

Design and Development of Food Ordering System on Web Based Technology

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Abstract: The online food ordering system is developed for SJK(C) Chung Hwa. SJK(C) Chung Hwa is a primary school which is located in Tangkak area. Currently, the food ordering system for this school is a manual system. Students have to queue up one by one to buy the food. However, this system is not allowed due to pandemic Covid-19. Hence, the main objective of this food ordering system is to allow parents pre-order food for their children. This proposed system will be developed by using the PHP language and the data will store in the MySQL database. Besides that, the waterfall model acts as a guide for developing this system. All the details about this online food ordering system are reviewed in this paper.

Keywords: Online Food Ordering System, Web-based, Waterfall Model

1. Introduction

The study selected is to create a meal ordering system for primary school named SJK(C) Chung Hwa. The online system will be used by canteen operators. There are two type of users in this system which are canteen operator and user. The canteen operator can manage menu, view orders, feedback and update their personal information while parents can view menu, add cart, make payment, give feedback, update their personal information and add information of children. This system is important because it is easier for users to pre-order food. This will help them to select healthier food.

For now, the existing system is a manual system. Students buy food one by one in the canteen and they have to queue in order to get their food. However, this system is not allowed due to pandemic Covid-19. It is difficult to maintain distance and can make Covid 19 spread easier. Besides that, we also proposed the payment is a cashless method which uses an e-wallet [1]. This is because the E-wallet is one of the famous payment types in Malaysia [2]. Using an E-wallet also helps to decrease calculation error.

The new system will save time because students can take their food because the payment has been made before so the queuing problem is solved [3]. Besides, the number of food sold will be shown in the system. Furthermore, the digital menu which contains information about food is created in the system. This can help users to make well-informed food decisions [4]. Moreover, the system will provide a platform for parents to order food online. This can prevent students from having close contact with each other.

2. Literature Review

2.1 Web-based Online System

E-canteen is a web-based food ordering system. The “online” term means the services will be performed by using the Internet. All activities can be carried out on the web page. For example: view menu, add cart and so on. Hence, this system allows parents to order and purchase meals by using the web page with the presence of the Internet. In a nutshell, the Internet is the most important requirement to allow parents to order food. After this, the graphic user interface (GUI) will be developed in this system. This can make this system become more attractive. Parents can order food easily by clicking the button inside the system. For example, parents can view the menu and click the add-cart button to add the food into the cart.

2.2 Study of Existing Related System

There are some existing systems that are related to online food ordering systems. For example: Canteen Ordering System of Welling School, MyKids LunchBox, and eCanteen Contactless Online School.

2.2.1 Canteen Ordering System of Welling School[5]

The canteen ordering system of Welling School is a web-based system. The function provided by this system is that the user can view the three weeks menu on the website. This is a digital menu. For the proposed system, the digital menu also provided for the users. The only difference of the menu is the picture of the food will be uploaded in the proposed system but the system of Welling School not.

The advantage of the system is the menu provides cake as dessert. The second advantage is there are announcements about the operation of the canteen in the system. Moreover, the contact number and email are shown at the bottom of the website.

The disadvantage of the system is the three-week menu shown. Moreover, the words in the menu are all in red color. Beside that, the menu of this existing system does not contain any picture of food. After this, the menu does not show the price of the food. Last but not the least, this system have too many modules likes news&events, curriculum ambition and others.

2.2.2 MyKids LunchBox[6]

My Kids LunchBox provides the function of viewing transaction history. Parents can view the details of the payment by using this function. For example: date of payment, how much food and so on. This function is the same as the view history function of the proposed system. Moreover, both of these systems provide a login function. This function can make sure the person who logs into the system is approved by the admin. From this, the canteen operator will not receive the order that was made by another person.

The advantage of the system is that parents can manage their profile. Besides, this system provides some instructions for the first time users. Moreover, the system provides the news module. The other advantage is there is a contact us at the bottom of each module. Moreover, the system provides the view transaction history. Parents can review the order made before.

The disadvantage of the system is the payment of the system using the credit form. Beside that, the system provides the function of registration for parents.

2.2.3 eCanteen Contactless Online School[7]

The function of select date is provided in both systems. Parents can select different dates and make payment at once. This can make it easier to order food for their children. These two systems also make parents unable to order food if the date is over. Besides that, this system provides a feedback function for users to give feedback about the system. It is almost the same with the proposed system. The only difference is the feedback given by the user about the food to the canteen operator.

The advantage of the system is it will lead the user on how to use the system. After that, the system does not contain too many modules. The other advantage is parents can add a new profile of children in the system. Moreover, this system can let parents select the date to make an order. Furthermore, the menu is separate according to the food categories like drinks, hot food and so on. Another advantage is the payment can be done by using PayPal. Besides, this system provides users with feedback to the staff of the system.

The disadvantage is the menu does not contain the picture of food. Besides that, the system can let users register accounts themselves.

2.3 Comparison with the Existing System

The comparison of the function will be shown in Table 1.

Table 1: Comparison between existing system and proposed system.

