



## Food Runner Mobile Application for UiTM Tapah Students

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### ABSTRACT

Nowadays, people are more convenience to order food online, especially for the university students, who often have a hectic schedule with assignments, presentations, exams and club activities. Universiti Tekonologi MARA (UiTM) Tapah Campus is located in a rural location, which hindering the students to utilize food delivery apps because the area is outside of delivery range supported by the existing food delivery apps. Therefore, this study aims to develop a mobile application that provides a food delivery service for students by students in UiTM Tapah campus. Named as EAT UiTM Tapah, the food runner mobile application was developed with real-time order status notification. Besides faster delivery, this application would allow students to earn extra money by becoming a runner of the food delivery rather than just being a customer. Based on the Waterfall model of System Development Life Cycle (SDLC), this mobile app has been developed on Android platform by using Android Studio and Firebase. This paper provides the fundamental design and implementation of the EAT UiTM Tapah, that was expected to be useful for the students.

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### 1. Introduction

As Malaysia moves closer to becoming a fully industrialized nation, urban areas are getting increasingly populated. With that, having busy work schedules is common, making home-cooked meals a great pleasure during weekdays. This has spawned a new standard: food delivery services, a fast-growing industry designed specifically for busy and exhausted people who want to eat at home.



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Having food delivered to the doorstep spares people the time and hassle of cooking at home or dining out. Food delivery service is another one of the services that some people explore as a secondary source of income. The extra money can be put toward various things, such as paying off existing debts or loans, creating an investment portfolio, or just saving for one's goals and dreams.

Tapah is a rural location with 5,000 students enrolled at the UiTM Perak Branch Tapah Campus. It is approximately 6 kilometres away from Tapah small town that provides several food outlets. Most of food delivery apps are unable to offer their services to UiTM Tapah because it is beyond their delivery range. As highlighted in [1], food delivery service is beneficial for university students to get their food, even though they are busy with their day-to-day routine, such as attending classes, sports and extra-curricular activities on campus. When students are occupied with classes, group discussions, or association's meetings, it leads to poor eating habits. As claimed by [2], poor eating habits are a major public health problem among students exposed to stress and lack of time to have their meals on time. Therefore, it is critical for UiTM Tapah students to have a convenient food delivery application mainly to those who have transportation problem. Besides of saving time, these students can be given chances to make pocket money if there are given opportunity to be a food runner. Additionally, healthy eating habits with appropriate eating schedule is high important for the students, which can be assisted by the use of online ordering food [3]. Therefore, it is anticipated that the food runner mobile application proposed from this study can be useful to the students in UiTM Tapah campus. This paper presents the fundamental design, the development stages and the software architecture, which named as UiTM Tapah EAT mobile application.

## **2. Literature Review**

This section provides the works of literature and theories related to food delivery service, push notification service and some existing food delivery system.

### **2.1 Food Delivery Service**

Delivery service is the act of providing a service by using transport organized by a supplier or a shop to deliver goods to their customers from a source location to a predefined destination. In Malaysia, delivery service is available mainly in the urban area where many people live and the hustle, which makes them occupied with busy schedules and sometimes depends on the delivery service. The usual operating time of delivering is during work hours, including the weekends. The significance of delivery service is that it gives jobs opportunities that can help people generate their side income. Service that provides delivery can be of various types [4]. In Malaysia, delivery services can be food delivery service, courier delivery service, and grocery delivery service.

A food delivery service is a service that sends customers fresh or prepared meals delivered to their homes. These services cook and prepare meals for customers, taken from registered restaurants. Meals may pack in plastics container to make them safely delivered to the customers. These services usually operate on a category of online food ordering, where customers can order the food they want by browsing through an application with an Internet connection. According to [5], during the global COVID-19 outbreak in 2020, online food delivery made ready-to-eat meals more accessible to consumers and allowed food providers to continue operating. The system allows users to order their meals online through their computer or smartphone using the Internet by scrolling through the installed web browser of the system. Several popular restaurant chains in Malaysia sign up to provide service to deliver their food, such as McDonald's, KFC, PappaRich, Boat Noodle, and many more. Various food delivery services exist in the form of applications, for example, Food Panda, GrabFood, dahmakan, and many more. Each service even has its unique features that satisfy customer's needs. Some of them also operate in 24-hour food delivery services. Lunch hours are especially a peak hour because these services are primarily available in cities where the population of targeted customers is much higher.

