Utilization of Android Technology in an Integrated Information System for Car Booking Service

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ABSTRACT
Mobile devices have become a widespread phenomenon globally, with 67% of Indonesia's population adopting them. Android, a Google-developed operating system, is dominating the market due to its Open-Source nature, variety of applications, integration with Google services, and user flexibility. Android-based devices have evolved into personal assistants capable of taking photos, recording video and sound, creating documents, and storing data efficiently. Information technology has penetrated various sectors, including education and industry. In the industrial sector, businesses like repair shops can optimize transaction management by utilizing internet and information technology. To overcome challenges in system management, an Android-based car service booking information system is planned. This system will simplify service booking transactions, provide accurate spare parts information, and present sales reports for related party analysis. The application is built using Kotlin programming language and MySQL as a database. The system development phase includes a Data Flow Diagram (DFD) design phase, physical design, and database management system (DBMS) with MySQL.

General Terms
Android

Keywords
Android, Booking Servie, Database, Website

1. INTRODUCTION
The use of mobile devices has become a widespread phenomenon around the world, especially in Indonesia. According to data from the Central Bureau of Statistics, around 67 percent of Indonesia's population has adopted mobile devices [1]. This fact reflects the rapid growth in mobile device technology, which in turn has a significant impact, especially in improving effectiveness [2] and efficiency [3], especially as a communication tool that supports various daily activities. Android, as a mobile operating system developed by Google, currently dominates the market thanks to its Open-Source nature [4], the variety of applications available [5], its integration with Google services, and the level of user flexibility [6].

The advantages of Android-based mobile devices are not limited to communication functions [7]. They have evolved into personal assistants capable of taking photos, recording video and sound, creating documents, and storing data with efficiency [8]. This reflects the evolution of mobile devices not only as communication tools, but also as multifunctional tools that support various daily needs of users. The development of information and technology has also penetrated various sectors, including education, industry, and other sectors [9].

In the industrial sector, some businesses, such as repair shops, still adopt old ways in their business processes, including manual recording of transactions using books. With the development of information and technology today, transaction management in workshops can be optimized by utilizing internet and information technology. The use of information technology aims to simplify transactions and process information efficiently.

Vehicle service companies and auto parts sales face challenges in system management. Based on research, the operational process starts from customers using vehicle services and managing spare parts sales data according to the services provided. Unfortunately, data management is still done manually by recording in the sales book without periodic sales reports, which can lead to stock-outs. To overcome this, the development of an Android-based car service booking information system is planned, which will provide convenience in finding spare parts information, facilitate payment transactions, and simplify service data processing for monthly financial reports. The goal is to simplify service booking transactions, provide accurate spare parts information, and present sales reports for related party analysis.

2. RESEARCH METHOD
This application is built using the Kotlin programming language and MySQL as a database that stores application data on the server. The application system architecture can be seen in Figure 1.

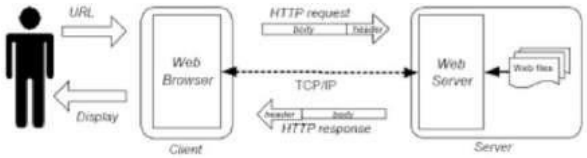


Fig. 1 Application System Architecture

2.1 System Development
In the system development phase, there are three main components that play different roles: the design phase to design the appearance of the application, the Android application as the frontend, and the database system that serves as the backend for data storage and data automation. The design of this application is developed using a Data Flow Diagram (DFD), followed by a physical design that includes designing the physical design of the Database Management System (DBMS), with MySQL as the DBMS used in this system [10]. Data Flow Diagram is a data logic model created to describe the origin and destination of data leaving the system, where data is stored, processes that generate data, and interactions between stored data and processes applied to that data [11].

