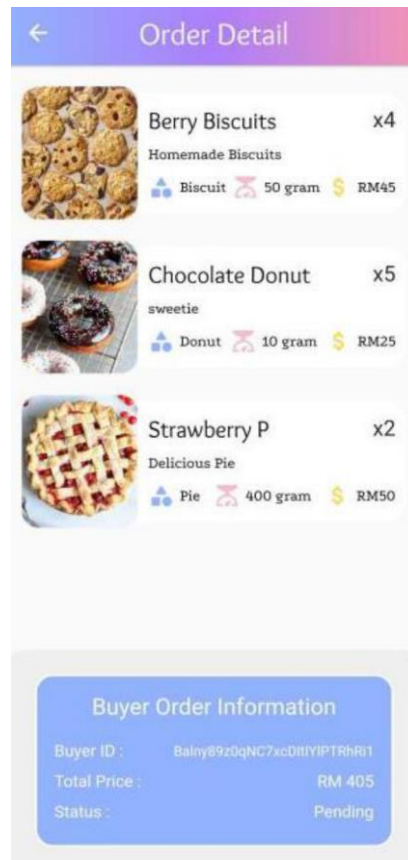
If the buyer decided to purchase the desserts, he can press the check out button to check out the cart items. After checking out successfully, the cart will become back to empty and wait the buyer to have further dessert to add.

## Update Order Status



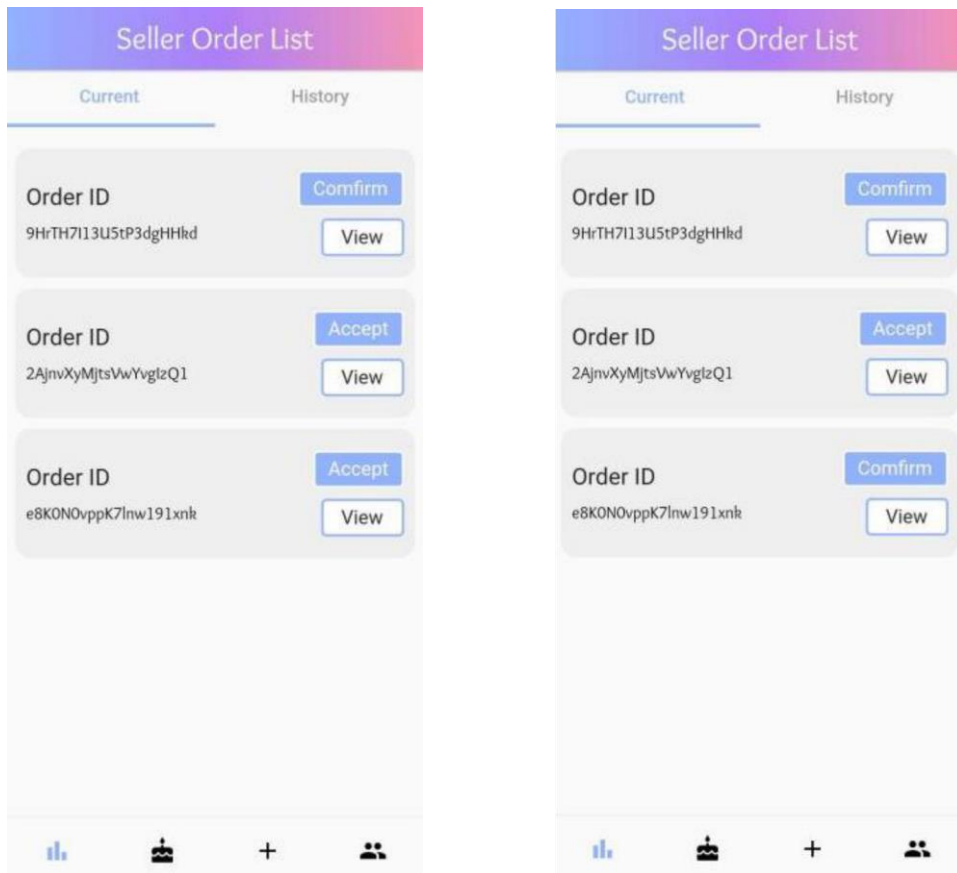
*Figure 5.5.26 Buyer Order Page*

After the buyer has check out the cart successfully, the order will display on the buyer order page. The status of the order will state pending because it is going to wait the seller to accept the order.



