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AN ANALYSIS OF DESIGN ANDROID FOOD ORDERING APPLICATIONS AT TAICHAN KUMIS RESTAURANT

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Abstract: There are several processes that must be passed before the dishes ate the customer's table. The first is looking at the menu, the second is ordering the dishes to the waiter and then the waiter noted the orders, and the last is the waiter handed over the order notes to the kitchen section. These steps have some obstacles, such as unreadable the writers writing, random queue, and the out of date of the kitchen stocks. Nowadays, the technology is growing rapidly, so it should be used maximally. There is a way to shorten the steps with "Android-based food ordering app". A combination of wireless technology and mobile android/tablet. It ease the customers to order when they arrived at the restaurant. They just click the menu which they want at the tablet, after that the orders will be in the system automatically. In addition to ease the waiter, it also makes the customers feel more comfortable. The application is also show favorite menu selection for a recommendation to new customer of Taichan Kumis.

Keywords: Food Order, Restaurant orders, Order Processing, Mobile Android, Unified Modelling Language.

I. INTRODUCTION

The growth of restaurants in Indonesia a few years back is greatly increased dramatically. Consumptive nature of Indonesian people, became one of the factors of restaurant growth. The competition that happens to get customers is getting tighter. The restaurant should improve the quality of the restaurant in order to attract customers' purchasing power. Conventional service provided by the restaurant has several obstacles, so the customer process to get food less efficient.

In some restaurants, the waiter must record customer orders on a piece of paper and then insert it into the computer. Orders are conveyed later in the process in the kitchen, this way less effective and efficient. Not to mention when the food supply customers ordered in the kitchen was gone, the waiter had to return to the customer's table. then re-record customer orders and then re-process until the order gets to the kitchen. The restaurants have to provide the best services and maintain relationships with their customer in order to survive in this competition[3].

The evolution of technology is increasing rapidly. This is evidenced by many things can do using technology such a mobile device[4]. This is made possible through the use of electronic payment system[2]. To solve the problems that occur in the restaurant wireless technology and android tablets can be designed and implemented in several middle or large scale restaurants. Applications are installed on each tablet. Customers choose available orders by clicking on a

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tablet. Preferred orders are sent to the kitchen via a wireless network, and displayed in the kitchen to be processed by the kitchen.

The pace at which Restaurants Managements Information Systems are being deploy in fast-food and beverage industry is fascinating and widely accepted in the world[11]. The restaurant can arrange the ordering process quickly and accurately, so the queue can be sorted according to the route.

This proposal system is very useful for the continuity of the restaurant. Because it has feedback from customers, with criticism or advice given when the customer is finished ordering[6]. Customers who first come to the restaurant was not too confused with the menu what will be in the message, the application also displays the menu favorites or menu recommendations. Promos can also be included in the app, so customers can find out which promo is being created or done by the restaurant.

II. RESEARCH METHOD

2.1 Tablet

Tablets are a mobile computer mainly functioned by touching the screen instead of using a physical keyboard. A tablet features both a stylus as well as an on screen keyboard. There are mainly two types of tablets, resistive (passive but high level of precision) and capacitive (less accurate but more responsive).[3]

2.2 Basic Principles of Customer Satisfaction

According to Tse & Wilton in Nasution (Nasution, M.N 2004) Satisfaction can be defined as the customer response to the evaluation of the perceived difference between expectation and the final result after consumption. Meanwhile, Kotler in Nasution (Nasution, M.N 2004) said that customer satisfaction is the level of a persons feelings after comparing the results and the expectation. From several definitions of the experts, the author conclude that the customer satisfaction is the condition where the last condition is accepted by the customers from the products they get in accordance to what they expected.

Customer satisfaction includes the difference between expectation and perceived performance. The customer is the one who receives someone's product (in this case the output of food and beverage from restaurant), so that the customers who decide the quality of the product. A number of elements that are not important in determining customers, namely:

1. Customer must be a top priority
2. The customer who become the most priority is the most loyal customer, who bought many times.
3. Customer satisfaction is guaranteed by producing high quality products with periodic improvements.

Customers who are satisfied with the services provided, make the value of the quality of the restaurant to be increased. The restaurant is well known for its good service, it becomes one of the brand marking that is done by the restaurant but its distribution through customers.

2.3 Recommendation System

Recommendation system is an application that presents, recommends, and gives suggestions an item in making a decision desired by the user. The suggestion relates to a variety of decision-making processes. Recommendation systems are starting to bloom as the application *platform* shifts from *desktop platforms* to web and *mobile platforms*. This can be proved by the number of desktop-based applications that began to be replaced with *web* and *mobile applications* (Naufal, 2013).

Recommendation system is usually a stand-alone application, but as a complement feature in an application. For example, in Instagram there is a "*Suggestions for You*" feature gained from friends who have been added. Twitter also features "*Who to Follow*". Users of iOs in the App Store will also see "*Trending*" which shows the recommendation of favorite applications. Nowadays, the website of online shop is equipped with recommended features of the recommendation system for the purchase of other products in the form of features "*Good To Buy*" and others.

2.4 Software Development Method

The method used in the development of this software is Rational Unified Process (RUP). Rational Unified Process (RUP) is a software engineering method developed by collecting various *best practices* in the development of modern software in a form suitable for various projects and organizations.[3]

RUP is a software development methodology created by Rational Software Corporation (now one of IBM's divisions), which uses UML (Unified Modelling Language) as a modelling language during the development period and iterative incremental as a model of the software development cycle.

