

# User Interface Design of Mobile Application for Ordering Food Menus

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**Abstract:** Development of technology in the informatics field make it easier for user to perform all their tasks or needs. In the face of business competition, the company must look for strategies to attract customers. The information technology that is currently developing is android. Not only it is used like mobile phone in general, Android is now widely used for other purposes such as ordering food in restaurants or other eating places. This research provides uniqueness by adding an easy and fast interface design to place an order without involving the process of coding. Hence, it will be easier for the user to develop this application without having to learn more about the program code. The result of developing this food and beverage ordering application is that it can simplify and speed up the process of delivering food and beverage that was ordered from the waiters to the kitchen.

**Keywords:** *ordering food menus, mobile application, user interface design*

## Introduction

With the development of technology nowadays, the use of internet plays an important role for a company. Therefore, the development and use of existing technology is needed to help businesses in the restaurant that will help order services to be faster and easier, and also provide convenience for customers.

Restaurant business in Indonesia is increasing. A variety of foods become the attraction of each restaurant compared to the food served at home. At the restaurant, the waiter approaches the visitor and records the order on a paper then goes to the kitchen to process the making of the ordered food. The process is efficient for small restaurants with few

visitors. But there will be problems if a restaurant has a large space or a lot of visitors. Therefore, an online system is needed to speed up the process of submitting visitor order lists.

Advances in technology is expected to be able to assist companies in providing satisfying services for customers by facilitate the company in delivering food and beverage orders to the kitchen. Moreover, the use of mobile android connected to the server can send order data to the cashier and kitchen parts of the restaurant. Android mobile phone is selected for the application development because it is flexible and easy to operate, which is the nature of android mobile phone. Therefore, a research about user interface design of mobile application for ordering food menus is needed.

## Related Works

FIWOS [1] (integrated wireless ordering system) utilizes the use of wireless-based PDAs which purpose is to coordinate when ordering food so that it can increase work efficiency, which can save time, reduce human errors and provide higher quality of customer service. This approach makes a simple, stand-alone and wireless web-based application. This client-server connectivity is continuous. Transaction sessions carried out using PDAs, via wireless access points to send information to the server. The server then sends information via the access point to the appropriate printer such as a kitchen printer, bar printer or cash register printer. The created application design includes choosing an empty table from the list, making orders, adding food, and completing

orders. There is a button to refresh the list menu to get the latest status update of a table. Food can be selected or deleted from the list and then can be added to the order. Research on [2] presents an integration of wireless communications technology and web service technology to create wireless food ordering systems. This system implements wired and wireless data access to the server for ordering food through desktop PCs and mobile devices such as PDAs through an integrated wired / wireless network. This system is based on a secure web service architecture and several security strategies to ensure the security of the adopted mobile communications. Wireless web service applications based on mobile devices provide a means of convenience and also increasing efficiency and accuracy. The system is made up of 5 parts, namely management systems, food management, client management, food ordering management and financial management. The management system is responsible for the initial settings of the system such as administrator settings, wireless network settings, log management, etc. Food menu management set the name, price, type, state of the food, and so on. Client management oversees information from clients, which includes VIP information. Food ordering management is responsible for overseeing food ordering information from cable users and wireless users. Financial management administrates the cash management, bills, and financial audits of restaurants.

Furthermore, the research in [3] introduces a new food ordering system wirelessly. The processes in this system are ordering food, printing and database to manage menus and so on. This system includes food ordering instruments and receiver parts. This system uses MCS AT89S52 as a control chip in food ordering instruments, using a type of keyboard matrix 4 \* 4 for data input which includes number of tables, number and quantity of dishes, and for displays used by LCD OCMJ4X8C. The research in [4] designs and develops PDA systems for ordering food with Mc Donalds restaurant as the case study. The purpose of this research is to describe how the interactive design approach is applied in developing handheld systems for fast food restaurants. There are four main activities in the interactive design, which are identify the needs and establish requirements for user experience, develop designs that meet requirements, build interactive prototypes, and evaluate interactive