Features\System	Canteen Ordering System (WELLING SCHOOL)	My LunchBox	Kids eCanteen Contactless Online School	E-Canteen for SJK(C) CHUNG HWA
Login	No	Yes	Yes	Yes
Menu with picture	No	No	No	Yes
Payment	No	Yes	Yes	Yes
View History	No	Yes	Yes	Yes
Tutorial of system	No	Yes	Yes	No

Table 1: Comparison between existing system and proposed system. (Cont'd)

Type	Web-based	Web-based	Web-based and Mobile-based	Web-based
Payment Type	-	Credit Form	PayPal	E-Wallet
Profile management	No	Yes	Yes	Yes
Feedback	No	No	Yes	Yes

3. Methodology/Framework

The Waterfall Model is the oldest and the most well-known SDLC model [8]. A Software Development Life Cycle(SDLC) is used to create high-quality software in a certain amount of time based on the needs of the client [9]. It will act as a guide for a project to produce a high-quality project.

3.1 Waterfall Model

The prototyping model chosen is Waterfall Model. There are five phases in the SDLC of waterfall models which are requirements, design, implementation, verification and maintenance. Figure 1 shows the phases of the waterfall model.

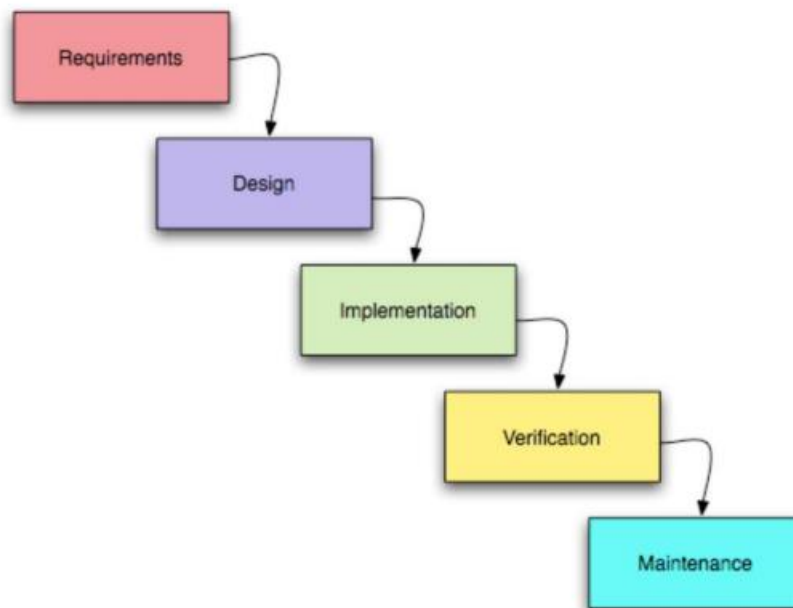


Figure 1: Phases of Waterfall Model [10]

The Waterfall Model is suitable for the project which has a clear requirement and the requirement is not changed easily. Hence, the waterfall model is chosen to be used to develop the e-canteen project because the requirements are clear enough. Besides that, the waterfall model entails a series of tasks to be accomplished in a specific order[11]. It is a linear structure of a model so it is easy to understand.

3.1.1 Planning and Analysis Phase

The result of the planning and analysis phase is shown in the table. The functional and non-functional requirements are shown. Requirement analysis is the process of determining requirements that a client expects from the proposed system. Table 2 and Table 3 show the functional and non-functional requirements respectively.

Table 2 : Functional Requirement

No.	Module	Functional Requirement
1.	Register Module	● System should allow parents to register a new account.
2.	Login Module	● System should allow the user to login the system by using the registered id and password.

		<ul style="list-style-type: none"> • The system should alert the user for any invalid input. • The system should redirect users to their respective main menu after they login successfully.
3.	Menu Module	<ul style="list-style-type: none"> • System allows the canteen operator and parents to view the menu. • System allows the canteen operator to manage the menu.
4.	Cart Module	<ul style="list-style-type: none"> • System allows parents to add food into carts. • System allows parents to view carts and make payment.
5.	Order Module	<ul style="list-style-type: none"> • System allows the canteen operator to view orders. • System allows parents to make orders.
6.	Child Module	<ul style="list-style-type: none"> • System allows parents to add, edit and delete information about children.
7.	Setting Module	<ul style="list-style-type: none"> • System allows parents to edit their personal information. • System allows the canteen operator to edit their personal information.
8.	Report Module	<ul style="list-style-type: none"> • System allows parents to give feedback according to their orders. • System allows the canteen operator to view feedback according to the orders made.

Table 3 : Non-functional Requirement

No.	Attributes	Non-functional Requirements
1.	Security	Users must login to use the system.
2.	Operational	Users must have an internet connection to use the system.
3.	Performance	The system must be reliable.
	Performance	The data of the system must be shown fast.