### **2.2 Push Notification Service**

An alert messaging system may be a calendar reminder or a notification of a new message. Alerts can be in the form of e-mail messages, text messages (SMS), or push notifications. Mobile application developing companies include message alert notification sounds in their apps, often choosing from many different sounds. Alerts are primarily sent through a notification system, and the most common application of the service is machine-to-person communication. The significance of alert systems is that they can inform any user of new content or pending tasks and trigger user engagement [6]. It will build a sense of interactivity within the app, and new content does not need

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to be refreshed manually. It also comes with a sound feature to indicate there is an alert thing to be notified. The notification system is a common system that can exist in web systems and mobile application platforms like Android and iOS. There are four categories of notification which are user-generated notifications, context-generated notifications, system-generated notifications, and push notifications.

Notifications provide a unique mechanism for increasing the effectiveness of real-time information delivery systems [7]. A combination of software and hardware that provides a means of delivering a message to a set of recipients is a notification system. It often displays activity that is related to an account. For instance, sending an e-mail about a user's Google account was logged in on another device for security purposes. There are three types of events to trigger the notification: the user, the system, and the event-based notification. According to [8], event notification systems offer asynchronous communication across different entities in distributed systems. There are several notification technologies for Android devices, and one of them is push notification. Push notifications serve as a significant feature of device communication. Many ways, including standardized protocols, may deliver push notifications [9]. According to [10], the pushed data could be displayed as notifications depending on the default notification function in the installed application. There are three types of classification available in smartphone notification services: Pop-up Notification, Status Bar Notification, and Icon Notification [9]. Push notifications have significantly saved costs as it provides almost zero cost and provides efficiency in responsiveness, particularly in delivering critical and real-time alerts [11].

### **2.3 Related Work**

In Malaysia, a few food delivery apps can be downloaded on smartphones to order food quickly and from the comfort of one's own home. FoodPanda is a well-known global online food delivery service that operates in over 20 countries [12]. The system is available in the form of web and mobile applications. Varieties range of food available in the application with over 700 partnerships with restaurants in Malaysia. To place an order, customers must first enter their location and then choose a menu from a list of available restaurants. FoodPanda delivers a real-time status update that allows customers to see the progress of their orders. By filtering the results, the consumer can choose the type of food they want. The customer can also enter their essential details, such as remarks for the order. Foodpanda offers few payment options such as cash, credit card and online banking. Usually, Foodpanda charges RM5 for delivery, but sometimes they give a free delivery discount in picked restaurants on special occasions. GrabFood is a food delivery platform in Malaysia that helps people getting delicious food from local vendors to chain restaurants.

GrabFood is accessible in few states in Malaysia to cover different areas. GrabFood accepts variations in payment types, such as debit/credit cards, GrabPay Credits and even PayPal, as defined in the GrabPay application by the user's payment method. There is no minimum order fee, as well. GrabFood does not allow cash payments, Android Pay, or Alipay. Depending on the restaurant business hours, it starts to deliver as early as 8 in the morning and can last until midnight. The application will display the restaurant is currently closed for delivery and will be open the next day.

DahMakan is a local food delivery service that has been in operation since 2015. Unlike GrabFood and FoodPanda, which work with local restaurants and cafes to deliver food, DahMakan has its fleet of chefs who promise to bring fresh and healthful chef-prepared meals. They used to be much more expensive, but now they cost between RM15 to RM25. The customers can also make an order a day in advance where it helps them always be prepared and not to skip a meal during their hectic days. DahMakan also exists on few platforms online, which are in mobile applications and on their official website. It has a clean and friendly user interface. It also displays meals in packages to easily pick and add to the cart without wasting their time making decisions. DahMakan customers can opt for different payment types such as credit/debit cards, online banking, and cash on delivery. There are no delivery charges for the customers, which the frugal people highly favour.

Table 1 shows the comparison between FoodPanda, GrabFood and DahMakan by means of their delivery, payment options, operating hours, delivery charge, sytems's platform, order in-time tracking, food ordering and notification.

Table 1. Comparison between Food Delivery Applications

Features	Application		
	FoodPanda	GrabFood	DahMakan
Area of delivery	Whole state of Malaysia but in certain districts only.	Available in Klang Valley and has recently expanded to selected areas in Melaka, Kota Kinabalu, Penang, Johor and Kuching.	Kuala Lumpur and Selangor area only.
Payment options	Cash, credit card and online banking	Debit/credit cards, GrabPay Credits and PayPal	Cash and PayPal
Operating hours	24 hours delivery	Depending on the area and local restaurant hours, it begins delivering as early as 8 am and runs as late as midnight.	9 am – 9.30 pm
Delivery charge	RM5.00	RM5.00	Free
System's platform	Mobile application	Mobile application	Web and mobile application
In-time tracking for order	Track orders placed from the app via live tracking, which is enabled once the order is picked up from the restaurant.	Users can directly track the driver's whereabouts and the estimated time of the driver to the point of delivery right on the application.	Users will get in-app notifications of their rider's estimated time of arriving based on GPS tracking.
Food Ordering	Available from user's nearest location of food outlets that registered with FoodPanda.	Available from user's nearest location of food outlets that registered with GrabFood.	Preparing home-cooked meals by their own business.
Notification	Notify the customer that the rider arrived at the restaurant and arrived at their doorstep.	Notify the customer that the rider arrived at the restaurant and arrived at their doorstep.	Users will receive in-app notifications of their rider's estimate time of arriving based on GPS tracking. The user will also receive a dispatch SMS update about the rider's arrival.