prototypes. The evaluation results show that some parts of the design still need to be improved before the final product will become used in the market. In [5], an automatic food ordering system using the Interactive User Interface approach was created to improve the performance of the food ordering system. A computer screen is placed on each table for customers to make their order. The Interactive User Interface is integrated with a system that allows customers to get a real time assistant from the kitchen assistant using the video conferencing system. Orders will be sent to the server in the kitchen. Food will be sent to customers who use robots that are controlled via wireless transmitters. In the application there are 5 main menu choices available, namely menus, food ordered, chef, help and language. Using this approach, the time taken for customers to get help from kitchen assistants can be reduced. However, the proposed system also allows kitchen assistants to be unable to help every customer who requests for video conferencing and it also requires more than one server to be used to handle a big number of customer.

Research in [6] implements CWOS-RTF (customizable wireless food ordering system with real-time customer feedback). CWOS-RTF makes it easy for restaurant owners to update menus and setup systems in a wireless environment. Implementation of a smartphone that has been integrated with CWOS-RTF can facilitate the communication of restaurant and customer owners in real-time. In the proposed application there are 2 user interfaces, namely the user interface for the customer and the user interface for the restaurant owner. CWOS-RTF will receive customer information and the selected menu. Then the restaurant owners will receive a menu list from the system and the restaurant owner can enter feedback using the system to update the order status to the customers. This system requires customers to place an order through their mobile application. However, not all of the customers have a smartphone. The research in [7] proposed the SRO (Self-Service Restaurant Ordering System) by developing a Graphical User Interface (GUI) using Microsoft Visual Studio 2008 and Microsoft Office Access 2007 for databases. Customers can order through touch screen devices placed at each table in the restaurant. Customers can view menus, prices and make orders directly using the system. Then their order will be sent to the database in the restaurant and will be displayed on the computer

screen in the kitchen for food preparation. The SRO system cannot yet be connected to a web-based application.

Research in [8] discusses TPIR (Tablet PC in Restaurant) by developing ordering systems in restaurants and using modern touch screens based on wireless technology. This system was developed using Visual Basic 6.0 and SQL Server 2000. The process of the proposed approach is that customers can choose, add and delete orders. When the customer finish selecting food from the list, the kitchen and cashier will receive the order details by the customer. In its implementation, TPIR utilizes wireless services to connect customer table PCs with database servers. Therefore, this system requires other device, which is access points, as a tool to connect to Wi-Fi networks. The created system is still unable to connect with a web-based application. The research in [9] proposes to develop an android application that aims to improve the food ordering system to accelerate customer interaction through the use of Wi-Fi technology. The application is made using Eclipse IDE software with add-ons from Android SDK (Software Development Kit) and encoded in Android 3.0 (Honeycomb). The process of the proposed application is that customers can choose the type of food and enter a list of selected food choices, then information will be sent to the server and will be received in the kitchen section. The created system is not web based.

System Description

A. Architecture Design

The food and beverage ordering system that will be built requires an internet connection as a liaison between customer orders that are inputted from the Android mobile to the company's server. Figure 1 is the picture of the proposed system architecture.

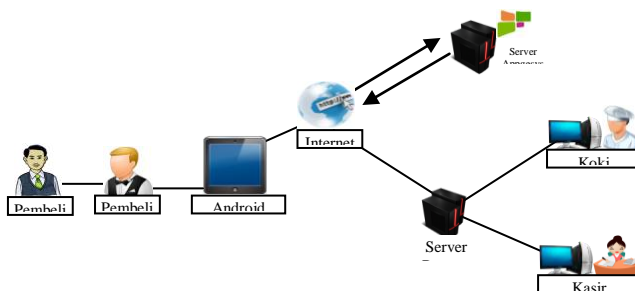


Figure 1. Architecture design of the proposed system

B. System Design

1. Logical Design of System Procedure

The design of procedure of the built ordering system uses sequence diagrams and activity diagrams. The logical design of the system procedure is as follows.