3.1.2 Design Phase

The proposed system is designed based on two sides of view: the canteen operator and parents. These users have to login to access this system. The home page of them is different because they have different functions that need to be performed. For example: the canteen operator has a view order function but the parent module does not have. All of these functions must be easy to understand and use. Besides, the background for the proposed system will be background with no image. This can help users to view the content clearly.

3.1.3 Implementation Phase

The language that was chosen by the developer is PHP Language and will be used to develop the system. All the coding is edited in Sublime Text as it will show the number line for each line of the coding. After running the website in Chrome, the coding line that contains the error will be shown. Then, the data will be saved into the MySQL database. The first prototype has been produced to show the functions of the website and the linkness between pages. From this, the canteen operator and parents can understand the system more clearly.

3.1.4 Testing Phase

The testing phase will be done through Chrome. The function of login for two different users will be tested. This can make sure every user can login to the system. For the canteen operator, the manage menu function, view feedback function, view order function and setting function will be tested. This can make sure the canteen operator can add, edit, update and delete the menu, can view the feedback made by parents, can view the order list and can update the personal information. For parents, the function of view menu, add to cart, check out the cart, and view history will be tested. This can make sure parents can place orders by using the proposed system. In conclusion, this phase is important to make sure all functions reach the requirements.

3.1.5 Maintenance Phase

This is the last phase of the waterfall model. After the test, clients will give their feedback about the system to make the system better and more functional. Clients will also give feedback on the problems they met during the testing phase like they cannot know the meaning of some icon used, and the menu is shown slowly when they need to view the menu. All of the requests and problems are recorded and the improvements will be made to produce a better system for users.

3.2 Software and Hardware Requirement

To develop the system, several software has been chosen and downloaded. This software will make sure that the system can be developed and run smoothly. Table 1 shows the software requirements and its function. Table 2 shows the hardware requirements for developing the proposed system.

Table 4: Software Requirements and Its Function

Software	Function
XAMPP Control Panel	As a server
Sublime Text	As a platform for coding. (html and PHP are acceptable)
Microsoft Word	To produce and complete the final report
Visual Paradigm	Used to design diagrams. (DFD, class diagram)

Project Libre	Used to produce Gantt Chart.
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Table 5: Hardware Requirements

Hardware	Specification
Brand of Laptop	ASUS
Processor	Intel(R) Core(TM) i5-8265U CPU

3.3 System Requirements Analysis

Requirement analysis refers to the system specific performance characteristics and functional characteristics based on the measurement of customer needs and objectives, tasks and operations, expected use of people, products and processes, constraints and efficiency[12]. To help the developer define the user requirement, several diagrams will be produced. These diagrams included flowchart and Entity Relation diagram (ERD) .

3.4 Flowchart of System

Figure 2 shows the flowchart of the proposed system. The whole system will be divided into two parts which are the canteen operator, and parents.