The application in Table 1 has two common features. First is the ability to place an order and second is to receive real-time order status notifications. As a result, the two features can be considered the essential aspects of the UiTM Tapah EAT mobile application.

### 3. Methodology

UiTM Tapah EAT mobile application for UiTM Tapah students has been developed according to one of the System Development Life Cycle (SDLC) model, namely as Waterfall model. Waterfall model is a sequence of stages in which the output of each stage becomes the input for the next stage [13]. Every phase must be completed before the next phase starts and there is no

overlapping of the phases. The sequential phases of waterfall model are requirement analysis, design, implementation, and testing. Requirement gathering and analysis is the first steps of the development model.

### 3.1 Requirement Gathering and Analysis

Requirement analysis involves understanding design, function and purpose requirements by gathering important information. As stated by [14], requirements are gathered, analyzed and then proper documentation is prepared, which helps further in the design and development tasks. Table 2 shows the customer and runner requirements.

Table 2. Customer and runner requirements

Customer	Runner
Create an account.	
Login to the system.	
Navigate the restaurant's menu.	Pick up order.
Select an item from the menu.	Check order details.
Add an item to their current order.	Notify the customer of their order status.
Provide details of delivery place.	Remove completed orders.
Receive payment details.	
Place an order.	
Receive notification of order's status by push notification.	

Customer and Runner are the two users who will use the mobile application. Both users must create their account and login to the system with the authorized user account. Push notification will be used for customer users to notify them the status of delivery. Before the development task can be started, it is important to design the system architecture based on the requirements listed in Table 2.

### 3.2 System Design

System design helps in specifying the hardware and software requirements. Additionally, system design is important in defining the overall system architecture. System architecture of this project is a model that describes the structure, relationships, behaviors and shows multiple views of the system as shown in Figure 1.

The mobile application requires a smartphone with Android version 5.0 (Marshmallow) or above. Students of UiTM Tapah, is the user of the system who need to log in to their account by entering their phone number and their password. In signing up, the user needs to enter their unique student identification number to trace if there is a backup buyer. Each phone number can be signed up only once to avoid multiple accounts of the same user. The data that is input by the user will be connected to Firebase, which store the data of the users (customer and runner). At the main page, user can choose to be a customer that want to order food online, or a runner that pick-up orders. The customer will receive a push notification regarding their order, either the runner is on their way to the delivery address, or the order has arrived at their doorstep.