a. Sequence Diagram

Sequence diagram is a diagram that shows or displays interactions between objects in a system and is arranged in a sequence or time series. Interactions between objects include users, displays, and so on in the form of messages. Sequence diagrams are used to describe a scenario or series of steps that are carried out as a response to an event to produce a particular output.

b. Activity Diagram

Activity diagram describes the flow of activity in the system being designed; how each flow starts, the decisions that might occur, and how they end. Activity diagrams are special state diagrams, where most states are actions and most of the transitions are triggered by the completion of previous state (internal processing).

2. Relation Between Tables

Figure 2 shows the relation between tables that contained in the built system.

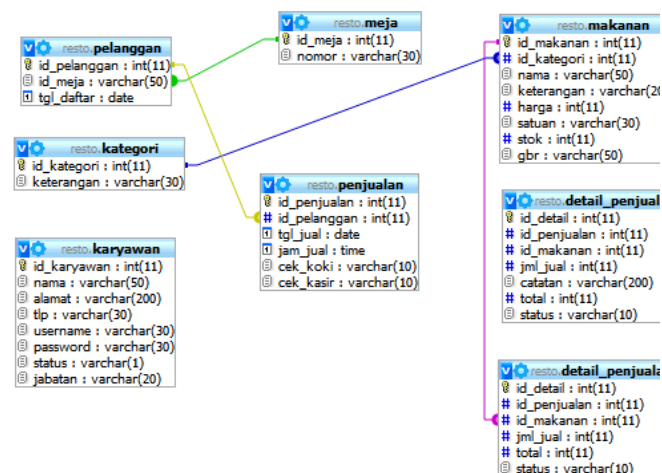


Figure 2. Relation between tables

### C. Requirement Analysis

Aims of the requirement analysis phase is to define the needs of the developed system. From the proposed procedure, the system requirements can be identified, such as:

- a) The food ordering system that uses android mobile phone help waiters speed up the process of delivering orders to the kitchen and cashiers,
- b) The food ordering system with *One Click* concept,
- c) The system that can send a list of order data to the restaurant cashier and kitchen automatically without having to refresh the kitchen or cashier page,
- d) The system that can provide restaurant sales report per day or per month.

#### 1. Hardware Requirement

- a) 2 units of computer that will be used for the cashier and the kitchen with specification as follows:  
*Processor: Intel Core 2 duo@ 2.7Ghz*  
*Harddisk : 320 Gb*  
*Memory : 2048 Mb DDR3*  
*Monitor :*  
*LCD 15" (for cashier)*  
*LCD 22" (for kitchen)*  
*Mouse*  
*Keyboard*
- b) 1 unit of mobile phone that supported with android operating system that will be used for the media of ordering food and beverages.
- c) Network installation; local network installation is needed to connect all computer units and servers. RJ45 cable and one switch are needed.
- d) Internet; an internet network connection with a minimum speed of 1Mbps is required. We recommend using Speedy internet provider, specifically the Speedy internet cafe package, because the internet speed is stable and sufficient for corporate needs.

#### 2. Software Requirement

The software requirements needed are the operating system for the server (2 new computer units that will be used in

the cashier section) to be used. We recommend using the Windows 7 operating system. For the ordering system we use mobile android.

#### 3. Information Requirement

Identification of information requirements is the first step in determining the type of information that suits the needs of users. Information obtained from users will be a reference for consideration in providing appropriate information. The built system must meet the information requirements needed by the users. The following identifies the information needs:

- a) List of Food and Beverage Menu along with their prices  
Can be done by manager as a policy maker at the place.
- b) Employee Data  
Can be done by manager as a human resources recruiter in that place.
- c) Table Data  
Can be done by manager or waiter that knows the table data every day.
- d) Daily Sales Report  
Can be done by the cashier before finished their work shift. Information on this sales report includes transactions made on that day for daily reports.
- e) Monthly Sales Report  
This estimation report is carried out by the cashier when closing the Monthly Book.