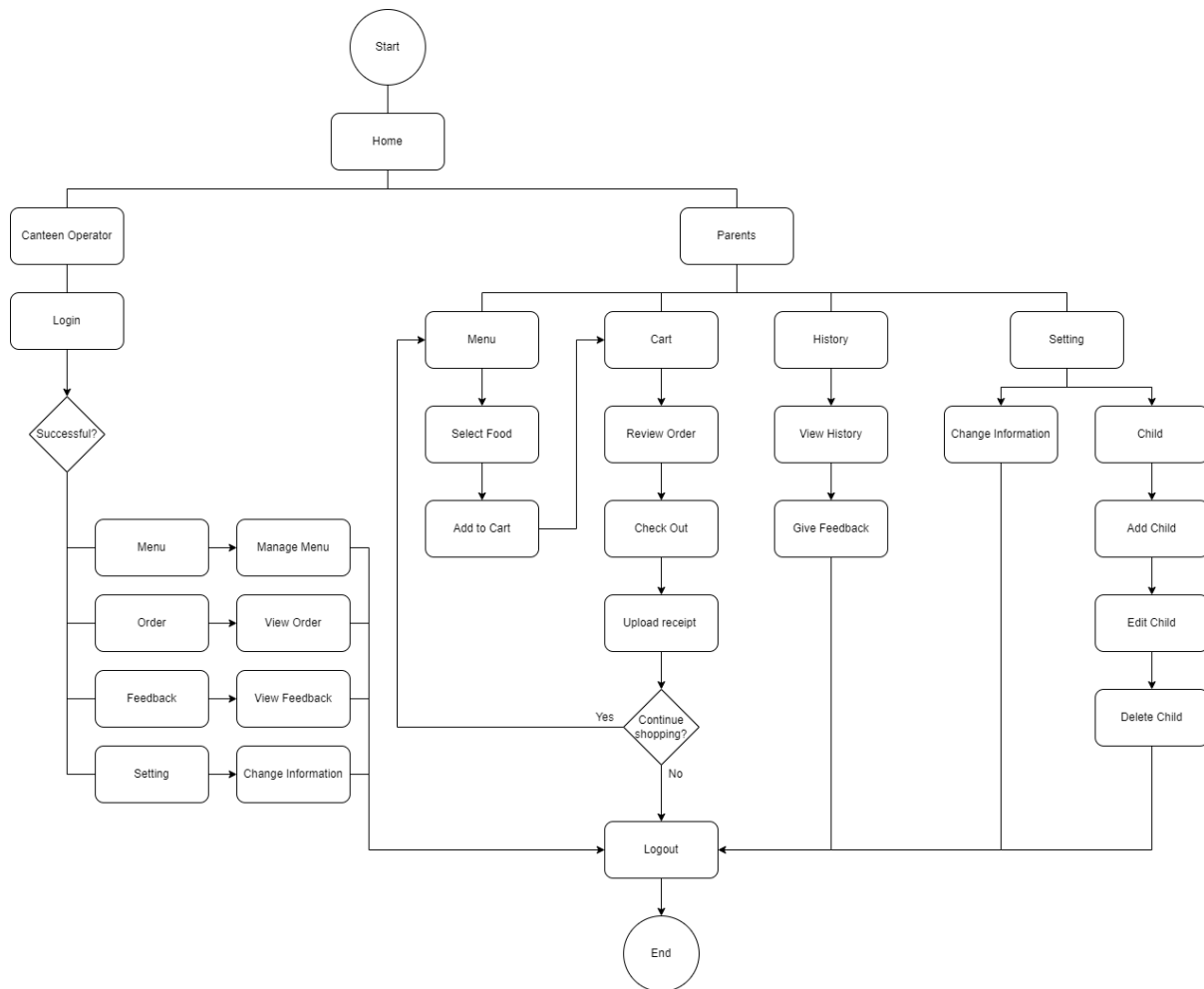


Figure 2: Flowchart

3.5 Entity-Relationship Diagram

The ERD is constructed by using the Crow’s Foot Notation. This ERD is usually drawn in a graphical form as boxes (entities) that are connected by lines (relationships) which express the associations and dependencies between entities. Besides, the word ‘PK’ will represent the primary key and ‘FK’ will represent the foreign key. Figure 3 shows the ER diagram of the system. The ER diagram for the proposed system includes users, food, menu, cart, payment, child and feedback. The relationship between entities will be expressed by using the cardinality.

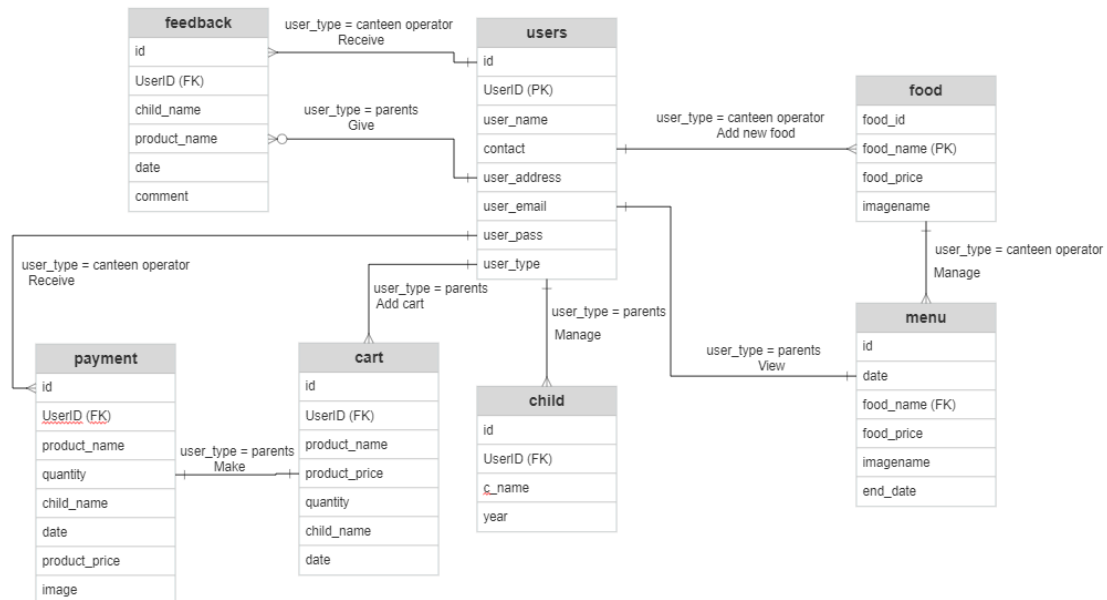


Figure 3: ERD

3.6 Data Dictionary

In this project, there are seven data dictionaries which are users, food, child, menu, cart, payment, and feedback. The characteristics that will be shown in the data dictionary are primary key, foreign key, caption, field name, data type and field size.