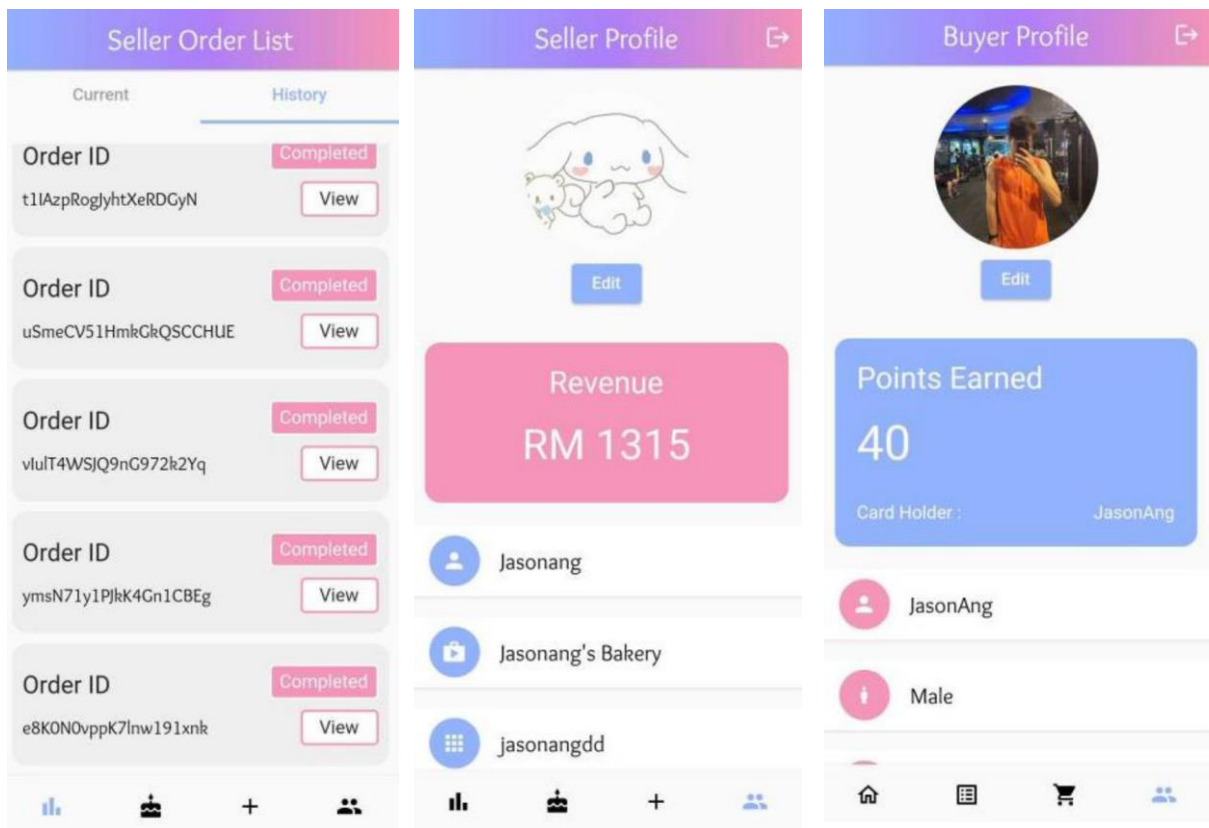
*Figure 5.5.27 Order Detail*

The buyer can press the view button to see the detail of the order. There will list out all the desserts that the buyer added to the cart. The card at the below is stating the buyer order information like buyer ID, total price, and the status of the order.



*Figure 5.5.28 Seller Order List*

At the seller order list page, there will list out all the ordered that made by every buyer. Seller can press the accept button to accept the buyer's order, then once the seller is prepared and delivered the order to the buyer, seller can press confirm to complete the order.



*Figure 5.5.29 Complete the Order*

Once the order is completed, the order will display at the history page for the seller and buyers to view. Then, the revenue of the seller and the point earn of the buyer will also increase once the order is completed.

