DESIGN OF COMPUTER REPAIR SERVICES APPLICATION ANDROID-BASED

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A R T I C L E I N F O	ABSTRACT
	Computers are one form of advances in electronic and informatics technology; the function of the computer itself serves as a tool for writing, drawing, editing images or photographs, or as a means of storage. Android, a Linux-based operating system, is a smart operating system that can compete with operating systems on a computer. Some of the problems identified include user difficulties in overcoming computer damage to determine whether to repair or buy a new unit, difficulty in reaching authorized service providers, risks when deciding to repair at a public service place, and limited access to information and costs repairing computer damage. This research specifically designs an Android application-based computer service application that makes it easier for people to get service services. The above research results formulate computer repair services using an Android-based platform with Android Studio and MySQL as the database for this study. This application is expected to be useful for customers in terms of time and cost.
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INTRODUCTION

Information technology is increasingly advancing and developing all the time and has a crucial role in all aspects of life, one of which is for service providers, including computers [1]. Computers are a form of advances in electronics and information technology, the function of the computer itself functions as a tool for writing, drawing, editing pictures or photos, or as a means of storage [2]. The computer may encounter several problems when operating both in software and hardware. To overcome the obstacles faced, users prefer to repair the unit rather than buying a new unit. The repair itself attempts to restore the condition and function of objects or tools that are damaged due to use; in this case, the repair does not require a new condition again [3]. Sometimes some computer products on the market provide official service places that are difficult to reach so that users are reluctant to repair them, which in the end, users prefer public service places. However, some users know that if their computer is repaired in a public place, it is risky because there is no clear information on repair costs and damage information.

Android is an application with smart-phone technology that is currently being discussed. This operating system is based on a modified Linux kernel so that it is suitable for use on cell-phones or other handheld devices [4]. This system has various advantages as computer code-based software that can be openly licensed (open source) to create applications or develop them. This makes Android suitable for supporting mobile-based ordering applications [5]. If seen, on the other hand, the development of the telecommunication industry is experiencing problems in a vast territory scope with the availability of mobile broadband infrastructure, especially in Indonesia [6].

Previous research adopted was the success of system development using object-oriented vehicle service information systems at KFMP workshops that can process data, make reports easier and more efficient, and present accurate, relevant, and timely information to make management decisions [7]. The success of the weighted product method applied to the recruitment of CNC machine operators results in a more objective and accurate system [8]. Classification of damage with backpropagation neural networks on the surface of Solar Panels with

a statistical method that is applied to the Artificial Neural Network by testing samples with an accuracy of 90 percent, so it is hoped that it can be detected earlier to see the occurrence of damage from the solar panel [9].

Some of the problems identified include user difficulties in overcoming computer damage to determine whether to repair or buy a new unit, difficulty in reaching authorized service providers, risks when deciding to repair at a public service place, and limited access to information and costs repairing computer damage. With the above background and prior research, this research specifically designs an Android application-based computer service application that makes it easier for people to get service services. The above research results formulate computer repair services using an Android-based platform with Android Studio and MySQL as the database for this study. This application is expected to be useful for customers in terms of time and cost.

LITERATURE REVIEW

System design is done to describe, plan, and make sketches or arrangements of several separate elements into one complete and functional unit. Hereinafter, information system design could apply to various types of specific company industries [10,11]. Specifically, application design is a set of modeling conventions used to define or describe a software system associated with objects, as is done in the service field of computer repair. Application design is a set of modeling conventions that are used to define or describe a software system associated with objects.

Use case diagrams to explain what the system and actors will do concerning the processes in the system. In designing the use case diagram, this will explain the things that users can do [12,13]. Activity diagrams that describe the various activity flow in the system are designed, and how each system flow begins, decisions occur, and how they end [14]. Sequence diagrams are one of the interaction diagrams that explain how an operation is performed [15].

Android is an operating system for Linux-based mobile devices, including an operating system, middleware, and applications. Android provides an open platform for developers to create their applications. Initially, Google Inc. bought Android Inc., which is a newcomer to make software for smartphone phones [16]. Then, to develop Android, the Open Handset Alliance was formed, a consortium of 34 hardware, software and telecommunications companies, including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and NVidia [17].