Table 6: Data Dictionary of users

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
PK	id	Numbering	int	
	UserID	user’s id	varchar	255
	user_name	Username	varchar	255
	contact	Contact number of users	char	15
	user_address	Address of users	varchar	255
	user_email	User’s email	varchar	255
	user_pass	Password	varchar	50
	user_type	Type of users	varchar	20

Table 7: Data Dictionary of food

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
	food_id	Food id	int	255
	food_name	Food name	varchar	100
	food_price	Food price	float	8,2
	imagename	Food image	varchar	255

Table 8: Data Dictionary of child

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
	id	numbering	int	11
	UserID	user's id	varchar	255
	c_name	Name of children	Varchar	255
	year	Year of study	int	10

Table 9: Data Dictionary of menu

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
	id	numbering	int	11
	date	Start date	date	
	food_name	Food Name	varchar	100
	food_price	Food price	float	8,2
	imagename	Food image	varchar	255
	end_date	End date	date	

Table 10: Data Dictionary of cart

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
	id	Numbering	int	11
	UserID	Parents' id	varchar	20
	product_name	Food name	varchar	100
	product_price	Food price	float	8,2
	quantity	Quantity of food	int	10
	child_name	Name of child	varchar	255

Table 10: Data Dictionary of cart (Cont'd)

date	Order date	date
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Table 11: Data Dictionary of payment

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
	id	numbering	int	11
	UserID	user's id	varchar	255
	product_name	Food name	varchar	100
	quantity	Quantity of food	int	10
	child_name	Name of child	varchar	255
	date	Order date	date	
	product_price	Food price	float	8,2
	image	Image of transfer receipt	varchar	255

Table 12: Data Dictionary of feedback

PK/FK	FIELD NAME	CAPTION	DATA TYPE	FIELD SIZE
PK	id	numbering	int	
FK	UserID	user's id	varchar	255
	child_name	Name of child	varchar	255
	product_name	Food name	varchar	100
	date	Order date	date	
	comment	Comment given by parents	varchar	255

3.7 Interface Design

The layout of the system for different views and partial coding will be shown to make the client more understanding about the design of the system. Figure 4 shows the login page of the system.

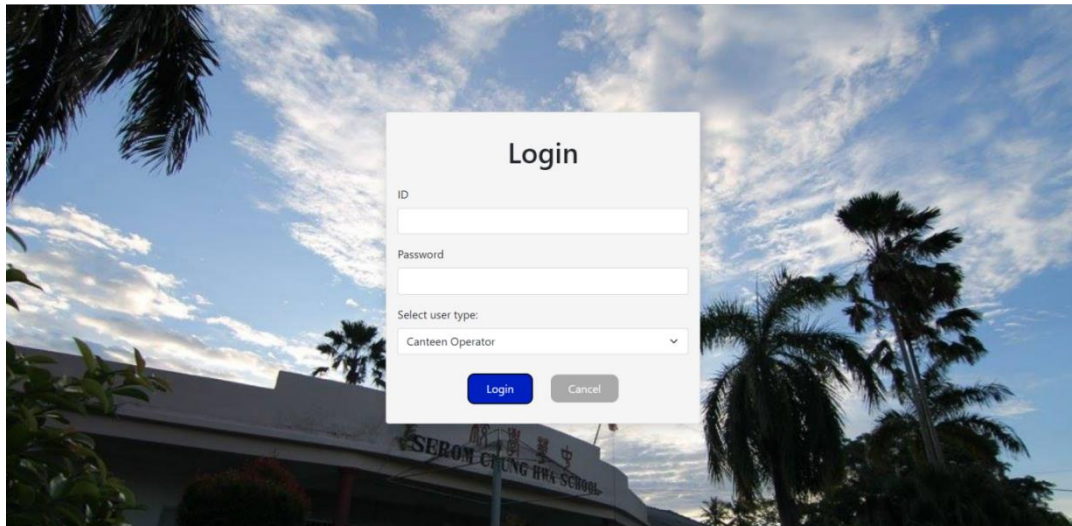


Figure 4: Login page

Figure 5 shows the view menu for the canteen operator. The canteen operator can select the date of a week to view the menu for that week.