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Using this model, RUP divides the software development phase into 4 phases as follows:

1. Inception (start), is an early stage to identify the system to be developed. At this stage, the activities are determining the scope of the interaction, performing user needs analysis, designing software, modelling UML diagrams (use case diagram, activity diagram, sequence diagram & class diagram).

2. Elaboration (extension / planning), is the most important stage before entering the construction and transition phase. In this stage, design is created completely based on the analysis results on inception stage. The activities that is undertaken in this stage include creating the design of the proposed system architecture, the design of data formals, the design of database, the interface design, and the design pattern used.

3. Construction (construction), is a stage to implement the design results and test the results of implementation. At this stage more focused on activities - activities include testing the results of analysis and design, determining the coding program used, programming, and program optimization.

4. Transition (transition), is the stage to submit the application to the roll-out system, which generally includes the implementation of user training and beta testing of applications against user expectations. This stage is more on the deployment or installation of the system in order to be understood by the user. Activities at this stage include user training, system maintenance and testing whether it meets user expectations.

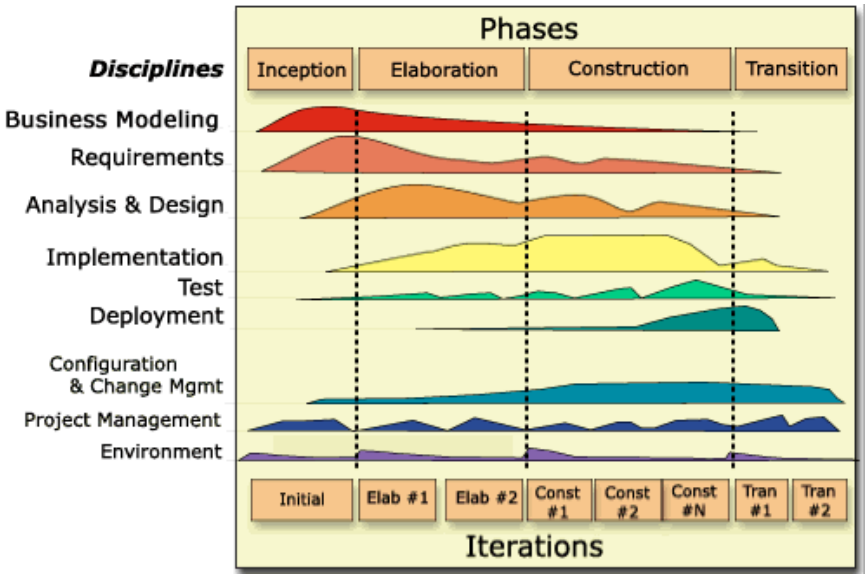

Fig. 1 Architecture *Rational Unified Process*

2.5 UML (Unified Modelling Language)

UML (Unified Modelling Language) UML is a unity of modelling language developed by Booch, Object Modelling Technique (OMT) and Object Oriented Software Engineering (OOSE). The Booch and Grady Booch methods are very well known as the Design Object Oriented method. This method makes the process of analysis and design into four stages iterative, namely: the identification of classes and objects, the semantic identification of the relationship object and class, interface details and implementation (Munawar 2005, p.17).

Using UML can be modelled for all types of software applications, where the application can run on any hardware, operating system and network, and written in any programming language. However, since UML is also use class & operation in its basic concepts, UML is more suitable for software writing in object-oriented languages. Like other languages, UML defines notation and syntax / semantics. UML notation is a set of special forms to describe various software diagrams. Each form has a certain meaning, and UML syntax defines how the forms can be combined. UML notation is derived from 3 pre-existing notations: Grady Booch Object-Oriented Design (OOD), Jim Rumbaugh - Object Modelling Technique (OMT), and Ivar Jacobson – Object Oriented Software Engineering (OOSE).

UML has a number of graphical elements that can be combined into diagrams. Since this is a language, UML has a number of rules for combining these elements. Inside UML there are the following types of diagrams:

Table I. Type Diagram UML

No	Diagram	Usability
1	*Use Case*	Modeling business processes
2	*Conceptual*	Model the existing concepts in the application
3	*Sequence*	Modeling the delivery of messages between objects
4	*Collaboration*	Modeling interaction between objects
5	*State*	Modeling behavior between objects

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6	*Activity*	Model the use cases and objects in the system
7	*Class*	Model the class structure
8	*Object*	Model object structure
9	*Component*	Model object component
10	*Deployment*	Model the distribution of the app

III.RESULTS AND DISCUSSION

3.1 System Requirement Analysis

This application aims to improve the quality of service at Taichan Kumis restaurant. The stages of needs analysis are intended to define the needs of the system to be developed. From the proposed procedure obtained system requirements such as:

1. Food ordering system using android tablet to fasten service delivery order process to the kitchen and cashier.
2. This system can send the order data list to the cashier and restaurant kitchen of Taichan Kumis.
3. This system can display the recommendation of the most favorite menu to customers who first come to the restaurant.
4. This system can display periodic promotions that are being held Taichan Kumis restaurant.
5. The system can provide reports on restaurant sales per day or per month.
6. This system can show estimation of cooking process of customer order

This application is intended to improve the quality of service provided by the restaurant Taichan Kumis. This application is made based on android because the user is familiar with the application. So, the user will not feel confused when they use it for the first time for food reservations. The requirements are divided into two, they are non-functional & functional requirements.

