Development of Motorcycle Workshop Reservation Application at Wahyu Motor, Godean

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ABSTRACT

The accumulation of queues at the workshop becomes a problem when motorized vehicle users who will service their vehicles come simultaneously. Therefore, the development of the application is expected to minimize the buildup of queues. So as to facilitate and reduce the waiting time of the community members who will service their motorized vehicles. The research method used uses a waterfall model. Users who use the application can log in, then choose what type of service they want and fill in complaints or additions if needed. The application runs on the Android operating system, which runs on mobile devices. Testing of the application is carried out using blackbox testing and user acceptance testing. The test results obtained were in accordance with what the testers wanted. It is hoped that the presence of the application can facilitate, ease, and shorten the number of users who will service their vehicles.

General Terms

Android Studio, Kotlin, MySQL

Keywords

Reservation, Workshop, Web-based, Mobile-based Application, Booking Application

1. INTRODUCTION

The increasing population in Indonesia makes the mobility of citizens even higher. Many citizens buy motorized vehicles, especially those with two wheels. Motorbikes are motorized vehicles with two or three wheels without houses [1]. Sales of two-wheeled vehicles from dealers are increasingly inversely proportional to motorcycle service workshops. As a result, the buildup of queues at the workshop is unheeded.

The more a motor vehicle is used, the more its engine components will wear out and need to be replaced. If these components are not replaced, the service life of the vehicle engine is reduced, and it can even cause fatal damage. However, consumers who own vehicles are not just one or two; in the end, there is a considerable queue if consumers go to the repair shop at the same time.

Problems during motorcycle maintenance or service arise when the queue of vehicles builds up. Factors that can occur are caused by several things, including the number of visitors greater the number of mechanics, the length of time in the unknown service process, and the arrival of visitors to the workshop at the same time. The emergence of these problems can occur because a system has not been implemented that can notify visitors of the number of queues at the motorcycle workshop, thus causing the accumulation of the number of visitors at the workshop during motorcycle service [2].

Developments in information technology today can make it easier for agencies or companies to process work data, which ultimately produces accurate information easily and efficiently [3]. Until now, the development of information technology has been accessible through various platforms, not only computers but also mobile devices such as smartphones. The development of an application system can be utilized as a means of solving problems that occur in workshops by developing a system that can be used as a medium of information for motorcycle service queues at workshops with Android-based smartphone devices. With the development of related applications, visitors can register service queues and monitor the number of queues. So that the number of queues at the workshop can be minimized and visitors can estimate the time to arrive at the workshop [2].

Applications belong to a subclass of computer software that uses direct computer capabilities to perform tasks as desired by the user. Applications are developed to simplify certain tasks or jobs, such as data usage, data addition, and application [4]. In using the application, it involves mobile hardware in the form of a smartphone based on the Android operating system. The system is based on modifying the Linux kernel with open-source devices so that application developers can develop their own applications and run them anywhere [5].

The development of reservation applications has been widely developed and utilized so that queues at workshops can be minimized and visitor time can be increased. Research that has been done before includes developing an application related to online booking at an Android-based motorcycle workshop, and the results of this development can be used to shorten visitor time at the workshop [5]. Developed a service booking application at a car repair shop that can be implemented to facilitate data collection [6]. Designed a service booking program at a web-based car repair shop that can be implemented [7]. Developed a motorcycle service application, and the development can be implemented [8]. Designed a service booking and scheduling application, and the application can be implemented [9]. Designed a motor vehicle service application, and in this design, the developed application can be implemented and can solve existing problems [10]. In designing an android-based service reservation information system, one can place orders and can monitor service queues in real time [11]. In designing a motorcycle service information system can be implemented [12]. Designed a registration system application at a workshop with a website-based home service that can be used and implemented [13]. In the booking service information system design, the system can be implemented and used [14]. Implement an information system about online booking services with a web base to produce an online booking application that can be implemented and used [15]. Designed applications related to web-based online service booking systems that can be implemented and used [16].