### D. User Interface Design

The structure of the system can be described by decomposition diagram and menu structure image from the ordering application in Figure 3. When viewed from the structure of the decomposition diagram, the food ordering application system consists of 2 interfaces namely service and admin. The service section is done by using an android device that has been provided and has been installed this food ordering application. The ordering process can be done by a waiter or by the customer himself. The admin section is used for administration which is divided into 3 job categories, which are manager, cashier, and chef.

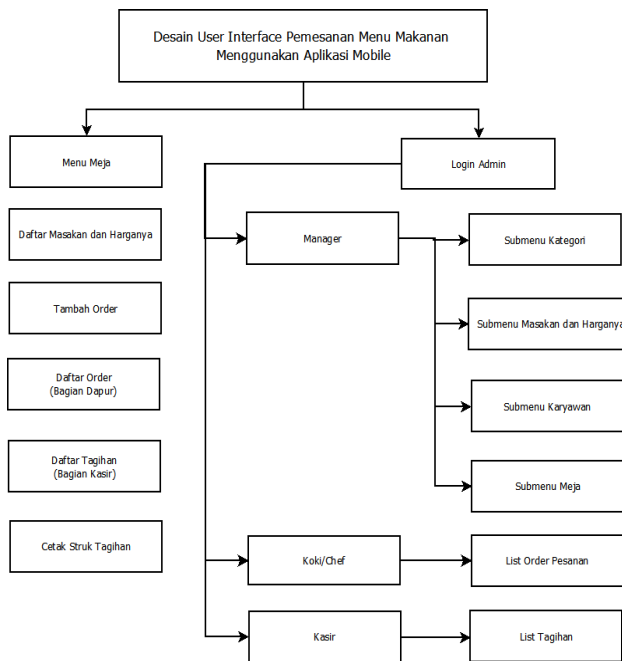


Figure 3. User Interface Design

Discussion

Customer Page

Customer page is a page used by customers to order food or drinks. Figure 4 is the customer's initial page when using the application and Figure 5 is the main page of the menu ordering application.