3.1.1 Non-Functional Requirements

Non-functional requirements are complementary features that support the work of a system and have an indirect effect. The functional requirements required in building this application such as:

1. Reliability The built system can be used easily by the user and reliability when it used by the waiter.
2. Performance A fast and stable internet connection is used for the system to run properly and orders can be received quickly.
3. Usability The built-in system can be used quickly, more over the system is friendly for users, with a great display and easy to be understood.
4. Information The information here contains information consisting of information on raw material usage estimates and sales reports in restaurants that can be done per day or per month.
5. Hardware Requirements
   11 units of android tablets that will be used by customers as a tool to order with the following specifications:
   Processor: quad-core 1.3 GHZ
   Memory: 2 GB Ram
   Android: 6.0 Marshmallow
   Screen: 1280 x 800 pixel

3.1.2 Functional Requirements

In functional modelling requirement that will be used is modelling using use case, activity diagram, class diagram, sequence diagram, and mock up android after UML design phase is completed. Use case diagrams can be a good enough technique to analyze the needs of users of the system. In addition to good understanding of the elements, use case diagrams can also document the system requirements well, which appears in the following figure:

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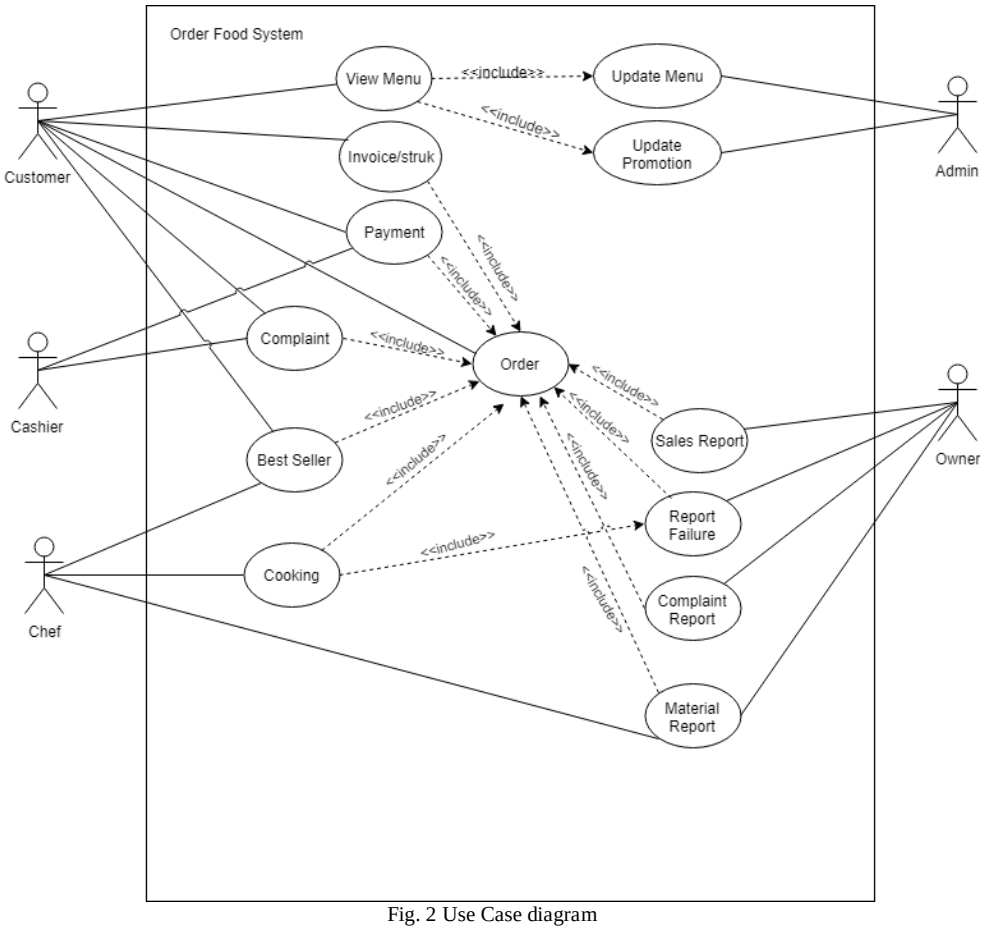