Hypertext Preprocessor is an open source programming language that is very suitable or specifically for web development and can be embedded in an HTML thesis. PHP language can be said to describe several programming languages such as C, Java, and Perl and is easy to learn [18]. The working system of PHP begins with requests that come from web pages by the browser. Based on the URL or website address in the internet network, the browser will find an address from the web server, identify the desired page, and deliver all the web server's information. MySQL is a database containing one or several tables. A table consists of some rows, and each row contains one or some tables. The table consists of some rows, and each row contains one or some tables [18].

RESEARCH METHOD

This research method uses an approach to qualitative research. Data collection was carried out to analyze the information system running to identify users' needs whose information is obtained through observations and interviews with key-informant (user); this is because several procedures feel very burdensome for the user and admin because they still apply manual procedures.

The research methodology used and applied in this research includes (Fowler, F.J., 2004):
1. Library research is a data collection technique that is the priority.
2. Observation (field study) is a direct observation of the workplace. The goal is to find out the problem and what is needed by the community to solve the problem.
3. Literature study attempts to study all scientific findings that are documented in written form to support and strengthen arguments from new research or further research that we are currently doing [19].

After analyzing the system that is currently running, several problems were identified as follows:
1. Customers find it difficult to repair computers due to the lack of affordable service places.
2. Customers need time to do computer repair because computer repair services are far away and cannot be ordered online.
3. Customers find it difficult to find available services because of the lack of available information.
4. Admin has difficulty making reports.

The system design stage is described as a design for building a system and configuring

software and hardware components to produce a good system. The designed system becomes one component. This stage is done using a case diagram, activity diagram, sequence diagram, then the design of the interface, and implementing the system.

RESULTS AND DISCUSSION

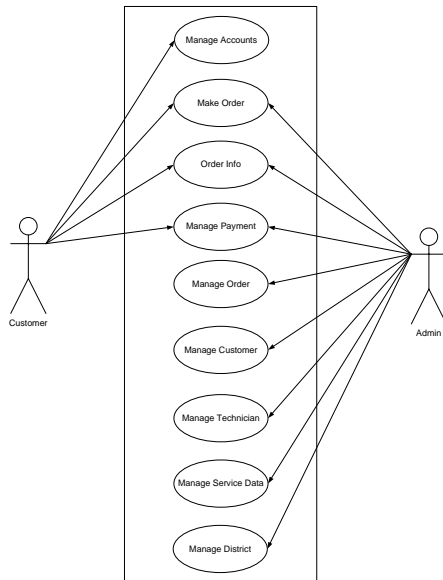Use Case Diagram of the proposed system, as follows:

Figure 1. Use Case Diagram

The following is a system description in the use case proposed:
1. Actor: Customer
   Description: Manage accounts
   a. Customers can see the admission
   b. Customers can change; if the data is changed, the customer will need a login password when changing the data
   c. If there is a field that does not suit your needs when you press the save button, it will be returned to the customer edit form with a certain error message
   d. Customers can change the old password with a new password
2. Actor: Customer
   Description: Make an Order
   Customers can place orders by filling in the required fields such as type, brand, type, complaint, date to meet, address to meet, and the customer will see the estimated price of the order
3. Actor: Customer
   Description: Customer Info
   a. When the system receives the order, the customer will get an SMS notification about the technician who will meet him. The