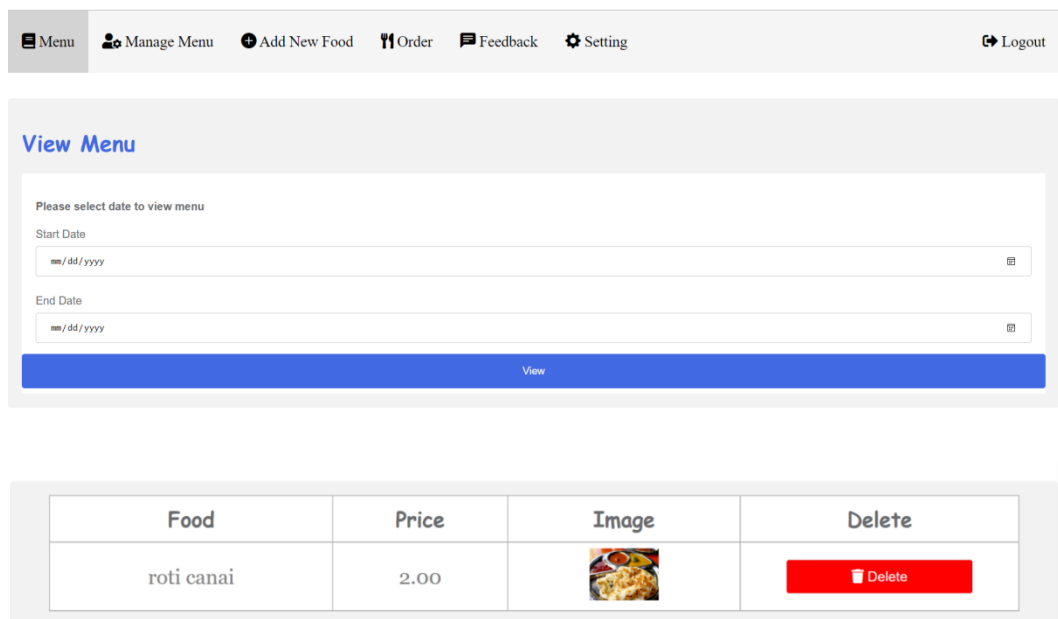


Figure 5: View menu for canteen operator

Figure 6 shows all the food that was added by the canteen operator. Then, the canteen operator can add the food by clicking the add button to customize the weekly menu.

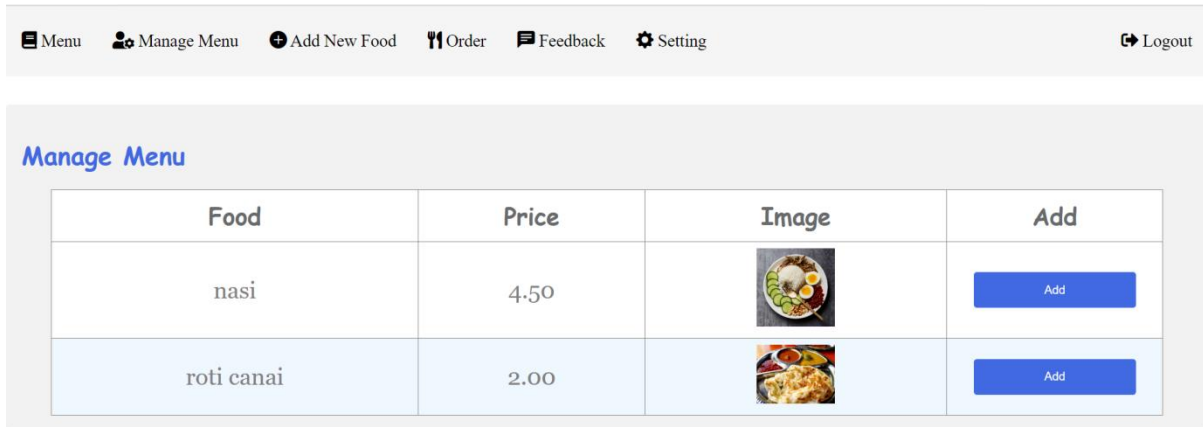


Figure 6: Manage Menu for canteen operator

Figure 7 shows the orders that were made by parents. Canteen operator can view the food ordered and the e-wallet transfer receipt as proof that the parents had made payment.

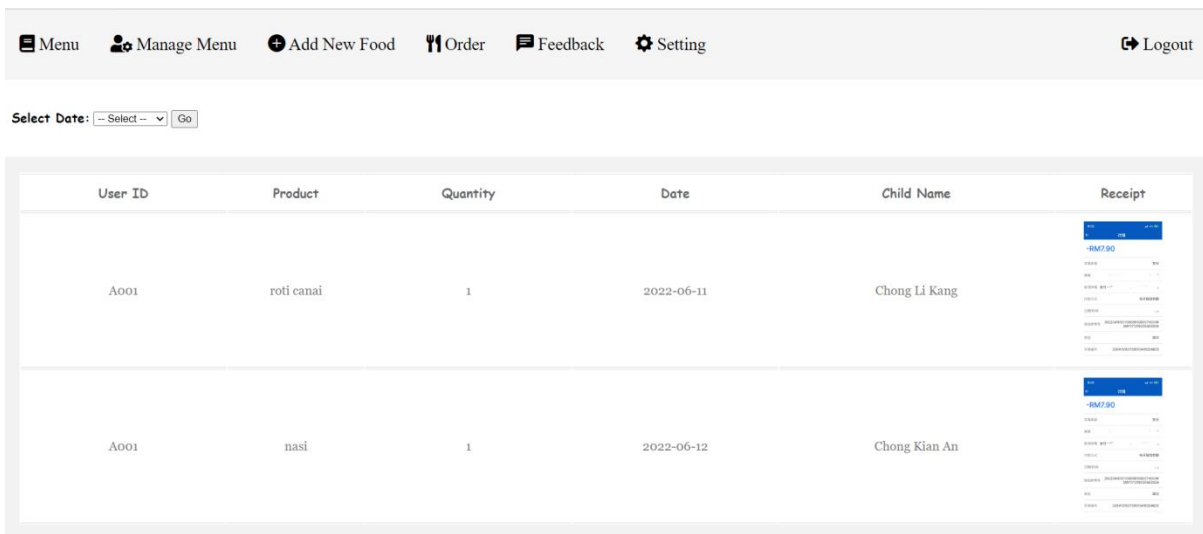


Figure 7: View orders for canteen operator

Figure 8 shows the feedback interface for canteen operator. They can view the comment given by parents.