Based on the previous explanation, there is still a lack of maximum use of platforms in previous research, namely, still focusing on one platform between using smartphones only or

web-based applications only. In developing web-based applications, a web server is needed, which is the software backbone of the world wide web. The server will process client requests and then be processed, which generates data and is sent back [17]. To speed up the web development process, it can utilize a framework. The framework used is CodeIgniter, which is a web-based application framework that utilizes the concept of MVC (model, view, controller). Developing web applications by utilizing the CodeIgniter framework does not require program creators from scratch because the framework has provided a library of functions that can be used, so that application creation can be done quickly and easily [18]. The language used in developing web-based applications with the CodeIgniter framework is the PHP language [19].

Based on the analysis of the obstacles or problems faced, the motorcycle workshop reservation application was developed. The advantages of the resulting product are that users can monitor and make reservations via their respective smartphones, and workshop owners, as admins, can monitor via the web and can collect data via the web. The results obtained from the development of related applications can reduce the number of queues at the workshop and facilitate workshop owners in recording workshop activities better than before, which is still manual.

2. RESEARCH METHOD

The method for developing related applications utilizes the System Development Life Cycle (SDLC) Waterfall model. This model is sequential in nature, which means that after the completion of one set of activities, it will lead to the start of the next. The stages of the work or process are shown in Figure 1.
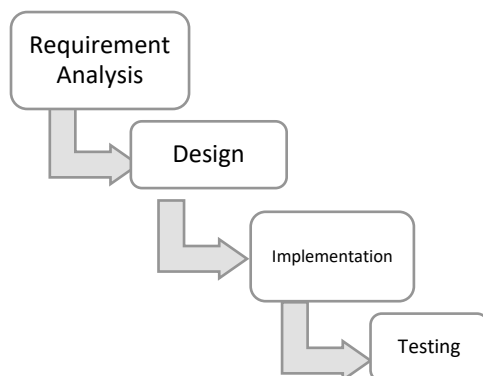

Figure 1 Waterfall Model

In the waterfall model, it involves several stages, including the following:

2.1 Requirement Analysis

In this stage, the process carried out is to identify the software requirements needed in order to determine the description of the system during development to find out the problems, obstacles, and opportunities that arise and the needs required, so as to get a solution. Requirements analysis is divided into two categories: system requirements, which can be in the form of hardware and software, and user requirements. System requirements are an analysis of the minimum hardware or software needed in application development. User requirements are an analysis related to interaction, behavior, and application data flow carried out by users.

In conducting related research, the hardware or hardware utilized by researchers includes:

- Laptop brand ASUS A455LF with specifications of Intel Core i5-5200U 2.20GHz processor, 12GB DDR3 RAM memory, 512GB SSD, and 500GB HDD.

- POCO X3 NFC smartphone with Snapdragon 732G chipset, 8GB RAM, 128GB internal ROM.

In conducting related research, software or software utilized by researchers, among others:

- Laptop using Windows 10 operating system

- Smartphone using Android 12 operating system

- Web browser (Google Chrome, Mozilla Firefox)

- Text editor utilizing Visual Studio Code

- Android Studio IDE

- XAMPP v3.3.0

- CodeIgniter framework

2.2 Design

In the process of developing related applications, it is necessary to design the process or stages of work. This is the stage after system analysis, where the system components to be developed are designed in advance according to user needs. The design includes:

2.2.1 System Architecture

The following is the system architecture of the motorcycle workshop reservation application that was built:
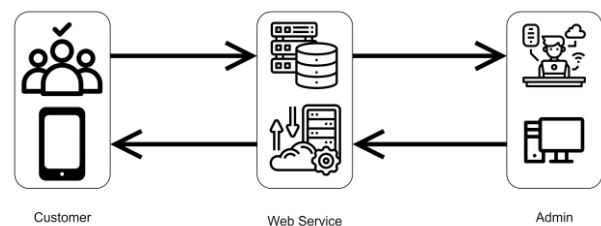

Figure 2 System Architecture

There are three interaction components that can be seen in Figure 2. The first is the user as the application user; the second is the web service that connects the user with the admin; and the third is the admin as the system manager. The process that occurs between the three components is that when the user sends a request in the form of a queue number, the web service will send it to the admin. Then, the admin receives a request, and the response is sent to the user through the web service intermediary.