## 5.6 Implementation Issues and Challenges

Implementing this dessert mobile commerce application using Flutter and Firebase can present various issues and challenges. Some of these include like the authentication and security. Implementing secure authentication and ensuring the security of user data is crucial for any mobile commerce application. In the case of Flutter and Firebase, the application must ensure that the authentication process is robust and secure. This can be achieved by using Firebase Authentication, which provides various sign-in methods, such as email and password, phone number, and social media authentication. Additionally, the application must ensure that the user data is encrypted and stored securely on Firebase servers.

Then, the second challenge is the real-time database management. This is because in a mobile commerce application, managing real-time data such as dessert details, order information, and buyer orders is crucial. Firebase Realtime Database can be used to manage real-time data in Flutter applications. However, it is important to design the database schema carefully and use proper data modeling techniques to ensure efficient and effective data retrieval.

Next issue is about the payment gateway integration. Integrating payment gateways into a mobile commerce application can be complex. The application will need to integrate a payment gateway that is compatible with Flutter and Firebase, such as Stripe or PayPal. The application must also ensure that the payment process is secure, and that customer payment data is encrypted and stored securely. So, in the end due to the complexity, the application is not applying the payment gateway integration while only design as a simple check out confirmation.

Last challenge is about the performance and scalability of the application. This is because a mobile commerce application should be able to handle high volumes of traffic and transactions. To ensure optimal performance and scalability, the application must optimize the application's code and use Firebase Cloud Functions to perform backend operations such as processing payments and order transaction run in a smooth process.

## **5.7 Concluding Remark**

In conclusion, implementing a dessert mobile commerce application using Flutter and Firebase can be a challenging yet rewarding experience. By addressing key issues such as authentication and security, real-time database management, payment gateway integration, user interface design, and performance and scalability, developers can create a robust and effective mobile commerce application that meets the needs of their target audience. With the right planning, design, and implementation, a dessert mobile commerce application can provide a seamless and enjoyable experience for customers, resulting in increased sales and customer loyalty.

# Chapter 6 System Evaluation and Discussion

## 6.1 System Testing and Performance Metrics

The application will allow the seller to be able to login and enter the main page. Then, seller is also allowed to upload the details of the dessert and modify the details of the uploaded dessert. Next, seller can view and update the status of the order. Seller can update the profile information and view the revenue too. There will have some verifications required to fulfill such as:

1. The seller and buyer will be able to login to the application successfully.

No.	Test Case	Expected Outcome	Result
1.	Verify user fill in the form with NULL data (email or password)	The user will not be able to log in to the application and will pop the error message	PASS
2.	Verify user filled in the wrong password of the account	The user will not be able to login and will pop the error message to allow the user to fill in the correct password	PASS
3.	Verify user fill in the account email and password that does not register.	The user will not be able to login and will pop the error message that warns that is not a valid account	PASS
4.	Verify user to reset the password by filling in the existing email	The user will be able to receive a reset password email to reset the password	PASS

*Table 6.1.1 Verification Plan 1*



- The seller will be able to upload the information about the dessert and display it successfully.

No.	Test Case	Expected Outcome	Result
1.	Verify seller fill in the form with empty data (name, category, price)	The seller will not be able to add the dessert and will pop the warning for the seller to enter proper data.	PASS
2.	Verify seller to add the dessert successfully by clicking the Add Button.	The seller can add the dessert successfully and pop out successfully added message.	PASS
3.	Verify the seller to view the added dessert on the seller dessert page.	The seller will be able to view and scroll the list of desserts added by the seller.	PASS

*Table 6.1.2 Verification Plan 2*

- The seller will be able to modify the information about the desserts added and delete them if necessary.

