

MODEL-VIEW-CONTROLLER
ARCHITECTURE CAFETERIA
MANAGEMENT SYSTEM WITH
FOOD PRE-ORDERING
BY
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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TUNKU ABDUL RAHMAN

Date: 1/9/2021

SUBMISSION OF FINAL YEAR PROJECT /DISSERTATION/THESIS

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Name : Ewe Chun Kit

Date : 2/9/2021

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ABSTRACT

This is a cafeteria management system with food pre-ordering for academic purpose. It is developed to reform the traditional business model in school cafeteria and bring a new trend to them. As during this Covid-19 pandemic, the students are not allowed to get meal directly from the canteen. The traditional canteen's business model requires a lot of manual work from the staffs. Especially during this covid-19 pandemic, the staffs need to deal with the pre-order records which generated by using excel. The flow of ordering would cause human errors, for instances users break the rules when placing order, incorrect data migration, and others. All these human errors will cause the users and hawkers receive the incorrect results and affect their purchasing experience. Therefore, this system is going to provide the school cafeteria to have a better management. Due to the unclear user requirement, throwaway prototyping is conducted as the methodology. This methodology is mostly used when the user requirements are not clear is because it allows the developer to send the prototype and do further enhancement to fulfil the user requirements. MVC will be taken as the architectural pattern of this project to reduce the redundancy of code. This project will study and compare the similar systems and interview a secondary school's food pre-ordering system as references.

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LIST OF ABBREVIATIONS

<i>etc.</i>	et cetera
<i>MCO</i>	Movement Control Order
<i>COVID-19</i>	Coronavirus Disease 2019
<i>MVC</i>	Model-View-Controller
<i>CRUD</i>	Create, read, update, and delete
<i>API</i>	Application Programming Interface
<i>UI</i>	User Interface
<i>PDA</i>	Personal Digital Assistant
<i>CSRF</i>	Cross-Site Request Forgery

Chapter 1 Introduction

This chapter includes the problem statement and motivation, project scope, objectives, impact, significance and contribution and background information. Mainly discussing about the scope of the project and the purpose of the project.

1.1 Project Background and Motivation

Canteen plays an important role in the school. Students and teachers spend more than 8 hours in the school (including curriculum activities), canteen as the source of meals is responsible to provide a variety of nutritious meals with the reasonable price and reinforce classroom learning. For the students who take their meals from canteen frequently, the available of the best quality of food would enhance the learning performance of student in class. For the students who don't use canteen regularly, canteen delivered the message of healthy eating habits to them as well.

Malaysia government has promulgated the Movement Control Order (MCO) under the Prevention and Control of Infectious Diseases Act 1988 and the Police Act 1967 since 18 March 2020 (MCO Updates • MDBC, 2021). The purpose for promulgating MCO is to control the spread of Covid-19 virus in Malaysia. Due to the 2-week incubation time of Covid-19, Malaysia raised the 1st MCO last for 1 month. During MCO, the Malaysian are restricted to go to public area to keep social distancing between each other. School is one of the places that is restricted.

Luckily, the covid-19 cases were under-controlled, and the students may attend the physical classes from 15 July 2020. But still, the students and staff are not allowed to have meal in canteen. Many schools have ready a plan of food pre-ordering and let the students and staffs having meal in class or staff room. The canteen's hawkers will get the order one week in advance and ease them to prepare food. Besides that, this has reduced the food wastage problem as well. Without the helping of system, there are lots of paperwork need to be considered. Even though, the school using the helping of software, such as google form to let the users place order and generate excel file to create report for canteen's hawker

1.2 Problem Statement

This project will focus on how to reduce the manpower when dealing with the food orders. Below are the problem statements of this project.

- **The components of the system are not centralized**

The previous system is conducted at two sides, which are Google Form and Microsoft Excel. This seems hard to manage by the administrator. The users place orders at the Google Form while the admin analyses the data(orders) at the Microsoft Excel. Decentralized system will cause the inconsistency of data, there might have some loss of information during the data migration. Human error will be very critical in this system, for example when admin doing data migration and he/she wrongly put the orders at the column of the student who did not place the order. Besides that, human error may cause the loss of correct information. According to figure 1.1.1, the admin accidentally enters the wrong value in the column and the total value is affected. These are the flaws of the previous system.

=SUM(B5*2.4,B6*3,B7*3,B19*4,B20*3,B21*7,E5*3,E6*3,E7*5,E18*3,E19*3,B40*3,B41*5,B53*3,B54*3,E40*3,E41*3,E53*4,E54*5,E55*7)										
	A	B	C	D	E	F	G	H	I	J
49	西瓜燕菜 (RM1.60)	12	咸煎饼X2 (RM2.00)	19						
50	小苹果 1粒 (RM1.00) 【不切片】	5	海绵蛋糕X3 (RM2.70)	13						
51										
52	星期一 02-11-2020 1.00pm	数量	星期二 03-11-2020 1.00pm	数量						
53	云吞面 (RM3.00)	53	鸡饭 (RM4.00)	71						
54	皮旦肉碎粥 (RM3.00)	48	鸡饭 (加大) (RM5.00)	8						
55			鸡扒 (RM7.00)	39						
56	素-肉骨茶面 (RM3.00)	23								
57	素-经济饭 (RM4.00)	9	素-经济饭 (RM4.00)	14						
58	素-昌保鸡丁饭 (RM4.00)	10	素-日式咖喱饭 (RM4.00)	26						
59	红豆汤 (RM1.50)	18	摩摩喳喳 (RM2.00)	10						
60										
61	烤面包X2 (RM3.00)	35	木瓜 (RM2.00)	9						
62	西瓜燕菜 (RM1.60)	13	咸煎饼X2 (RM2.00)	9						
63	小苹果 1粒 (RM1.00) 【不切片】	8	海绵蛋糕X3 (RM2.70)	7						
64										
65										
66										
67					素食	RM3,692.00				
68					素食	RM1,281.00				
69					水果/糕点	RM730.40				
70						RM5,683.40				

Figure 1.1.1 Report to the canteen's hawkers

- **Loss of data integrity**

The information of the system, foods, orders, users' details, and etc, is not managed by a proper database system, which means it might be lost the data integrity. When collecting users' details, there without the primary key that can determine this data will be unique. Even the student login with their own email, but what if they wrongly insert their classes, this is another workload for admin to retrieve back to their correct class. Wrong insertion of class can lead to the correctness of report that are purposely generated to the canteen's hawkers.

2021年1月20日至1月28日 订餐表格

订餐与用餐须知:

- 1) 用餐时段: 第一次休息 (9.50am - 10.20am) / 第二次休息 (1.00pm - 1.30pm)
- 2) 用餐地点: 各自班级座位
- 3) 订餐者: 当天请假或任何状况缺席, 恕不退款。(可自行通知同学代领餐)
- 4) 订餐付款方式: 准备【现金】将交给班上负责收钱的同学。
- 5) 订餐回复将发送到您所填写的电子邮件地址。
- 6) 如有任何疑问, 请联系负责人 杨月诗012-4253268 / 郭健壮 017-4819812

注: 由各班委派负责学生, 在休息节前5分钟, 到食堂领餐。

当您提交这份表单时, 系统会记录您的电子邮件地址。

不是 ewechunkit@spsmp.edu.my? [请切换帐号](#)

*必填

中文姓名 *

您的回答

班级 *

选择

下一页

Figure 1.1.2 One of the pages from the ordering form

- **Time Consumption on data migration**

The admin needs at least 2-3days of data processing time and this happens weekly. Data processing cost very high human capital due to the statistics table is not deal with any formula and the admin enters the values one by one.

A B C D E F					
新民独中食堂订餐单					
28/10/2020 -03/11/2020					
星期三 28-10-2020 9.50am	数量	星期日 01-11-2020 9.50am	数量		
Roti CanaiX2 (RM2.40)	65	印度香饭 Nasi Briyani (RM3.00)	39		
新加坡炒米粉 + 煎蛋 (RM3.00)	24	经济炒金巨面 + 煎蛋 (RM3.00)	41		
番茄饭 (RM3.00)	66	西式早餐 (RM5.00)	75		
素-炒鸳鸯大板 (RM3.00)	15	素-卤面 (RM3.00)	8		
素-炸面 (RM3.00)	11	素-Tom Yum 炒饭 (RM3.00)	22		
素-叉烧包X2 (RM3.00)	6	素-肉松三文治 (RM3.00)	12		
薯条 (RM1.50)	69	金瓜西米露 (RM2.00)	6		
龟苓膏 (RM1.60)	18	西瓜 (RM2.00)	24		
蛋挞X2 (RM2.40)	10	红豆麻滋X2 (RM2.40)	12		
番石榴 (RM2.00)	11				
星期三 28-10-2020 1.00pm	数量	星期日 01-11-2020 1.00pm	数量		
Tomyum 汤面 (RM4.00)	37	红酱意大利面 (RM3.00)	53		
卤肉饭 (RM3.00)	73	鸡扒饭 (RM3.00)	96		
鱼扒 (RM7.00)	12	素-叉烧饭 (RM4.00)	2		
素-经济饭 (RM4.00)	6	素-鸡饭 (RM4.00)	12		
素-宫保虾菇饭 (RM4.00)	10	金瓜西米露 (RM2.00)	10		
薯条 (RM1.50)	84	西瓜 (RM2.00)	27		
		花生麻滋X2 (RM2.00)	19		

Figure 1.1.3 Reports of the whole week orders

Besides that, the admin needs to generate different types of reports to fulfil the business requirement. When generating the reports that grouping by classes, the admin has to generate each class excel tables to get the information. If there are 21 classes which means the admin has to generate 21 tables before generating the report to canteen's hawkers.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
J1W 陈洁慧老师				J1W 陈洁慧老师				J1W 陈洁慧老师				J1W 陈洁慧老师					
李中文	RM5.50	星期三 28-10-2020 9.50am	不订购	星期三 28-10-2020 1.00pm	不订购	星期三 28-10-2020 1.00pm	不订购	星期四 01-11-2020 9.50am	不订购	星期四 01-11-2020 9.50am	不订购	星期四 01-11-2020 9.50am	不订购	星期四 01-11-2020 9.50am	不订购	星期四 01-11-2020 9.50am	不订购
李国威	RM21.90	Roti CanaiX2 (RM2.40)	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购	鸡扒饭 (RM3.00)	不订购	汉堡包 (RM5.00)	不订购	不订购	不订购	不订购	不订购
陈伟强	RM19.50	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购	不订购	西瓜 (RM2.00)	不订购	榴莲饭 (RM3.00)	不订购	不订购	不订购	西瓜 (RM2.00)	不订购
黄国雄	RM19.50	不订购	薯条 (RM1.50)	不订购	蛋包饭 (RM2.40)	不订购	经济炒金巨面 + 煎蛋 (RM3.00)	不订购	不订购	不订购	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
胡国雄	RM27.90	Roti CanaiX2 (RM2.40)	不订购	卤肉饭 (RM3.00)	不订购	西式早餐 (RM5.00)	不订购	鸡扒饭 (RM3.00)	不订购	不订购	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
江国雄	RM23.90	Roti CanaiX2 (RM2.40)	不订购	薯条 (RM1.50)	不订购	Tomyum 汤面 (RM4.00)	不订购	经济炒金巨面 + 煎蛋 (RM3.00)	不订购	红酱意大利面 (RM3.00)	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
林国雄	RM16.40	Roti CanaiX2 (RM2.40)	不订购	薯条 (RM1.50)	不订购	卤肉饭 (RM3.00)	不订购	西式早餐 (RM5.00)	不订购	鸡扒饭 (RM3.00)	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
陈国雄	RM21.50	不订购	薯条 (RM1.50)	不订购	卤肉饭 (RM3.00)	不订购	不订购	西瓜 (RM2.00)	不订购	鸡扒饭 (RM3.00)	不订购	不订购	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
罗尹凡	RM22.40	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	西瓜 (RM2.00)	不订购	鸡扒饭 (RM3.00)	不订购	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
黄国雄	RM33.40	Roti CanaiX2 (RM2.40)	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	西式早餐 (RM5.00)	不订购	鸡扒饭 (RM3.00)	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
林国雄	RM38.00	新加坡炒米粉 + 煎蛋 (RM3.00)	不订购	薯条 (RM1.50)	不订购	Tomyum 汤面 (RM4.00)	不订购	西式早餐 (RM5.00)	不订购	鸡扒饭 (RM3.00)	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
林国雄	RM25.00	新加坡炒米粉 + 煎蛋 (RM3.00)	不订购	卤肉饭 (RM3.00)	不订购	不订购	经济炒金巨面 + 煎蛋 (RM3.00)	不订购	鸡扒饭 (RM3.00)	不订购	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
苏国雄	RM29.00	薯条 (RM3.00)	不订购	鱼扒 (RM7.00)	不订购	西式早餐 (RM5.00)	不订购	红酱意大利面 (RM3.00)	不订购	汉堡包 (RM5.00)	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
林国雄	RM17.50	薯条 (RM3.00)	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	印度香饭 Nasi Briyani (RM3.00)	不订购	鸡扒饭 (RM3.00)	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
黄国雄	RM19.20	不订购	龟苓膏 (RM1.60)	不订购	素-叉烧饭 (RM4.00)	不订购	素-肉松三文治 (RM3.00)	不订购	不订购	不订购	不订购	西瓜 (RM2.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
李国威	RM22.50	不订购	番石榴 (RM2.00)	不订购	经济饭 (RM4.00)	不订购	不订购	不订购	不订购	不订购	不订购	炸鸡包 (RM3.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
林国雄	RM41.20	素-炒鸳鸯大板 (RM3.00)	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购	金瓜西米露 (RM2.00)	不订购	素-叉烧饭 (RM4.00)	不订购	不订购	不订购	素-Tom Yum 炒饭 (RM3.00)	不订购
RM434.60																	

Figure 1.1.4 Report of each classes

- **Unpleasant user experience**

Due to the human error, there got many unpleasant user experiences in the process. From the user's perspective, they couldn't remember what they order for next week meal. From the hawker's perspective, they wrongly created the order to the student and staff because of their veiled voice when placing the order. Although the hawker may leave you a receipt or invoice after placing order, the hardcopy can be lost easily. According to a survey statistic report (figure 1.1.5), there are almost 28% of American thrown away or lose their receipt after purchasing. The hawkers calculate their profit manually with assisting of calculator. The school canteen's hawkers are mostly using the traditional way to collect payment and manage their operating funds.

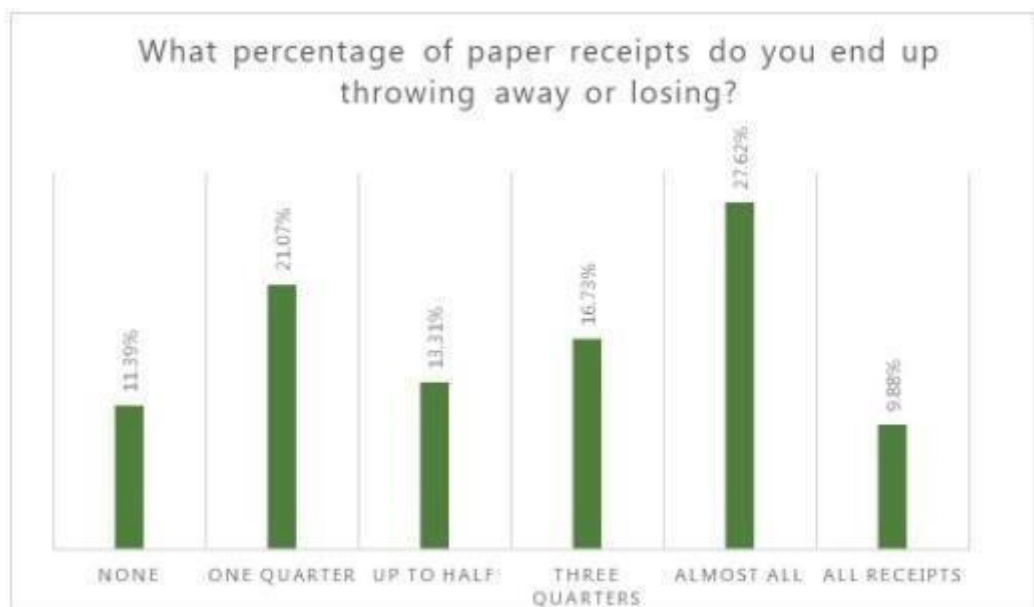


Figure 1.1.5 Statistic of throwing receipt

1.3 Project Objectives

There are the objectives in this project:

- **To develop a responsive web application which can manage the order and generating reports for the hawkers, staff members and students**

This project allows the students and staff members can place their order by using the form. Database of the system could generate report for the hawkers and admin to prepare the meals for the buyers. The hawker could utilize the report to determine the ingredients they need to prepare to avoid the food wastage problem. The reports will be generated for food preparation, food delivery, and food distribution and payment purpose as well. A responsive web application enable user to download the web application in the mobile device.

- **To help admin to reduce the data processing time**

Regarding to the interview, to dealing with the data, the admin normally needs to take 2-3 days without the help of system. By integrating the ordering part and monitoring part into a centralized system, the workload of admin is reduced. The admin does not need to perform data integration manually instead of maintaining data by using the system with MySQL database.

- **To provide hawkers an analytic report with sentiment analysis**

This project helps the hawkers to know with their sales weekly, thus they can measure their performance with the charts. Sentiment analysis can help them to launch their menu by meeting the consumer's needs as this can improve a lot for their sales.

- **To provide users to manage their order**

This project allows users to manage their order with the help of form. They could place order or alter the content of the order before the menu is closed. Besides that, this project also allows them to leave their comment for the weekly order as well.

- **To provide a feature that could recommend food to the user by their order history**

This project can propose some weekly food to the consumer with their order history. This can help them to make decision with the weekly menu. Using machine learning techniques on the order history to get the food that suite with their flavor.

1.4 Project Scope

This project is to help a school canteen to develop a cafeteria management system as the progressive website application. Basically, php will be used as the main language to develop this project. Laravel will work as the frontend and backend. Some php APIs will be supported the tasks of machine learning and text sentiment analysis.

To resolve the problems, the web app should contain following functionalities:

User management

- Able to register the students, teachers and staffs as the system user.
- Able to retrieve the user information to be used at where they suit.
- Able to update the user's information such as class, password (if the user forgot).
- Able to delete the user as the student, staff or teacher left from the school.
- The information such as name, class, account password and etc. are stored in a new entity.

User profile management

- Enable user to view their profile
- Enable user to change their password.

Order management

- Enable user to place order
- Enable user to choose quantity before checkout
- Enable user to delete the order before the weekly order closed
- The information such as date_range_id, user_id, food_id, quantity and etc. are stored in a new entity.

Food Management

- Enable admin to create food in the menu
- Enable admin to import the weekly menu
- Enable admin to update the food detail
- Enable admin to remove the food from weekly menu
- The information such as food name, price, days, session and etc are stored in a new entity.

Class management

- Enable admin to create new class
- Enable admin to update the detail of class
- Enable admin to remove the class

- The information such as class name and etc are stored in a new entity.

Date range management

- Enable admin to create new date range
- Enable admin to activate/deactivate date range to control the availability of the menu
- Enable admin to remove the unused date range
- The information such as start date, end date, holidays, and etc. are stored in a new entity.

Transaction management

- Enable user to leave the feedback message after one week the user receive the meal. Eg. 23rd August received the last order then the feedback form will be closed by 30th August
- The information such as transaction_id, feedback, and etc. are stored in a new entity.

Stall Management

- Enable admin to create new stall
- Enable admin to update the stall detail
- Enable admin to delete the unused stall
- The information such as stall name, owner_id and etc. are stored in a new entity.

Report module

- Enable hawker to receive the sentiment analysis on the received feedback
- Enable to generate e-receipt/purchase history for the user
- Enable to generate weekly order reports by stall for the hawker to estimate the orders quantity and collect money.
- Enable to generate weekly order report by class for the representative of class representative to distribute the ordered food and collect money

Food recommendation module

- Enable system to recommend user the food in weekly order menu by predicting with the order history data

Chapter 2 Literature Review

This chapter includes literature review, critical remarks from previous work. Mainly discussing about the papers which is related to this project. By referencing others work to refine the tasks can be applied in this project.

2.1 Literature Review

2.1.1 Restaurant Pre-Ordering System: An Approach to Channeling Dynamic Business Creativity

This project developed a restaurant pre-ordering system that allows customers to order before arriving at the restaurant. This pre-ordering system that can be accessed through the Internet and supporting remote access from numbers of users. This project was applied the client-server architecture while Model-View-Controller (MVC) was the design pattern. (figure 2.1.1.1)

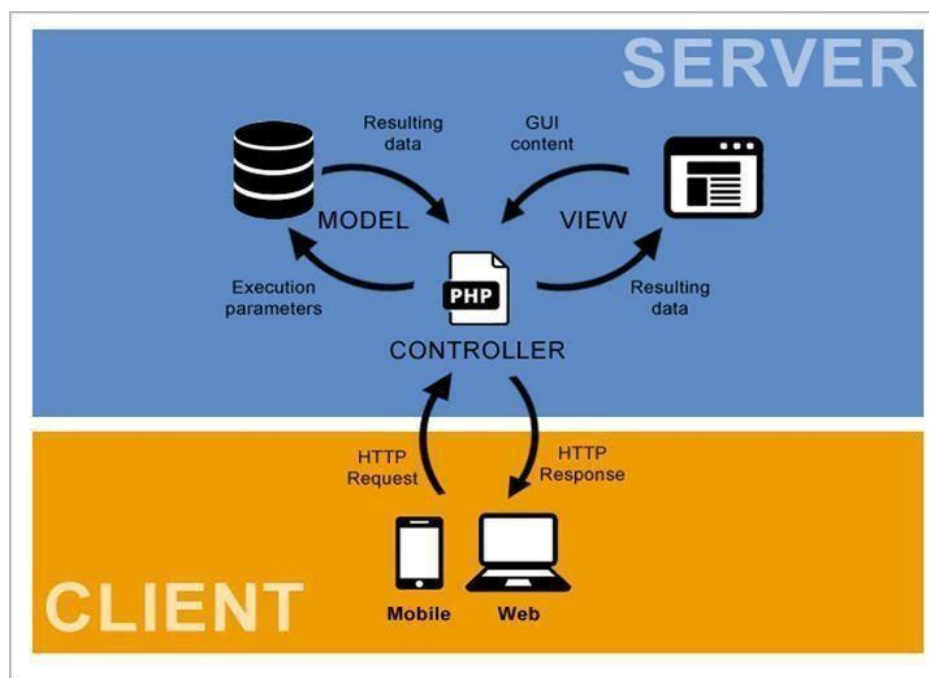


Figure 2.1.1.1 System architecture and design pattern

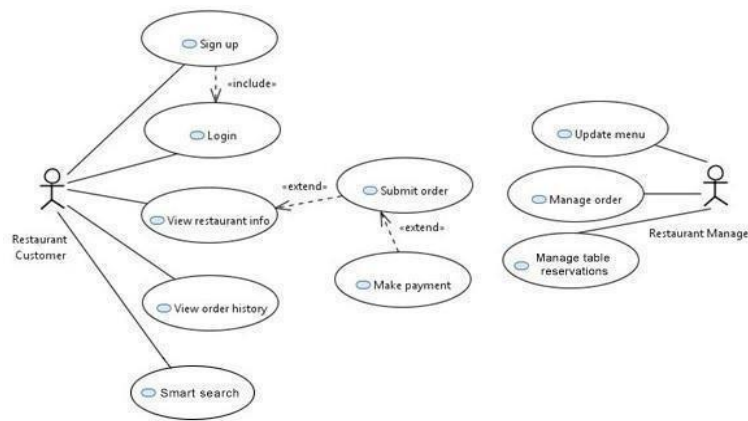


Figure 2.1.1.2 Use case diagram

According to the figure 2.1.1.2 above, this system has the common functionalities, for instances, login, signup, view order history, update menu, manage order, manage table reservation and etc. The system serves for the customers who want to eat in or take away. The customer opens the mobile app and login as user. A UI with restaurants' list is shown and followed by the crucial information which is the availability of seats. (Anuar, Abdullah and Soo, 2017) The customer could choose their desired dish with showing the preparation time in the following page. After that, the customer comes to a checkout page which has the options of eat in or take away and the estimated arrival time. There are few options for the payment, which includes credit card or cash. The customer should be at the restaurant at the arrival time.