The motorcycle workshop reservation application based on Android is a mobile application that can be used by visitors to register for service at a workshop, where the data is sent to the web workshop reservation application through a web service intermediary by utilizing the API. In the first view of the application, the login page will appear. Visitors who will make reservations can log in first by entering their username and password. If the visitor does not have an account, then the visitor can create one first by pressing the sign-up button. After a successful login, visitors can select the type of service and make a motorcycle workshop reservation.

The website motorcycle workshop reservation application is an application system that can be accessed through a browser. In use, the application is used by the workshop administrator. The workshop admin acts as a monitor and confirmer of service

status, and the admin can register visitor accounts. When the admin registers an account, an account will be created containing a username and password that will be given to visitors so that they can log in to the Android motorcycle workshop reservation application system.

2.2.2 Data Flow Diagram

A data flow diagram is a diagram in which it contains an image of the flow of data in an information system process. The data flow diagram also contains information related to input and output in each entity and process that occurs, as shown in Figure 3 below.
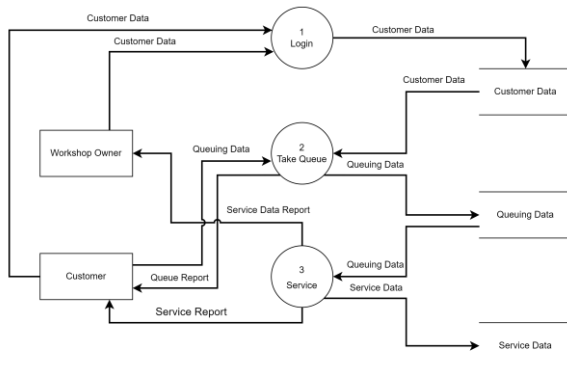
Figure 3 Data Flow Diagram

There are three data stores, namely customer data, queue data, and service data. The functions of the data store are:

2.2.2.1 Customer Data

Customer data stores information about customer identity, which consists of customer ID, username, password, name, address, telephone number, and email.

2.2.2.2 Queue Data

Queue data stores information about customer queues, consisting of queue ID, service type, and complaint.

2.2.2.3 Service Data

Service data stores information about services that contain a service ID and a customer ID.

The motorcycle workshop reservation system has three processes: the login process, taking the queue, and service. The processes in the DFD above are as follows:

Login

In this process, visitors, as mobile users, login using the username and password that have been created. Account creation can be done by the workshop owner as an admin. After the customer enters the username and password, the system verifies the data to determine whether the visitor's account is correct or not. If the account is correct, then the customer can enter the system and will be directed to the main page.

Take Queue

In this process, visitors who have successfully logged in can enter the service queue. Visitors can choose what type of service they want.

Service

After the queue-taking process is complete, the visitor waits for the service process. If previously there was a queue, visitors who have just taken the queue will automatically have a pending status until it is done by the mechanic and changes are made.

3. IMPLEMENTATION

3.1 Implementation result

Based on the analysis and design that have been done previously, this stage produces a motorcycle workshop reservation application system. The interface results from the implementation of the application, which has been made as follows:

3.1.1 Android Visitor Login Page

Figure 4 Login Page

Figure 4 shows the results of the login implementation that is displayed when the visitor first opens the Android application. On that page, there is a form that must be filled out in the form of a username and password and a login button. If visitors do not have an account, they can register first by clicking the register button.

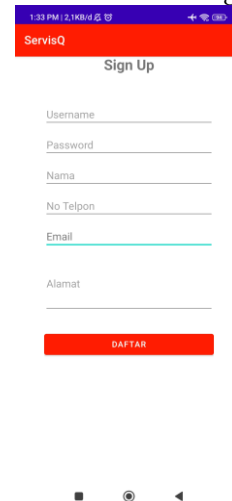### 3.1.2 Android Visitor Account Sign-Up Page

Figure 5 Sign-Up Page

Figure 5 above shows the results of the implementation of the new visitor account registration page. The page consists of a form in the form of username, password, name, telephone number, email, and visitor address. At the bottom, there is a register button. If the form has been filled out correctly, the visitor can register a new account.