No.	Test Case	Expected Outcome	Result
1.	Verify the pop out form by clicking the update button.	The seller will be able to fill out the updated dessert form by clicking the update button.	PASS
2.	Verify the seller modified the information about the dessert.	The seller will be able to modify the information about the dessert and will show the updated successfully message.	PASS
3.	Verify the seller deletes the added dessert by clicking the delete button.	The seller will be able to delete the dessert from the Firestore Database	PASS

*Table 6.1.3 Verification Plan 3*

4. Buyer can view the status of order and seller can update the status of order.

No.	Test Case	Expected Outcome	Pass
1.	Verify the buyer order list will appear after buyer check out	The buyer order page will have the check out order and pending status.	PASS
2.	Verify the seller can accept the order.	The seller can accept the order and the status of order from buyer will become "Processing".	PASS
3.	Verify the seller can confirm the order.	The seller can confirm the order and the status of order from buyer will become "Completed".	PASS
4.	Verify the completed status of the order from seller and buyer side.	The completed status of the order will display at the history page.	PASS
5.	Verify the result after completed the order.	The buyer will get the point and seller will earn the revenue.	PASS

*Table 6.1.4 Verification Plan 4*

5. The seller and buyer can update the profile page.

No.	Test Case	Expected Outcome	Result
1.	Verify the data of the user information will display on the profile.	The information of the user will display instead of bad state error.	PASS
2.	Verify the user can update the profile.	The user can modify and update the photo and information of user.	PASS
3.	Verify the user to logout the account and back to role selection page by clicking the logout button.	The user will be able to log out of the account.	PASS

*Table 6.1.5 Verification Plan 5*

6. The buyer can add the dessert to cart and check out successfully.

No.	Test Case	Expected Outcome	Result
1.	Verify the data of the dessert will display on the buyer main page.	The buyer can view all the added desserts in list order with details.	PASS
2.	Verify buyer can adjust the quantity of the dessert.	The buyer can set the quantity of the dessert until maximum 10 units.	PASS
3.	Verify buyer cart page.	The added dessert will display on the cart page.	PASS
4.	Verify buyer to modify the cart.	The buyer can readjust the quantity or the desserts and delete them.	PASS
5.	Verify the accurate of the total price	The total price of the total desserts in the cart is correct.	PASS
6.	Verify the checkout button function.	The order will be check out and the cart will be empty.	PASS

*Table 6.1.6 Verification Plan 6*

## 6.2 Project Challenges

During develop this dessert mobile commerce application will face some problems and challenges. One of the challenges is the learning curve. This is because learning to work with Flutter and Firebase can be challenging, especially for me who are not familiar with these technologies. The development process invests time and effort in learning to ensure that I can use these technologies effectively. Second challenges for this project are the integration challenges. The integrating Flutter with Firebase are quite complex, especially when considering the various Firebase services that may be required, such as authentication, storage, and real-time database. The database needs to be well design to store the data like user information, dessert details and the order detail and status. Bad design of the database will mess up the development and waste time. The third challenge is to design the user experience interface. Designing a user-friendly and intuitive interface for the application can be challenging, as the development process will need to leverage Flutter's widgets and design principles to create a visually appealing and user-friendly application. I have watched many UI design videos and review several applications that related to the dessert application to design the project. The last challenges that I face for this project is the ensure the performance and scalability of this application is well. The application needs to handle large volumes of traffic and transactions, while maintaining high levels of performance, can be challenging. The development process will need to optimize the application to run smoothly on various devices and network conditions.

### **6.3 Objectives Evaluation**

Basically, the dessert mobile commerce application is developed to achieve the objective. For the first objective which is the customers can easily access desserts by filtering them according to category. The application provided a user-friendly interface that allows customers to easily filter desserts by category. The effectiveness of this feature can be evaluated by tracking the number of successful filter usage. Customers can press the default filter button to filter the dessert on the main page.

Then, for the second objective which is customers can track the order and view the status of the order. The application allowed customers to track their orders and view the status of their orders in real-time. The effectiveness of this feature can be evaluated by tracking the number of successful order tracking attempts and customer satisfaction levels.

Next, the third objective is sellers can upload information of the dessert to advertise and sell their products. The application provided sellers with a user-friendly interface of the form that allows seller to easily upload and manage the information of their desserts.

Last objective of this project which is customers can claim points after completing an order. The application provided a point system that allows customers to earn points after completing an order. The points that earned by buyer will display on the buyer profile. The buyer can use the point to purchase order to deduct the total price.

## **6.4 Concluding Remark**

The development of the mobile commerce application for desserts faces several challenges, such as the challenge of learning to work with Flutter and Firebase, as well as integrating these technologies. Additionally, designing a user-friendly interface and ensuring good performance and scalability can be difficult. The success of the objectives can be measured by analyzing the number of successful uses of filters, tracking attempts, and customer satisfaction. The objectives of the application are to allow customers to filter desserts by category, track their orders in real-time, enable sellers to easily upload and manage their dessert information, and provide customers with a points system that allows them to earn and use points towards orders. The dessert mobile commerce application is designed to provide an effortless experience for both buyers and sellers.