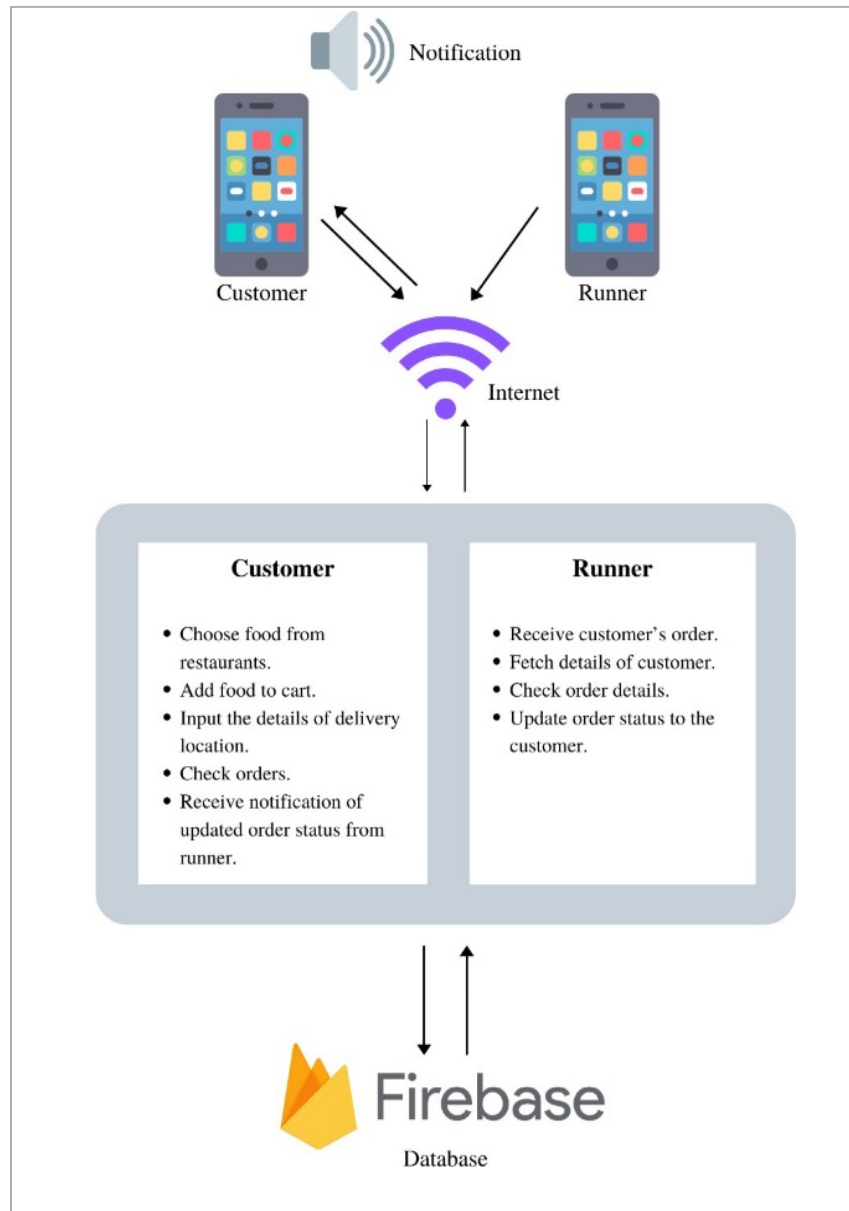


Figure 1. System architecture of UiTM Tapah EAT mobile application

### 3.3 Development

After the requirements and design activities have been completely done, development phase begins. The application has been developed with JAVA programming language by using an Integrated Development Environment (IDE) called Android Studio Development Kit software. For the database, Firebase Realtime Database has been used to allow a real time synchronization.

Android Studio 2.3.3 has been used for designing and developing the mobile application. There are two type of end users for UiTM Tapah EAT, which are the customer and the runner. Figure 2 shows the hierarchy application structure of UiTM Tapah EAT mobile application.