Fig. 2 Use Case diagram

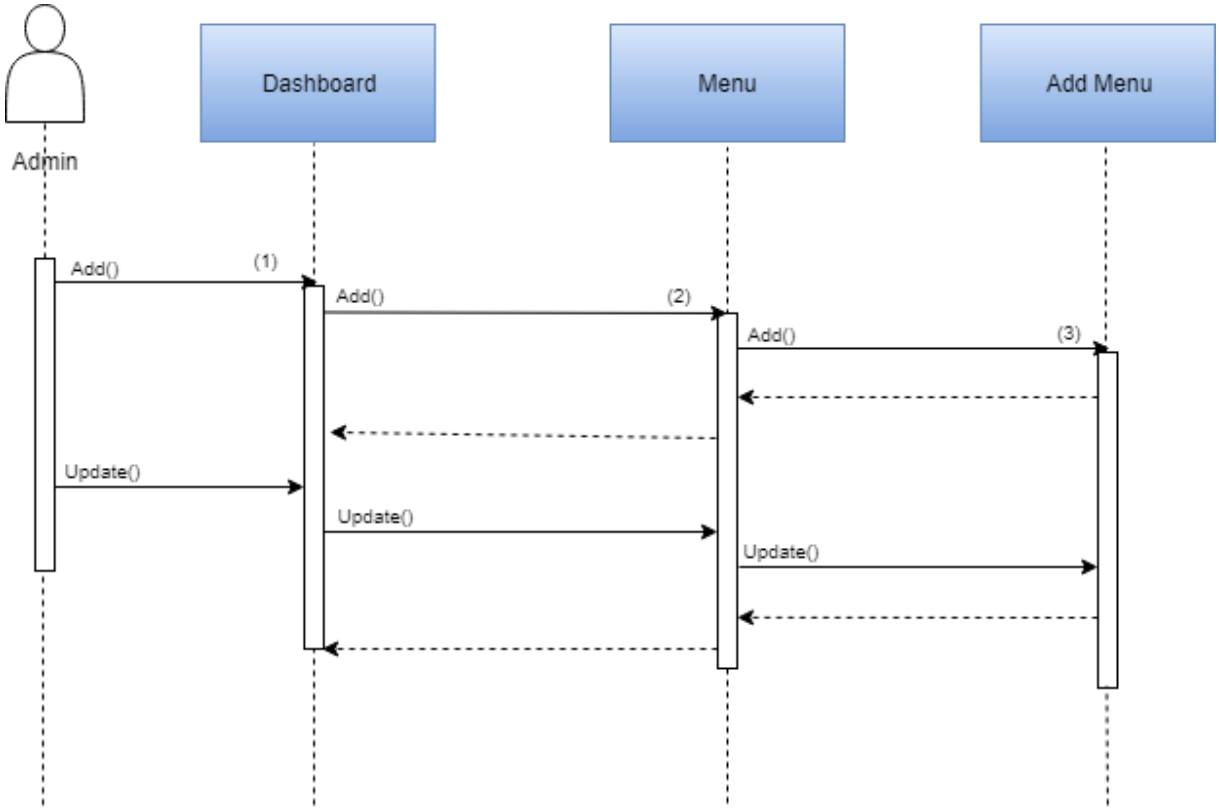

Fig. 3 sequence diagram

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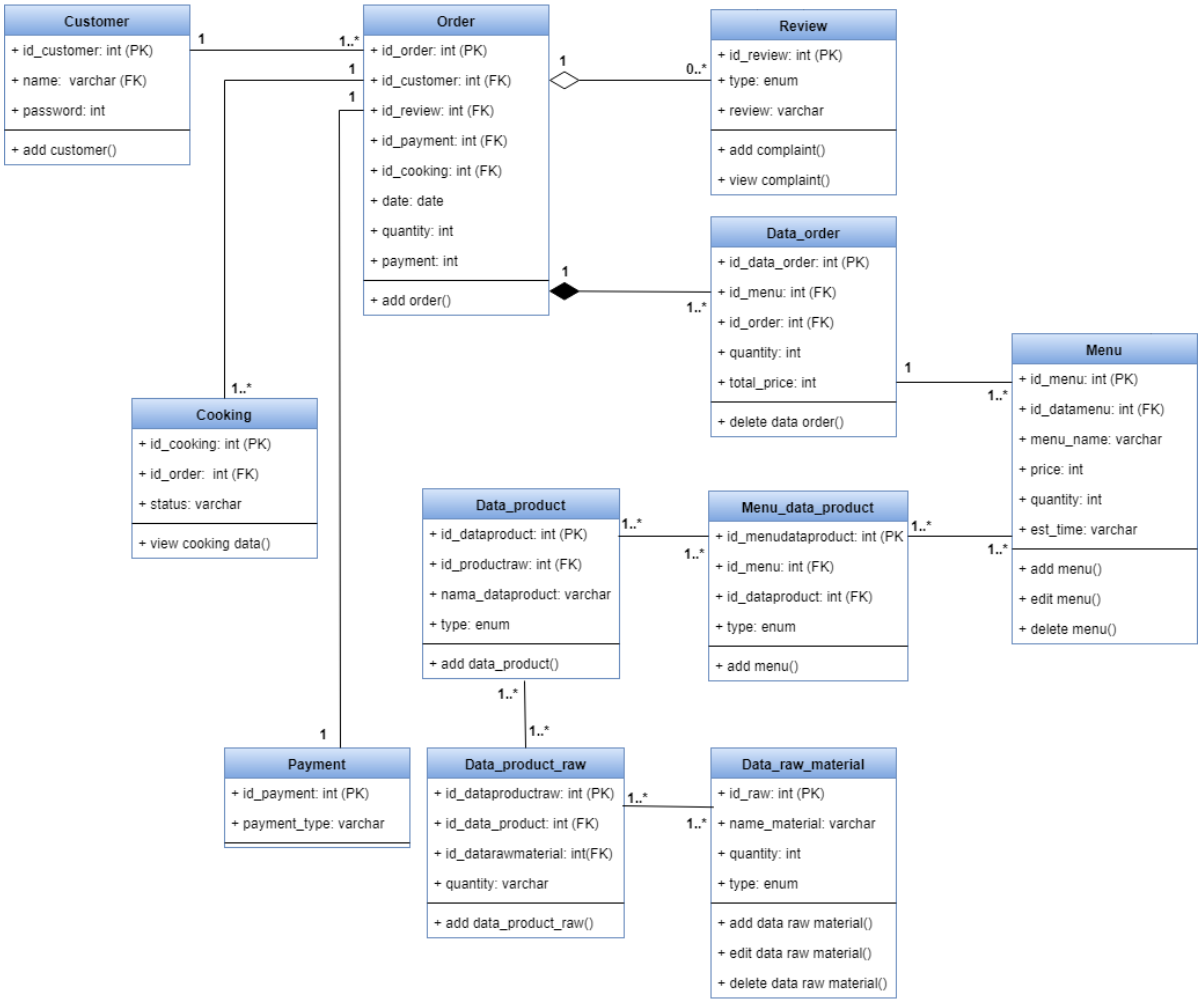