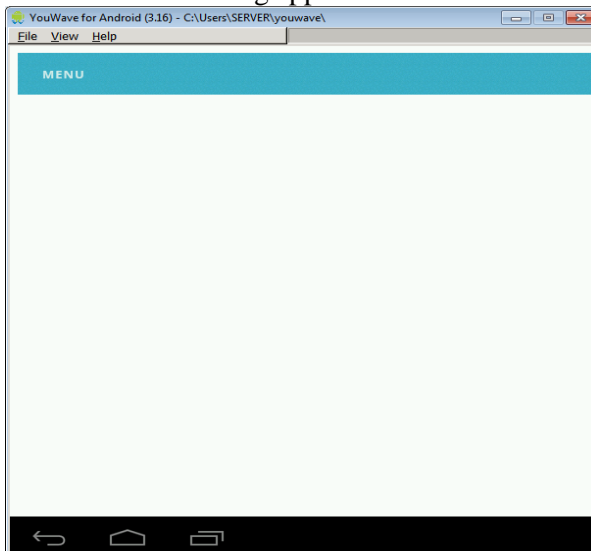


Figure 4. Customer page on android mobile phone

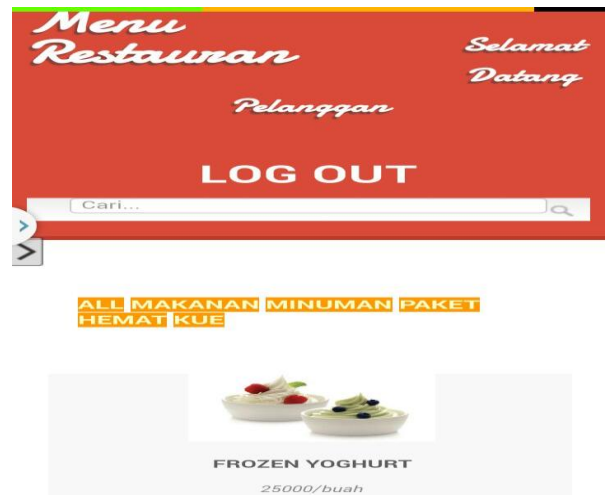


Figure 5. Customer's main page

Administrator Login Page

On this login page the system will be transferred according to the position that has been entered by the manager. Figure 6 is the display of administrator login page that can be opened through a restaurant site. For trial, this system uses the site <http://www.jemariterampil.com/adminpanel/login/>.

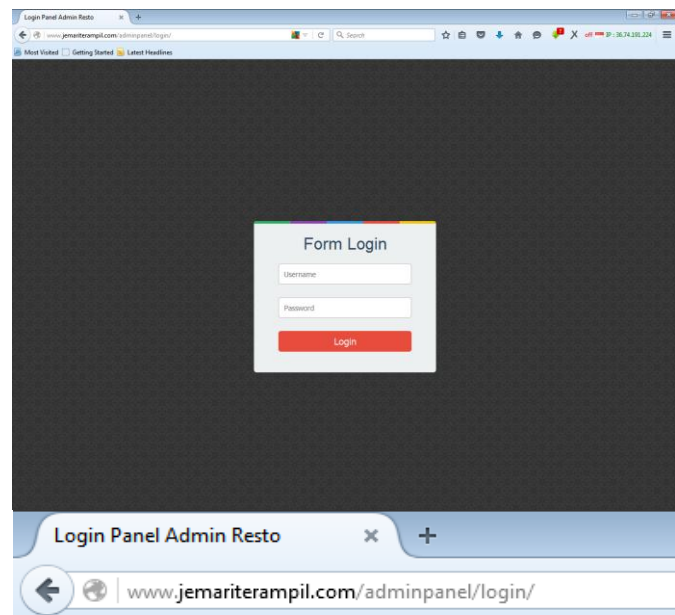


Figure 6. Administrator login page and its website address

1. Manager Section

In this section a manager can set the category, cuisine, table, and employee data and at the same time can monitor the real time transactions that occur by looking at the numbers on the admin dashboard. The display of manager section can be seen in Figure 7. Setting the category can be done on

the category setting page in Figure 8. The table setting page is shown in Figure 9, the cuisine setting page is shown in Figure 10, and the employee setting page is shown in Figure 11.