Besides the common functionalities, this system will show the availability of seats in real time of each nearby restaurants to the customer for better decision making when choosing restaurant. Something interesting from the use case diagram is the smart search, this is another new feature that is implemented in this system. It can help the customer to search the foods via image or speech. (Anuar, Abdullah and Soo, 2017) For the image is to help the one who do not know the name of food, while the foreigner can use their native language to search the food, currently it supported Mandarin, English, Cantonese, Korean and Bahasa Melayu.

The system shows the availability of seats is useful for the customer. This has saved time for a lot of people, especially lunch break in Kuala Lumpur. The smart search is also a smart implementation since it solved the big problem when the users does not know about the food name. The only issue of the system is it cannot delete the order after completing the payment stage. This issue is quite critical since changing mind is often happening in the real life.

2.1.2 Canteen Management Android Application Using E-Wallet

This project developed a canteen management system that provides student and staff of the college a fast service on food ordering. The system has changed the management model of canteen. The canteen gets rid of the traditional business mode, the system reduces human error in accounting and store the records of users and orders permanently. (Fegade, Nandge, Patil and Gaikwad, 2019) The users do not need to queue up to purchase food while this is helpful when exam period. In additional, the system helps the admin waiving the paperwork as well. These help users and admin to save a lot of time.

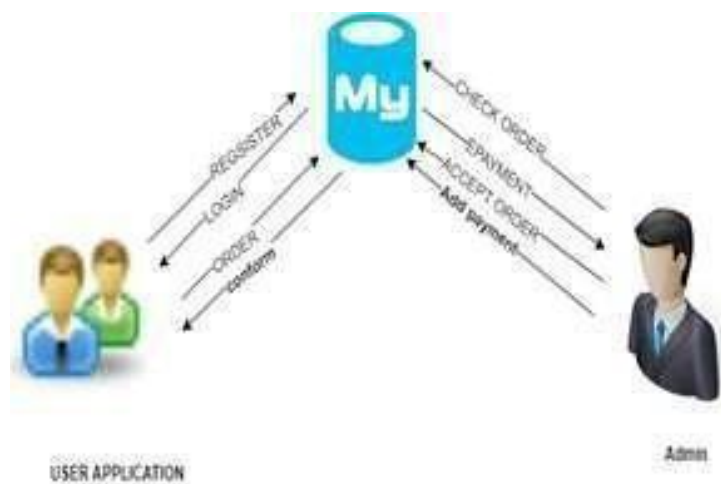


Figure 2.1.2.1 System overview

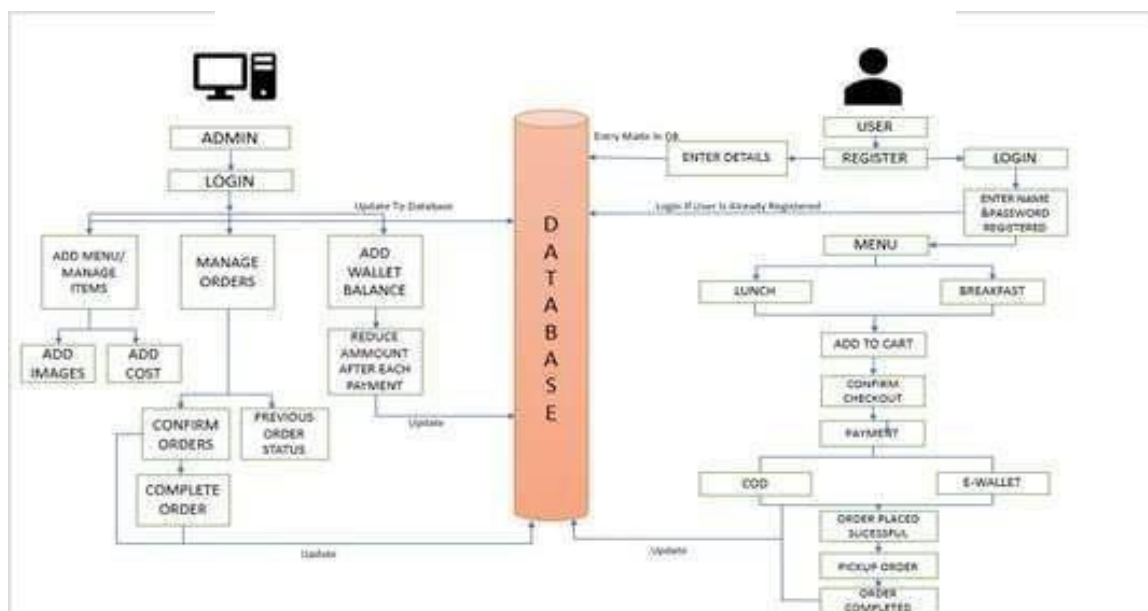


Figure 2.1.2.2 Architecture design

According to figure 2.1.2.2, there are common features of ordering system, which includes manage orders, manage menu, place order, checkout and etc. The student/staff has to register as a user, then he may access the ordering system to order food. The users have to login before ordering food, they could view the menu and add the desired items into the cart. When they going to make payment, just click on cart, then there is the UI with the summary of order. The users can choose the payment methods which are COD and E-Wallet. (Fegade, Nandge, Patil and Gaikwad, 2019) The system will prompt users an ordered successful message once the user has done the payment and the record will update to database. The admin could design the menu(foods) and manage the orders. He updates the order's status once the users received the order.

Other than that, the users could top up their e-wallet by paying cash to the admin. Once the admin received cash, he would add the top-up value to the account. The system will also recommend the hot sales food to the users.

The advantage of the system is applying e-wallet as the payment method in the college. This sounds new the users and it also cut down the time of purchasing, ease the users and the canteen's hawkers in the transaction. Another highlight of the system is the recommendation features, it helps the allodoxaphobia to make decision, it provides lesser options to the particular users. The system without the delete order once the users make payment, as the reason above, the mind changing is just in a wink of eye.

2.1.3 Canteen Food Ordering Android System

This project developed a canteen food ordering system to serve the employees in a company. The system is trying to save the time of employee when their lunch break. To solve the food wastage in the cafeteria, the system let the users pre-order their food, so that increasing the chance of them getting the food items they prefer. (Singh et al., 2016) By getting to know what food items in advance would also improve the effectiveness of cafeteria staff.

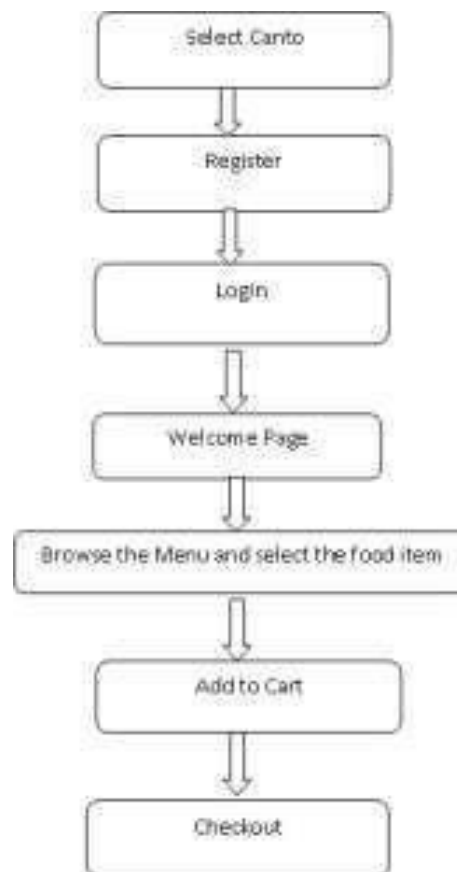


Figure 2.1.3.1 Flow chart

The system allows users to order meals from the canteen menu and the order can be picked up by users or delivered to them. Besides that, the system allows users to add meal into cart, update and delete the selected meal in the cart. The system provides numbers of payment methods, instalments, cash, and credit card. The admin can manage the menu by implementing CRUD. (Singh et al., 2016) The menu with recipes and ingredient lists will be display to the users, so that the users may choose upon the ingredient and get more details to the food. Additional feature of the system is providing internet through company WIFI or outside ISP which can be accessed by authorized employees.

According to figure 2.1.3.1, the user has to login the system then browses the menu and selects the desired food. The foods with recipes and ingredient list can be the reference for the users. After selection, the user may access the cart and ready for checkout. At this moment, user can decide whether self-pick up or delivery. After that, the users may choose the payment methods to complete the ordering.

The highlight of the system is instalment features, this functionality giving the users convenience if the users make good use of it. While, this raise another problem from the canteen's hawker, due to the instalment features, they might face the problem of capital flow. Beside that, the developers applied database transaction to handling the system failure that will crash the data in database. This is a good practise when designing a database system.

2.1.4 Automated Food Ordering System with Real-Time Customer Feedback

This project is to design for the automated food ordering process in restaurant to give customers a better dining experience. The project proposed automated food ordering system with real time customer feedback (AOS-RTF) for restaurants to achieve the aims. (Tanpure, Shidankar and Joshi, 2013) Wireless data helps this system to access to the servers, which applies three-tier architectural pattern (MVC).

The system architecture consists of 3 main areas from the restaurant, which are the Serving area, the Kitchen, and the Cashier table. (Tanpure, Shidankar and Joshi, 2013) The system consists of 4 crucial parts, which are the mobile phone, the server and web applications, the central database, and networking infrastructure. The customers can make orders via the android application and the restaurant-owner's laptop will receive the orders then forward the orders to kitchen. The server and web application on the restaurant-owner can help the owner to manage the menu and receive the order which are from internet. (Tanpure, Shidankar and Joshi, 2013) The administration can store foods details and order information in the central database. Whereas the networking infrastructure is to support the communication via local network and global network.

Figure 2.1.4.1 shows the architecture in local network, which means it is suitable for the customers who are close to the restaurant. While figure 2.1.4.2 shows the architecture in global network. The user with android device 3 is the one who access via global network. This system allows the users to order from their workplace and grab their orders when the orders is prepared, therefore saving the time they are waiting.

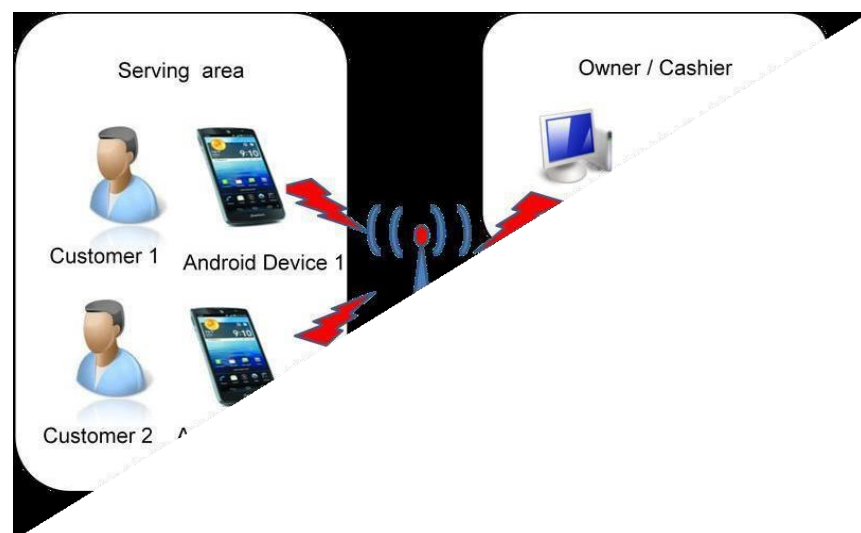


Figure 2.1.4.1 Architecture design without internet



Figure 2.1.4.2 Architecture design with internet

According to the context diagram (figure 2.1.4.3), the restaurant owner has to login the system then initialises the menu. The system assigns a unique number to customers once they logged in the system. (Tanpure, Shidankar and Joshi, 2013) When the customer placed order, the system will forward the order information and customer details to restaurant-owner and kitchen. The owner can update the order status according to the progress in kitchen while the customer can view his order status. After dining, the user can make payment and give feedback regarding the service and system.

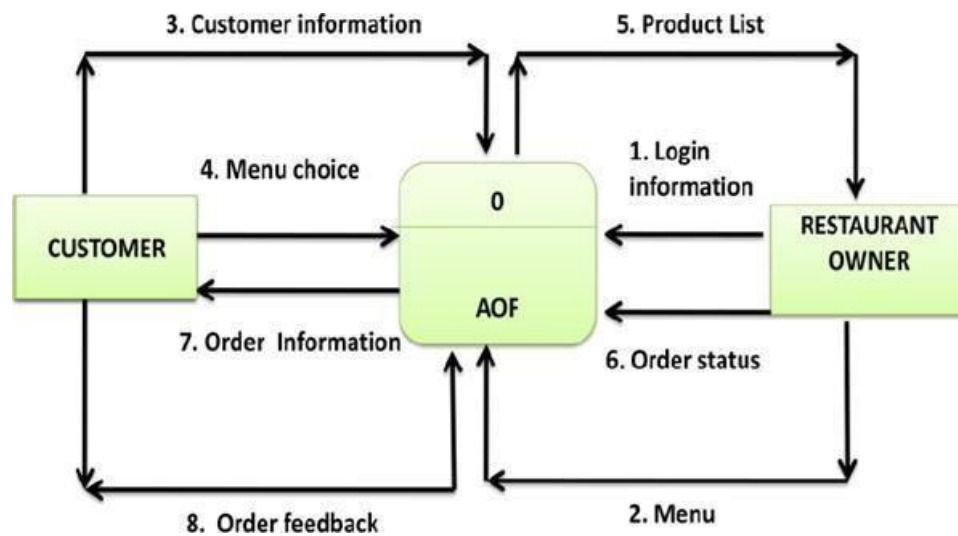


Figure 2.1.4.3 Context diagram

The advantage of the system is the system architecture is portable to any restaurant with or without internet access. Compare among the existing restaurant food ordering system, this system is cheaper than the PDA's and multi-touchable system since the coverage of internet. Besides that, the processing speed is nearly to the multi-touchable system. The disadvantage is the system provides only single payment method, which is cash payment. Nowadays, the pandemic of Covid-19, e-payment is advisable to be the payment method.

2.1.5 Sin Min Private Food pre-ordering system

The secondary school used this system to solve the issue that stated in Chapter 1 project background. They have used it for few weeks, and some problems could not be solved due to the limitation of technology they have.



2021年1月20日至1月28日 订餐表格

订餐与用餐须知:

- 1) 用餐时段: 第一次休息 (9.50am - 10.20am) / 第二次休息 (1.00pm - 1.30pm)
- 2) 用餐地点: 各自班级座位
- 3) 订餐者, 当天请假或任何状况缺席, 恕不退款。(可自行通知同学代领餐)
- 4) 订餐付款方式: 准备【现金】将交给班上负责收钱的同学。
- 5) 订餐回复将发送到您所填写的电子邮件地址。
- 6) 如有任何疑问, 请联系负责人 杨月诗012-4253268 / 郭健壮 017-4819812

注: 由各班委派负责学生, 在休息节前5分钟, 到食堂领餐。

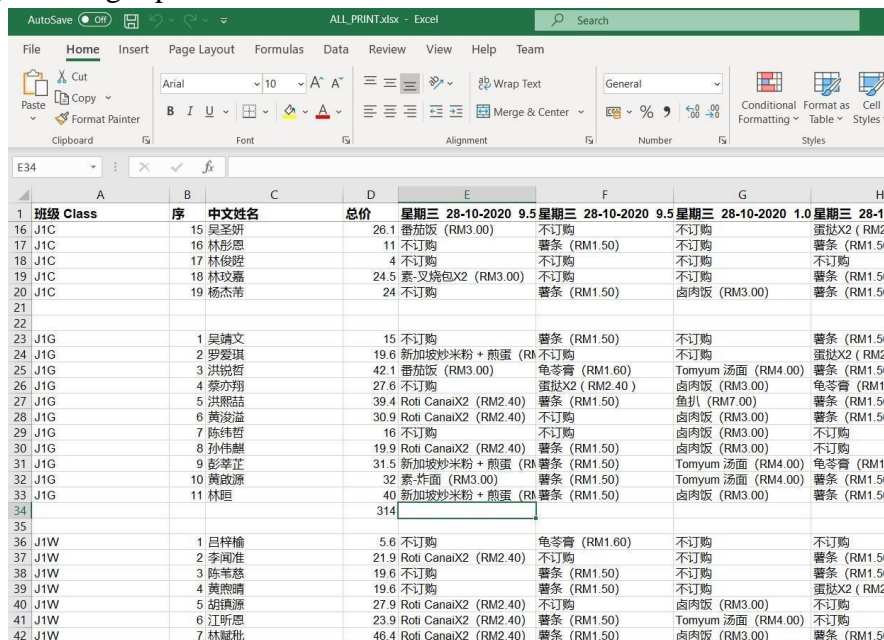
当您提交这份表单时, 系统会记录您的电子邮件地址。

不是 ewechunkit@spsmp.edu.my? 请切换帐号

*必填

Figure 2.1.5.1 Google form of the system

The system consists of two main part, Google Form and Microsoft Excel. Google Form provide the interface for users to place order, while the Microsoft Excel is used to manage the orders and generating report.



班级 Class	序	中文姓名	总价	星期三 28-10-2020	9.5 星期三 28-10-2020	9.5 星期三 28-10-2020	1.0 星期三 28-10-2020
16 J1C	15	吴圣妍	26.1	番茄饭 (RM3.00)	薯条 (RM1.50)	不订购	蛋挞X2 (RM2.00)
17 J1C	16	林彤恩	11	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)
18 J1C	17	林俊毅	4	不订购	不订购	不订购	不订购
19 J1C	18	林致嘉	24.5	素-叉烧包X2 (RM3.00)	不订购	不订购	薯条 (RM1.50)
20 J1C	19	杨杰滢	24	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)
21							
22							
23 J1G	1	吴靖文	15	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)
24 J1G	2	罗爱琪	19.6	新加坡炒米粉 + 煎蛋 (RM2.40)	不订购	不订购	蛋挞X2 (RM2.00)
25 J1G	3	洪培哲	42.1	番茄饭 (RM3.00)	龟苓膏 (RM1.60)	Tomyum 汤面 (RM4.00)	薯条 (RM1.50)
26 J1G	4	蔡办翔	27.6	不订购	蛋挞X2 (RM2.40)	卤肉饭 (RM3.00)	龟苓膏 (RM1.50)
27 J1G	5	洪麗慈	39.4	Roti CanaiX2 (RM2.40)	薯条 (RM1.50)	鱼扒 (RM7.00)	薯条 (RM1.50)
28 J1G	6	黄浚溢	30.9	Roti CanaiX2 (RM2.40)	不订购	卤肉饭 (RM3.00)	薯条 (RM1.50)
29 J1G	7	陈伟哲	16	不订购	不订购	卤肉饭 (RM3.00)	不订购
30 J1G	8	孙伟麟	19.9	Roti CanaiX2 (RM2.40)	薯条 (RM1.50)	卤肉饭 (RM3.00)	不订购
31 J1G	9	彭芷芷	31.5	新加坡炒米粉 + 煎蛋 (RM2.40)	薯条 (RM1.50)	Tomyum 汤面 (RM4.00)	龟苓膏 (RM1.50)
32 J1G	10	黄政源	32	素-炸面 (RM3.00)	薯条 (RM1.50)	Tomyum 汤面 (RM4.00)	薯条 (RM1.50)
33 J1G	11	林珥	40	新加坡炒米粉 + 煎蛋 (RM2.40)	薯条 (RM1.50)	卤肉饭 (RM3.00)	薯条 (RM1.50)
34			314				
35							
36 J1W	1	吕梓楠	5.6	不订购	龟苓膏 (RM1.60)	不订购	不订购
37 J1W	2	李润淮	21.9	Roti CanaiX2 (RM2.40)	不订购	不订购	薯条 (RM1.50)
38 J1W	3	陈韦慈	19.6	不订购	薯条 (RM1.50)	不订购	薯条 (RM1.50)
39 J1W	4	黄雨晴	19.6	不订购	薯条 (RM1.50)	不订购	蛋挞X2 (RM2.00)
40 J1W	5	胡瑞源	27.9	Roti CanaiX2 (RM2.40)	不订购	卤肉饭 (RM3.00)	不订购
41 J1W	6	江昕恩	23.9	Roti CanaiX2 (RM2.40)	薯条 (RM1.50)	Tomyum 汤面 (RM4.00)	不订购
42 J1W	7	林斌批	46.4	Roti CanaiX2 (RM2.40)	薯条 (RM1.50)	卤肉饭 (RM3.00)	薯条 (RM1.50)

Figure 2.1.5.2 Microsoft Excel of the system

The admin must open a new google form to create a new weekly menu. This is a pre-ordering system thus the admin collects the data and send them to canteen's hawkers one week in advance. The google form open 4 days for ordering, the student and staff can place and modify their orders within these four days. They get a copy of google form as order history after checkout. The admin will process the data by using 2-3 days. After that, she has to generate three types of reports to canteen's hawker, class representative, and form teachers, which is the heaviest workload in the process. Human error mostly occurs at this stage, and this has affected to the reports the users view. This is due to the first problem statement; system is not centralized.

In additional, the order details may be lost if the excel file was accidentally deleted by someone. The admin cannot retrieve the generated report and take time to re-do the report. The order history (copy of google form) does not provide sufficient information to users. The users have to sum the total by themselves. Due to the mode of the copy of the google form, it is hard to refer if the users only order the food of a day. The copy will show all the column even the user did not order the food.

2.2 Critical remarks of previous works
































System	F1	F2	F3	F4	F5	F6	F7
System 2.1.1							
System 2.1.2							
System 2.1.3							
System 2.1.4							
System 2.1.5							
Proposed System							

Table 2.2.1 Comparison table of existing system and proposed system

Remark:

F1 – Menu/Food Management

F2 – Order Management

F3 – User Management

F4 – E-wallet/Credit Card/Debit Card Payment

F5 – Database

F6 – Report

F7 – Mobile Application

System 2.1.1 means the system reviewed in chapter 2.1.1

Chapter 3 System Design

This chapter includes use case design, ERD design, data dictionary, and wireframe design.