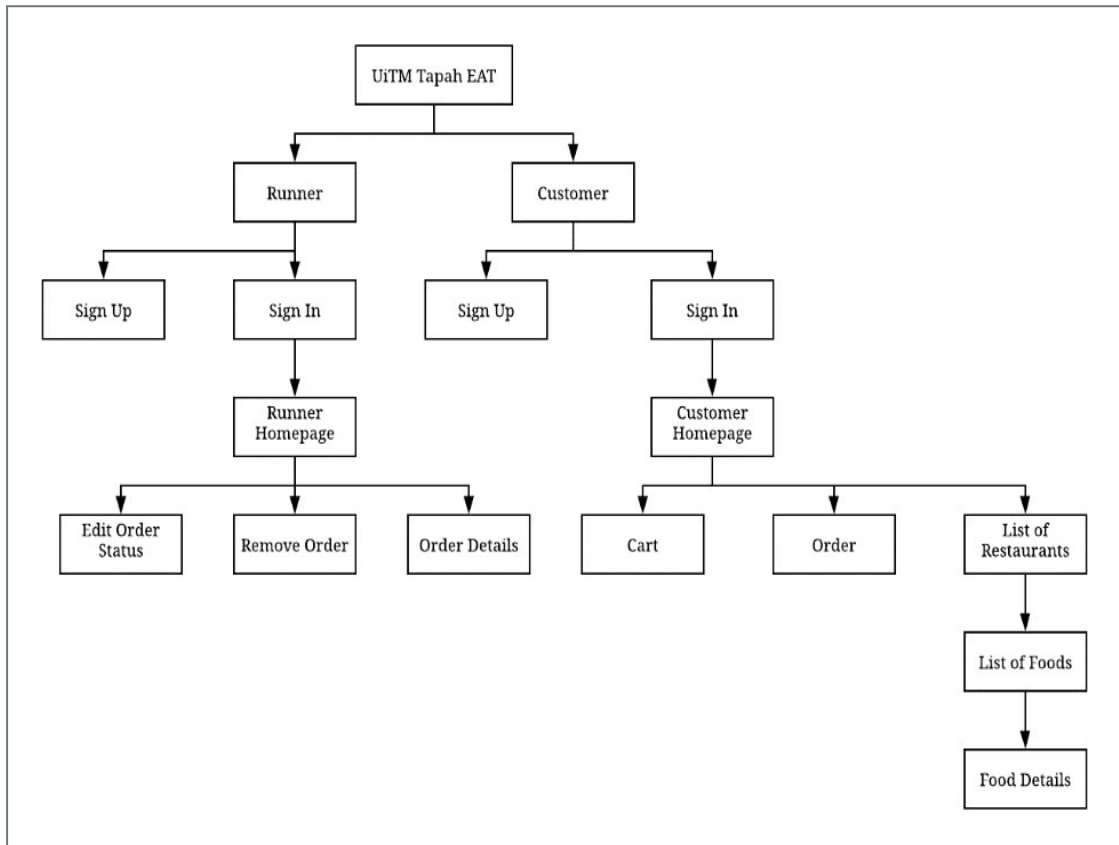


Figure 2. Hierarchy application structure of UiTM EAT

### 3.3 Testing

In this phase, the application will be evaluated based on unit testing and environment testing. The purpose of unit testing was to see if the system's functions compliance to the requirements and design specifications. The environment testing is to verify the cross-platform of the mobile application.

## 4. Results and Discussion

This section explains the main menu of UiTM Tapah EAT mobile application. It will also provide insights and findings on the application by gathering data through the process of testing. There are three modules involved in this application, namely Sign-in and Sign-up Module, Customer Module and Runner Module.

### 4.1 Sign-in and Sign-up Module

Sign-in and sign-up for customer and runner is implemented using the same menu, where in signing up, the students need to fill their personal details such as name, phone number, student id number and password. In sign in page, students need to fill in their phone number and password. Figure 3 shows the screen of sign-in and sign-up page of customer and runner, respectively.

Each student can only sign-up for one account of runner and one account of customer. If same phone number was registered more than once, a toast message will popup. An Android Toast is a small message display on the screen, similar to a tool tip or popup notification. The toast message will be showed at the bottom of the screen of an activity and only remains visible for a short period. Figure 4 shows how a toast message looks like on the screen when a user had signed-up with existed phone number.



Figure 3. Screen shows Sign-in and Sign-up page for customer and runner



Figure 4. Screen shows a toast message of the application

#### 4.2 Customer Module

After a customer had successfully login, he/she will be directed to a customer home page. Figure 5 shows the screen of customer home page with a sidebar navigation when the user swipes the screen to the right, respectively.

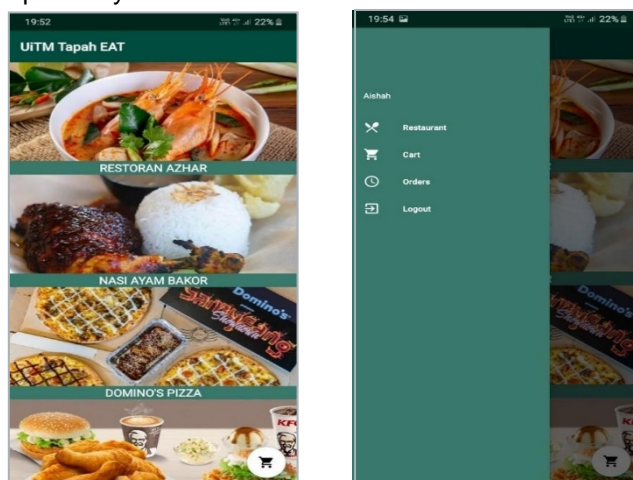


Figure 5. Screens show the customer homepage and sidebar navigation of the application



Figure 6 shows the Restaurant page that display list of restaurants available in the application. These restaurants are near with UiTM Tapah where students usually had their meal. When a customer selects a restaurant of their choice, a food menu list available in the respective restaurant will be display. A food details such as food's picture, name and price will be displaying once the customer select a food from the menu list. A customer can add the food into the cart and a toast message will popup indicates it is successfully added.

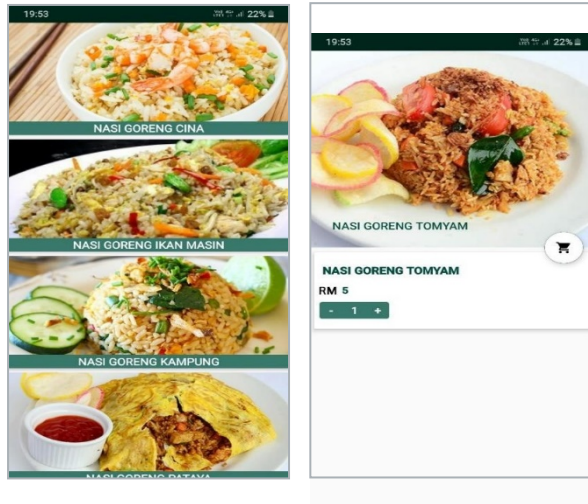


Figure 6. The Restaurant Menu

A customer can view the cart by click on the cart feature at the sidebar navigation or a cart button the home page (refer to Figure 7).