Fig. 4 Class Diagram

3.2.1 Prototype Design

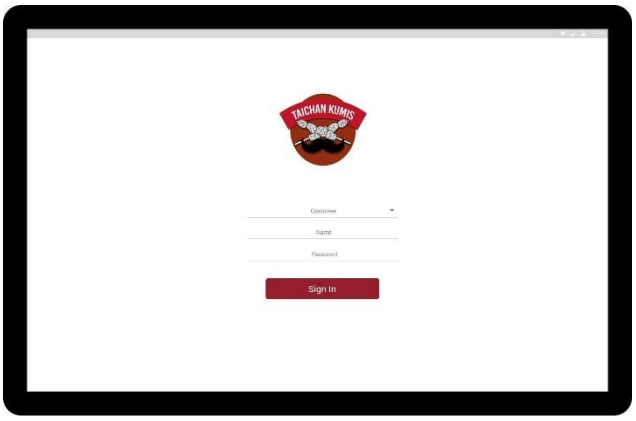

Fig. 5 Login Page

Figure 5 shows the login page of the application, where the user must enter the name and password before entering the main menu.

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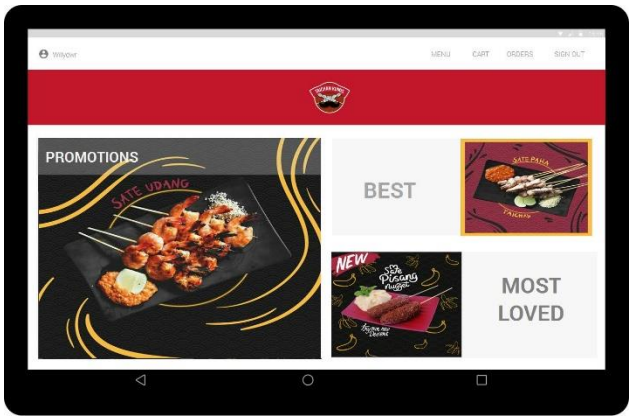

Fig.6 Dashboard User

Figure 6 below shows the prototype design for the user's dashboard, the user can choose which page to go to for the first time. On the page is the main page of the food ordering app before the user makes the ordering process.

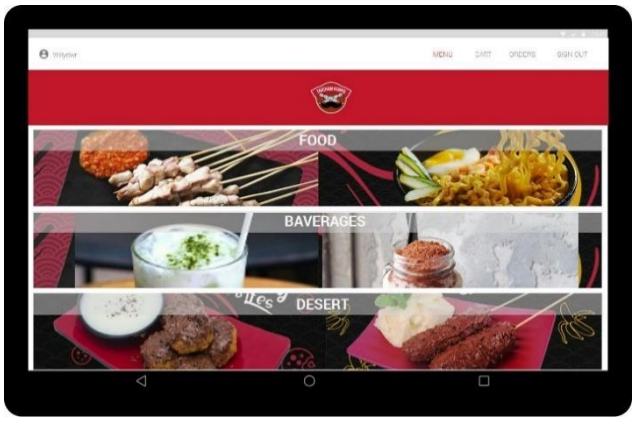

Fig. 7 Category page

Figure 7 shows the menu category page that is on Taichan Kumis restaurant. Before entering on this page the user must press the menu button on the dashboard first.

Fig. 8 Ordering Page

Figure 8 is the core page of the food ordering app, displaying the entire menu in the restaurant. And the process of ordering food before getting to the kitchen section takes place on this page. When the choice of food menu is selected, this page displays the entire food menu in the Taichan Kumis restaurant. Likewise if the customer selects the drink menu, then the page will display the whole menu of drinks. Customers can enter the order in accordance with the desired on this page.

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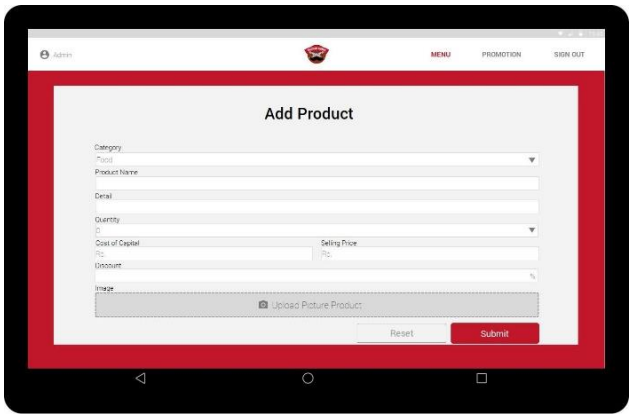

Fig. 9 Add Product

This page is a plus page detail type of sales products that will be displayed on the application menu for admin roles.