3.1 Use Case Diagram

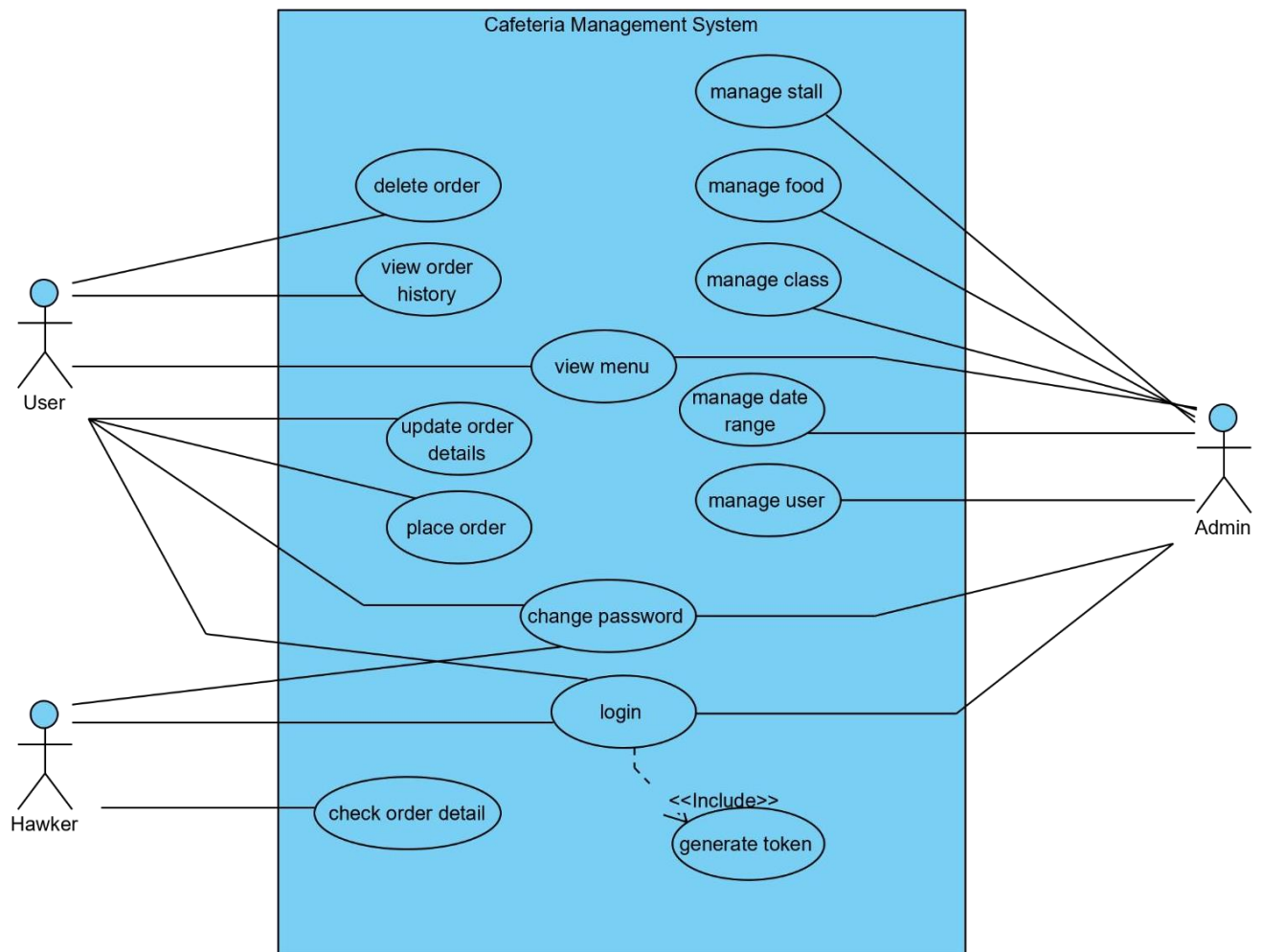


Figure 3.1.1 Use case diagram

3.2 Entity Relational Diagram

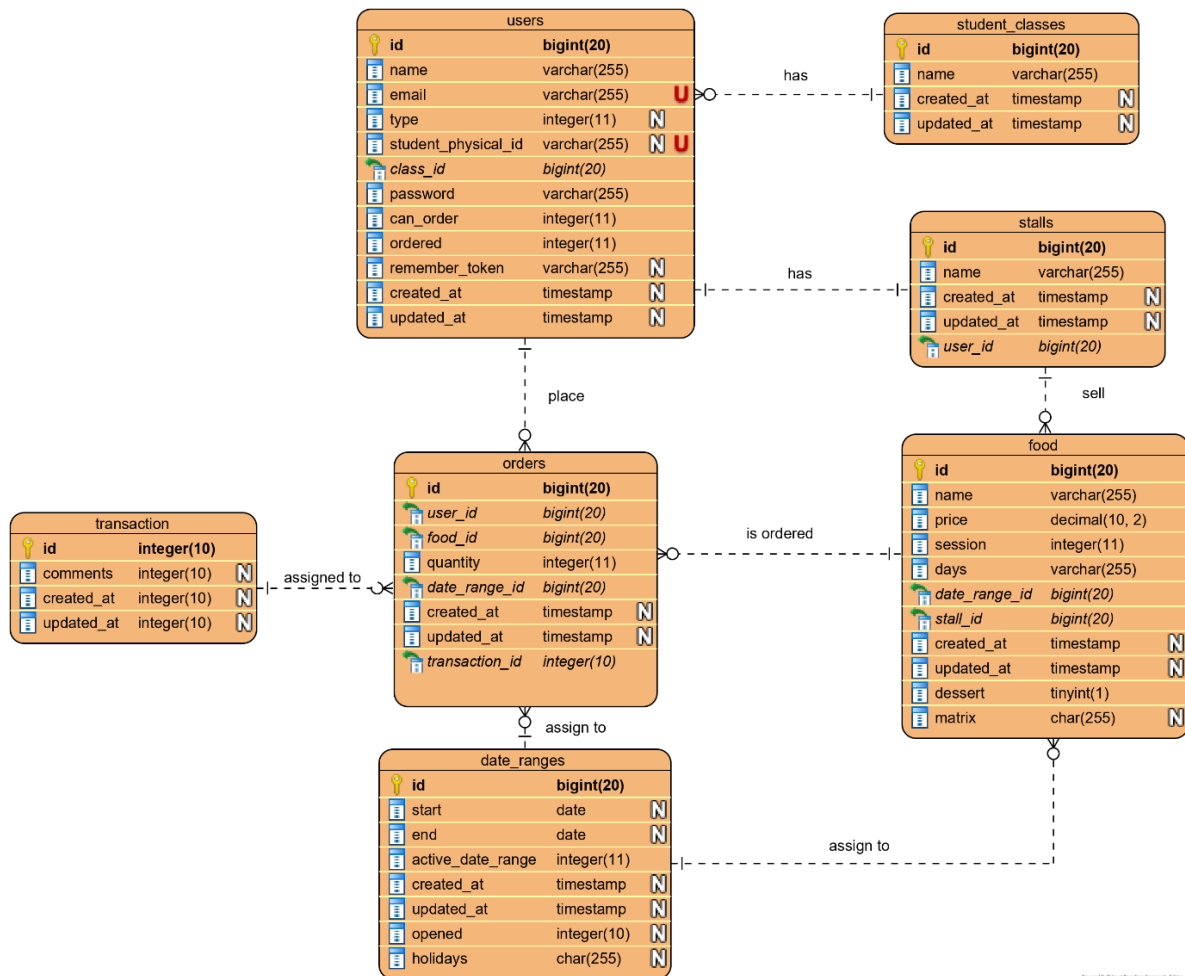


Figure 3.1.2 Entity relational diagram

3.2.1 Data Dictionary

Users Entity

Field Name	Data Type	Field Length	Constraint	Description
id	bigint	20	PK	User id, auto incremental
name	varchar	255	Not null	User's name
email	varchar	255	Unique	User's email
type	integer	11	Not null	User's type, which determine the user's activity
student_physical_id	varchar	255	Unique, nullable	Student id/staff id
class_id	bigint	20	Not null, FK	Unique number of classes
password	varchar	255	Not null	Encrypted password
can_order	integer	11	Not null	To determine the user can order or not
ordered	integer	11	Not null	To determine the user already ordered or not

Table 3.2.1.1 Users entity

Class Entity

Field Name	Data Type	Field Length	Constraint	Description
id	bigint	20	PK	Class id, auto incremental
name	varchar	255	Not null	Class name

Table 3.2.1.2 Class entity

Orders Entity

Field Name	Data Type	Field Length	Constraint	Description
id	bigint	20	PK	Order id, auto incremental
user_id	bigint	20	FK	Unique number of users
food_id	bigint	20	FK	Unique number of foods
quantity	integer	11	Not null	Quantity of the ordered food
date_range_id	bigint	20	FK	Unique number of date ranges
transaction_id	bigint	20	FK	Unique number of transactions

Table 3.2.1.3 Orders entity

Food Entity

Field Name	Data Type	Field Length	Constraint	Description
id	bigint	20	PK	Food id, auto incremental
name	varchar	255	Not null	Food name
price	decimal	10, 2	Not null	Food price
session	integer	11	Not null	Recess session
days	varchar	255	Not null	School days, eg. SUN, MON, etc.
date_range_id	bigint	20	FK	Unique number of date ranges
stall_id	bigint	20	FK	Unique number of stalls
dessert	tinyint	1	Not null	To determine whether the food is dessert or not
matrix	json	-	Not null	Characteristic of food, to predict the recommended food.

Table 3.2.1.4 Food entity

Stall Entity

Field Name	Data Type	Field Length	Constraint	Description
Id	bigint	20	PK	Stall id, auto incremental
Name	varchar	255	Not null	Stall name
user_id	bigint	20	FK	Unique number of the stall's owner

Table 3.2.1.5 Stall entity

Date Ranges Entity

Field Name	Data Type	Field Length	Constraint	Description
id	bigint	20	PK	Date range id, auto incremental
start	date	-	Not null	Start date of the week
end	date	-	Not null	End date of the week
active_date_range	integer	11	Not null	To determine the week is applying or not
opened	integer	10	Not null	To determine the week has been applied or not
holidays	json	-	Not null	Holidays of the week

Table 3.2.1.6 Date ranges entity

Transaction Entity

Field Name	Data Type	Field Length	Constraint	Description
id	bigint	20	PK	Transaction id, auto incremental
comments	varchar	255	Nullable	Comments of the transaction