User ID	Product	Child Name	Date	Comment	Action
A001	nasi	Chong Li Kang	2022-06-09	good	Delete

Figure 8: View feedback for canteen operator

Figure 9 shows the menu for parents. Parents can view the food that is available for the current week. For example, they can view the menu on 13/11/2022(Monday) until 17/11/2022 and they can place orders within the date.

Figure 9: Menu for parents

Figure 10 shows the cart interface for parents. Parents can view the food list after they add the food into cart. Then, they can proceed to payment by clicking the check out button.

Product	Quantity	Child	Date	Price	Action
roti canai	1	Chong Li Kang	2022-06-11	RM 2.00	Delete
nasi	1	Chong Kian An	2022-06-12	RM 4.50	Delete
				Total Price: RM6.50	Check Out

Figure 10: Cart for parents

Figure 11 shows the history page of food ordered by parents. Parents can give feedback to the selected food by clicking the feedback button.

Product	Quantity	Child	Date	Price	Action
nasi	1	Chong Li Kang	2022-06-09	RM 4.50	Feedback
nasi	1	Chong Kian An	2022-06-09	RM 4.50	Feedback
nasi	1	Chong Li Kang	2022-06-10	RM 4.50	Feedback

Figure 11: History of food ordered for parents

4. Result and Discussion

The result and discussion section present data and analysis of the study.

4.1 Test Case

Testing is carried out to test the functionality of the eight modules. Table 6 shows the test case for the register module. Table 7 shows the test case for the login module. Table 8 shows the test case for the menu module. Table 9 shows the test case for the cart module. Table 10 shows the test case for the order module. Table 11 shows the test case for the child module. Table 12 shows the test case for setting modules. Table 13 shows the test case for the report module.

Table 13: Test Case Register

Test Case ID	Description	Expected Result	Result
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Table 13: Test Case Register (Cont'd)

M1-1	The system will register the information of new users.	System will show a “Registered” message and redirect the user to the homepage.	Pass
M1-2	User does not fill up the information needed.	System will show an alert message.	Pass
M1-3	Users enter a password that is less than eight characters.	System will display a “Password should more than 8 characters” message.	Pass

M1-4	Users enter an User ID that has been registered.	System will display a “User ID already taken” message.	Pass
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Table 14: Test Case Login

Test Case ID	Description	Expected Result	Result
M2-1	User enters the correct User ID and password.	Users can login and will redirect to their user homepage.	Pass
M2-2	Users enter the wrong User ID or password.	System will show an error message.	Pass

Table 15: Test Case Menu

Test Case ID	Description	Expected Result	Result
M3-1	To check whether users can view the menu.	The menu will show in canteen operator’s and parents’ main page	Pass
M3-2	To check whether the canteen operator can manage the menu.	The canteen operator can add, update and delete the menu.	Pass

Table 16: Test Case Cart

Test Case ID	Description	Expected Result	Result
M4-1	To check the add cart function.	Parents should be able to add the selected food into the cart.	Pass
M4-2	To check the view cart function.	Parents should be able to view the selected food that is added into the cart.	Pass
M4-3	To check the payment function.	Parents should be able to make payment after viewing the cart.	Pass

Table 17: Test Case Order

Test Case ID	Description	Expected Result	Result
M5-1	To check whether the canteen operator can view the order.	The order list will be shown in the order module after canteen operator login.	Pass

Table 18: Test Case Child

Test Case ID	Description	Expected Result	Result
M6-1	To check the system allows parents to manage children.	Parents are able to add, edit and delete child information.	Pass

Table 19: Test Case Setting

Test Case ID	Description	Expected Result	Result
M7-1	To check the users are able to edit their information.	The canteen operator and parents are able to edit and update their personal information.	Pass

Table 20: Test Case Report

Test Case ID	Description	Expected Result	Result
M8-1	To check the feedback function.	Parents are able to give feedback for the selected food.	Pass
M8-2	To check whether the canteen operator can view the feedback.	The canteen operator are able to view the feedback given by parents.	Pass

5. Conclusion

In conclusion, this proposed system is focused on solving the problem statement and reaching the objective of the project. This online food ordering system has provided a platform for users to ease the process of ordering food. It brings various advantages for the users and the disadvantages of the current system has been improved.

5.1 Recommendation

The first recommendation is to categorize the food based on categories. For example, the categories can be divided into food, drinks and dessert. This helps parents to search for food easily. Besides that, the interface should be designed to become more attractive. This can attract the attention of parents to use

this system. The other recommendation is to provide selection of cold or hot for drinks. Parents can select and order directly.