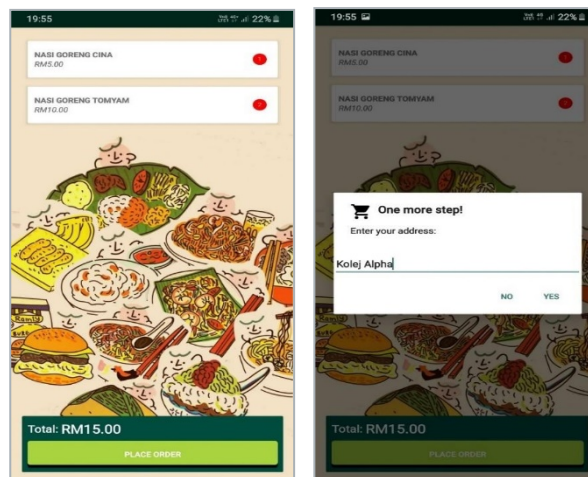


Figure 7. The Cart Menu

The cart will display list of foods' name, price and quantity ordered. At the bottom of cart page, a total price of food ordered is displayed. Users need to click a "Place Order" button to confirm their order and an alert dialog will appear at the center of the screen where user need to input their delivery address. Finally, a toast message will appear to indicate the order has been placed.

The Order menu will display a random unique number which indicates the order number for the runner reference, the order status, customer's phone number and delivery address as seen in Figure 8.



Figure 7. The Order Menu

Order status contains three types of status which are *Placed*, *On My Way* and *Arrived*. This status can only be changed by the runner and the customer will be given a notification every time the status has changed. The “Remove” button allow users to remove the order or keep it as their order history.

#### 4.3 Runner Module

After a runner had successfully login, he/she will be directed to home page. Figure 8 shows the screen of runner home page with a list of incoming orders and with no order, respectively.

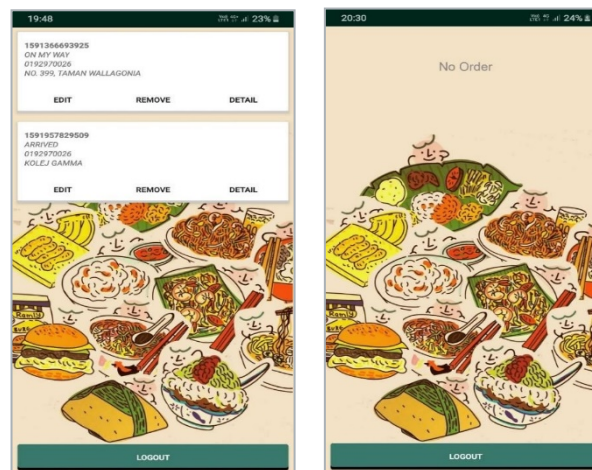
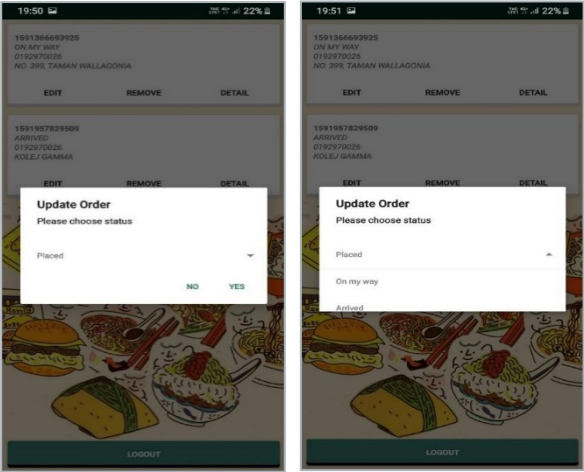



Figure 8. Screens show the runner homepage of the application

The order details appeared in the home page is similar with order details in customer module, where the details are unique order number, order status, customer's phone number and delivery address. The difference is in runner module, there are three different buttons compared to the customer module which only has one *Remove* button. The three buttons are *Edit*, *Remove*, and *Details* where each button have different functions. Table 4 shows features of each button. At the bottom of the page is a *Logout* button where the runner can sign out from the application and return to the sign in page.