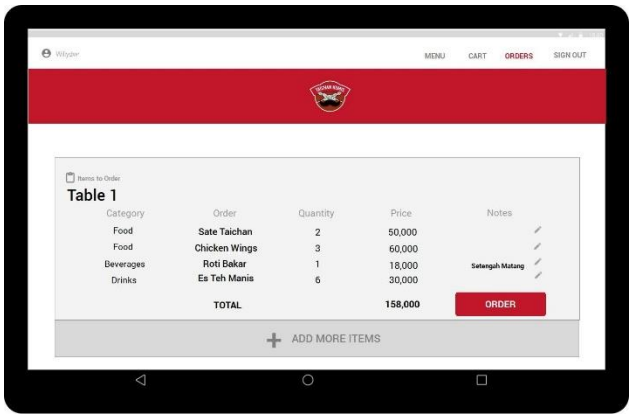

Fig. 10 Order List

Figure 9 is an order list page that displays a list of user orders before being sent to the kitchen via the application.

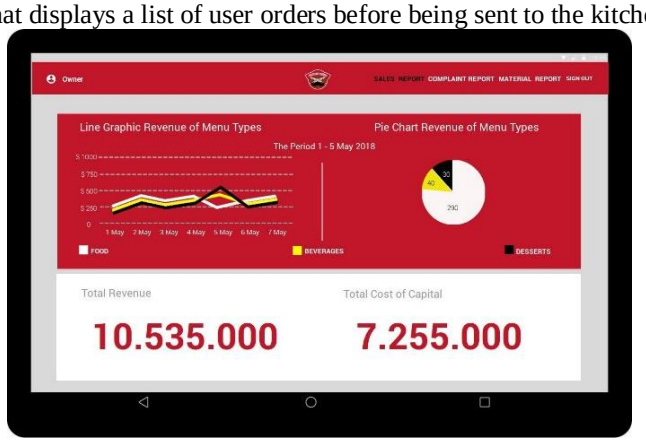

Fig. 11 Sales Report

On this page, the owner can see the total restaurant sales revenue that is displayed through line graph and pie chart.

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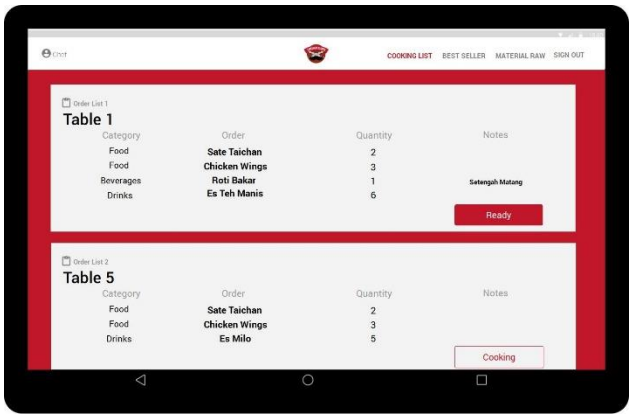

Fig. 12 Cooking List

This page displays a list of customer orders on the screen that will be processed in the kitchen. Incoming customer orders are displayed on screen, so the chef can process incoming orders in the queue.

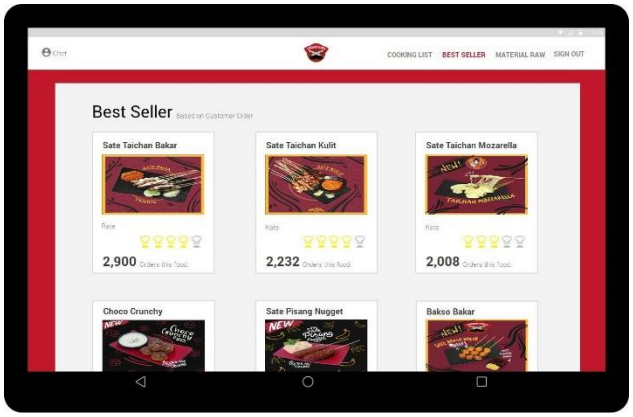

Fig. 13 Best Seller

Figure 12 on this page shows the bestselling product types sold in Taichan Kumis restaurant based on the largest number of customer orders. Orders that get the most orders, in the first show on the best seller page.

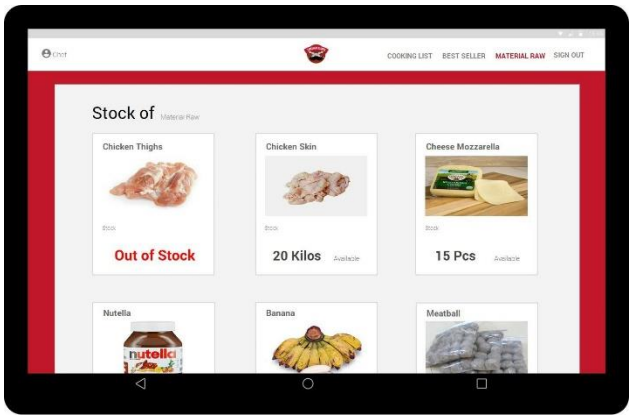

Fig. 14 Material Raw

This page shows the availability of raw materials that are still available or are out of stock.

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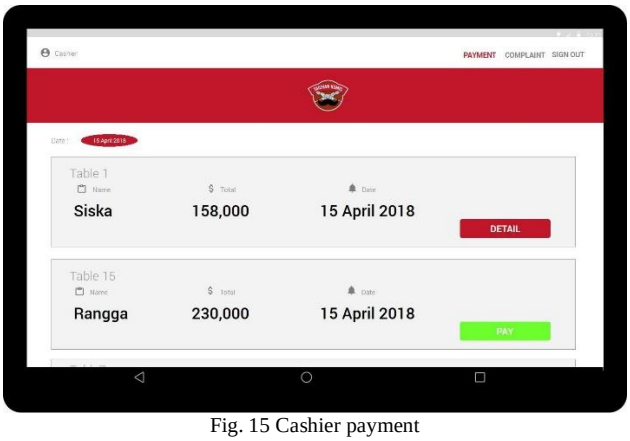

Fig. 15 Cashier payment

Figure 14 shows the total customer purchases before pay or after pay. The unfinished purchase process is marked with the PAY button that is still listed in the column.