Acknowledgement

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Appendix A (Gantt Chart)

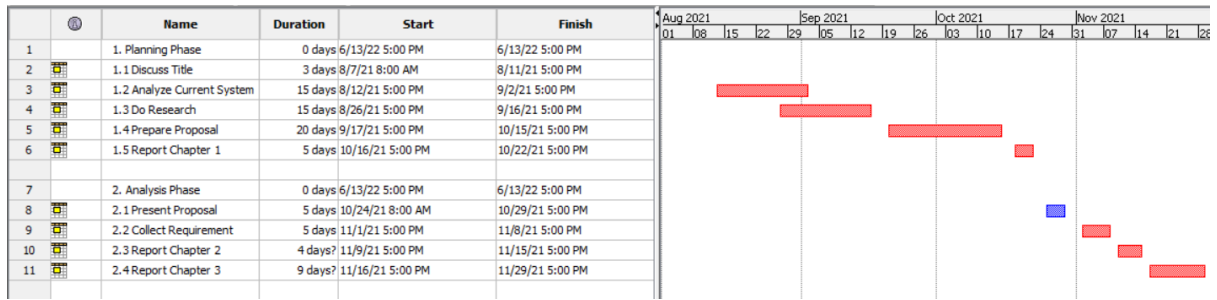


Figure 12: Gantt Chart

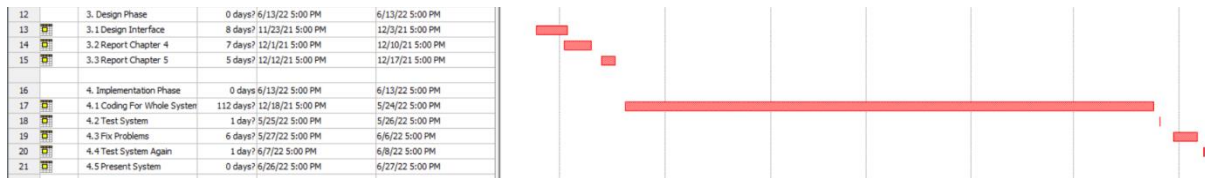


Figure 12: Gantt Chart (Cont'd)

References

- [1] Ramya N. (2017). Cashless transaction: Modes, advantages and disadvantages. Retrieved from: https://www.researchgate.net/profile/Ramya-N/publication/316429963_Cashless_transaction_Modes_advantages_and_disadvantages/links/58fd7c384585152eded4adbc/Cashless-transaction-Modes-advantages-and-disadvantages.pdf. [Accessed 12/11/2021].
- [2] Md Arif Hassas, Zariza Shukur, Mohammad Kamrul Hasam (2021). Electronic Wallet Payment System in Malaysia. Retrieved from: https://link.springer.com/chapter/10.1007/978-981-15-8335-3_55. [Accessed 12/11/2021].
- [3] Aqeel Ahmed (2021). e-Canteen Ordering System: Food Delivery Software. Retrieved from: <https://computers.journalspub.info/index.php?journal=JSCT&page=article&op=view&path%5B%5D=687>. [Accessed 12/11/2021].
- [4] Centers for Disease Control and Prevention (2021). Benefits of Healthy Eating. Retrieved from: <https://www.cdc.gov/nutrition/resources-publications/benefits-of-healthy-eating.html>. [Accessed 12/11/2021].
- [5] Canteen Ordering System of Welling School. <https://www.wellingschool-tkat.org/page/?title=Canteen+Ordering+System&pid=1157>. [Accessed 19/11/2021].
- [6] My Kids LunchBox. <https://mykidslunchbox.com.au/>. [Accessed 19/11/2021].
- [7] eCanteen Contactless Online School. <https://www.ecanteen.com.au/>. [Accessed 19/11/2021].
- [8] Harshad S.Modi and et (2017). Comprehensive Analysis of Software Development Life Cycle Models. *International Research Journal of Engineering and Technology(IRJET)*, 4(6), 117.
- [9] C Fagarasan, O Popa, A Pislă and C Cristea (2021). Agile, waterfall and iterative approach in information technology projects. Retrieved from: <https://iopscience.iop.org/article/10.1088/1757-899X/1169/1/012025/pdf>. [Accessed 9/6/2022].
- [10] IYAWÉ, G.O., AKHIDENO, I.A AND IGBINIGIE (2017). A Comparison Between Four Software Process Models. *BIU Journal of Basic and Applied Sciences*, 3(1), 84. Retrieved from: http://www.biu.edu.ng/wp-content/uploads/2018/09/BIUJBAS-31_8.pdf. [Accessed 19/12/2021].
- [11] Ishan Gaba (2021). What is Project Planning: Tools and Fundamentals. Retrieved from:

<https://www.simplilearn.com/tutorials/project-management-tutorial/project-planning>.

[Accessed 22/12/2021].

- [12] C Chen and X L Ma (2020). Research on the Requirement Analysis and Management Method of Aircraft PHM System. *IOP Conf. series: Materials Science and Engineering*. Retrieved from:

<https://iopscience.iop.org/article/10.1088/1757-899X/1043/2/022026/pdf>

[Accessed

22/12/2021].