# Chapter 7 Conclusion and Recommendation

## 7.1 Conclusion

In conclusion, the development of a dessert mobile commerce application using Flutter and Firebase has been a success, and all objectives have been achieved. The project aimed to create a user-friendly and efficient mobile application that would allow customers to browse and filter desserts with ease. Through the integration of Firebase, the application was able to track the order and view the status of the order. The seller can upload information of the dessert to advertise and sell their products. Last objective which is the buyer can claim point after completed an order.

The application was developed using Flutter, a powerful and flexible mobile app development framework that allowed for efficient development and customization of the user interface. The use of Firebase as a backend provided a scalable and reliable solution for data storage and management, which was critical for the application's success.

Throughout the development process, various challenges were encountered, such as integrating different Flutter packages and ensuring seamless communication between the app and Firebase. However, these challenges were overcome through careful planning, research, and collaboration.

From this project development, I have learned a lot about mobile app development using Flutter and Firebase. I have gained valuable experience in designing and implementing user interfaces, managing application state, and integrating third-party packages. Additionally, I have developed an understanding of Firebase's capabilities in managing real-time data and providing user authentication, dessert information and order transaction between buyer and seller.

Overall, the development of a dessert mobile commerce application using Flutter and Firebase has been a valuable learning experience that has equipped me with the skills and knowledge necessary for future projects. Through this project, I have gained a deeper understanding of mobile app development and the tools and technologies used in the industry. I am confident that the skills and experience gained from this project will be beneficial in my future endeavors.

## 7.2 Recommendation

Based on the experience of developing a dessert mobile commerce application with Flutter and Firebase, the project can develop with the use of advanced technologies for future mobile app development projects.

One potential advanced feature is the integration of artificial intelligence (AI) technologies, such as machine learning algorithms, to provide personalized recommendations and improve the overall shopping experience. This could include features such as personalized dessert recommendations based on previous orders or preferences, or real-time chatbots to assist with customer inquiries and support.

Another potential feature is the integration of augmented reality (AR) technologies to allow customers to visualize and interact with desserts before making a purchase. This could include features such as 3D models or virtual reality tours of desserts, which would provide customers with a more immersive and engaging shopping experience.

In addition, integrating social media features, such as user-generated content, social sharing, and influencer partnerships, could increase customer engagement and help promote the application to a wider audience.

Finally, implementing secure and efficient payment processing, such as support for multiple payment options and mobile wallets, can help streamline the checkout process and increase customer satisfaction.



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[12] App Annie. (2020). COVID-19 mobile app impact report. [Online]. Available: <https://www.appannie.com/en/insights/market-data/covid-19-mobile-app-impact-report/>. [Accessed: Apr. 27, 2023].

[13] Facebook. (2021). Global state of small business report. [Online]. Available: <https://www.facebook.com/business/boost/resource/global-state-of-small-business-report>. [Accessed: Apr. 27, 2023].

[14] NIST. (2020). Cybersecurity considerations for remote work. [Online]. Available: <https://www.nist.gov/blogs/cybersecurity-insights/cybersecurity-considerations-remote-work>. [Accessed: Apr. 27, 2023].

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 3</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

Done to separate the buyer and sell module.

## 2. WORK TO BE DONE

Planning to allow buyer to filter the dessert.

## 3. PROBLEMS ENCOUNTERED

-

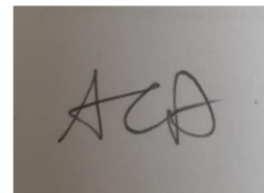
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 4</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The buyer is allowed to filter the dessert based on the category.

## 2. WORK TO BE DONE

Allow the user to upload image for the profile.

## 3. PROBLEMS ENCOUNTERED

Not familiar with the image upload using Firebase.

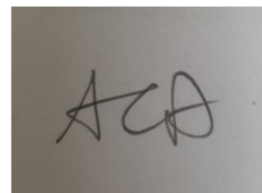
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 5</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The user is allowed to upload the profile image.