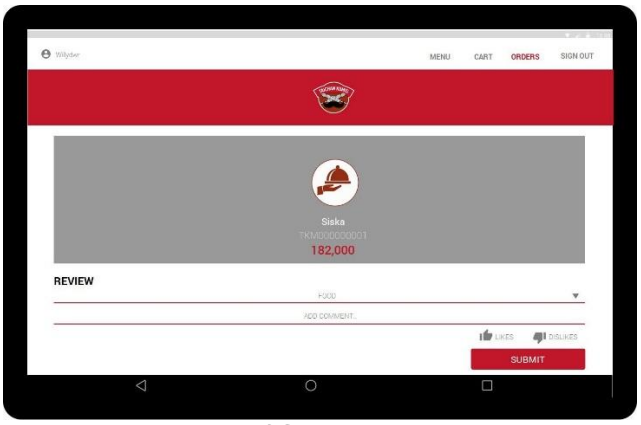

Fig. 16 Customer review

This page appears when the customer completes the transaction, then the customer can provide feedback about the cuisine, service, and comfort of the place.

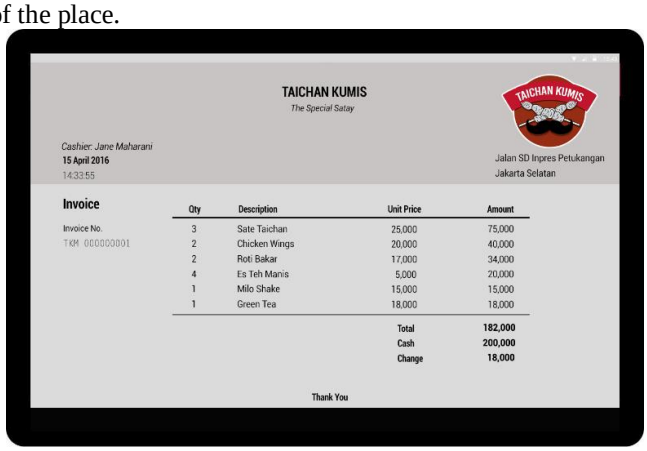

Fig. 17 Invoice

This is a customer order data invoice before printing through print machine.

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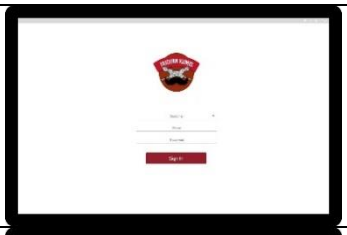
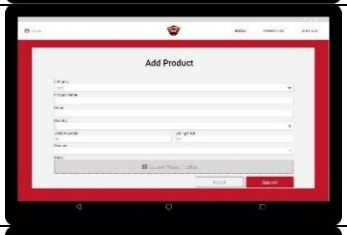
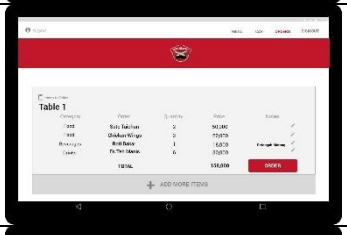
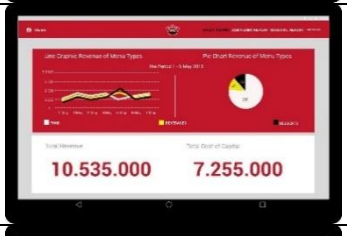
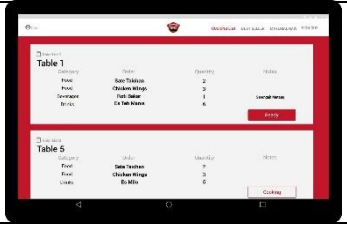
3.2 Black Box Testing

Table II. Black Box Testing

No	Purpose	Test example	Expected result	Tested by	Testing date
1	Checking the login system, running or not		Admin can login if username and password are correct Password input can use symbols	Willy	
2	Choose a type category on the dashboard		The system can execute correctly without error	Willy	
3	Select a product type category		The system can execute correctly without error	Willy	
4	Selecting and entering the number of the order		The system can record and execute correctly without error	Willy	
5	Check CRUD on product data		Product can be created, viewed, updated, and deleted The input must match the database type	Willy	
6	Checking the order's appearance		The system can display the order correctly	Willy	
7	Displays income graph		The system displays the revenue graph without error	Willy	
8	Displays customer orders on the screen in the kitchen		The system can accept customer orders correctly according to the order input	Willy	