Table 3.2.1.7 Transaction entity

3.3 Wireframe

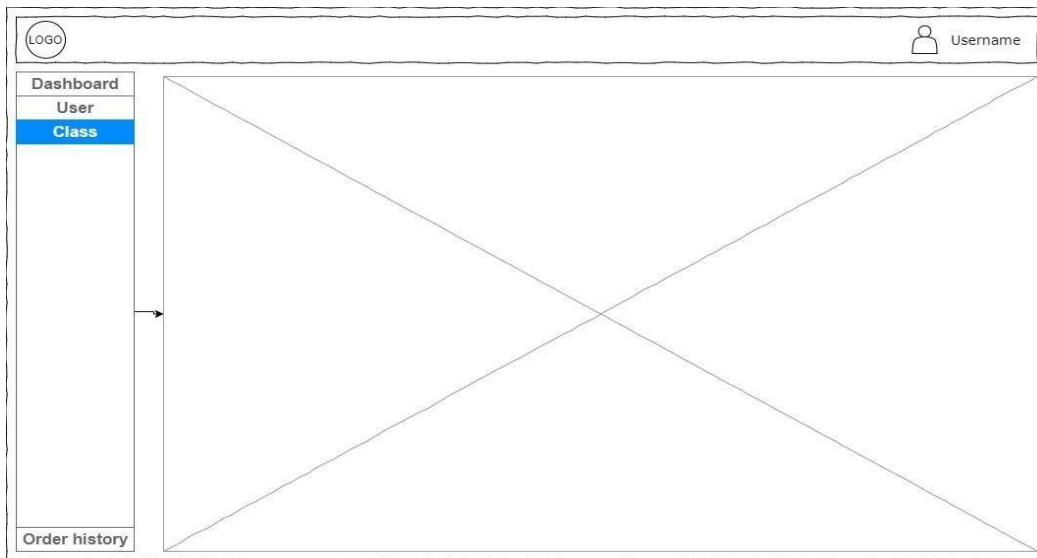


Figure 3.3.1 Home page

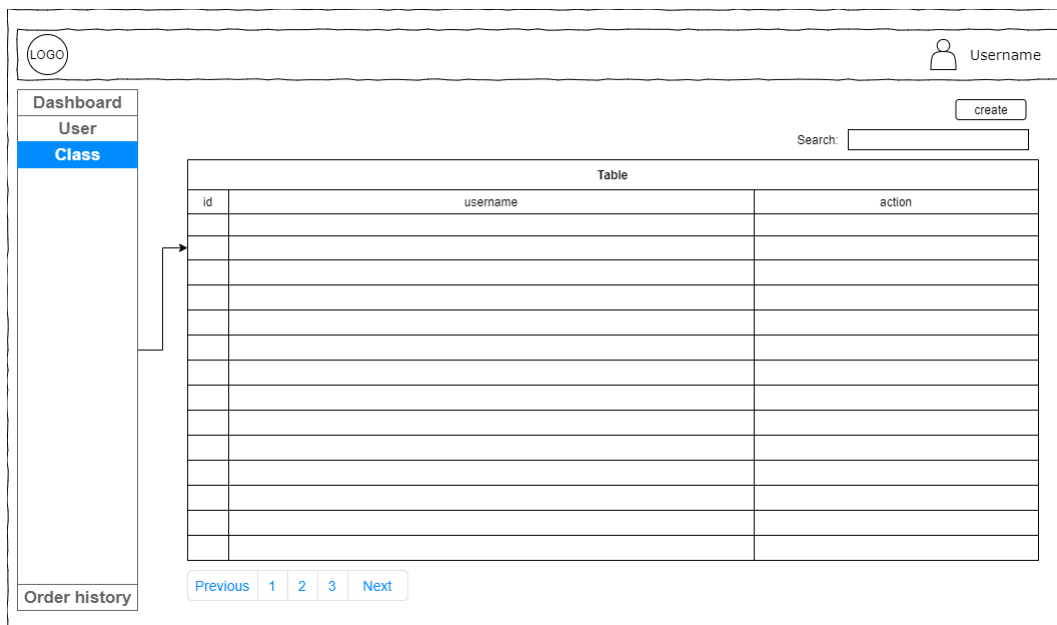


Figure 3.3.2 User management

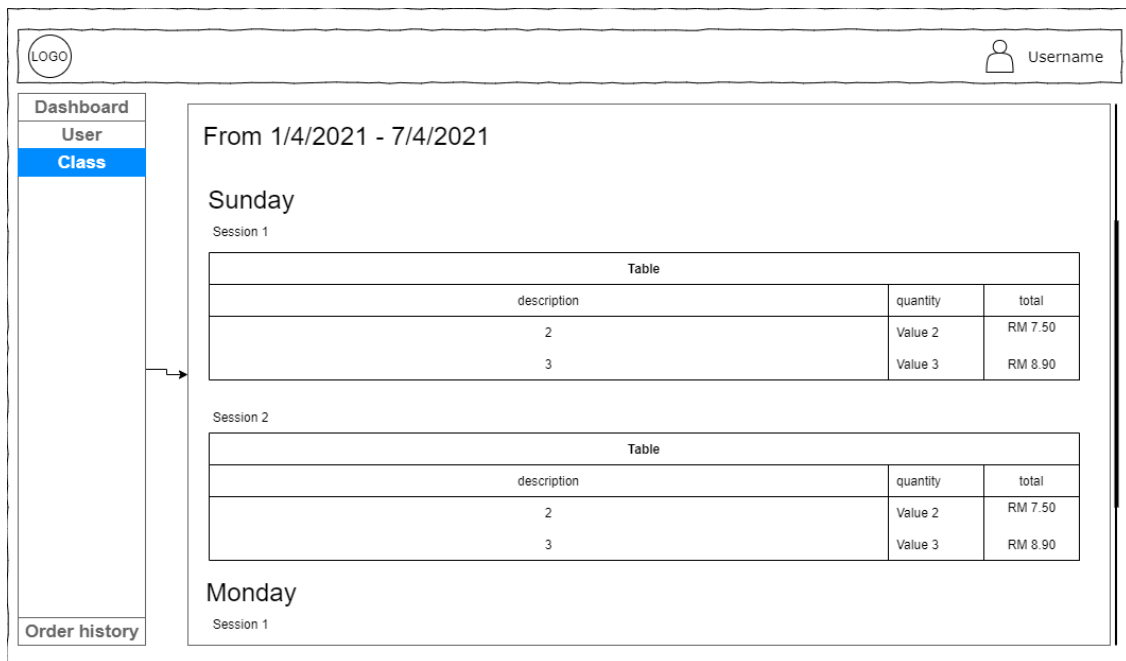


Figure 3.3.3 Order history

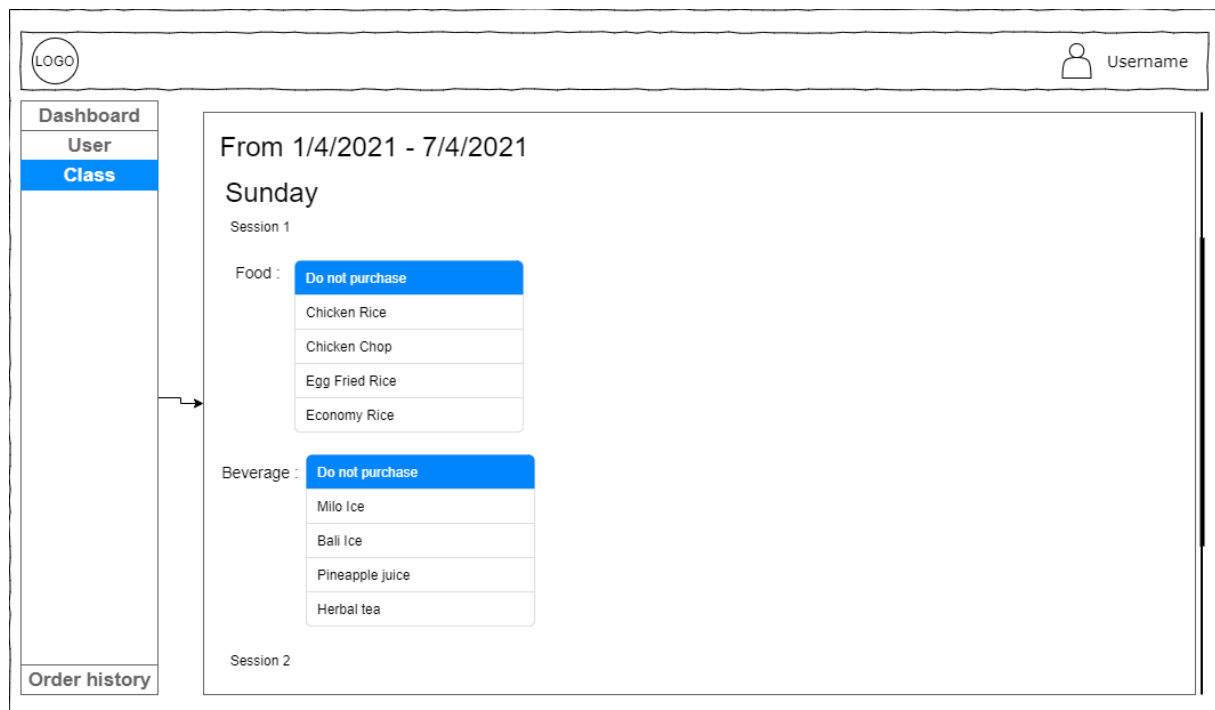


Figure 3.3.4 Order page

LOGO

Username

Dashboard

User

Class

Order history

From 1/4/2021 - 7/4/2021

Sunday

Session 1

Food : Chicken Rice

Quantity: 1

2

3

4

5

Beverage : Bali Ice

Quantity: 1

2

3

4

5

Session 2

Checkout: RM 23.50

Confirm

Figure 3.3.5 Checkout page

3.4 Sitemap

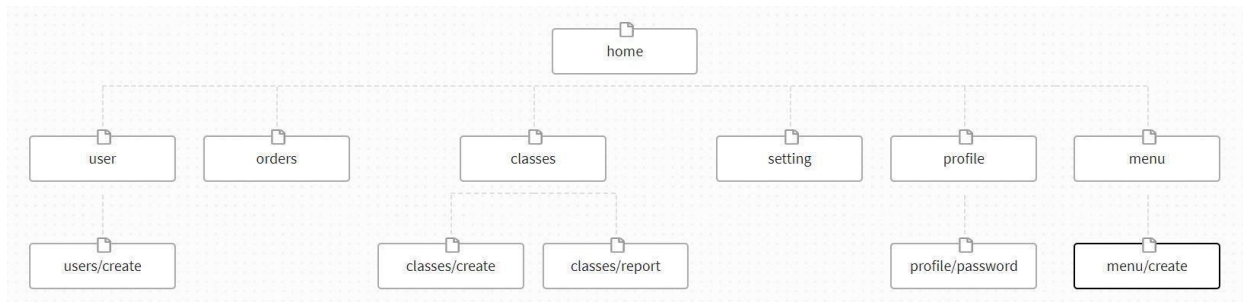


Figure 3.4.1 Sitemap

Chapter 4 Design Specification

4.1 Block Diagram



Figure 4.1.1 User's block diagram

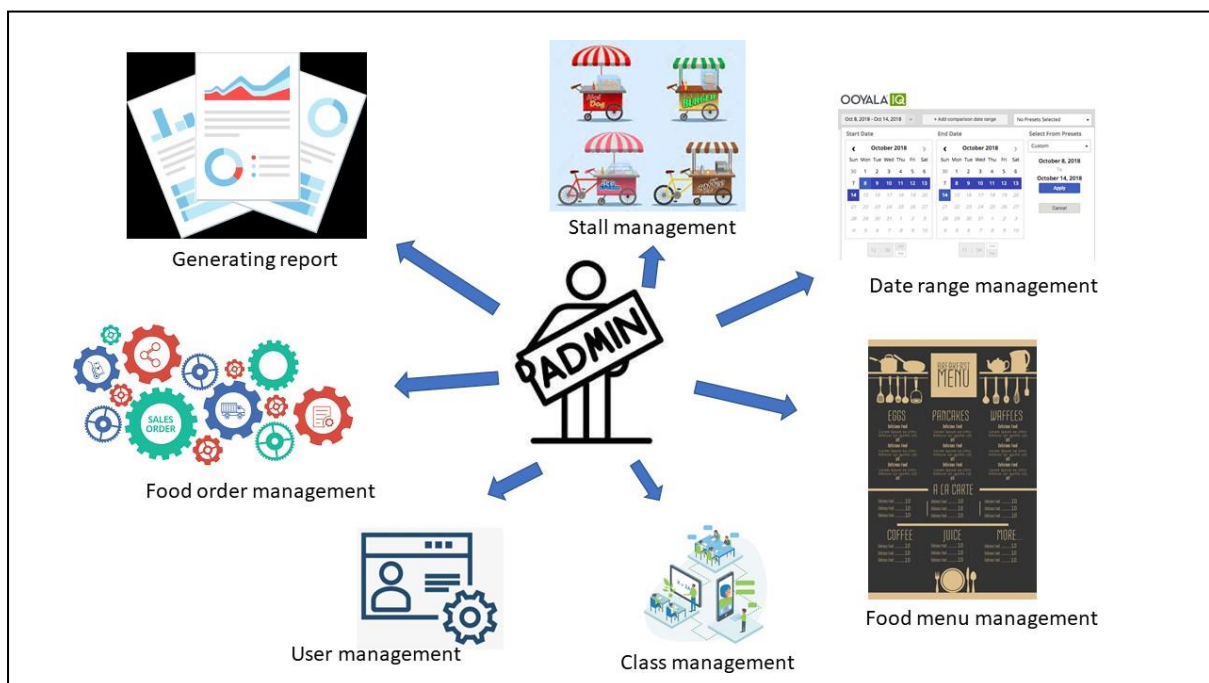


Figure 4.1.2 Admin's block diagram



Figure 4.1.3 Hawker's block diagram

4.2 Software Architecture Design

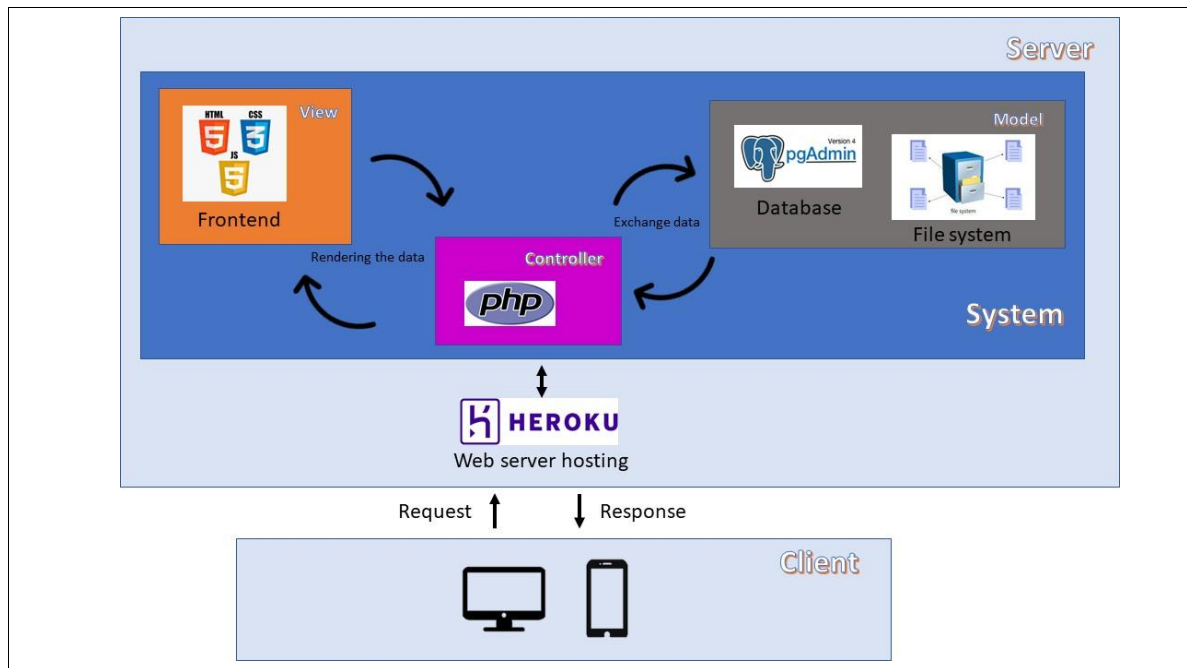


Figure 4.2.1 Software architecture design

MVC architecture design is implemented in the project. The client side can access to the content through web browser and request service to the server. Users can access to the web application through computer, tablet or mobile devices as this project is designed as responsive web application. It can fit most of the screen size. The controller exchanges data with model component with file system and database by using Eloquent query provided by Laravel. View works as the frontend of the project and render the data requested from controller. After rendering data, it will be responded to the client's web browser. Heroku is used as the web server for deployment of the project and hosting of postgresql database.

4.3 Methodology

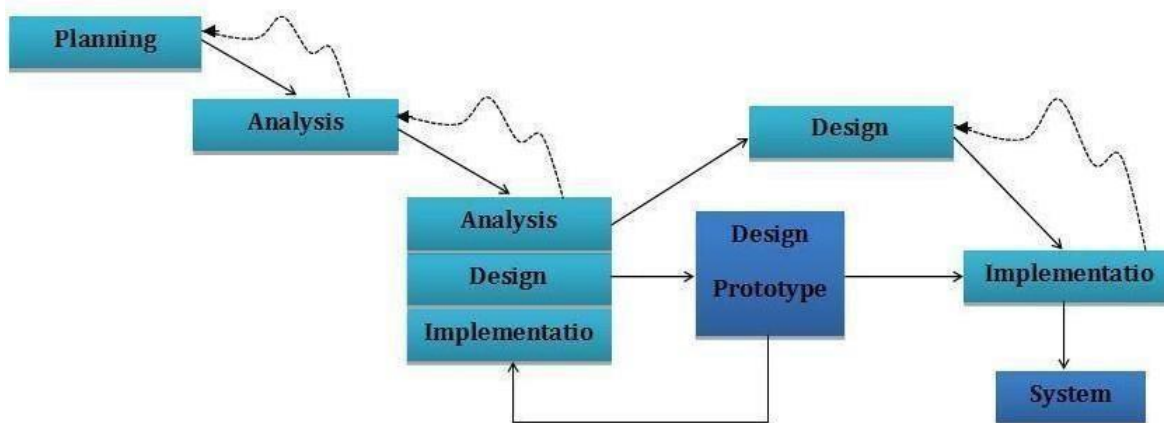


Figure 4.3.1 Throwaway prototyping

Planning

In this phase, to identify the system for development, literature review and desktop research have been done and shown in Chapter 2.

Prototype 1

Analysis

An interview was conducted with the representatives from the school, Ms. Yeoh Guik See and Ms. Lean Shu Yeng. The interview consent forms and notes are attached in Appendix. This part will briefly discuss on based on the interview notes. The problem statements and background in chapter 1 are written based on the interviews. They are facing 4 major problems, time consuming to deal with the data, need an order history/receipt to know their weekly expenses, required technical skill of excel to generate the report, prevent human error when placing order and generating report. The project scope was defined as well in this phrase, which is stated in chapter 1.

Design

In this phrase, the general design of user activities, such as use case and activity diagram (Appendix A11 - A16) are proposed. Besides that, ERD, data dictionary, wireframe and sitemap are designed in chapter 3 as well.

Implementation

Visual Studio Code is used as main IDE to develop the project while Git is used as the source code management. The source code of the project is deployed in the GitHub for future enhancement with other developer. The web application was developed by applying Laravel Framework. This project implemented authentication, authorization with tokenization that provided by the Laravel. The details are included in chapter 5.

Testing

In this phrase, beta testing was applied to identify the defects and improve the user experience. The beta testing involved 200+ users from the school. The evidence of testing is attached in the Appendix. An evaluation survey form was designed to the user after 1 month of testing.

Prototype 2

Analysis

The following analysis is based on the survey result collected from the system users:

There are 225 users responded to the evaluation survey and 201 of them are students while 24 of them are teachers.



Figure 4.3.2 Survey result on usage of system

89.3% of respondents used the system to order food while 10.7% never use the system. Most of the reason from the respondents who didn't use the system to order food indicate that they bring their own food from home.

Below statistics are collected from the respondents who had been used the system.

I have a good experience in ordering food 在订餐方面有不错的体验
201 responses

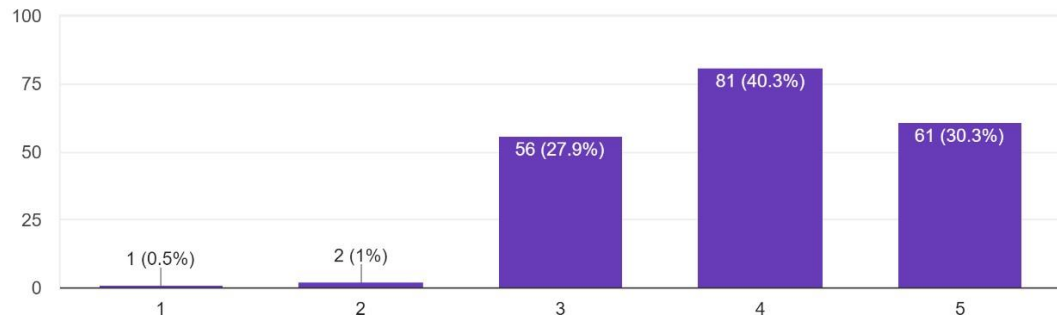


Figure 4.3.3 Survey result on user experience

70.6% of the respondents think that their user experiences are good in ordering food. 27.9% of the respondents think that their experiences are moderate in ordering food while 1% with 2 respondents have a bad experience in ordering food.

As the representative of class, the report is clear to distribute food/ collect food/ collect money.
作为班级的代表，报表在领取食物、分配食物甚至是收取费用时，它都提供了清楚的资讯
201 responses

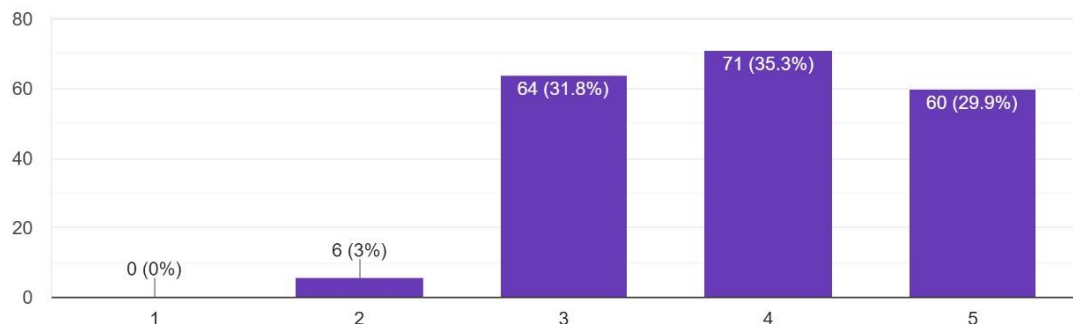


Figure 4.3.4 Survey result on the performance of report

65.3 % of the respondents agreed with the statement while 31.8% of respondents neither agree nor disagree with the statement and only 3% think that the report doesn't help them in the business process.

Do you think the order history is helpful to keep track your expenses?
请问您觉得订餐历史记录有助于让您了解您的开销吗?
201 responses

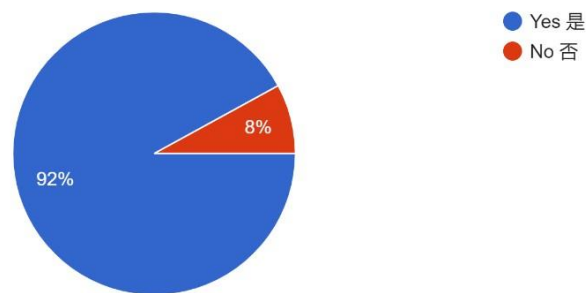


Figure 4.3.5 Survey result on performance of order history

92% of respondents think that order history is helpful to track the expenses while with 8% disagreed with the statement.

If the system can suggest food weekly, will you agree with this?
如果这项系统能够为您推荐食物，请问您有意愿使用这项功能吗?
201 responses

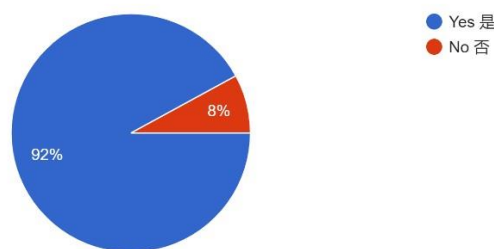


Figure 4.3.6 Survey result on new implementation

92% of the respondents agree with the new implementation, while 8% of them don't think it is necessary to be included in the system.

The survey also collected some suggestions/comments from the user:

- Push notification to the users who haven't ordered food
- Implement payment gateway
- Show the ingredient of food
- Improve the UI in mobile web browser
- Easy to forget the URL

Besides that, the interview session was also conducted with Ms. Yeoh and Ms. Lean to retrieve user's experience from perspective of administration and hawker. The interview consent forms and notes are attached in Appendix. In general, they said that the system decreased the time dealing with data. Ms. Lean, the administration, indicated she can finish her task from generating report until distributing the report to the hawker and users within 1 hour. Meanwhile, she hopes the system can help to reduce the workload when creating the menu. Ms. Yeoh claimed that the order quantity in the report and the calculation on the collected money are precise. This had reduced the food wastage problem in the school and the hawkers earned more on that. The hawkers need the report to analyze their business performance.

After the analysis and the discuss with Ms. Yeoh and Ms. Lean, some new features are introduced. To suggest food for the users based on the weekly menu, to evaluate the business performance and know the user's sentiment on the menu they proposed, to provide better user experience on the mobile device since they always forgot the URL.

Design

Due to the new requirements, the project's database need to be redesigned. As conclusion the food entity need to add matrix attribute to categorize the food type for the food recommendation module. Besides that, add transaction entity to the database to keep the comments from the users after each transaction. The comments are used to analyze the sentiment of the users on the meal they ordered in that week.

Implementation

In this phrase, APIs are integrated in this project to meets the new requirement, such as Excel Import API is to help administration to reduce workload when creating food, KNN machine learning API is used on food recommendation module, while Text Sentiment API is used on the business performance analysis.

Testing

As the pandemic, the school is closed currently, so the beta testing couldn't be applied. Decision table and use case testing are applied in this project and result will be discussed in chapter 5.

4.4 Timeline

TASK	START	END	DAYS
Planning phrase	27-Jul-20	20-Aug-20	25
Study project background	27-Jul-20	2-Aug-20	7
Determine problem statement	3-Aug-20	9-Aug-20	7
Study literature review	10-Aug-20	20-Aug-20	11
Review existing system	10-Aug-20	20-Aug-20	11
Analysis phrase	17-Aug-20	4-Sep-20	19
Interview	17-Aug-20	23-Aug-20	7
Refine user requirements	24-Aug-20	26-Aug-20	3
Determine system functionalities	27-Aug-20	28-Aug-20	2
Refine project scope and objectives	29-Aug-20	1-Sep-20	4
Determine methodology & tool of use	1-Sep-20	4-Sep-20	4
Design phrase (1st gen prototype)	18-Jan-21	7-Feb-21	21
Design use case diagram	18-Jan-21	22-Jan-21	5
Design activity diagram	23-Jan-21	31-Jan-21	9
Design database	25-Jan-21	7-Feb-21	14
Design user interface	1-Feb-21	5-Feb-21	5
Design site map	6-Feb-21	7-Feb-21	2
Implementation phrase (developing) (1st gen prototype)	8-Feb-21	14-Mar-21	35
Develop user interface	8-Feb-21	11-Mar-21	32
Develop user module	8-Feb-21	16-Feb-21	9
Develop food module	17-Feb-21	25-Feb-21	9
Develop order module	26-Feb-21	6-Mar-21	9
Develop class module	7-Mar-21	14-Mar-21	8
Implementation phrase (testing) (1st gen prototype)	15-Mar-21	9-Apr-21	26
Usability testing	15-Mar-21	21-Mar-21	7
Pre-launch system	22-Mar-21	9-Apr-21	19
Fix testing errors	15-Mar-21	9-Apr-21	26
Analysis phrase (2nd gen prototype)	14-Jun-21	2-Jul-21	19
Further review on the requirements	14-Jun-21	27-Jun-21	14
Refine system functionalities	28-Jun-21	2-Jul-21	5
Design phrase (2nd gen prototype)	3-Jul-21	11-Jul-21	9
Redesign database	3-Jul-21	11-Jul-21	9
Redesign user interface and sitemap	5-Jul-21	11-Jul-21	7
Implementation phrase (developing) (2nd gen prototype)	12-Jul-21	8-Aug-21	28
Develop text sentiment module & report module	12-Jul-21	8-Aug-21	28
Develop user interface	19-Jul-21	25-Jul-21	7
Train KNN model	26-Jul-21	5-Aug-21	11
Implementation phrase (testing) (2nd gen prototype)	9-Aug-21	29-Aug-21	21
Usability testing	9-Aug-21	13-Aug-21	5
Pre-launch system	14-Aug-21	27-Aug-21	14
Fix testing errors	11-Aug-21	29-Aug-21	19
Implementation phrase (maintenance) (2nd gen prototype)	30-Aug-21	12-Sep-21	14
Receive feedback from client	30-Aug-21	12-Sep-21	14
Fix emerging errors	30-Aug-21	12-Sep-21	14

Table 4.4.1 Timeline of the project

As mentioned above, the project was developed by using throwaway prototype methodology, the phrases and timelines are mainly separated into 3 parts, which is IIPSPW, FYP1 and FYP2. In IIPSPW, this project is under planning phrase and analysis phrase. While in FYP1, the 1st version prototype was developed and sent to user for testing. Before the FYP 2, users' feedbacks are collected. The project was enhanced with the new requirements. Due to MCO the schools are closed so that the project couldn't be tested at the client side.

4.5 Development Tools

Laravel



Figure 4.5.1 Laravel

Laravel is a PHP web framework which is founded by Taylor Otwell. It provides the MVC as the architectural pattern of web applications and dependency on Symfony. It is also the most famous backend framework in 2019. Laravel is used as the backend development framework in this project.

Minimum requirement:

- **PHP version ≥ 5.4 and PHP version < 7**
- **Mcrypt PHP extension**
- **OpenSSL PHP extension**
- **Mbstring PHP extension**
- **Tokenizer PHP extension**

Visual Studio Code

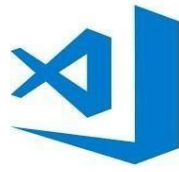


Figure 4.5.2 Visual Studio Code

Visual Studio Code is an IDE which is compatible with most operating system, such as Windows, macOS, Linux etc. It supports for debugging, intelligent code completion, snippets, code refactoring, and embedded Git. It has rich ecosystem with other languages' extensions, for instances Python, Java and others. Besides that, JavaScript is one of the built-in languages in this source code editor.

Minimum requirements:

- **CPU: 1.6 GHz**
- **RAM: 1 GB**

XAMPP



Figure 4.5.3 XAMPP

XAMPP is founded by Apache Friends, is a web server solution stack package consists of the Apache Server, database, and interpreters for PHP scripts. XAMPP helps to host the project's database when development phrase.

Minimum requirements:

- -

Heroku



Figure 4.5.4 Heroku

Heroku is a platform as a service (PaaS) that enables developers to deploy their projects in the cloud server. It supports several programming languages. The basic deployment is free, and this is good to the small organization or the web application that have light traffic. Heroku provides a server for the project to be deployed.

Minimum requirements:

- **Installation of git bash**

GitHub



Figure 4.5.5 GitHub

GitHub is a provider of Internet hosting for software development and version control using Git. The author can share his project to other developer and the project uploaded are open source to download and reference. This project will be deployed as well to ease the teamwork with other developers in the future. Besides that, the GitHub provides another softcopy of the project. It can be used as the plan B when the project in the PC lost.

Git Bash



Figure 4.5.6 Git Bash

Git Bash is a software which supports Windows platform an emulation layer for a Git command line experience. This is the middleware that communicates between GitHub and Visual Studio Code by using Git commands.

Minimum requirements:

- **Windows version: v2.10.1, Windows Vista or later**

Heidi SQL



Figure 4.5.7 Heidi SQL

Heidi SQL is an open-sourced database administration tools, which suits for MySQL, MariaDB, Microsoft SQL Server, PostgreSQL, SQLite. In this project, this tool is used to manage the database of the production and testing system.

Minimum requirements:

Windows version: Windows XP or later

4.6 System Specification

Processor	Intel® Core™ i5-8300H CPU @2.30Ghz
RAM	8GB
Laravel version	8.x
Visual Studio Code version	1.53
XAMPP version	7.4.10-0
Git version	2.28.0
Heidi SQL version	11.3.0.6295
Windows version	Windows 11 Home Single Language

Table 4.6.1 Device specification of development

Android version	4.0 or above
RAM	4 GB or above
Storage	32 GB or above

Table 4.6.2 Mobile phone specification for user

Operating System	Windows, MacOS
RAM	4 GB or above
Web Browser	Any browsers, recommended is Google Chrome

Table 4.6.3 Desktop/laptop specification for user

Chapter 5 Project Implementation

5.1 Route Design

```
Route::get('/', function () {
    return view('auth.login');
});

Auth::routes();

Route::get('/home', [App\Http\Controllers\HomeController::class, 'index'])->name('home');
Route::middleware(['checkIsAdmin'])->group(function () {
    Route::get('/setting', [App\Http\Controllers\HomeController::class, 'setting'])->name('setting');
    Route::post('/can-order', [App\Http\Controllers\HomeController::class, 'canOrder'])->name('canOrder');

    Route::resource('users', App\Http\Controllers\UserController::class);
    Route::get('list', [App\Http\Controllers\UserController::class, 'list'])->name('list');

    Route::resource('menu', App\Http\Controllers\MenuController::class);
    Route::get('chooseDateRange', [App\Http\Controllers\MenuController::class, 'chooseDateRange'])->name('chooseDateRange');
    Route::get('chooseDateRangeList', [App\Http\Controllers\MenuController::class, 'chooseDateRangeList'])->name('chooseDateRange.list');
    Route::get('menu-index/{id}', [App\Http\Controllers\MenuController::class, 'menuIndex'])->name('menu_index');
    Route::get('sessionOneList/{days}/{date_range}', [App\Http\Controllers\MenuController::class, 'sessionOneList'])->name('sessionOneList');
    Route::get('sessionTwoList/{days}/{date_range}', [App\Http\Controllers\MenuController::class, 'sessionTwoList'])->name('sessionTwoList');
    Route::post('import/menu', [App\Http\Controllers\MenuController::class, 'foodImport'])->name('import-food');

    Route::resource('classes', App\Http\Controllers\StudentClassController::class);
    Route::get('class/list', [App\Http\Controllers\StudentClassController::class, 'list'])->name('class.list');
    Route::get('class/{id}', [App\Http\Controllers\StudentClassController::class, 'class'])->name('class.name-list');
    Route::get('class/{id}/list', [App\Http\Controllers\StudentClassController::class, 'nameList'])->name('class.name-list-list');
    Route::get('class-orderDateRange/{id}', [App\Http\Controllers\StudentClassController::class, 'orderDateRange'])->name('orderDateRange');
    Route::get('class/{id}/order', [App\Http\Controllers\StudentClassController::class, 'order'])->name('class.order');
    Route::get('class/{id}/orderDetails', [App\Http\Controllers\StudentClassController::class, 'orderDetails'])->name('class.orderDetails');

    Route::get('/date-range', [App\Http\Controllers\DateRangeController::class, 'date_range'])->name('date_range');
    Route::get('/date-range-list', [App\Http\Controllers\DateRangeController::class, 'date_range_list'])->name('date_range.list');
    Route::get('/date-range-create', [App\Http\Controllers\DateRangeController::class, 'date_range_create'])->name('date_range.create');
    Route::post('/date-range-store', [App\Http\Controllers\DateRangeController::class, 'date_range_store'])->name('date_range.store');
    Route::get('/date-range-edit/{id}', [App\Http\Controllers\DateRangeController::class, 'date_range_edit'])->name('date_range.edit');
    Route::put('/date-range-update/{id}', [App\Http\Controllers\DateRangeController::class, 'date_range_update'])->name('date_range.update');
    Route::delete('/date-range-delete/{id}', [App\Http\Controllers\DateRangeController::class, 'date_range_delete'])->name('date_range.delete');

    // Route::resource('stalls', App\Http\Controllers\StallController::class);
    // Route::get('stalls-list', [App\Http\Controllers\StallController::class, 'list'])->name('stall-list');
});
Route::middleware(['checkIsKitchenandAdmin'])->group(function () {
    Route::get('/report', [App\Http\Controllers\ReportController::class, 'index'])->name('report.index');
    Route::get('/report/show', [App\Http\Controllers\ReportController::class, 'show'])->name('report.show');
    Route::get('/report/{stall_id}', [App\Http\Controllers\ReportController::class, 'hawkerReportIndex'])->name('report.hawker.index');
    Route::get('/report/{stall_id}/show', [App\Http\Controllers\ReportController::class, 'hawkerReport'])->name('report.hawker');
    Route::post('orders/check-amount', [App\Http\Controllers\OrderController::class, 'checkAmount'])->name('check-amount');
});
Route::get('profile', [App\Http\Controllers\UserController::class, 'profile'])->name('profile');
Route::get('/profile/password', [App\Http\Controllers\UserController::class, 'viewchangePwd'])->name('change-pwd-view');
Route::post('/profile/password/change', [App\Http\Controllers\UserController::class, 'changePassword'])->name('change-pwd');

Route::middleware(['checkUserCanOrder'])->group(function () {
    Route::resource('order', App\Http\Controllers\OrderController::class);
    //Route::post('orders/menu', [App\Http\Controllers\OrderController::class, 'chooseMenu'])->name('chooseMenu')->middleware('checkUserCanOrder');
    Route::post('orders/checkout', [App\Http\Controllers\OrderController::class, 'checkout'])->name('checkout');
});
Route::middleware(['checkUserCanDeleteOrEdit'])->group(function () {
    Route::get('orders/{id}/edit/', [App\Http\Controllers\OrderController::class, 'edit'])->name('editOrder2');
    Route::post('orders/edit', [App\Http\Controllers\OrderController::class, 'editOrder'])->name('editOrder');
    Route::get('orders/delete/{id}', [App\Http\Controllers\OrderController::class, 'deleteOrder'])->name('deleteOrder');
});

Route::get('orders/selectDateRange', [App\Http\Controllers\OrderController::class, 'orderHistorySelectDateRange'])->name('orderHistory.selectDateRange');
Route::post('orders/history', [App\Http\Controllers\OrderController::class, 'history'])->name('viewOrder');
Route::get('/text-sentiment', [App\Services\TextSentiment::class, 'sentiment'])->name('text-sentiment');
Route::get('KNN/initial', [App\Services\FoodClassificationService\KNN::class, 'initial'])->name('KNN-initial');
Route::post('order/comment', [App\Http\Controllers\TransactionController::class, 'comment'])->name('comment');
```

Figure 5.1.1 Route list

5.2 Event Specification

5.2.1 Users Use Case

Users can download the web application in their mobile phone or as a desktop application.