customer will also receive an SMS reminder on the date specified above
   b. The customer can see the status of the order he has placed
   c. If the technician has processed the unit and the customer has agreed to the price given by the technician, the customer can make a payment in the application
4. Actor: Customer
   Description: Manage Payments
   a. Orders that have been completed will send an SMS notification to make a payment
   b. There is a Payment menu, which is a menu for customers to make payments. It includes several payment methods
   c. Customers can see the status of the payment they have made
5. Actor: Admin
   Description: Manage Payments
   a. When the order is complete, the admin can see the customer's payment status
   b. There are several payment statuses in the admin menu; if the payment status is the failure or deny, the admin can confirm the customer to made a new payment for him
6. Actor: Admin
   Description: Manage Orders
   a. Admin can change, view or delete orders at any time if needed
   b. Admin can see the order list
   c. The admin can change the customer's order status to be carried out to the next process
7. Actor: Admin
   Description: Manage Customers
   a. Admin can see a list, change, and delete of customer data
   b. Admin can change customer data
   c. Admin can delete customer data
8. Actor: Admin
   Description: Manage Technicians
   Admin can see a list, change, delete, and add of technician data
9. Actor: Admin
   Description: Manage Service Data
   Admin can see a list, change, delete, and add of service data
10. Actor: Admin
   Description: Manage Area Data
   Admin can see a list, change, delete, and add of area data
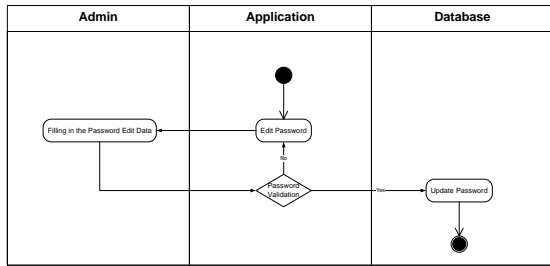   The following is the design activity diagram proposed, as follows:

Figure 2. Activity Diagram: admin change password

The following is the design of a sequence diagram for repair service applications proposed, as follows:
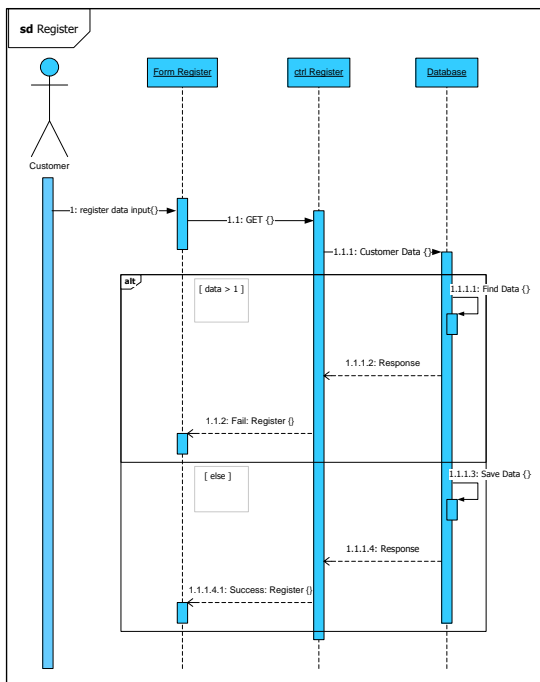

Figure 3. Sequence Diagram: customer register

In designing the application interface for ordering computer repair services, there are several screen display designs that will later be displayed in this application, including the following:

Figure 4. Splash Screen Display Design

Implementation

The Implementation Stage is an advanced stage of system design that will be carried out if the program system that has been made is ready to operate optimally according to needs, among others, is to implement interface design into the form of the main page, along with the scope of the application that used in its application [20]. Database stored in the cloud can allow users to accesses such as laptops, or smart-phones which are connected to the internet network [21]. The author uses a web view layout or a hybrid application, an application that is opened on any platform as long as the platform supports the browser, but the author uses the Android Studio software so that this application only opened on the Android platform. To meet the hardware specification standards for manufacturing this system, the following hardware specifications are required:

Table 1. Laptop Hardware Specifications

Symbol	Quantity
Processor	Intel(R) Core i7
Hard Disk	1000GB
RAM Memory	12 GB
Monitor	14"
Mouse, Keyboard	-

Table 2. Smart-Phone Hardware Specifications

Symbol	Quantity
Kernel Version	4.4.111-16139119
Android Version	9 Pie
RAM Memory	3 GB

The software used in making this system are as follows:

Table 3. Software Specifications

Symbol	Quantity
Operating Systems	Windows 10 Pro
Web Server	- Hosting Admin rumahweb.com (PHP 5.6) - Hostinger VM Database and User Hosting (Cent OS, Lampp)
Web Browser	Google Chrome
Platform	Android Studio 3.2.1 Visual Studio Code 1.35.1 Visual Paradigm 15.2 PHP Maker 2017 Balsamic Mockup Codeigniter Framework Cyberduck FTP Xshell Midtrans payment gateway (free) Medansms SMS gateway (free)

Here are some interface in this application:
1. Splash screen display

Figure 5. Splash Screen

The splash screen display design describes the initial appearance of the application, which contains the store logo when a new application is run.
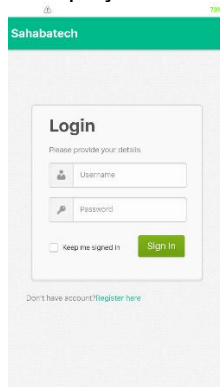
2. Login member display

Figure 6. Member Login Form

The login form display is the initial display after the splash screen for users to log in with their account
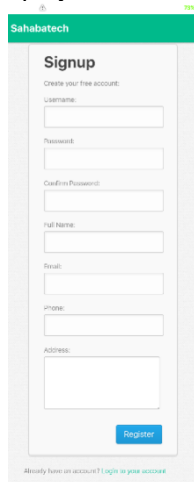
3. Member list display

Figure 7. Member List Form

Member list form to register new users using this application
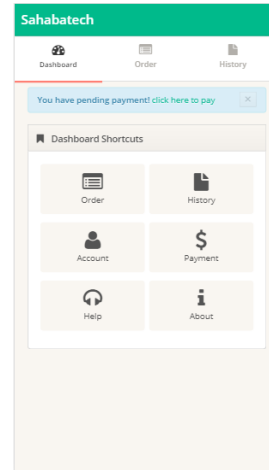
4. Main display

Figure 8. Main Page

The main page is an application shortcut key. This page contains main page shortcuts such as order, history, account, payment, help, and about for admin.
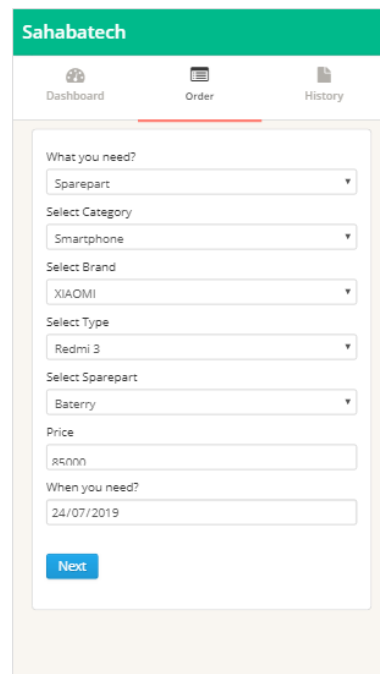
4. Service ordering display

Figure 9. Merit Order Form

The order form for reserving services determines the need, date, and determines

the complaint of damage, and determines the address to meet.

At this stage, it is a process that is used in conducting a test analysis to suit the user's requirements. The program tested to determine possible errors in this test using White-Box and Black-Box.

Table 4. Admin Black-Box Testing

Activity	Testing Scenarios	Expected Results	Conclusions
Login	Clear fields	Login failed!	Valid
	Fill in only the Username	Login failed!	Valid
	Fill in only the Password	Login failed!	Valid
	Fill in the Username and Password wrong	Login failed!	Valid
	Fill in the Username and Password with the registered account	Enter the Dashboard Menu	Valid
User management	Add user data		
	(the fields to be filled in are incomplete)	Failed to add user data and displays the message "Please enter required field"	Valid
	(completely filled fields)	Successfully added users and returned to the user list menu	Valid
	(edit user by clicking the pencil icon then enter the 'Edit' menu, after editing and click 'Save')	The edit was successful and returned to the user list menu	Valid
	(delete User by clicking the trash icon then the user will be deleted)	Delete successfully and return to the user list menu	Valid
Technician Management	Add technician data		
	(the fields to be filled in are incomplete)	Failed to add technician data and displays the message "Please enter required field"	Valid