Figure 7. Admin dashboard and its website address

Figure 8. Category setting page and its website address

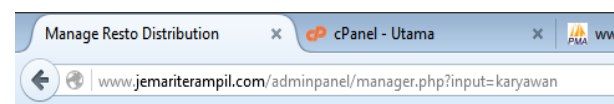
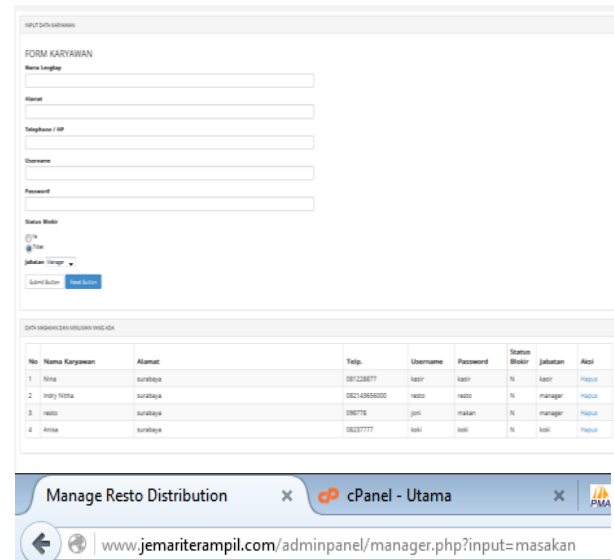
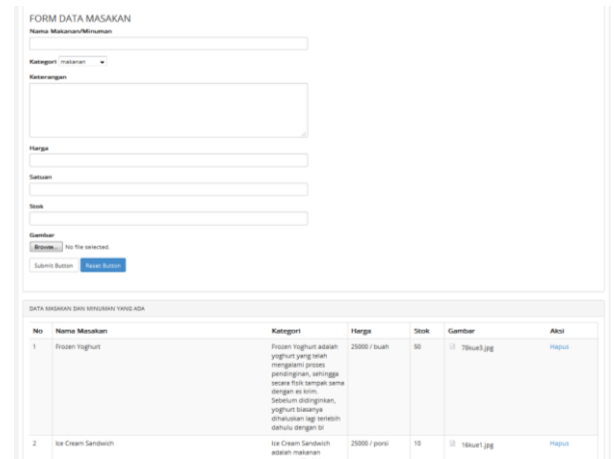
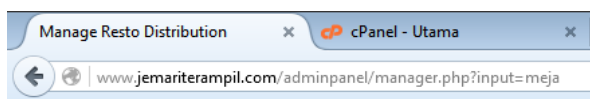
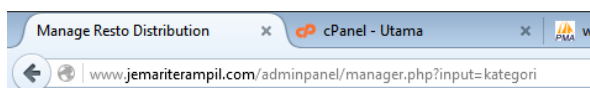
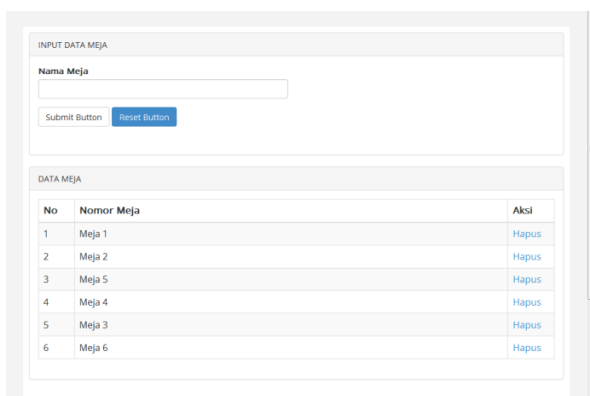
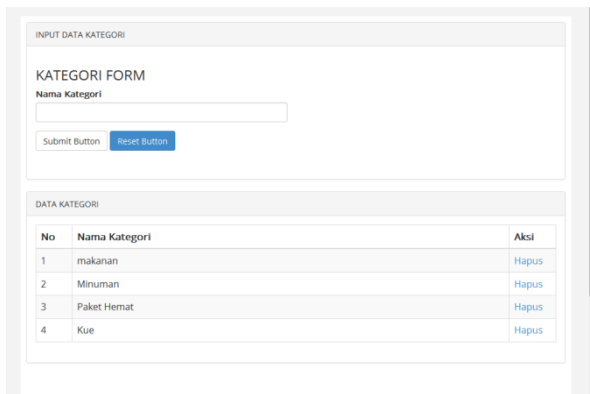


Figure 10. Cuisine setting page and its website address

Figure 11. Employee setting page its website address



## 2. Chef Section

In this section the chef can see a list of food orders that must be prepared in detail and real time. This real time data comes from orders of customers who request the desired dish. When the chef has made it, the chef just clicks on the "CHECK" which will appear in the cashier section to make a bill to the customer. Figure 12 is an overview of the order list page on the kitchen monitor.



Figure 12. Order list page on the kitchen section and its website address

### 3. Cashier Section

The cashier section contains a list of customer bills as in Figure 13. The data is obtained from the chef who has clicked "CHECK" which indicates the order has been made. The cashier can print the billing receipt that will be given to the customer as shown in Figure 14 along with the example of customer bills.