## 2. WORK TO BE DONE

Planning to develop the user can edit their profile.

## 3. PROBLEMS ENCOUNTERED

-

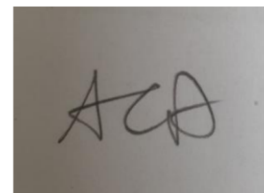
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 6</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The user is allowed to edit their profile.

## 2. WORK TO BE DONE

Planning to do the buyer add to cart.

## 3. PROBLEMS ENCOUNTERED

Struggle to design the database for the cart.

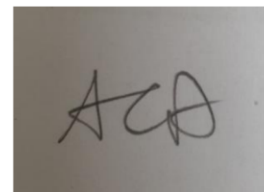
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 7</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The buyer can adjust the quantity of the dessert and add to cart.

## 2. WORK TO BE DONE

Planning to allow buyer to modify the cart.

## 3. PROBLEMS ENCOUNTERED

-

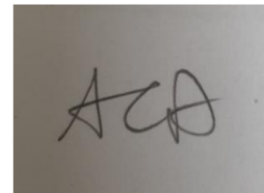
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 8</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The buyer is allowed to modify the quantity of the dessert and can delete the unwanted dessert.

## 2. WORK TO BE DONE

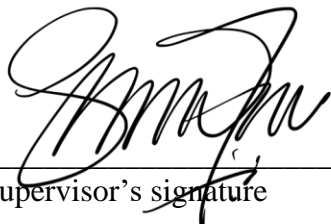
Planning to fetch the check out item list to seller and buyer order page.

## 3. PROBLEMS ENCOUNTERED

Not familiar to store the list item in the Json format.

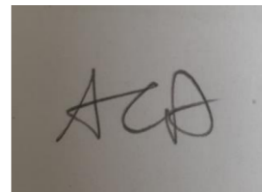
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 9</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The check out order can display on seller and buyer order page.

## 2. WORK TO BE DONE

Planning to do the seller can update the status of the order.

## 3. PROBLEMS ENCOUNTERED

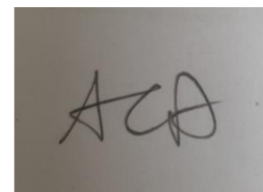
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## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 10</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The seller can accept and confirm the status of the order.

## 2. WORK TO BE DONE

Planning to do the completed order will store and display at the history page.

## 3. PROBLEMS ENCOUNTERED

-

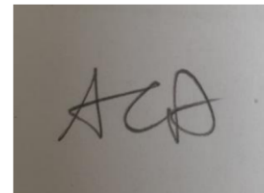
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 11</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The completed page will fetch and display at the history part.

## 2. WORK TO BE DONE

Planning to do the buyer will receive point and seller will earn revenue after the order is completed.

## 3. PROBLEMS ENCOUNTERED

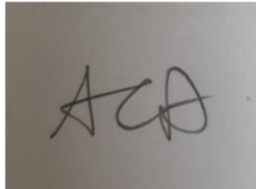
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## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 12</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

The buyer and seller can receive their point and revenue after order is completed.

## 2. WORK TO BE DONE

Finalize all the module and adjust the design of the user interface.

## 3. PROBLEMS ENCOUNTERED

-

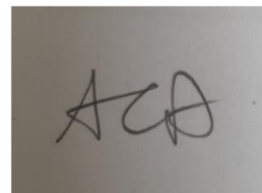
## 4. SELF EVALUATION OF THE PROGRESS

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Supervisor's signature



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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Trimester 3 Year 3</b>	<b>Study week no.: 13</b>
<b>Student Name &amp; ID: Ang Chyh Dian 1903854</b>	
<b>Supervisor: CIK ANA NABILAH BINTI SA'UADI</b>	
<b>Project Title: Dessert Mobile Commerce Application</b>	

## 1. WORK DONE

Complete the final year project.

## 2. WORK TO BE DONE

Write the report.