Activity	Testing Scenarios	Expected Results	Conclusions
	(completely filled fields)	Successfully added technicians and returned to the technician list menu	Valid
	(edit technician by clicking the pencil icon then enter the 'Edit' menu, after editing and click 'Save')	The edit was successful and returned to the technician list menu	Valid
	(delete technician by clicking the trash icon then the user will be deleted)	Delete successfully and return to the technician list menu	Valid
Order Management	If there is a new order and click the "accept" button and then the "save" button by entering the technician's name	Redirected to the page to confirm receipt of the order, the order status becomes "waiting."	Valid
	If there is an order with a "waiting" status and has entered the time for COD, click the "process" button	Redirected to the page for confirmation of order processing and order status to "process" and also able to print travel documents	Valid
	If there is an order with the status of "process" and then the technician in question provides the completed passport, then click the "Finish" button and redirected to the page to confirm completion of the order and then fill in the fields with the reference letter of travel	Redirected to the order list page, and the order status is complete	Valid

Activity	Testing Scenarios	Expected Results	Conclusions
	Edit the order by clicking the "Pencil" button, redirecting to the edit page and, then editing it as needed then clicking the save button	Redirected to the order list page and the order status changes as changed	Valid
	Delete orders by clicking the "trash" button	Redirected to the order list page and the order was successfully deleted	Valid

Table 5. User Black-Box Testing

Activity	Testing Scenarios	Expected Results	Conclusions
Login	Clear fields	Login failed!	Valid
	Fill in only the username	Login failed!	Valid
	Fill in only the password	Login failed!	Valid
	Fill in the username and password wrong	Login failed!, display the message "Gagal! Username atau password salah"	Valid
	Fill in the username and password with the registered account	Successful Login displays the message "Success! Anda berhasil masuk"	Valid
Account	Edit Account by leaving the fields blank	Cannot click the "update" button with focus on an empty field	Valid
	Fill in only one of the fields in Edit account	Cannot click the "update" button with focus on an empty field	Valid
	Fill in the correct field on the Edit account	Successfully updated account data	Valid
Password	Edit Password by leaving the fields blank	Cannot click the "update" button with focus on an empty field	Valid
	Fill in only one of the fields on the edit password form	Cannot click the "update" button with focus on an empty field	Valid
	Entering the password	Failed to update	Valid

Activity	Testing Scenarios	Expected Results	Conclusions
	and confirming the password is not the same in the Edit password field	password and displays the message "Gagal! Password tidak sama"	
	Fill in the password and confirm the password is the same but the Old password is wrong in the Edit password field	Failed to update password and displays the message "Gagal! password salah"	Valid
Order Form	Clear fields	Cannot click the "submit" button with focus on an empty field	Valid
	Fill in only one of the Request Order field	Cannot click the "submit" button with focus on an empty field	Valid
	Fill in correctly on the Order Request field	Successfully sent an order request and display the message "Berhasil! Akan kami proses!"	Valid
History	Click the "search" icon	Displays the details of the history	Valid

White-Box testing focuses on checking design details. Thus the White-Box testing is based on the source code of the system, which fully uses structural requirements.

Based on the test results, with the above test cases, it can be concluded that the application created is free from syntax errors and functionally produces results that the user expects.

CONCLUSION

With the use of an Android-based computer repair service ordering application design, the authors can conclude that: (1) The mobile applications will be able to shorten customer time in performing computer services and streamline customer time. (2) This mobile application can display the estimated cost to estimate the damage or spare parts customers need. (3) With this computer service mobile application with a dynamic display of computer service via a smartphone, it will make it easier for users to order computer services.

Suggestion for this research that: (1) this application add direct notifications to the technician to speed up the service waiter. (2) this application does not cover a large area, so only customers in certain areas can only use this application. (3) this application is basically web-based, so this application completely requires a connection to the internet.

ACKNOWLEDGMENT

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