Table 4. Overview of *Edit*, *Remove*, and *Detail* button

Button	Graphical User Interface (GUI)	Features
Edit		<p>When a runner clicked on the <i>Edit</i> button, an alert message will appear. The runner can update the status of their customer's order by clicking the status spinner which contains all three types of order status. A notification of updated status will automatically be sent to respective customer when the runner clicked Yes.</p>
Detail		<p>When the <i>Detail</i> button is clicked, order details page will appear according to the order made by respective customer. This is for the runner to pick up the food ordered by their customer. The details provided are food's name, quantity and price.</p>
Remove	-	<p>The function of <i>Remove</i> button is the same as in the customer module where the runner can delete the order once they delivered the food.</p>

#### 4.4 Unit Testing Result

Testing is performed to test all the functionalities meets the requirements. Each module was verified and validated as this process is an important element to the successfully development of UiTM Tapah EAT. Table 5 shows the status of the testing results.

Table 5. Result of unit testing of UiTM Tapah EAT mobile application

No.	Test Case Name	Expected Functions	Validated Status
1	Main Page	User can choose to either sign up or sign in to be a customer or a runner using the buttons.	Yes
2	Sign In	Successfully sign in as Customer.	Yes
		Successfully sign in as Runner.	Yes
3	Register	Successfully register as a new user for Customer.	Yes
		Successfully register as a new user for Runner.	Yes
4	Customer Home Page	Able to scroll down the list of restaurants available in the application.	Yes
		Able to swipe the screen to the right to view the sidebar navigation menu and click on the features.	Yes
5	Food Menu	Customer can scroll down the list of food menu of the respective restaurants.	Yes
6	Food Detail	Customer can click on the food menu to see the details of it.	Yes
		Customer can make an order according to their preferences quantity.	Yes
7	Cart	Customer can click on the cart feature through the sidebar navigation.	Yes
		Customer can click on the cart feature through an icon at the home page.	Yes
		Customer can check their order list and acknowledge the total price of the order.	Yes
		Customer able to click on the Place Order button to place their order.	Yes
		Customer able to key in their delivery address which will be store into the database and can be retrieve by the runner module.	Yes
8	Orders	Customer can click on the order feature at the sidebar navigation.	Yes
		Customer can check their order status at the Orders page	Yes
9	Remove	Customer can click on the Remove button.	Yes
		Customer can delete order when their order completed.	Yes
10	Logout	Customer can logout from the application.	Yes
11	Runner Home Page	Runner can see the list of orders from the customers.	Yes
12	Edit	Runner can click on the Edit button.	Yes
		Runner can click on the status spinner to choose the order status.	Yes
		Runner can click Yes to send notification to the customer and click No to cancel the status update.	Yes
13	Detail	Runner able to click on the Detail button.	Yes
		Runner can check the list of food ordered by their customer.	Yes
14	Notification	Customer able to retrieve notification from the Runner.	Yes
		Customer able to click on the notification and redirected to the Orders page.	Yes

The application's key feature is that it allows customers to receive real time notifications from the runner about order status. Figure 7 depicts the screenshot of a smartphone screen when an order was updated. It accurately displays the order key and status in real time.

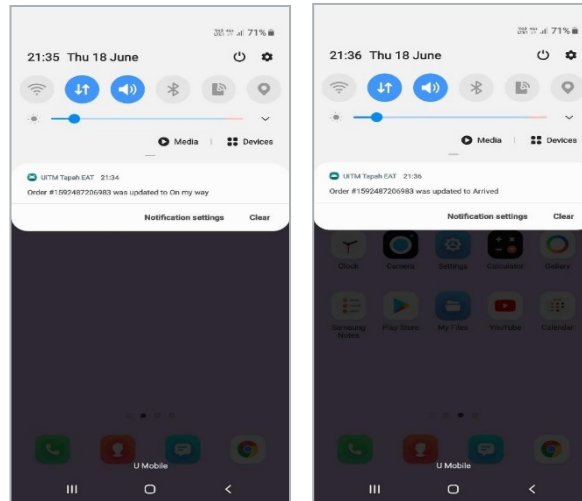


Figure 7. Notification bar on smartphone when order was updated

All modules created in the application were running correctly and efficiently. The application's features have been able to assist the user in effectively handling food delivering process. The application managed to send notifications alert automatically to the customer when his/her order was updated by the respectively runner.

#### 4.5 Test Environment Result

The test environment was executed using two different devices as describes in Table 6. From the testing, it was found that the application required an Internet connection to work smoothly from both devices, as the real-time database does not support offline used. Therefore, the Internet connectivity for this testing on both devices was obtained via mobile network and Wi-Fi. The application was also able to run on both devices with the user interfaces are equally fit on the screen although the different range of screen sizes. This proved that UiTM Tapah EAT is successfully deployed on different smartphone operating system (OS) version like Android Pie and Marshmallow. Due to the successfully deployment on different of smartphone devices with different versions of OS, this application can be justified as a cross-platform Android versions mobile application.