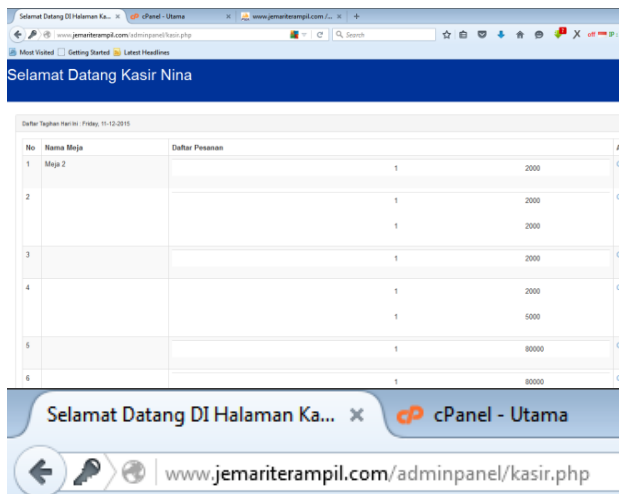


Figure 13. Bill list page on the cashier section and its website address

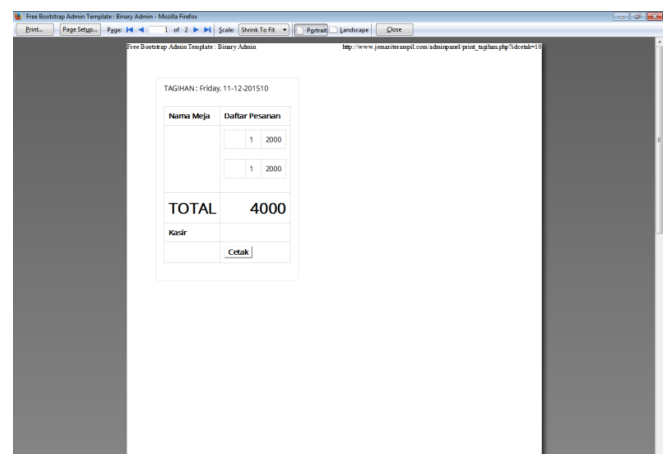
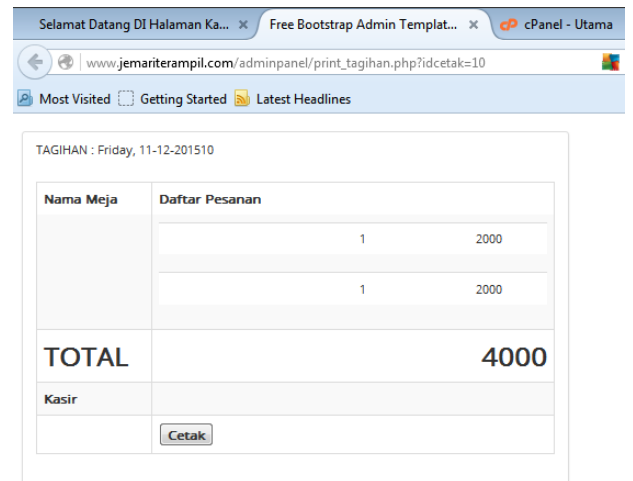


Figure 14. Example of the bills that will be printed

### System Testing

System testing is done after the application has been developed. There are three users who play a role in the use of the system, and nineteen use cases that can be used. Figure 15 shows the device used as the testing medium.



Figure 15. Testing device

Testing is done by using each form in the application that is built, and test the delivery of order data that is carried out with a simulator from the Android mobile. Testing process start from the service section where in this section the use of mobile android is done to order available food and

drinks. In this section there is a list of available menu along with its price and the total order that was displayed. The customer clicks on the order then the order list will directly appear in the kitchen section, therefore the kitchen section can see the list of orders on the monitor. When there are orders appeared on the monitor, the chefs make ordered menu immediately. When the order has been made by the chef, the chef will click "CHECK" so that the order is sent to the cashier section to make a receipt. Furthermore, the cashier will monitor the food data that has been ordered and has been made by the chef to make the bill. The food menu application is built based on mobile application. We hope this application can provide added value to similar applications by focusing on the speed of interface design for data management, and the creation of an Android application by not using the Android language itself.