## 3. PROBLEMS ENCOUNTERED

-

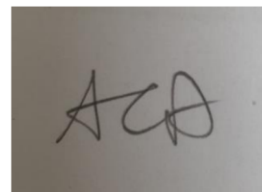
## 4. SELF EVALUATION OF THE PROGRESS

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Student's signature

# POSTER



Ang Chyh Dian IA 1903854

## Dessert Mobile Commerce Application



### Introduction.

This project dessert mobile e-commerce will be developed to help those small and medium sellers to sell their different types of desserts on an online platform. Consumers can filter and find the dessert they like easily.

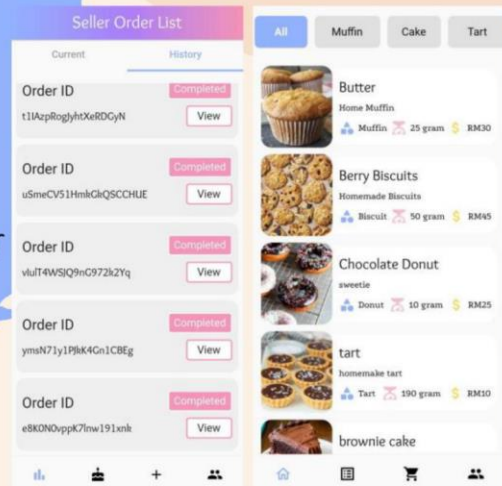


### Objectives.

1. Ease of access for the customers to filter specific desserts.
2. Track and View History Order.
3. Seller upload information about the dessert to advertise desserts
4. Allow the consumer to claim point after completed an order.



### Results.



### Methodologies.

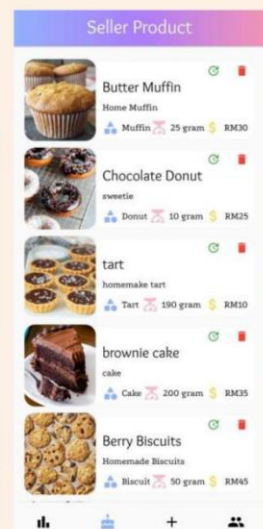
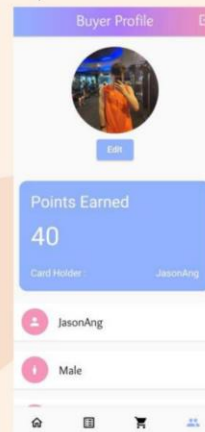
1. Apply firebase Auth for account authentication.
2. Apply Firestore Database to store the information of seller and dessert.
3. Apply seller to upload, display, update and delete dessert.



### Conclusion.

The project is hoped to be delivered successfully and it could be useful and bring convenience for the dessert lover to find and enjoy the dessert.

Supv: CIK ANA NABILAH  
BINTI SA'UADI



## PLAGIARISM CHECK RESULT

### FYP2 Report

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Form Number: FM-IAD-005	Rev No.: 0	Effective Date: 01/10/2013	Page No.: 1 of 1



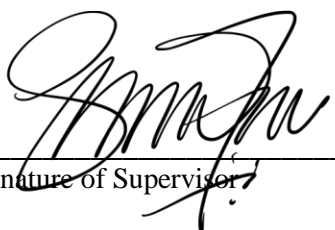
**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY**

<b>Full Name(s) of Candidate(s)</b>	Ang Chyh Dian
<b>ID Number(s)</b>	19ACB03854
<b>Programme / Course</b>	IA
<b>Title of Final Year Project</b>	Dessert Mobile Commerce Application

<b>Similarity</b>	<b>Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)</b>
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***Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.***



---

Signature of Supervisor

Name: ANA NABILAH BINTI SA'UADI

Date: 27 APRIL 202

---

Signature of Co-Supervisor

Name: \_\_\_\_\_

Date: \_\_\_\_\_



**UNIVERSITI TUNKU ABDUL RAHMAN**

**FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY  
(KAMPAR CAMPUS)**

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Student Id	19ACB03854
Student Name	Ang Chyh Dian
Supervisor Name	CIK ANA NABILAH BINTI SA'UADI

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	Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
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√	Weekly Log
√	Poster
√	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)
√	I agree 5 marks will be deducted due to incorrect format, declare wrongly the ticked of these items, and/or any dispute happening for these items in this report.

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I, the author, have checked and confirmed all the items listed in the table are included in my report.

(Signature of Student)

Date: 27<sup>th</sup> April 2023