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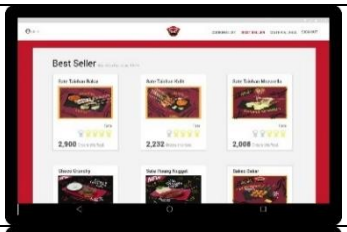
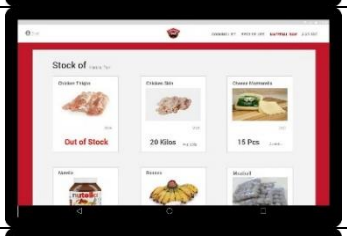
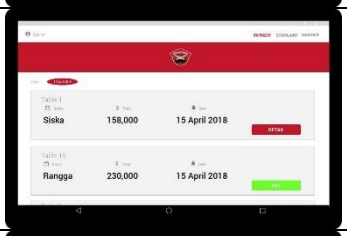
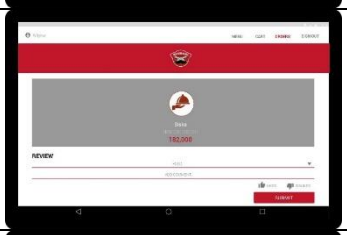
9	Displays products with highest sales		The system can display products based on the largest number of orders	Willy	
10	Displays stock of raw materials for chef		Displays stock of raw materials for chef	Willy	
11	Conducting customer payment validation process		Cashier can perform customer payment validation process	Willy	
12	Customers provide reviews about restaurants		Customers can input reviews about restaurants through apps	Willy	
13	Test print out customer order data		The system can print and count the numbers correctly		

3.4 Database

The following is a database design of the application:

Specification database

1. Database name : Taichan
   Table name : Customer
   Primary Key : -

No	Field name	Data type	Size	Information
1	id_customer	int	11	Primary key
2	name	varchar	15	Customer name
3	Password	varchar	15	Customer password

2. Database name : Taichan
   Table name : Order
   Primary Key : id_order

No	Field name	Data type	Size	Information
1	id_order	Int	11	Primary key
2	id_customer	Int	11	Foreign key
3	id_review	Int	11	Foreign key

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4	id_payment	Int	11	Foreign key
5	id_cooking	Int	11	Foreign key
6	date	date		Order date
7	quantity	int	3	Number of orders
8	payment	int	3	The price paid

3. Database name : Taichan
   Table name : Review
   Primary Key : id_review

No	Field name	Data type	Size	Information
1	id_review	int	3	Primary key
2	type	enum	-	Review type
3	review	varchar	70	Customer review

4. Database name : Taichan
   Table name : Data_order
   Primary Key : id_dataorder

No	Field name	Data type	Size	Information
1	id_data_order	int	11	Primary key
2	id_menu	int	11	Foreign key
3	id_order	int	11	Foreign key
4	quantity	int	11	Number of orders
5	total_price	int	11	Total order price

5. Database name : Taichan
   Table name : Cooking
   Primary Key : id_cooking

No	Field name	Data type	Size	Information
1	id_cooking	int	11	Primary key
2	id_order	int	11	Foreign key
3	status	enum	-	Order status

6. Database name : Taichan
   Table name : Menu
   Primary Key : id_menu

No	Nama Field	Data Type	Size	Information
1	id_menu	int	11	Primary key
2	id_datamenu	int	11	Foreign key
3	Menu_name	varchar	20	Menu name
4	price	int	11	Menu price
5	quantity	int	3	Number of orders
6	est_time	varchar	8	Estimated cooking time

7. Database name : Taichan
   Table name : Payment
   Primary Key : id_payment

No	Field name	Data type	Size	Information
1	id_payment	int	3	Primary key
2	payment_type	enum	-	Type of payment

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8. Database name : Taichan
   Table name : Data_produk
   Primary Key : id_dataproduk

No	Field name	Data type	Size	information
1	id_dataproduct	int	3	Primary key
2	id_produkraw	int	3	Foreign key
3	dataproduct_name	varchar	20	Data product name
4	Type	enum	-	Type of product

9. Database name : Taichan
   Table name : Data_raw_material
   Primary Key : id_raw

No	Field name	Data type	Size	Information
1	id_raw	int	3	Primary key
2	nama_material	varchar	20	Material raw
3	quantity	int	3	The number of materials
4	type	enum	-	Type of materials

10. Database name : Taichan
    Table name : Menu_data_product
    Primary Key : id_menudataproduct

No	Field name	Data type	Size	Information
1	id_menudataproduct	int	11	Primary key
2	id_menu	int	11	Foreign key
3	id_dataproduct	int	11	Foreign key
4	type	enum	-	Type of materials

11. Database name : Taichan
    Table name : Data_produk_raw
    Primary Key : id_dataprodukraw

No	Field name	Data type	Size	Information
1	id_dataproductraw	int	11	Primary key
2	id_data_product	int	11	Foreign key
3	id_datarawmaterial	int	11	Foreign key
4	quantity	varchar	3	Amount of data available

IV. CONCLUSIONS

Based on the results of the analysis and design that has been described above, it can be drawn conclusion that:

1. This system can accommodate to ease the user to order the menu categorized. So that, it will fasten the process of ordering food until the orders are arrived in the kitchen and also it can minimize the mistake.
2. This system can recommend the favorite menu that can be viewed by the customers who come to the restaurant for the first time.
3. The promotion in the system can minimize the budget of the restaurant, since they do not have to print the brochures to inform about promotion that is held by the restaurant.
4. The system can record sales transactions, revenue and use of raw materials and able to print daily sales reports, reports the period of restaurant sales in the process of monitoring.
5. The system can display a comparison chart of sales data for the period.

V. ADVICE

Suggestions that can be drawn for this analysis and design are possible for further system development:

1. For further development, this app can add payment methods with debits, credit cards, or top up balances using Ovo applications

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2. For further development, this application can be integrated for all types of mobile phones both iOs and android and can download directly from the user's mobile application store, so users can order food and book a place with the payment system at the beginning.
3. The system conversion suggestion uses parallel conversions, considering it avoids when a power outage occurs and the system cannot run properly.

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