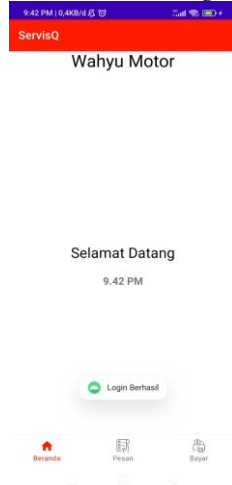### 3.1.3 Android Visitor Home Page

Figure 6 Visitor Home Page

Figure 6 shows the results of the implementation of the main page for Android visitors. At the bottom of the main page, there is navigation. Navigation to the main/home page, navigation to the message page, and navigation to the pay page.
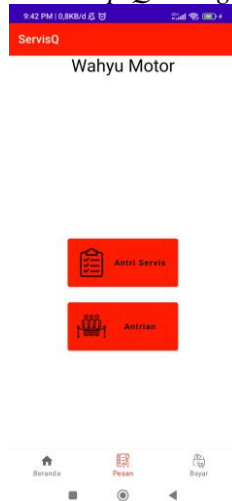
3.1.4 Android Workshop Queuing Page

Figure 7 Workshop Queuing Page

Figure 7 shows the implementation results of the workshop queue message page. The page has two buttons, namely service queue and queue. The service queue button will switch to the workshop service queue list page if pressed. The queue button will switch to the queue information page and service status if pressed.

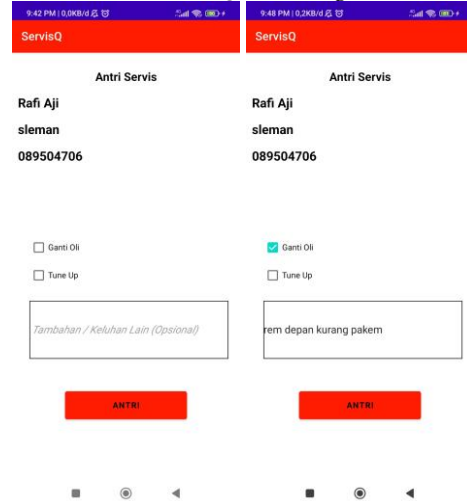### 3.1.5 Android Service Queue Page

Figure 8 Service Queue Page

Figure 8 shows the results of the implementation of the workshop service queue page. The workshop service queue page displays vehicle owner/visitor data, service type, and an optional complaint form, which can be filled in or left blank. Then, at the bottom of the workshop service queue page, there is a queue button. If the data is correct and the desired service has been filled in, then the button can be pressed to register the service queue.

3.1.6 Android Queue Page

Figure 9 Queue Page

Figure 9 shows the implementation results of the queue page. The queue page displays the workshop queue number and service status. If the visitor has not registered for the queue, then the page does not display the queue number and service status. The queue number and service status will appear if the visitor has registered for service on the service queue page. Service status can be updated by the workshop owner or admin through the service page on the web.

3.1.7 Web Visitor Data Page

Figure 10 Web Visitor Data Page

Figure 10 shows the implementation results of the web visitor data page. The visitor data page can be accessed by the workshop owner or admin via the web. The page displays visitor data along with the registered visitor account.

3.1.8 Web Visitor Data Sign-Up Page

Figure 11 Web Visitor Data Sign-Up Page

Figure 11 shows the results of the implementation of the added web visitor data page. The addition of visitors can be done by the admin via the web. On the visitor addition page, there is a form in the form of username, password, name, telephone number, email, and visitor address. After the data is filled in, the account that has been created can be used by visitors as a login in the Android application.

3.1.9 Web Queue Page

Figure 12 Web Queue Page

Figure 12 shows the implementation results of the web queue page. The page displays the workshop queue, where there is a display of the vehicle owner's name, telephone number, address, service type, complaint, and service status action button. The queue page is accessed by the admin or workshop owner. The service status action can be selected according to the state of the vehicle at the workshop. If the vehicle is newly

queued, the status will be automated to wait; when the vehicle has been worked on, the admin can select work; or if the vehicle is canceled, the admin can select the cancel button. If the vehicle is finished being serviced, then the admin can select finish, and the status is sent to the Android application so that the owner or visitor can monitor his vehicle to see if it has been serviced.