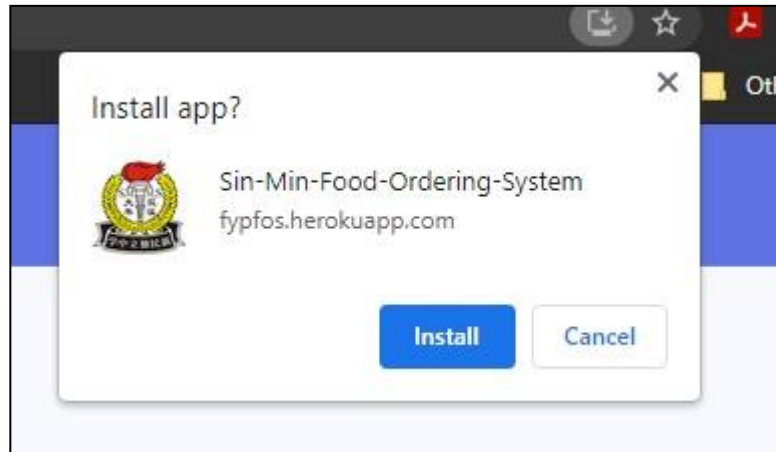


Figure 5.2.1.1 Install web application



Figure 5.2.1.2 Installed app in mobile device



Figure 5.2.1.3 Installed app in desktop

Users include students, teachers, and staffs, will login through the login page and they will be assigned a unique token and redirected to the user's dashboard. The unique token is useful in verifying the user's session to avoid any malicious activity from other users.

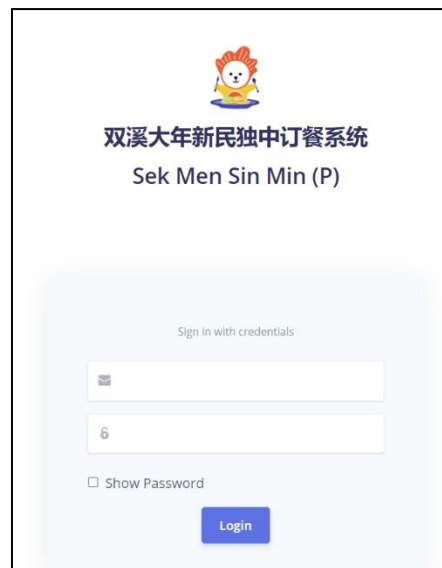


Figure 5.2.1.4 Login page

Dashboard with food recommendation can suggest the food in this week for the user and this data are predicted by using previous week order history (at least ordered 2 weeks of food). K-Nearest Neighbor machine learning model is applied to recommend food for the user.



Figure 5.2.1.5 User's Dashboard

Users could view their details and change the password.



The 'Profile' form displays user details in a table. A 'Change Password' button is located in the top right corner.

Profile	
NAME	CHONG YEE ROU
EMAIL	2018020@spsmp.edu.my
TYPE	User
STUDENT / TEACHER ID	2018020
CLASS	S1Sc

Figure 5.2.1.6 User's profile



The 'Change Password' form includes three input fields: 'Old Password', 'New Password', and 'Confirm Password'. A 'Show Password' checkbox is located below the 'New Password' field. 'Back' and 'Submit' buttons are at the bottom.

Change Password

Old Password
Please Enter Your Old Password

New Password
Please Enter Your New Password
☐ Show Password

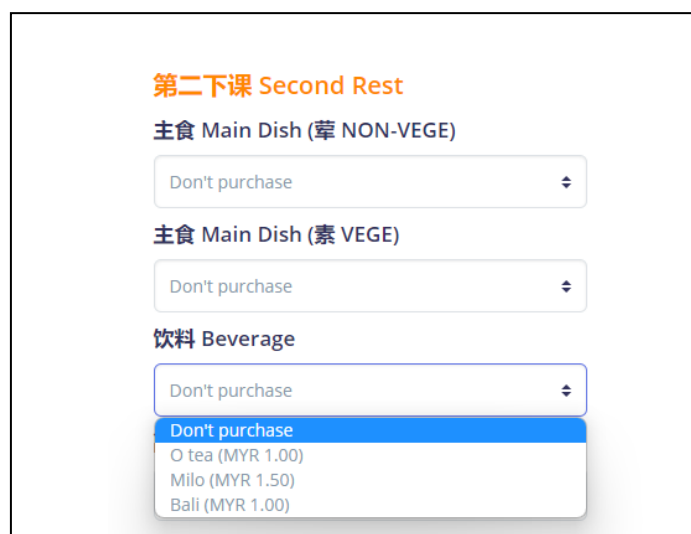
Confirm Password
Please Re-enter Your New Password

Back Submit

Figure 5.2.1.7 Change password

Food order module

The student, teacher and staff can place order and select the quantity at the checkout page.



The 'Food order' form is titled '第二下课 Second Rest'. It contains three sections: '主食 Main Dish (葷 NON-VEGE)', '主食 Main Dish (素 VEGE)', and '饮料 Beverage'. Each section has a dropdown menu with 'Don't purchase' as the selected option. The '饮料 Beverage' dropdown is open, showing options: 'Don't purchase', 'O tea (MYR 1.00)', 'Milo (MYR 1.50)', and 'Bali (MYR 1.00)'.

第二下课 Second Rest

主食 Main Dish (葷 NON-VEGE)
Don't purchase

主食 Main Dish (素 VEGE)
Don't purchase

饮料 Beverage
Don't purchase
O tea (MYR 1.00)
Milo (MYR 1.50)
Bali (MYR 1.00)

Figure 5.2.1.8 Order form

Thursday 16-09-2021 (Malaysia Day)

第一下课 First Rest

主食 Main Dish (葷 NON-VEGE)

Don't purchase

Don't purchase

素食 Main Dish (素 VEGE)

Don't purchase

饮料 Beverage

Don't purchase

副食 Side Dish

Don't purchase

Figure 5.2.1.9 Order Form (holiday)

Confirm your order

Sunday 12-09-2021

第一下课 First Rest

Milo	1	MYR	1.50
------	---	-----	------

第二下课 Second Rest

Nasi Pataya	1	MYR	5.00
-------------	---	-----	------

Monday 13-09-2021

第一下课 First Rest

Sichuan Fried Rice(Vege)	1	MYR	4.00
--------------------------	---	-----	------

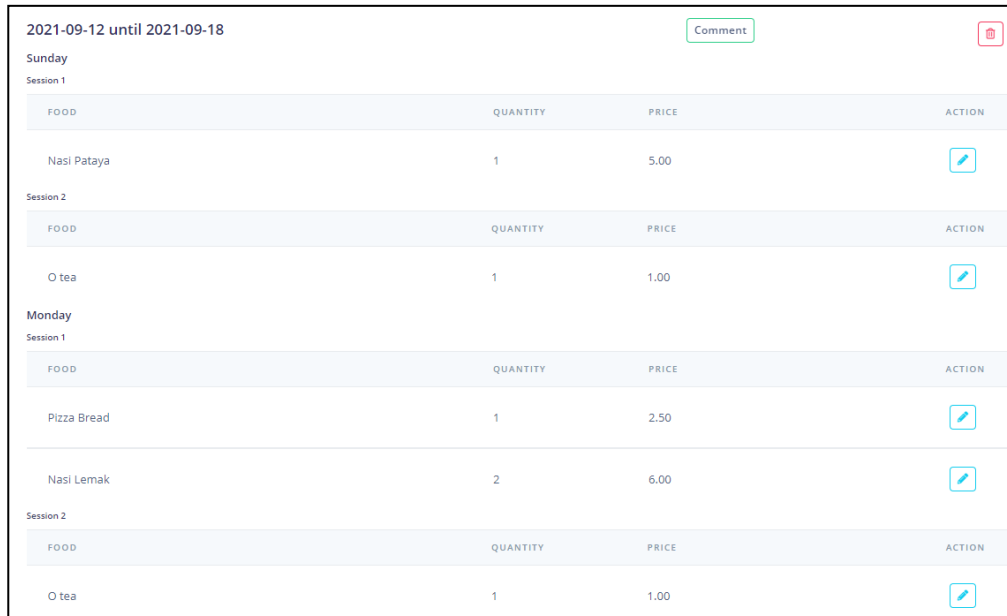
Subtotal : MYR 10.50

[Back](#) [Confirm](#)

Figure 5.2.1.10 Checkout page

History and Feedback module

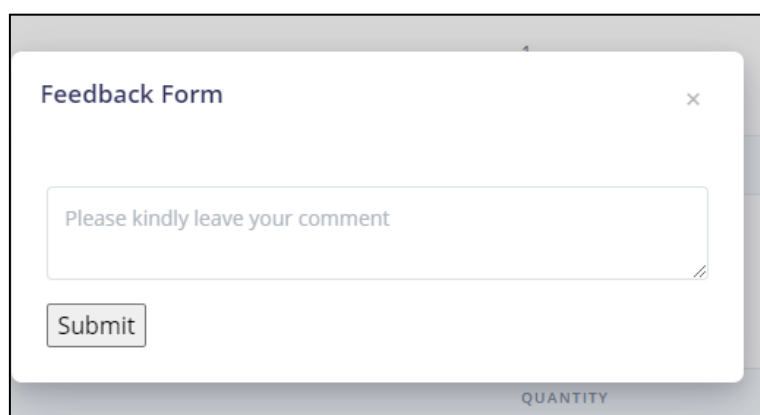
After place the order, the users can check their order history and leave their comments at here. The comments are collected and will be analyzed by the system to generate the bar chart for the hawker to evaluate their business performance.



The screenshot displays the 'Order history' interface. At the top, it shows the date range '2021-09-12 until 2021-09-18' and a 'Comment' button. The data is organized by day and session.

2021-09-12 until 2021-09-18			
Sunday			
Session 1			
FOOD	QUANTITY	PRICE	ACTION
Nasi Pataya	1	5.00	
Session 2			
FOOD	QUANTITY	PRICE	ACTION
O tea	1	1.00	
Monday			
Session 1			
FOOD	QUANTITY	PRICE	ACTION
Pizza Bread	1	2.50	
Nasi Lemak	2	6.00	
Session 2			
FOOD	QUANTITY	PRICE	ACTION
O tea	1	1.00	

Figure 5.2.1.11 Order history



The screenshot shows a 'Feedback Form' modal with a close button (X) in the top right corner. It contains a text input field with the placeholder text 'Please kindly leave your comment' and a 'Submit' button below it.

Figure 5.2.1.12 Feedback form

5.2.2 Hawker Use Case

Hawker could retrieve weekly report and check user expenses in his/her stall. Besides that, sentiment analysis is applied for the stall owner to evaluate his/her business performance.

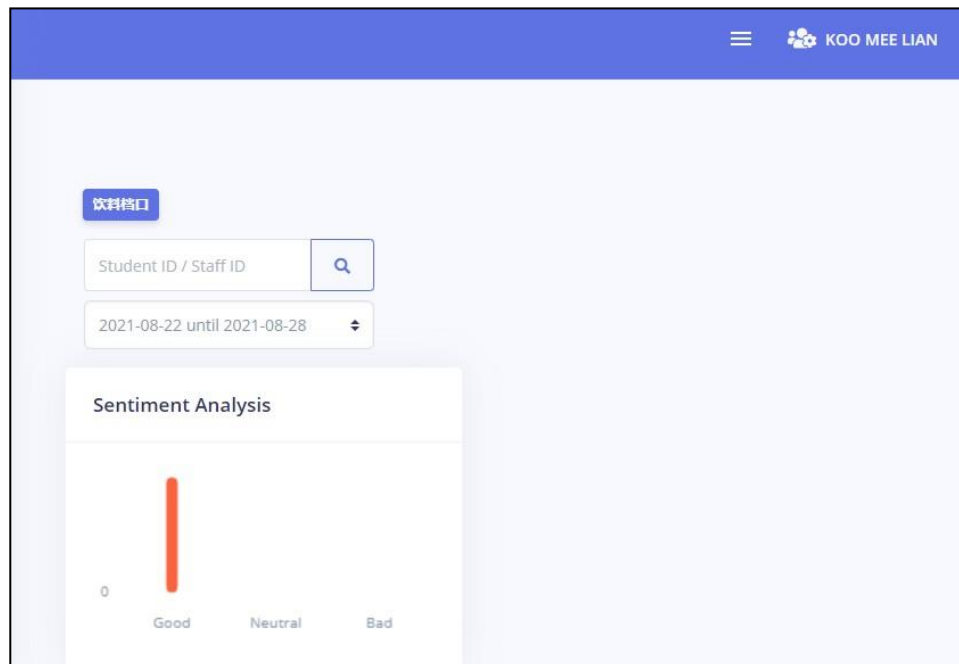


Figure 5.2.2.1 Hawker's dashboard

Report Module

饮料		Date Range : 2021-05-02 until 2021-05-06	
Monday			
第一下课			
烤面包 Toast x2Set		罗汉果 luo han guo	
Class	Quantity	Class	Quantity
Teacher/Staff	4	Teacher/Staff	1
J1C	6	J1C	4
J1W	1	J1W	2
J1S	3	J1S	6
J2C	5	J2C	1
J2W	5	J2W	2
J3C	6	J3C	1
J3W	2	S1Sc	2
S1Sc	2	S1C	2
S1C	3	S3C	1
S1W	2	S3W	2
S2C	2	Total	24
S2W	2		
S2S	2		
S3Sc	2		
西瓜布丁 watermelon Jelly			
Class	Quantity		
Teacher/Staff	1		
J1C	5		
J1W	3		
J1S	2		
J2C	4		
J2W	2		
J3W	2		
S2Sc	1		
S2S	1		
S3C	1		
S3W	1		
Total	23		

Figure 5.2.2.2 Weekly report from beverage stall

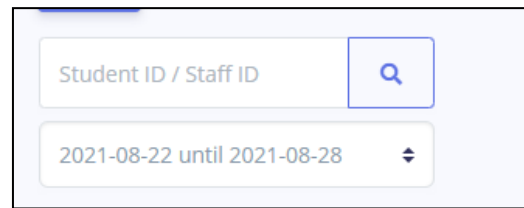
素食		Date Range : 2021-04-25 until 2021-04-29	
Sunday			
第一下课			
椰浆饭 Nasi Lemak		蛋包饭 Nasi Pataya	
Class	Quantity	Class	Quantity
Teacher/Staff	3	Teacher/Staff	5
J1C	12	J1C	4
J1W	7	J1S	1
J1S	8	J2C	2
J2C	5	J2W	1
J2W	12	J3C	3
J3C	7	J3W	2
J3W	11	S1Sc	1
S1Sc	3	S1C	1
S1W	6	S1W	2
S2Sc	3	S2W	4
S2C	4	S3C	1
S2W	10	S3W	4
S2S	5	Total	31
S3C	5		

Figure 5.2.2.3 Weekly report from non-vegetarian stall

素食		Date Range : 2021-05-02 until 2021-05-06	
Monday			
第一下课			
素炒粿角		素经济炒面	
Class	Quantity	Class	Quantity
Teacher/Staff	4	J1C	1
J3C	1	J1W	2
S2C	1	J3C	2
Total	6	S1Sc	1
		S3Sc	2
		Total	8
第二下课			
素鸡丁炒饭		素印度炒面	
Class	Quantity	Class	Quantity
Teacher/Staff	2	Teacher/Staff	2
J1W	2	J1C	1
J1S	1	J1W	1
J2C	1	J3C	2
J3C	1	S1W	1

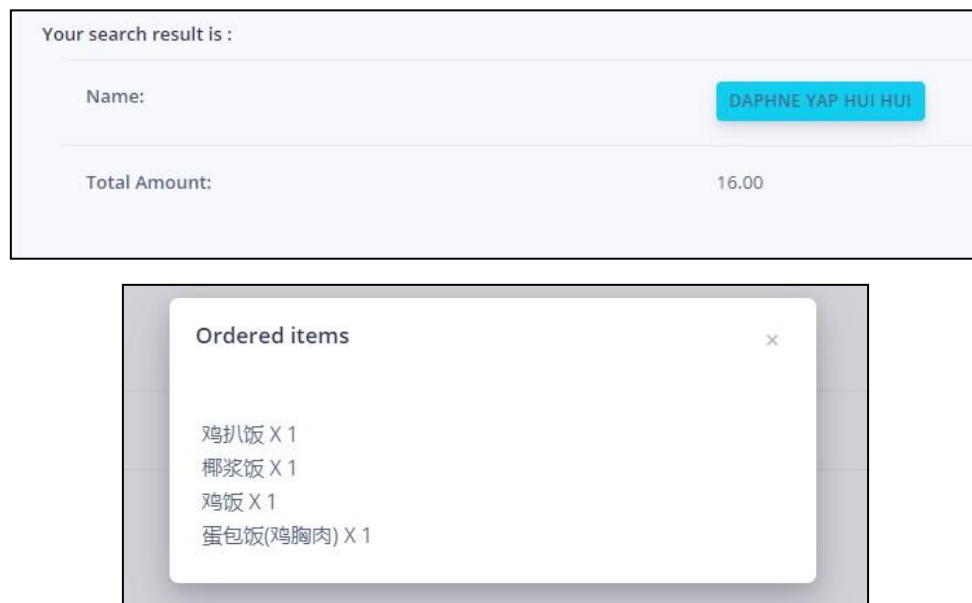
Figure 5.2.2.4 Weekly report from vegetarian stall

Check expenses module



A search form for customer expenses. It features a text input field labeled "Student ID / Staff ID" with a magnifying glass icon to its right. Below this is a date range selector showing "2021-08-22 until 2021-08-28" with a dropdown arrow.

Figure 5.2.2.5 Search customer expenses



The search results are displayed in two sections. The top section, titled "Your search result is :", shows the "Name:" as "DAPHNE YAP HUI HUI" in a blue button and the "Total Amount:" as "16.00". The bottom section, titled "Ordered items" with a close button, lists the following items: "鸡扒饭 X 1", "椰浆饭 X 1", "鸡饭 X 1", and "蛋包饭(鸡胸肉) X 1".

Figure 5.2.2.6 Search result

Sentiment analysis

The data is collected from the user's feedback then the system using VADER with lexicon and rule-based sentiment techniques to generate the graph. This will be helpful to the hawkers on evaluating their business.

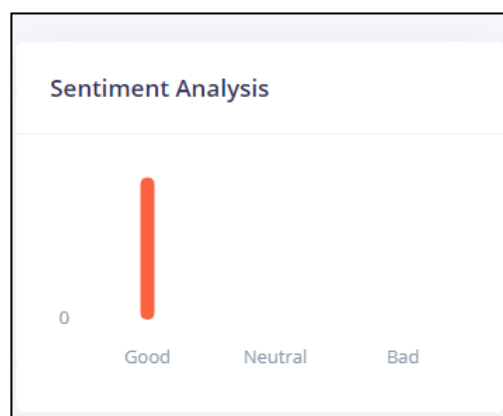


Figure 5.2.2.7 Sentiment analysis (evaluation on business performance)

5.2.3 Admin Module

Admin could manage user, class, menu(food), date range and control the availability of the menu. He/she can also check the expenses of users from three different stall and stall report as well. In addition, sentiment analysis is also available for the admin to evaluate the performance from three different stalls.