1. Questionnaires

Questionnaires are used to measure customer satisfaction with several attributes such as the use of android ordering applications, ordering speed and food serving speed. The form of questionnaires that must be filled by the customers is shown in Figure 16. The results of filling out the questionnaire is to compare the speed of the ordering process manually and the speed of the ordering process using the proposed android application. The experiments of the application has been done to 10 customers, and the result of the questionnaires that have been done is in Figure 17.

		a. Fast (< 5 minutes)	<input type="checkbox"/>	
		b. Takes long time ( 5 – 10 minutes)	<input type="checkbox"/>	
		c. Takes very long time (> 10 minutes)	<input type="checkbox"/>	
<b>C FOOD SERVING SPEED THAT HAS BEEN ORDERED</b>				
	1	Is serving the ordered food takes a long time?		
	2	Select one of the time categories used to receive an order		
		d. Fast (< 15 minutes)	<input type="checkbox"/>	
		e. Takes long time ( 15 – 25 minutes)	<input type="checkbox"/>	
		f. Takes very long time (> 25 minutes)	<input type="checkbox"/>	

Information :

Y : If you agree with the question

N : If you disagree with the question

: Check one of the choices

Figure 16. Questionnaires format

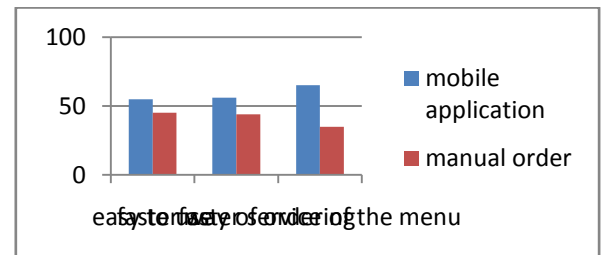


Figure 17. Graph result of the questionnaires from the answer of the customer

FOOD AND BEVERAGE ORDERING QUESTIONNAIRE USING THE MOBILE APPLICATION				
<b>A EASE FOR CUSTOMER BY USING A MOBILE APPLICATION</b>				
	1	Are you satisfied with the order using the mobile application?	Y	N
	2	Is the design of the android application good?	Y	N
	3	Do you have trouble operating this mobile application?	Y	N
<b>B ORDER SPEED WITH THE MOBILE APPLICATION</b>				
	1	Is ordering using a mobile application takes a long time?		
	2	Select one of the time categories used to place an order		

Discussion

The purpose of this work is to develop a menu ordering system in restaurants using touch screen technology. We use touch screens and give customers to choose food directly without help from the waiter. Customer orders are ordered or selected through the customer interface, which is designed in a user friendly manner. The benefit for the owner of this restaurant is that he can manage the restaurant from a central computer, he can check the input and output of the food. Restaurant owners, admin and cashier have the authority to enter their own part of the system, each waiter or cashier has a username and password. This type of security has been considered in the developed system. We use internet services in this research to connect tablet PC or touch screen of the customers with a database server. Results of the

experiment can be seen in the graph of questionnaires in Figure 17. The proposed design can make it easier for customers to order menu than ordering menu manually. The current design has met the basic requirements of the proposed concept, but there are still many improvements that can be made to improve the system.

### Conclusion

The developed system can facilitate and accelerate the process of delivering food and beverage orders from waiters and customer to the kitchen. The development of the proposed new system can contribute adding values to the application developers, especially the developers of similar applications about ordering food. Regular back up of the data must be held, whether daily, monthly or annually in order to avoid data loss due to system damage.

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