4. TESTING

4.1 Blackbox Testing

Blackbox in related research is carried out by running the module in the motorcycle workshop reservation application, and the results of the module are observed to determine whether they are as desired. Testing the application is based on the details contained in it, including the appearance of the application interface, the functions contained in the application, and the regularity of the desired process flow. At this stage of testing, do not see and test the source code in the program.

4.1.1 Initial Module

In the initial process, the customer logs in through the login page. Customers use a username and password to log in to the application. Account creation can be done by the admin or workshop owner. If you already have an account, then customers can log in and use the application.

Table 1 Testing SplashScreen and Login Page

Test Scenario	Expected Result	Test Result	Conclusion
Entry SplashScreen	Can display a splash screen with a logo and text "ServisQ"	As Expected	Valid
Login Page	Can display the login page with logo, username input, password input, login button	As Expected	Valid
Fill in the wrong username or password input	The system issues a "wrong username or password" warning	As Expected	Valid
Fill in the username and password correctly	Enter the main page and display a successful login toast	As Expected	Valid

4.1.2 Main Page Module

On the main page of the scenario to be tested, there are two buttons. The main page displays interactions after successfully logging in at the previous stage. The main page displays two buttons, namely the service queue and queue buttons.

Table 2 Testing the Main Page

Test Scenario	Expected Result	Test Result	Conclusion
Click the service queue button	Enter the service queue page	As Expected	Valid
Click the queue button	Enter the queue page and display the queue	As Expected	Valid

4.1.3 Service Queue Page Module

On this page, visitors can enter the type of service and complaints about the vehicle, if any. Then there is also a text view where the customer's name, address, and telephone number are written. At the bottom, there is a queue button.

Table 3 Testing the Service Queue Page

Test Scenario	Expected Result	Test Result	Conclusion
Enter the service queue page	In the text view above, the customer's name, address, and phone number are written	As Expected	Valid
Selecting the service type checkbox	Checkbox can be selected one or both at once	As Expected	Valid
Entering text into the complaint textbox	he textbox can be filled with text	As Expected	Valid
Not selecting both checkboxes then click queue	The system will not process the queue	As Expected	Valid
Not filling in the complaint text and filling in one or both checkboxes	he queue can be processed because the complaint can be empty (optional)	As Expected	Valid
When filling in correctly and click the queue button	The queue can be processed then return to the main page and display a successful service queue toast	As Expected	Valid

4.2 User Acceptance Test

In the related user acceptance test, there were 11 respondents who were given the opportunity to use the application that had been developed and asked to answer several questions presented in the form of a questionnaire. In each answer, there are weighting criteria, which can be seen in Table 4 below.

Table 4 Weighting Value Criteria

Answer	Description	Weight
SA	Strongly Agree	5
A	Agree	4
N	Neutral	3
D	Disagree	2
SD	Strongly Disagree	1

Table 5 User Acceptance Test

Question	Assessment					Actual Score	Ideal Score
	SD	D	N	A	SA		
Does the developed application work as it should?				5	6	50	50
Is the information presented in the application easy to understand?				6	5	49	50
Is the application easy to use?				7	4	48	50
Does the developed application make it easier for you to reserve a motorcycle workshop?				6	5	49	50
Total	0	0	0	96	100	196	200

Based on the results of user testing in Table 5 above, the percentage of test scores can be calculated by dividing the actual score by the ideal score using Equation 1 below.

$$Percentage\ of\ test\ values = \frac{Actual\ Score}{Ideal\ Score} \times 100\%$$

$$= \frac{196}{200} \times 100\% = 98\% \quad \textbf{(1)}$$

From the calculation results in the User Acceptance Test above, the percentage value of the test shows that the function and usefulness of the application developed gets a value of 98% out

of 100%, and it can be concluded that the application works well.

5. CONCLUSION

Based on the results, discussion, and testing of the applications that have been carried out, the Motorcycle Workshop Reservation Application can function and be used for workshop reservations. The proof is that reservation orders from customers appear on the admin's display, and the admin can provide actions to existing reservations. The results of the test also show results that are in accordance with what is expected by the tester.

In future development, relevant features can be added, such as updating orders, editing orders, and adding payment gateway features.
As well as the user profile update feature and security in the application, which can be improved even more.

6. ACKNOWLEDGMENTS

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