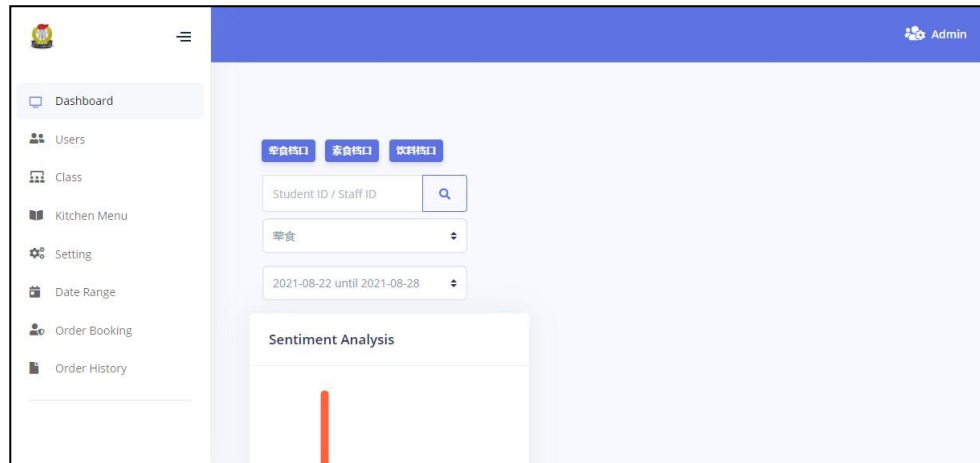


Figure 5.2.3.1 Admin's dashboard

Users List								Create
Show 10 entries		Search: <input type="text"/>						
ID	NAME	EMAIL	TYPE	STUDENT / TEACHER ID	CLASS	ACTION		
1	CHONG YEE ROU	2018020@spsmp.edu.my	Student	2018020	S1Sc			
2	LIM SHIN YU	2018007@spsmp.edu.my	Student	2018007	S1W			
3	LEE JING YI	2016033@spsmp.edu.my	Student	2016033	S3C			
4	LEE SHANG QIAN	2016079@spsmp.edu.my	Student	2016079	S3C			
5	STELLA OOI KAI XIN	2016048@spsmp.edu.my	Student	2016048	S3C			
6	HO CHEE SHENG	2016051@spsmp.edu.my	Student	2016051	S3W			
7	TAN PING SHEN	2016090@spsmp.edu.my	Student	2016090	S3C			

Figure 5.2.3.2 User management

Email	<input type="text" value="Please Enter email"/>
Name	<input type="text" value="Please Enter Name"/>
Type	<input type="text" value="Admin"/>
Class	<input type="text" value="Super Admin"/>
Student ID	<input type="text" value="Please Enter Student ID"/>
Password	<input type="text" value="Please Enter Password"/>
Confirm Password	<input type="text" value="Please Enter Confirm Password"/>

Back
Submit

Figure 5.2.3.3 Create user

Email	<input type="text" value="2018020@spsmp.edu.my"/>
Name	<input type="text" value="CHONG YEE ROU"/>
Type	<input type="text" value="Student"/>
Class	<input type="text" value="S1Sc"/>
Student ID	<input type="text" value="2018020"/>
Password	<input type="text" value="Please Enter Password"/>
Confirm Password	<input type="text" value="Please Enter Confirm Password"/>

Back
Submit

Figure 5.2.3.4 Edit user

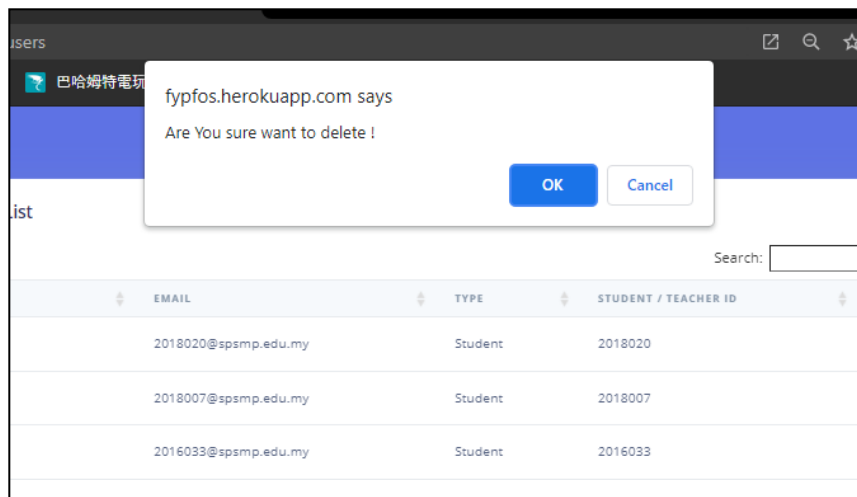


Figure 5.2.3.5 Delete user









































Show <input type="text" value="10"/> entries		Search: <input type="text"/>
ID	NAME	ACTION
1	Super Admin	    
2	Teacher/Staff	    
3	J1C	    
4	J1W	    
5	J1S	    
6	J2C	    
7	J2W	    
8	J3C	    

Figure 5.2.3.6 Class management

J2C

Show

10

 entries

Search:

ID	NAME	EMAIL	TYPE	STUDENT / TEACHER ID
1	CHONG JIN HOOI	2020010@spsmp.edu.my	Student	2020010
2	ETHAN CHUI YEE HEN	2019052@spsmp.edu.my	Student	2019052
3	GOH WEI ONN	2020039@spsmp.edu.my	Student	2020039
4	GOO GUAN HAN	2020036@spsmp.edu.my	Student	2020036
5	GRACY LOW AI QI	2020067@spsmp.edu.my	Student	2020067
6	JOSEPH SAN WEI KEE	2020014@spsmp.edu.my	Student	2020014
7	KHAW KAI ZHONG	2020052@spsmp.edu.my	Student	2020052
8	LEE KHAI YI	2020045@spsmp.edu.my	Student	2020045
9	LEE WEI HEN	2020016@spsmp.edu.my	Student	2020016
10	LIM CHUN XIAN	2019046@spsmp.edu.my	Student	2019046

Showing 1 to 10 of 30 entries

Previous

1

23Next

Figure 5.2.3.7 Student name list of class

J2C

Date Range :2021-04-25 until 2021-04-29

Sunday

第一下课

饮料	
Food	Quantity
美禄 Milo	2
西瓜 Watermelon	2
Pizza面包 Pizza Bread x 2pcs	1
水果布丁 Fruit Jelly	2

素食	
Food	Quantity
素云吞面 Wonton Noodle	1

荤食	
Food	Quantity
椰浆饭 Nasi Lemak	5
蛋包饭 Nasi Pataya	2

第二下课

荤食	
Food	Quantity
日式鸡扒饭 Japanese Chicken Chop Rice	1
意大利面(番茄酱) Spaghetti with tomato sauce	8

饮料	
Food	Quantity
Pizza面包 Pizza Bread x 2pcs	2
Chiffon x 3pcs	1
西瓜 Watermelon	2
O茶 O Tea	1

素食	
Food	Quantity
素砂煲面 Claypot Noodle	1

Monday

第一下课

饮料	
Food	Quantity
薏米 Bili	1
蛋包肠 Egg With Sausage	1
烤面包 Toast x2 Set	1
豆奶 Soya Bean Jelly	3

荤食	
Food	Quantity
炒金豆面+旦 Fried Cinton Noodles + Egg	7
蓝花饭 Butterfly Pea Flower Rice	1

Figure 5.2.3.8 Class weekly report for collecting and distributing food

TAN WEI ZHE	MYR 22.00		N/A	N/A	新加坡米粉+蛋 Singapore Fried Bihun+Egg x 1	美禄 Milo x 1	美禄 Milo x 1	东炎面 Tomyam Noodle x 1	炒东炎米粉 FRIED Tomyam Bihun x 1	美禄 Milo x 1	美禄 Milo x 1	汉堡包 Hamburger x 1
TEH XIANG GUANG	MYR 24.00		N/A	N/A	新加坡米粉+蛋 Singapore Fried Bihun+Egg x 1	扬州炒饭 Yang zhou Fried Rice x 1	皮巨肉碎粥 Congee with pork and preserved egg x 1	鸡扒饭 Chicken Chop Rice x 1	素经济炒面+素料 Fried Noodle x 1	家叉烧鸡饭 Chicken Rice x 1	番茄饭 x 1	N/A
VIVIAN KHOR HUI WEN	MYR 17.49		N/A	N/A	烤面包 Toast x2Set x 1	美禄 Milo x 1	美禄 Milo x 1	油条 you tiao x2pcs x 1	杯子蛋糕 Cup Cake 2pcs x 1	美禄 Milo x 1	肉松三文治 chicken floss sandwich x 1	美禄 Milo x 1
YONG HO SIANG	MYR 16.00		N/A	N/A	N/A	黑胡椒芝士焗饭 Black Pepper Cheese Baked Rice x 1	N/A	鸡扒饭 Chicken Chop Rice x 1	N/A	卤肉饭 Minced Pork Rice x 1	西式早餐 x 1	N/A
素食 素食 饮料		MYR 27.00 MYR 276.00 MYR 149.97										

Figure 5.2.3.9 Class weekly report for collecting money

第一下课

Show entries

Search:

ID	NAME	PRICE	STALL	ACTION
1	Nasi Pataya	5.00	荤食	
2	Burger(Vege)	4.00	素食	
3	Pizza Bread	2.50	饮料	
4	O tea	1.00	饮料	
5	Milo	1.50	饮料	
6	Ball	1.00	饮料	

Showing 1 to 6 of 6 entries

Previous Next

Figure 5.2.3.10 Food management

Please import documents

Select a file No file chosen

Figure 5.2.3.11 Import menu

Food Name:

Price:

Stall:

Dessert:

Figure 5.2.3.12 Create food

Food Name:

Price:

Stall:

Figure 5.2.3.13 Edit food

fypfos.herokuapp.com says
Are You sure want to delete !

Search:

	PRICE	STALL	ACTION
ya	5.00	華食	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

Figure 5.2.3.14 Delete food

Open for Order: ☒ Yes

Date range to order: 2021-05-02 until 2021-05-06

Submit

Figure 5.2.3.15 Weekly menu availability management

ID	START DATE	END DATE	ACTION
1	2021-04-18	2021-04-22	
2	2021-04-25	2021-04-29	
3	2021-05-02	2021-05-06	

Showing 1 to 3 of 3 entries

Previous 1 Next

Figure 5.2.3.16 Date range(week) management

Admin can define the holidays when creating or editing the date range and that day all the stalls will not have food to order.

Start Date: Please Enter Start Date

End Date:

Holidays:

Back Submit

Figure 5.2.3.17 Create date range

Start Date 12-09-2021

End Date 18-09-2021

HolidaysMalaysia Day

Back Submit

Figure 5.2.3.18 Edit date range

5.3 External Libraries/APIs

Laravel Excel

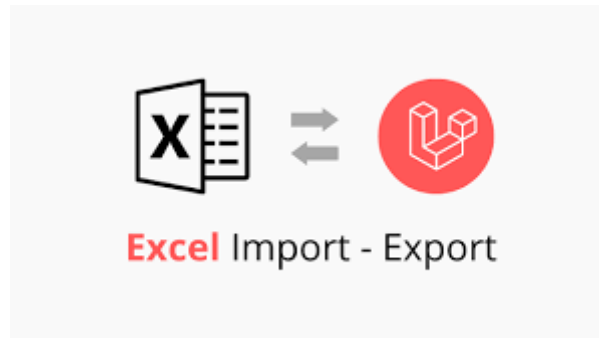


Figure 5.3.1 Laravel Excel

Laravel Excel is an APIs with elegant wrapper around PhpSpreadsheet to improve the performance on import and export. This API helps on creating the new menu to reduce the weekly workload from the admin.

PHP Sentiment Analyzer

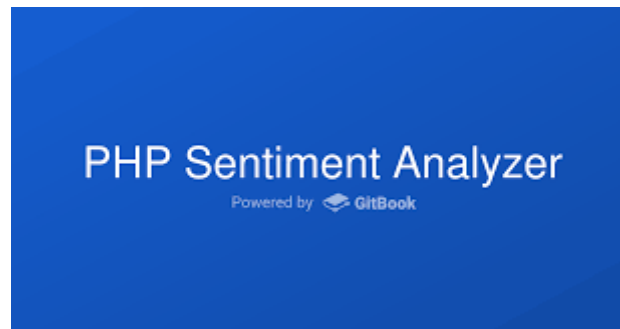


Figure 5.3.2 PHP Sentiment Analyzer

PHP Sentiment Analyzer is used to analyze the sentiments in a sentence using VADER with lexicon and rule-based sentiment analysis techniques. This API helps to analyze the feedback from the users and generate the report to admin and hawker for evaluating the performance.

PHP AI



Figure 5.3.3 PHP AI

PHP AI is a php library that provides the collection of machine learning models, such as SVC, KNN, Naive Bayes, Neural Network and etc. K-Nearest Neighbors implemented as the food recommendation functionality. From tuning the data from food entity database(training), and predict data is retrieved from the user's order history to suggest food for the user.

5.4 Security Measurement

Heroku

Heroku's network security is convenient to apply in the project. It provides firewalls, DDos mitigation, spoofing and sniffing protection and port scanning. Besides that, Heroku postgres stores the customer data in separate access-controlled databases per application. The system assigns a unique username and password to each database user.

XSRF token

CSRF (cross-site request forgery) is a type of malicious event which may be performed by the authenticated user. To prevent from the CRSF attacks, Laravel store the CSRF token in an encrypted XSRF-TOKEN cookie. (Figure 5.4.1) This is usually performed when the POST request is requested.

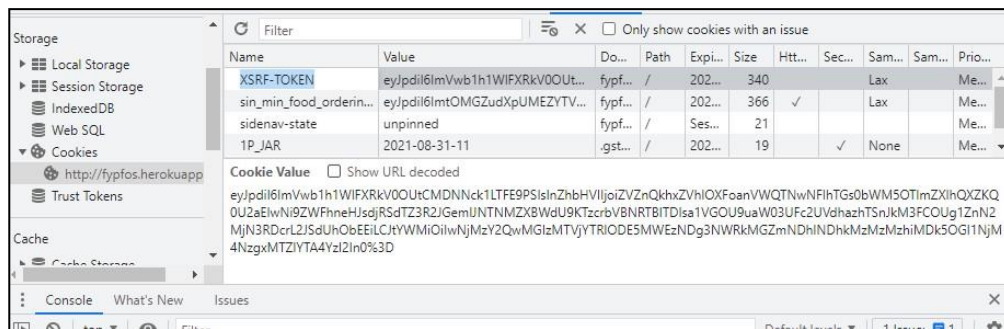


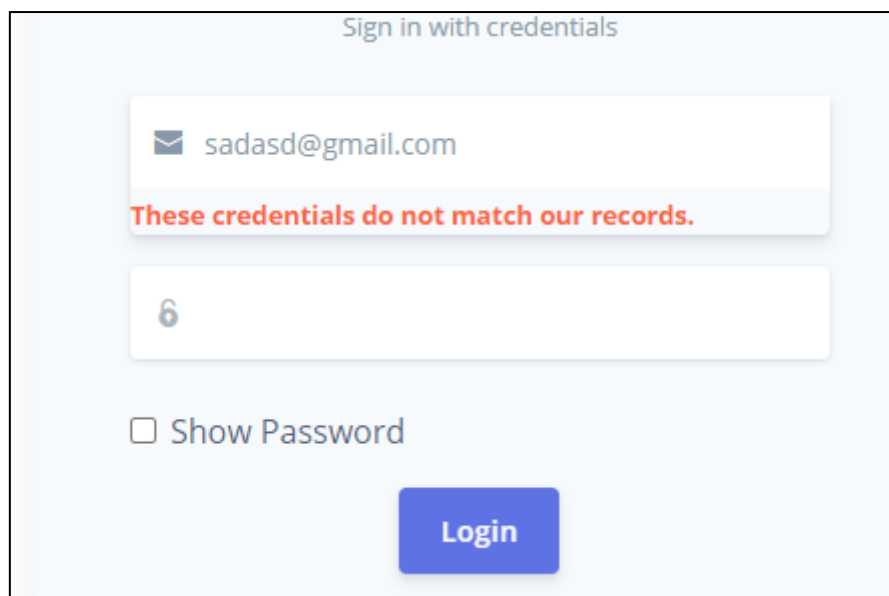
Figure 5.4.1 XSRF-TOKEN cookie

5.5 System Testing

5.5.1 Login

Condition			
C1: enter wrong password	T	-	-
C2: enter wrong email	-	T	-
C3: enter correct email and password	-	-	T
Action (Expected output)			
A1: display error message and request to re-input	T	T	F
A2: redirect user to dashboard	F	F	T

Table 5.5.1.1 Login decision table



Sign in with credentials

sadasd@gmail.com

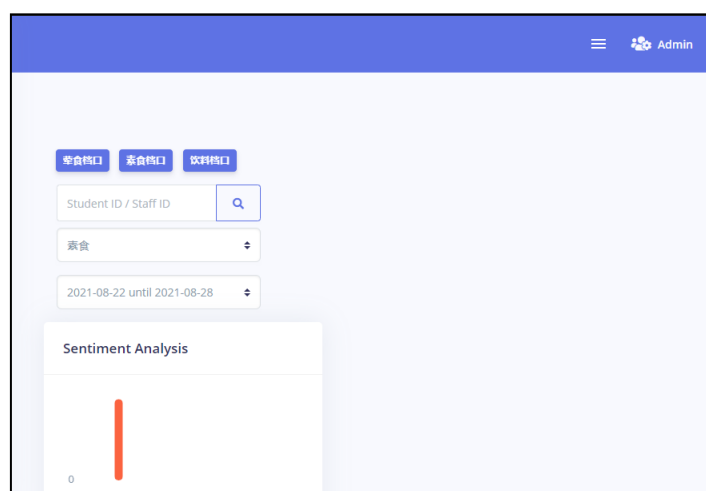
These credentials do not match our records.

6

☐ Show Password

Login

Figure 5.5.1.1 Enter wrong password/email



Admin

Student ID / Staff ID

素食

2021-08-22 until 2021-08-28

Sentiment Analysis

0

Figure 5.5.1.2 Enter correct email and password

5.5.2 Check Order Detail

Condition			
C1: enter incorrect student id/staff id	T	-	-
C2: enter correct student id/staff id	-	T	T
C3: student id/staff id not found	-	T	F
Action (Expected output)			
A1: display result with nothing	T	T	F
A2: display result with record	F	F	T

Table 5.5.2.1 Check order detail decision table

Student ID / Staff ID

素食

2021-08-22 until 2021-08-28

Your search result is :

Figure 5.5.2.1 Enter incorrect id/ id not found

Student ID / Staff ID

素食

2021-08-22 until 2021-08-28

Your search result is :

Name: CHONG YEE ROU

Total Amount: 3.00

Figure 5.5.2.2 Enter correct id and it was found

5.5.3 Change Password

Condition					
C1: enter wrong old password	T	-	-	-	F
C2: new password and confirmed password are not equivalent	F	T	F	F	F
C3: new password length < 6	F	-	T	-	F
C4: new password without alphanumeric	F	-	-	T	F
Action (Expected output)					
A1: display error message	T	T	T	T	F
A2: password updated and redirect to the login page	F	F	F	F	T

Table 5.5.3.1 Change password decision table

The screenshot shows a 'Change Password' form with the following elements:

- Old Password:** A text input field with the placeholder 'Please Enter Your Old Password'.
- New Password:** A text input field with the placeholder 'Please Enter Your New Password'. It is outlined in red, indicating a validation error. Below it is a checkbox labeled 'Show Password' and a red error message: 'The password must be alphanumeric with at least 6 characters'.
- Confirm Password:** A text input field with the placeholder 'Please Re-enter Your New Password'. It is also outlined in red. Below it is a red error message: 'The confirm password and new password must match.'
- Buttons:** 'Back' and 'Submit' buttons at the bottom.

Figure 5.5.3.1 Invalid format of new password/ new password and confirmed password are not equivalent

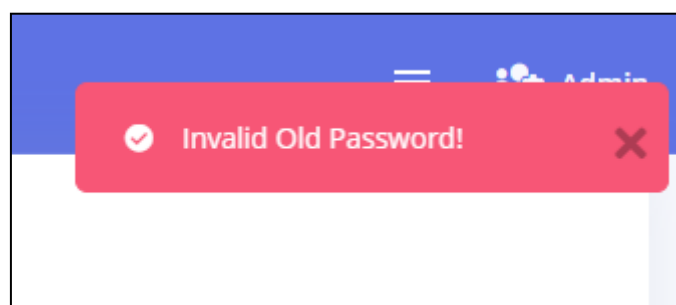


Figure 5.5.3.2 Enter invalid old password



双溪大年新民独中订餐系统
Sek Men Sin Min (P)

Sign in with credentials

☐ Show Password

Login

Figure 5.5.3.3 Enter valid old password, new password and confirmed password

5.5.4 Place Order

The selected food should be shown in the checkout page. (Expected output)



Sunday 12-09-2021

第一下课 First Rest

主食 Main Dish (荤 NON-VEGE)

Nasi Pataya (MYR 5.00)

主食 Main Dish (素 VEGE)

Burger(Vege) (MYR 4.00)

饮料 Beverage

Don't purchase

副食 Side Dish

Don't purchase

Figure 5.5.4.1 Place order page

Sunday 12-09-2021

第一下课 First Rest

Nasi Pataya	<input type="text" value="1"/>	MYR	5.00
Burger(Vege)	<input type="text" value="1"/>	MYR	4.00
Subtotal : MYR			9.00

Figure 5.5.4.2 Checkout page

Once the users placed order, they couldn't order anymore within the same week.

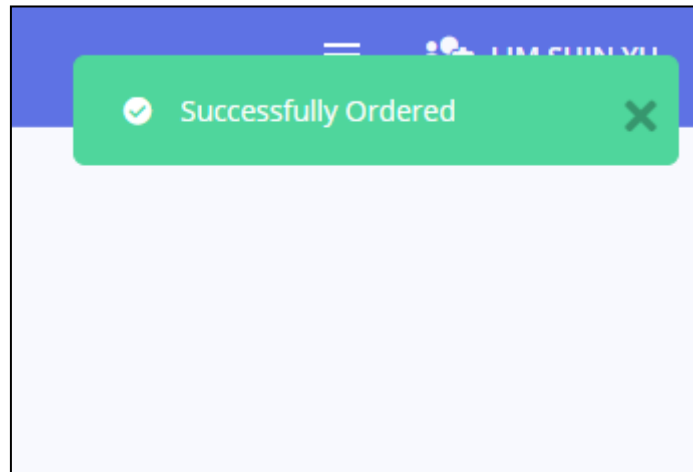


Figure 5.5.4.3 Ordered successful notification




2021-09-12 until 2021-09-18		Comment	
Sunday			
Session 1			
FOOD	QUANTITY	PRICE	ACTION
Nasi Pataya	1	5.00	
Burger(Vege)	1	4.00	
Session 2			

Figure 5.5.4.4 Order history (placed order)

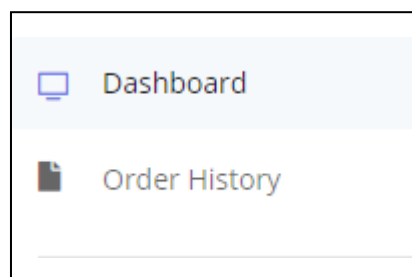


Figure 5.5.4.5 Disable weekly order

5.5.5 Delete Order

The system should prompt successfully deleted message, clear the order history and enable the weekly order again.