Table 6. Overview of tested devices

Device	Operating System Version	Screen Size (inches)
Samsung Galaxy A50s 2019 Smartphone	Android 9.0 (Pie)	6.4
Samsung Galaxy J5 2015 Smartphone	Android 5.1 (Marshmallow)	5.0

#### 5. Conclusion

Mainly, this work aimed to develop a food delivery mobile application, namely UiTM Tapah EAT, to allow students of UiTM Tapah to make their orders without wasting time. There is currently no food delivery service available in that area due to its remote location. Therefore, the mobile application will undoubtedly benefit the students. UiTM Tapah EAT is reliable in assisting the students in ordering their meal at their preferred restaurant and receiving real-time notification about the order status from the runner. Nonetheless, this initiative will create a system accessible only to students and include some of the same features as other large food delivery firms in Malaysia. It will encompass Tapah to Kampar in Perak, densely populated with food outlets ranging from local eateries to fast-food franchises. Despite certain difficulties students had purchasing food outside of the University, this mobile application will benefit them. Besides, students can also earn extra money as a runner that makes a commission from the delivery. The result of this project is expected to solve the current problems faced by most students in having their meal breaks during their packed schedule.

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Even though the mobile application development is successful, and the objectives have been achieved, the application has limitations. There is no location service provided for the customer to track the real-time location of the runner's whereabouts. The mobile application can be improved by implement the location service. This feature can allow the customers to track the real-time location of the runner to ensure their order will be delivered. There are other possibilities of further improving the application. The improvements may include a chat room between the customer and the runner. With this feature, the runner could quickly contact the customer if there is any problem with the order. Overall, this system can be further improved in the future to fit different requirements.

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### References

- [1] Z. Mustafa, "Delivering good food to student on campus," *New Straits Times*, p. 4, 2018.
- [2] D. Sundaram, H. F. Ghazi, and M. Elnajeh, "Breakfast, food consumption pattern and nutritional status among private university students in Shah Alam, Malaysia," *International Journal of Advanced Community Medicine*, pp. 19-22, 2018.
- [3] T. S. Wei and D. Das, "Development of Online Food Ordering System for University Students to Maintain Healthy Eating Habits," *Journal of Applied Technology and Innovation*, vol. 2, no. 2, pp. 17–21, 2018.
- [4] L. Teck Chai, and D. Ng Ching Yat, "Online Food Delivery Services: Making Food Delivery the New Normal," *Journal of Marketing Advances and Practices*, vol. 1, no. 1, pp. 62–77, 2019.
- [5] C. Li, M. Miroso, and P. Bremer, "Review of Online Food Delivery Platforms and their Impacts on Sustainability," *Sustainability*, vol. 12, no. 14, p. 5528, Jul. 2020.
- [6] A. Sahami Shirazi, N. Henze, T. Dingler, M. Pielot, D. Weber, & A. Schmidt, "Large-scale assessment of mobile notifications," *ACM*, 2014.
- [7] A. Mehrotra, and M. Musolesi, "Intelligent notification systems: A survey of the state of the art and research challenges," *CoRR abs/1711.10171*, pp. 1-26, 2017.
- [8] Q. M. Al-Zoubi, "Mobile-Based Notification System for University's Events," *M.S. thesis*, College of Arts and Sciences, Universiti Utara Malaysia, 2009.
- [9] M. Gusev, S. Ristov, G. Velkoski and P. Gushev, "Alert notification as a service," *37th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO)*, pp. 319-324, 2014.
- [10] Z. Xu and S. Zhu, "Abusing notification services on smartphones for phishing and spamming," *USENIX Workshop on Offensive Technologies (WOOT)*, 2012.
- [11] R. el Stohy, N. el Ghetany, & H. el Gharib, "A Proposed System for Push Messaging on Android," *International Journal Of Interactive Mobile Technologies (IJIM)*, vol. 10, no. 3, pp. 29-34, 2016.
- [12] R. Mohamad and S. Ramly, "Eatee mobile based food delivery system," *UTM Computing Proceedings: Innovations in Computing Technology and Applications*, vol. 3, 2018.
- [13] S. Balaji and M. Sundararajan Murugaiyan, "Waterfall vs V-Model vs Agile: A Comparative Study on SDLC," *International Journal of Information Technology and Business Management*, vol. 2, no. 1, pp. 26-29, 2012.
- [14] A. Alshamrani and A. Bhattab, "A Comparison Between Three SDLC Models Waterfall Model, Spiral Model, and Incremental/Iterative Model," *International Journal of Computer Science Issues*, vol. 12, no. 1, pp. 106-111, 2015.