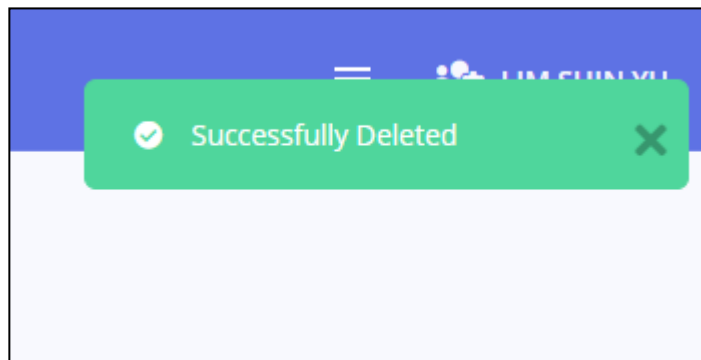


Figure 5.5.5.1 Delete successful notification

2021-09-12 until 2021-09-18		
Sunday		
Session 1		
FOOD	QUANTITY	PRICE
Session 2		
FOOD	QUANTITY	PRICE
Monday		
Session 1		
FOOD	QUANTITY	PRICE
Session 2		
FOOD	QUANTITY	PRICE
Tuesday		
Session 1		

Figure 5.5.5.2 Clear order history

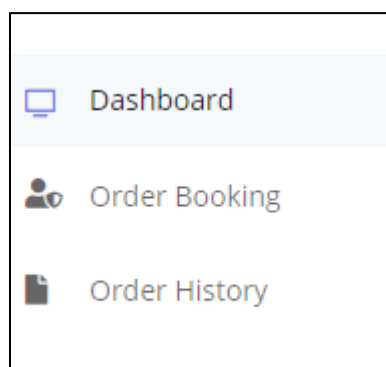
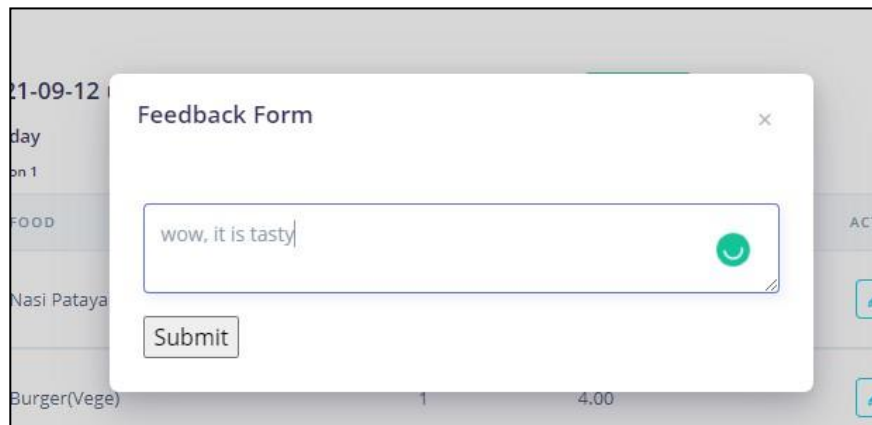


Figure 5.5.5.3 Enable weekly order

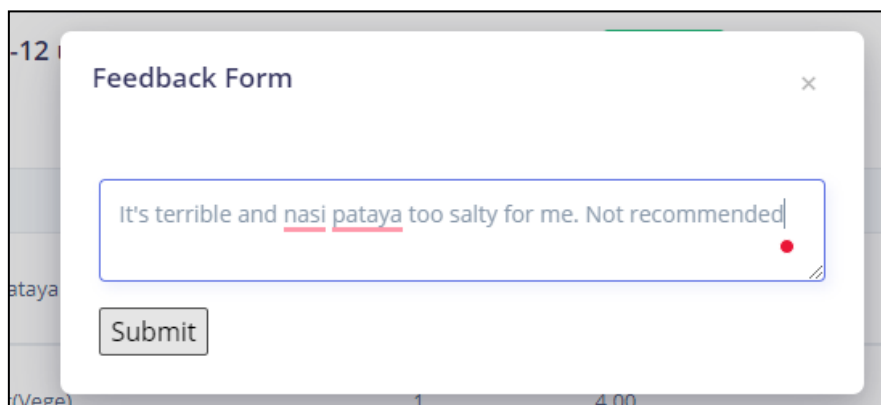
5.5.6 Sentiment Analysis

The model should detect figure 5.5.6.1 as good sentiment while figure 5.5.6.2 as bad sentiment.



A screenshot of a web application's feedback form. The form is titled "Feedback Form" and has a close button (X) in the top right corner. It contains a text input field with the text "wow, it is tasty" and a green smiley face icon on the right. Below the input field is a "Submit" button. The background shows a blurred view of a food menu with items like "Nasi Pataya" and "Burger(Vege)".

Figure 5.5.6.1 Sample of good sentiment



A screenshot of a web application's feedback form. The form is titled "Feedback Form" and has a close button (X) in the top right corner. It contains a text input field with the text "It's terrible and nasi pataya too salty for me. Not recommended" and a red sad face icon on the right. Below the input field is a "Submit" button. The background shows a blurred view of a food menu with items like "Nasi Pataya" and "Burger(Vege)".

Figure 5.5.6.2 Sample of bad sentiment

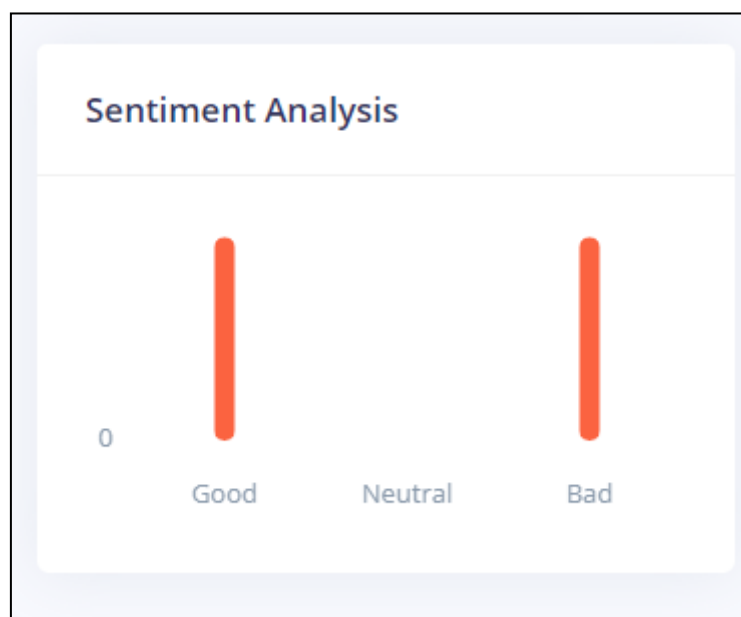


Figure 5.5.6.3 Result of the sentiment analysis after leaving the comment/feedback

5.5.7 Food Recommendation

This module is developed with the K-Nearest Neighbor. Below is the performance of the KNN model, its precision, recall and f1 score are 0.722, 0.722 and 0.7037 respectively. While the accuracy is 80%, there are 8 out of 10 predicted labels are same as the actual labels. Although the performance can't be considered as perfect, the performance can be improved in the future with its self-learning feature in the project. The model will use the data from database to train itself after the menu closed, so the food recommendation module can suggest the suitable food to the users.

```
{  
  "precision": 0.7222222222222222,  
  "recall": 0.7222222222222222,  
  "f1score": 0.7037037037037037  
}
```

Figure 5.5.7.1 Precision, Recall and F1 score of KNN model

```
[  
  "Beverage",  
  "Taiwanese",  
  "Malaysian",  
  "Western",  
  "Vege",  
  "Kuih",  
  "Japanese",  
  "Thai",  
  "Vege",  
  "Western"  
]
```

Figure 5.5.7.2 Predicted labels

```
$actual = [  
  'Beverage',  
  'Taiwanese',  
  'Malaysian',  
  'Western',  
  'Vege',  
  'Malaysian',  
  'Japanese',  
  'Thai',  
  'Chinese',  
  'Western'  
];
```

Figure 5.5.7.3 Actual labels

Chapter 6 Conclusion

This project designs a cafeteria management system for a school canteen to handle the issue of Covid-19. Covid-19 brings a lot of influence to the school, the school is closed, even the school reopen back, the students and teachers could not have meal in canteen to reduce the risk of infection Covid-19.

MVC is used as the architectural design pattern, which supports fast and parallel development to speed up the process of development. Besides that, it provides a teamwork environment for the developer to ease the progress of assigning task in future. Laravel will be used as the framework to develop the whole project. Deployment in Heroku provides safety environment to the users, admin and hawkers.

After the contribution of 2 semesters, the project had achieved the objectives below:

- **To develop a responsive web application which can manage the order and generating reports for the hawkers, staff members and students.**

This objective had achieved after FYP 1, as the result of evaluation survey collected from users. They have good experience when collecting and distributing food. The representative of hawker, Ms. Yeoh Guik See, said that this report is precise and solves their problem. Besides that, the decrement of the food wastage cases during the time they are using the system. Ms. Lean Shu Yeng, the system administration said that the system has reduced her workload and the system is user friendly to those non-tech-savvy. The reports example can refer from figure 5.2.3.8 – 5.2.3.10.

- **To help admin to reduce the data processing time**

Through the interview session, the system administration said that the data processing time has been shorten within 1 hours. She could complete her task within 1 hour from generating report then send the report to hawker and class representative.

- **To provide hawkers an analytic report with sentiment analysis**

This objective was shown in chapter 5.5.6, the sentiment analysis model can detect the sentiment from the feedback precisely. This will be helpful to the hawkers and administration when evaluate their business.

- **To provide users to manage their order**

The users can place order, delete order, leave comments in the system. Regarding the analysis in chapter 4.2, 90% of the users think that they have very good user's experience in food ordering.

- **To provide a feature that could recommend food to the user by their order history**

As the training result in chapter 5.5.7, the performance of the model is decent, and it can be improved in the future by applying self-learning on the model with previous menu contents.

Through the project development, there are several limitations are found. The project met difficulty when delivering system to the users for beta testing during this Covid-19 pandemic as the developer needs to conduct online meeting session to provide training to the administration, users, and hawker on how to use the system. Besides that, another critical issue of development is the unclear user requirements and unforeseen circumstances. They are making it hard to develop the system that meets the user requirements. For instances, it will be hard to change the database design in the middle of SDLC, and the database of the project has been changed 3 version before. Last but not least, the application without the image due to the limitation of the deployment platform, as the system is deployed at a free web hosting server, if including food pictures, user's profile pictures in the web server database, it will decrease the performance of the system.

For the recommendation, the developer can capture a tutorial video to the clients, so that they can replay the video when they meet problem at the system. User requirement should be documented well and signed at the developer and client before developing. After finish designing, the developer can meet with the client and present the design to them or sign the agreement after presentation if the client agreed with the design. Present a pitch-deck video to propose the system to the potential stakeholders with detailed documentation support in order to prove the reliability of the system.

For the future development, the system can try to integrate with the school management system to avoid the redundance data management from the administration, such as user database, class database and etc. Mobile application is the trend and it provide convenient and elegant user experience for the users.

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APPENDIX

Survey Questionnaire

Sin-Min FOS Evaluation Survey

 alvinewe120@gmail.com (not shared) [Switch account](#)

 Draft restored

* Required

I am 我是 *

☒ Student 学生

☐ Teacher & Staff 教职员

Do you use the system to order food before? 请问你使用过这系统吗? *


☐ Yes 是


☐ No 否

Next

Clear form

Sin-Min FOS Evaluation Survey

 alvinewe120@gmail.com (not shared) [Switch account](#)



* Required

Sin-Min FOS Evaluation Survey

Please kindly leave the reason you don't use the system to order food. 请留下您没使用该系统的原因. *



Your answer

Back

Submit

Clear form

Sin-Min FOS Evaluation Survey

 alvinewe120@gmail.com (not shared) [Switch account](#)


* Required

Sin-Min FOS Evaluation Survey

I have a good experience in ordering food 在订餐方面有不错的体验 *

1 2 3 4 5

Strongly disagree 非常不同意 ☐ ☐ ☐ ☐ ☐ Strongly agree 非常同意

As the representative of class, the report is clear to distribute food/ collect food/ collect money. 作为班级的代表, 报表在领取食物、分配食物甚至是收取费用时, 它都提供了清楚的资讯 *

1 2 3 4 5

Strongly disagree 非常不同意 ☐ ☐ ☐ ☐ ☐ Strongly agree 非常同意

Do you think the order history is helpful to keep track your expenses? 请问您觉得订餐历史记录有助于让您了解您的开销吗? *

☐ Yes 是
☐ No 否

If the system can suggest food weekly, will you agree with this? 如果这项系统能够为您推荐食物, 请问您有意愿使用这项功能吗? *

☐ Yes 是
☐ No 否

Please kindly leave any suggestions/ comments 请留下您宝贵的意见, 我们会视情况为系统进行升级

Your answer

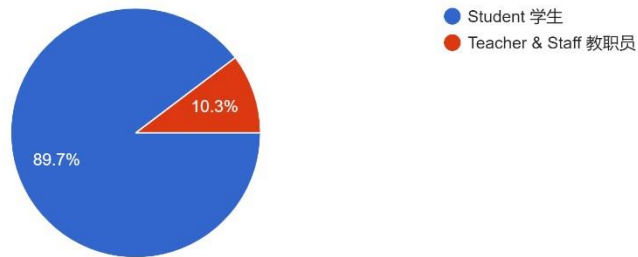
[Back](#)
[Submit](#)
[Clear form](#)

A1 – Survey Questions

Survey Result

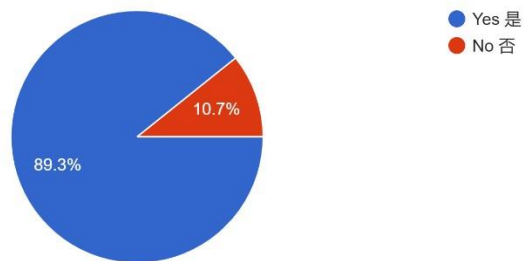
I am 我是

233 responses



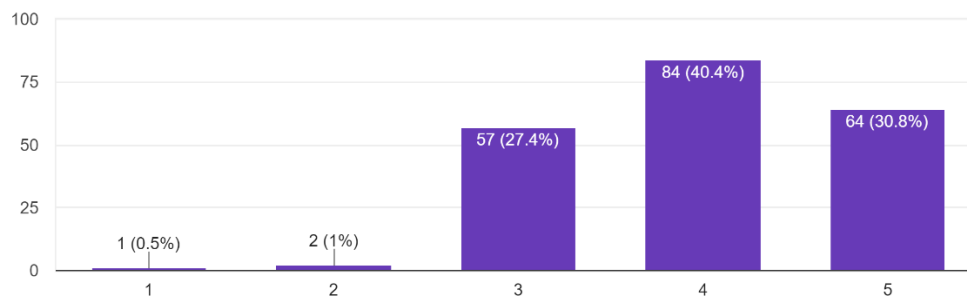
Do you use the system to order food before? 请问你使用过这系统吗?

233 responses

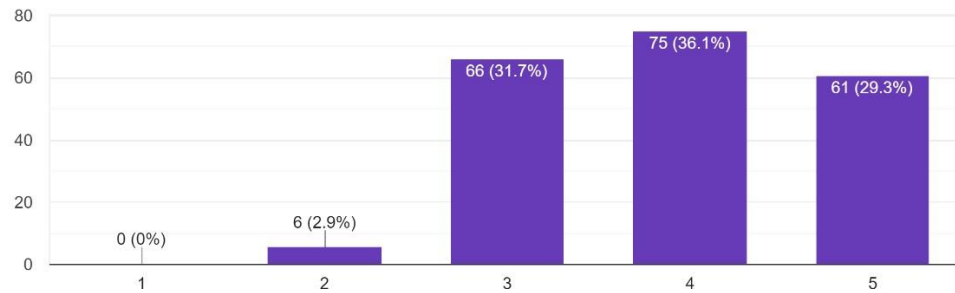


I have a good experience in ordering food 在订餐方面有不错的体验

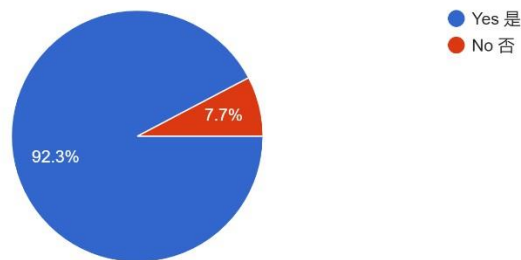
208 responses



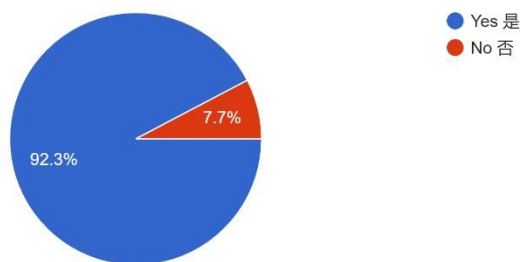
As the representative of class, the report is clear to distribute food/ collect food/ collect money.
作为班级的代表，报表在领取食物、分配食物甚至是收取费用时，它都提供了清楚的资讯
208 responses



Do you think the order history is helpful to keep track your expenses?
请问您觉得订餐历史记录有助于让您了解您的开销吗?
208 responses



If the system can suggest food weekly, will you agree with this?
如果这项系统能够为您推荐食物，请问您有意愿使用这项功能吗?
208 responses



Please kindly leave any suggestions/ comments 请留下您宝贵的意见，我们会视情况为系统进行升级

138 responses

无

没有

没有意见

-

加油

食物选择多一些

辛苦了

非常棒的一个订餐系统，方便统计餐点、餐费再提供完整的领餐报表。方便师生使用。

可以再吉一点 餐后食物可以再选些

A2 – Survey Results

Interview Consent Form

INFORMED CONSENT FOR INTERVIEWS


[UCCC3596 PROJECT I – A PORTFOLIO OF EVIDENCE FOR USER REQUIREMENT]

I, LEAN SHU YENG, agree to be interviewed for the project entitled UCCC3596 Project I - A Portfolio Of Evidence For User Requirements.

I certify that I have been told of the confidentiality of information collected for this project; that I have been given satisfactory answers to my inquiries concerning project procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice.

I agree to participate in one or more electronically recorded interviews for this project. I understand that the results of study may be published in an academic journal or book.

I agree that any information obtained from this research may be used in any way thought best for this study.



Signature of Interviewee

Date: 27/9/2020

A3 – Interview Consent Form (Lean, user requirement)

INFORMED CONSENT FOR INTERVIEWS


[UCCC3596 PROJECT II – A PORTFOLIO OF EVIDENCE FOR SYSTEM EVALUATION]

I, LEAN SHU YENG, agree to be interviewed for the project entitled UCCC3596 Project II - A Portfolio Of Evidence For System Evaluation.

I certify that I have been told of the confidentiality of information collected for this project; that I have been given satisfactory answers to my inquiries concerning project procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice.

I agree to participate in one or more electronically recorded interviews for this project. I understand that the results of study may be published in an academic journal or book.

I agree that any information obtained from this research may be used in any way thought best for this study.



Signature of Interviewee

Date: 20/4/2021

A4 – Interview Consent Form (Lean, system evaluation)

INFORMED CONSENT FOR INTERVIEWS

[UCCC3596 PROJECT I – A PORTFOLIO OF EVIDENCE FOR USER REQUIREMENT]

I, YEOH GUIK SEE, agree to be interviewed for the project entitled UCCC3596 Project I - A Portfolio Of Evidence For User Requirement.

I certify that I have been told of the confidentiality of information collected for this project; that I have been given satisfactory answers to my inquiries concerning project procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice.

I agree to participate in one or more electronically recorded interviews for this project. I understand that the results of study may be published in an academic journal or book.

I agree that any information obtained from this research may be used in any way thought best for this study.



Signature of Interviewee

Date: 27/9/2020

A5 – Interview Consent Form (Yeoh, user requirement)

INFORMED CONSENT FOR INTERVIEWS

[UCCC3596 PROJECT II – A PORTFOLIO OF EVIDENCE FOR SYSTEM EVALUATION]

I, YEOH GUIK SEE, agree to be interviewed for the project entitled UCCC3596 Project II - A Portfolio Of Evidence For System Evaluation.

I certify that I have been told of the confidentiality of information collected for this project; that I have been given satisfactory answers to my inquiries concerning project procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice.

I agree to participate in one or more electronically recorded interviews for this project. I understand that the results of study may be published in an academic journal or book.

I agree that any information obtained from this research may be used in any way thought best for this study.



Signature of Interviewee

Date: 20/4/2021

A6 – Interview Consent Form (Yeoh, system evaluation)

Interview Note

Interview Notes Form

Interview Details	
Date: 27/9/2020	Time: 4:26pm
Interviewer	
Name:	Lean Shu Yeng
Interviewer Title:	System administration and representative of users
Interviewer Phone Number:	012-938 7512
Questions to Ask Interviewer	
Question #1:	What does the impact of Covid-19 bring to the school?
Notes:	The students, teachers and staffs have to bring the meal themselves. One of the students pass out in the class due to forget to bring his meal to school on that day. Some of the parents bring their children meal to school during the recess time, and this has exposed students, teachers and staffs under very danger situation. Lesser contact, the lesser risk to get Covid-19 infection.
Question #2:	How the school deal with this situation?
Notes:	School set up a system with google form and
Question #3:	Do you feel satisfy with current system? Why?
Notes:	Satisfied with it since it worked as expected, but it is quite difficult to use, it requires technical skill to the excel. The admin needs to familiar with the excel to generate the report to hawkers and students. Generating report is the consumption.
Question #4:	How long you take time to deal with the data?
Notes:	3 days to migrate the data, another 1 day for double checking to ensure the data is correct.
Question #5:	What are the reports needed in the new system?
Notes:	Class weekly order report, Personal weekly order report, hawker weekly order report and hawker weekly income report
Question #6:	Do you receive any incomplete orders? How you deal with this kind of orders?
2 Page	
Notes:	Yes, incomplete response from google form increase the data processing time as he/she need to find out who is the student.
Question #7:	Besides the order functionality, what you need as a user to improve your user experience in the process of ordering?
Notes:	Personal expenses report to keep track their expenses weekly or even monthly.
Additional Notes	
Enter Additional Notes.	

A7 – Interview Note (Lean, user requirement)

Interview Notes Form

Interview Details	
Date:	27/9/2020
Time:	3:46pm
Interviewer	
Name:	Yeoh Guik See
Interviewer Title:	Representative of the hawker
Interviewer Phone Number:	012-425 3268

Questions to Ask Interviewer	
Question #1:	What does the impact of Covid-19 bring to the school?
Notes:	Canteen couldn't open as usual, has already affect the income of the hawker.

Question #2:	How the school deal with this situation?
Notes:	The school had proposed a methodology with google form and excel. The students and teachers can have meal in school during this pandemic.

Question #3:	Do you feel satisfy with current system? Why?
Notes:	Overall, no problem from the hawker's perspective, but just sometimes the hawkers received incorrect order list from the admin.

Question #4:	How long you take time to deal with the data?
Notes:	The hawker just receive report from the admin and admin is the one who dealing with the data. They must propose the menu 2 weeks before the menu opened for the public.

Question #5:	What are the reports needed in the new system?
Notes:	From the hawker's perspective, they need a weekly order report to deal with the recipe. Besides that, they need weekly income report to ease them from collecting money. They preferred the system with business performance analysis.

Additional Notes	
They are not tech-savvy.	

A8 – Interview Note (Yeoh, user requirement)

Interview Notes Form

Interview Details

Date: 20/4/2021 Time: 9:37pm

Interviewer

Name: Lean Shu Yeng

Interviewer Title: System administration Interviewer Phone Number: 012-938 7512

Questions to Ask Interviewer

Question #1: Could you briefly share about how the system helps you in daily task?

Notes: It has reduced the time of dealing with data, before that I work until backbone feel uncomfortable and my eyes feel dry since spending long time to the computer. I don't feel any difficult when using the system. Last time, I have to google search and study the excel formula to generate the report. So far, I haven't received any complain from students, teachers and staff yet.

Question #2: Do the reports helpful in your daily task?

Notes: The reports are clear and precise for the students and hawkers to refer. She only spends about 1 hour to finish the task from generating report until distribute report.

Question #3: Any recommendation/ suggestion on system enhancement?

Notes: Can help to reduce workload when creating menu, as the foods are key-in one by one, waste time.

Additional Notes

Enter Additional Notes.

A9 – Interview Note (Lean, system evaluation)

Interview Notes Form

Interview Details

Date: 20/4/2021 Time: 9:48pm
Interviewer
Name: Yeoh Guik See
Interviewer Title: Representative of hawkers Interviewer Phone Number: 012-425 3268

Questions to Ask Interviewer

Question #1: Could you briefly share about how the system helps you in daily task?

Notes: TBH, the hawkers quite worried when using the report in the first day. Eventually, they love this a lot as the quantity and ordered item are correct. Besides that, the system can check personal expenses, this also help them to reduce the work as they calculate themselves before.

Question #2: Do the reports helpful in your daily task?

Notes: The money and money calculation in the report are precise so that the hawker trust in the system and doesn't need to calculate themselves anymore. The correctness and consistency of the report is better than previous system. The hawker earned more because they know the quantity of the amount to prepare, and the meal box haven't left anymore.

Question #3: Any recommendation/ suggestion on system enhancement?

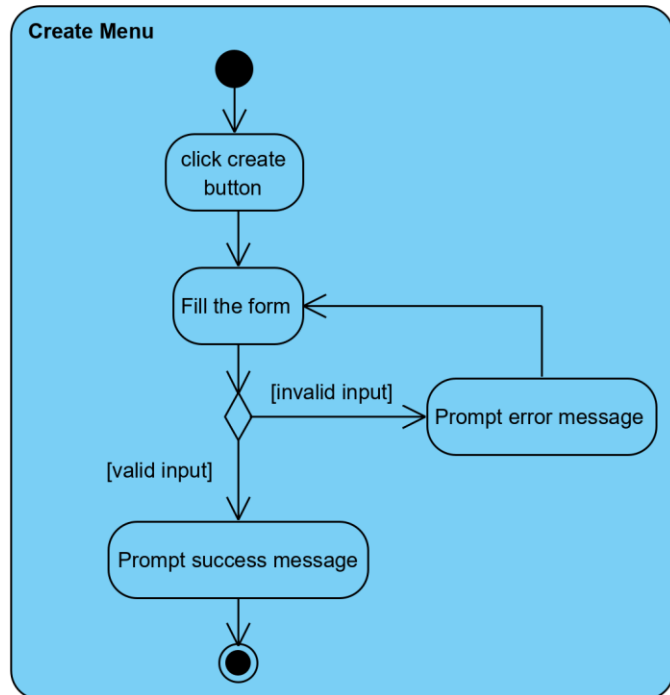
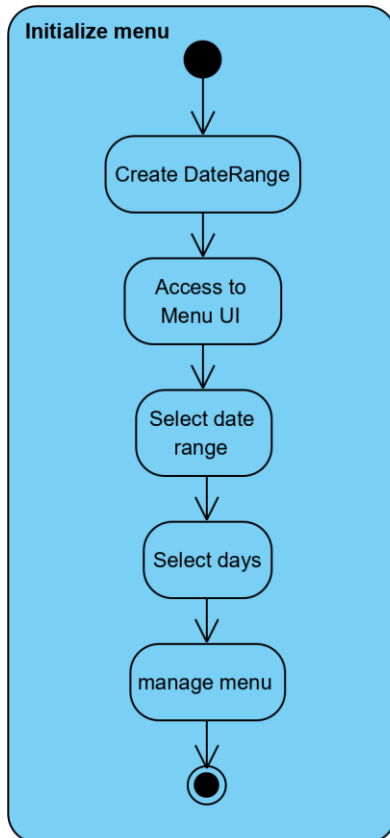
Notes: Need some tools to know the customer sentiment to analyse the business

Additional Notes

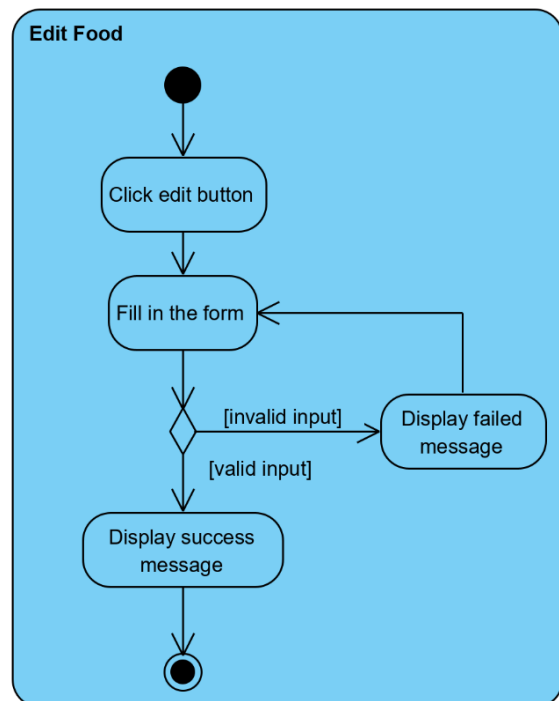
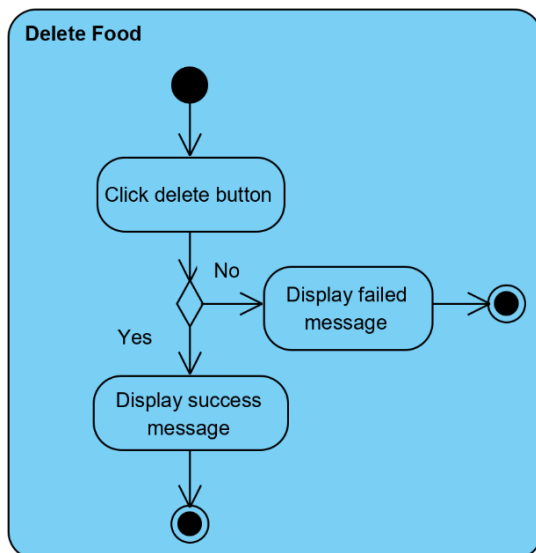
Enter Additional Notes.

A10 – Interview Note (Yeoh, system evaluation)

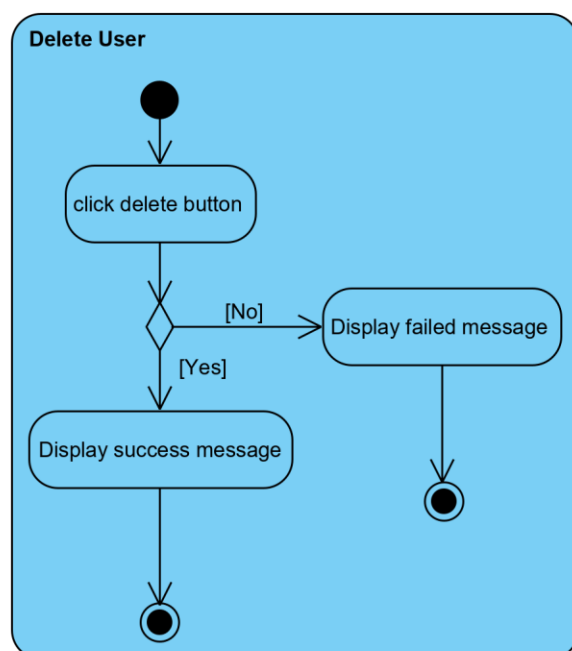
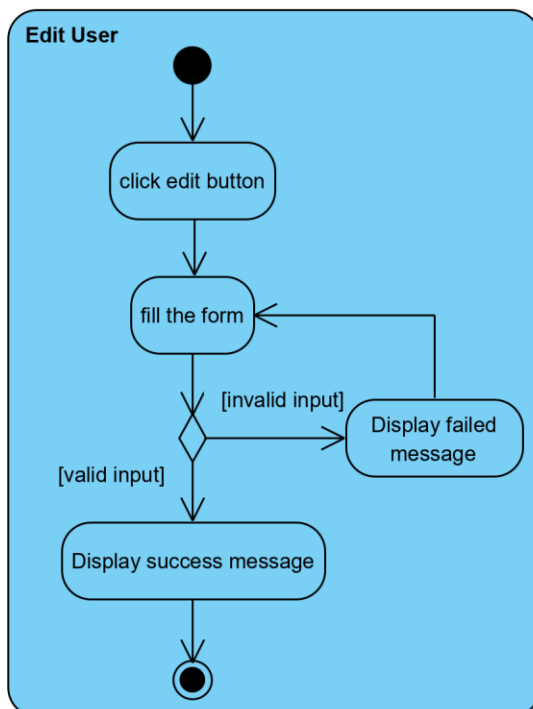
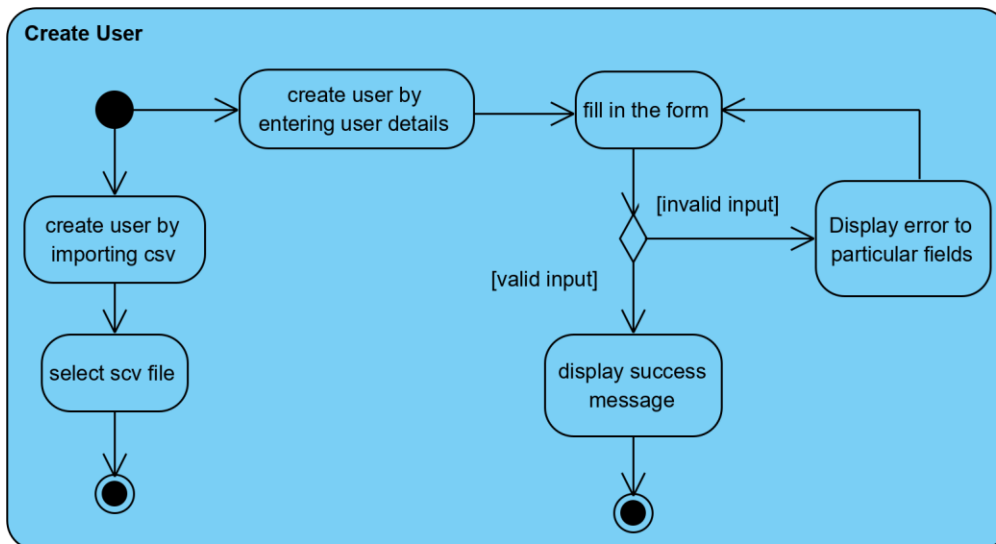
Activity Diagram



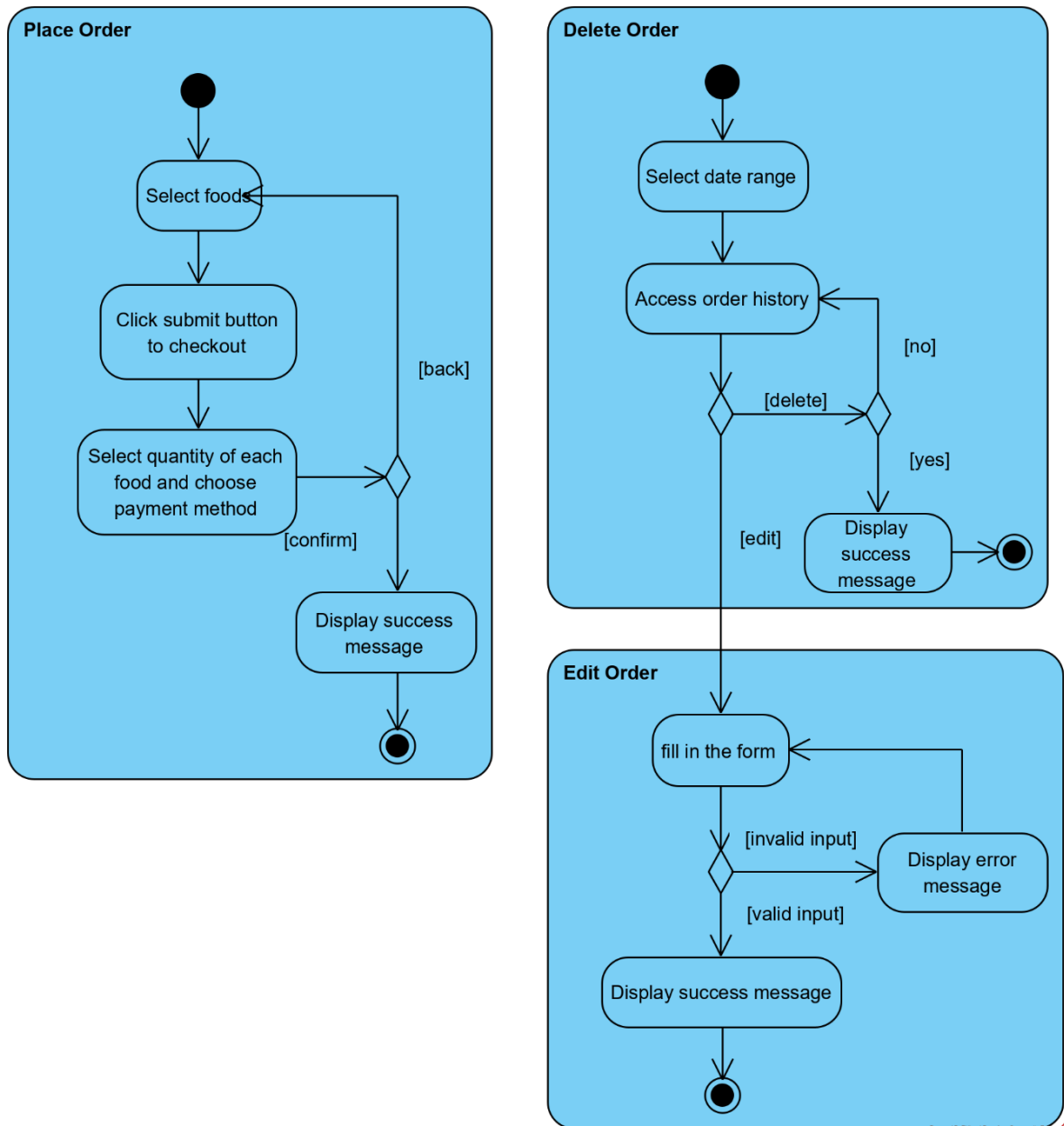
A11 – Activity diagram of initialize menu & create menu



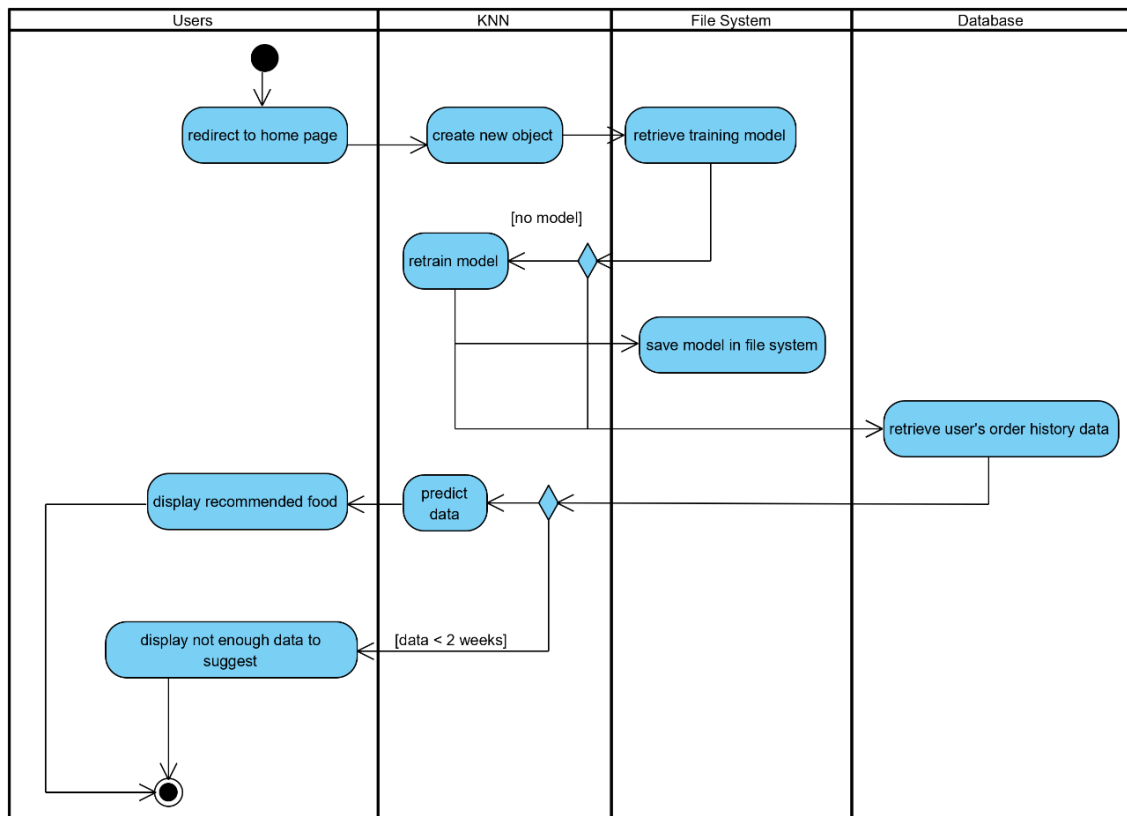
A12 - Activity diagram of delete food & edit food



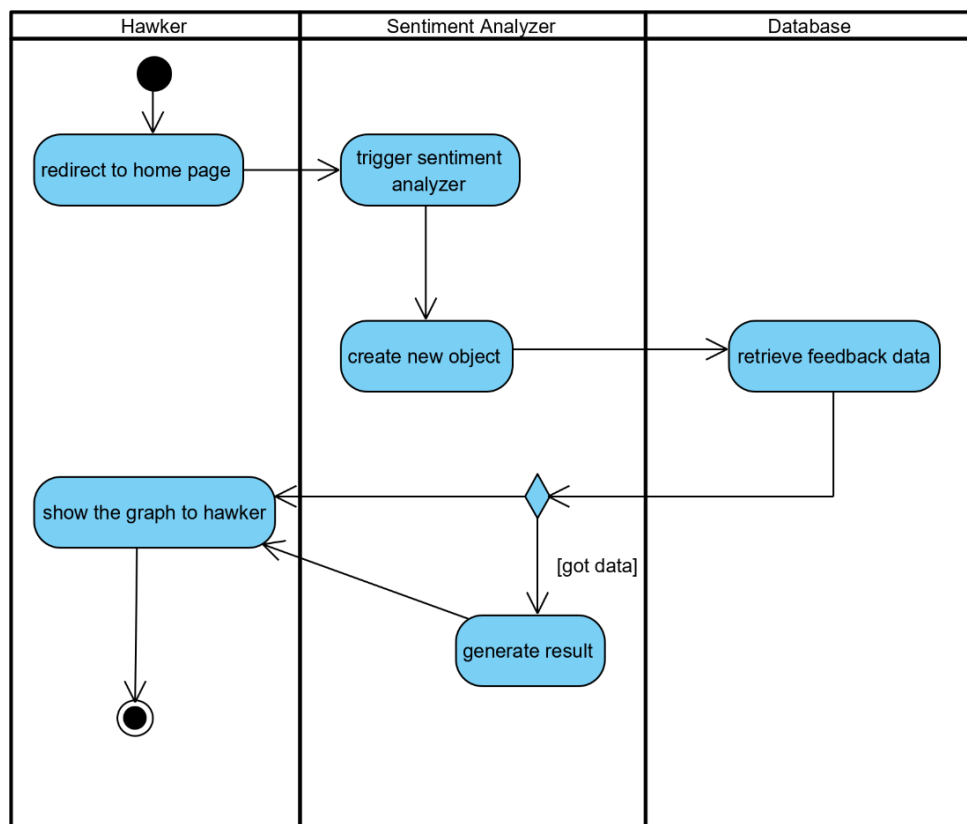
A13 - Activity diagram of edit, create & delete user



A14 - Activity diagram of place, delete & edit order



A15 - Activity diagram of food recommendation module



A16 - Activity diagram of sentiment analysis module

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: May, 2021	Study week no.: 5
Student Name & ID: Ewe Chun Kit, 18ACB06352	
Supervisor: Ts. Lim Jit Theam	
Project Title: MODEL-VIEW-CONTROLLER ARCHITECTURE CAFETERIA MANAGEMENT SYSTEM WITH FOOD PRE-ORDERING	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Prototype 1 testing done
- Collected evaluation survey result

2. WORK TO BE DONE

- Looking for machine learning source

3. PROBLEMS ENCOUNTERED

- -

4. SELF EVALUATION OF THE PROGRESS

- So far so good



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: May, 2021	Study week no.: 7
Student Name & ID: Ewe Chun Kit, 18ACB06352	
Supervisor: Ts. Lim Jit Theam	
Project Title: MODEL-VIEW-CONTROLLER ARCHITECTURE CAFETERIA MANAGEMENT SYSTEM WITH FOOD PRE-ORDERING	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Analyzed survey result
- Developed prototype of KNN model

2. WORK TO BE DONE

- Tuning the KNN model

3. PROBLEMS ENCOUNTERED

- -

4. SELF EVALUATION OF THE PROGRESS

- So far so good



Supervisor's signature



Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: May, 2021	Study week no.: 11
Student Name & ID: Ewe Chun Kit, 18ACB06352	
Supervisor: Ts. Lim Jit Theam	
Project Title: MODEL-VIEW-CONTROLLER ARCHITECTURE CAFETERIA MANAGEMENT SYSTEM WITH FOOD PRE-ORDERING	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Done the whole system development

2. WORK TO BE DONE

- Finalize FYP2 report

3. PROBLEMS ENCOUNTERED

- -

4. SELF EVALUATION OF THE PROGRESS

- So far so good



Supervisor's signature



Student's signature

POSTER



MVC Architecture Cafeteria Management System With Food Pre-ordering

Background

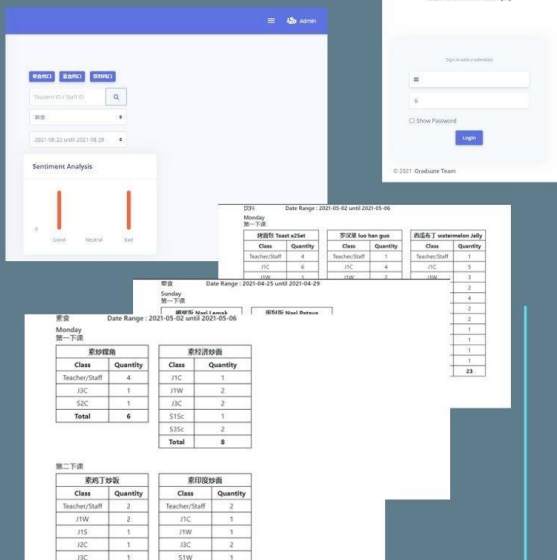
The canteen/cafeteria plays an important role in the school. Students and teachers spend more than 8 hours in the school (including curriculum activities), canteen as the source of meals is responsible to **provide a variety of nutritious meals with the reasonable price and reinforce classroom learning**.

Malaysia's government has **promulgated the Movement Control Order (MCO)** under the Prevention and Control of Infectious Diseases Act 1988 and the Police Act 1967 since 18 March 2020. During MCO, the Malaysian are restricted to go to a public area to keep social distancing between each other. School is one of the places that is restricted.

Block diagram



Website



Conclusion & discussion

- ✓ Reached the project objectives
- ? Integrate with mobile application
- ? Integrate with school management system


Contact
jackzewe120@utar.my
+601111777321

Supervised by: Ts. Lim Jit Theam
Co-supervised by: Ts. Yeck Yin Ping
Done by: Ewe Chun Kit

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ID Number(s)	18ACB06352
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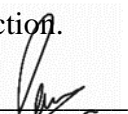
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