Confidentiality analysis on DFD supports information flow control and access control, which are commonly used confidentiality mechanisms. Meanwhile, a Database Management System is software that is responsible for managing and executing queries on a database. DBMS software is used to manage databases effectively and efficiently, from the initial creation of the database to daily operations such as input, editing, deletion, report generation, and so on [12]. Relational DBMS

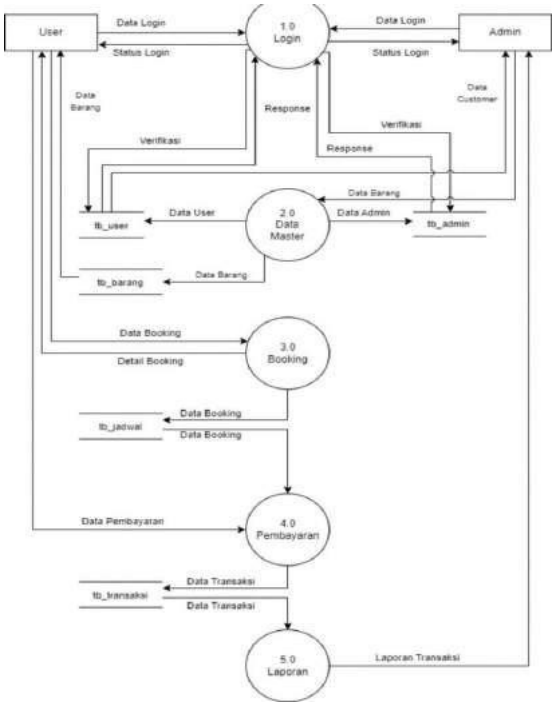
systems (RDBMS) describe data in the form of interconnected tables.

1. Context Diagram

The context diagram models the input and output flow of the application as a whole and describes all the elements or scope that can provide an overview of the system.

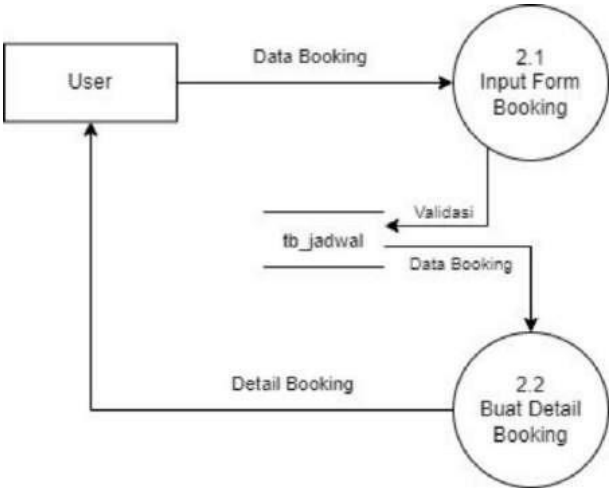
2. Data Flow Diagram level 1

Data Flow Diagram level 1 describes the entire process that occurs in the application, where customers can login, order, make payments, and the admin will receive reports.



3. Data Flow Diagram level 2 Booking

Data Flow Diagram level 2 booking describes how customers make reservations on the application by inputting a booking which then the customer will get a booking schedule, then the admin can accept the booking.



4. Data Flow Diagram level 2 Pembayaran

Data Flow Diagram level 2 Payment describes the admin can access and manage all system data. As for users or customers who can make payments by logging in and filling out the payment form first.

2.2 Wireframe Designing

Wireframe is an initial design or design framework of a system that is carried out before making a product and will be implemented in the application to be built [13]. The following is a wireframe display design for the mobile application:

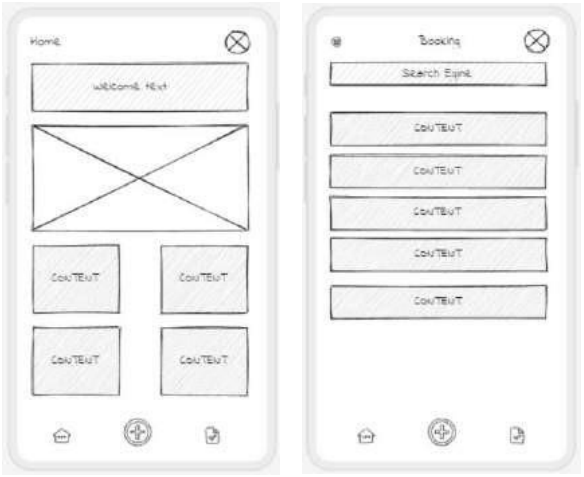


Fig. 2 Wireframe Desain for Mobile System

Here's a wireframe display design for the admin on the web:

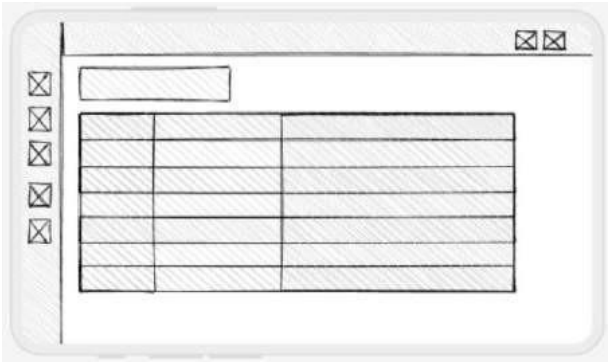


Fig. 3 Wireframe Desain for Website System

3. RESULT AND DISCUSSION

3.1 Assumption

The application users consist of two main groups, namely car repair shop customers who could operate smartphones, and workshop admins who can operate computers. The app's functionality allows customers to place service orders and make payments online, providing ease and convenience in the transaction process. On the other hand, the admin has an important role in receiving and confirming orders submitted by customers through the application, ensuring the smoothness of the booking process, and ensuring the delivery of services in accordance with customer requests. Thus, this application is designed to meet the needs and convenience of both car workshop customers and workshop admins.

3.2 Features

This application has several features that will be explained in the table below:

Table 1 Features Mobile App

No	Actor	Description
1	Customer	Log in, register, book, view item list, view orders, view latest information, and exit the app.
2	Employee	Log in, view accumulated orders, add service data, view customer data, add customer data, view booking data, edit booking data, view available item data, and view report data.

3.3 System Result

This application is the result of development using two programming languages, namely Java and Kotlin, with the support of Visual Studio Code as a development environment. By using this application, users can enjoy various features that have been described previously. One of the main advantages is the ability to perform a data input process that is directly connected to the database via the internet network. This feature allows customers to utilize the application to place orders for automotive spare parts easily and efficiently, creating a more comfortable user experience and real-time connection with the services provided.

1. Android App Results

3.3.1 Login and Register View

The login and registration page functions for customers who do not have an account or want to be able to access the system by logging in, by filling out the form or if they already have an account, inputting a username and password.

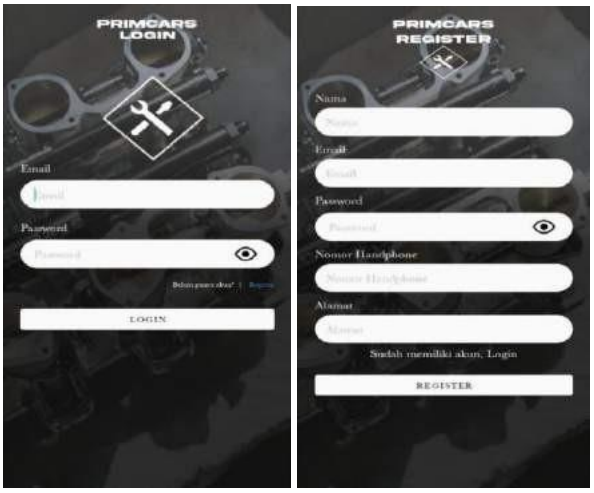


Fig. 4 Login and Register View

3.3.2 Dashboard View

The main page will appear When the login and registration process is successful, this page displays the application features.

Fig. 5 Dashboard View

3.3.3 Booking View

On the booking page the user can make a booking for service purposes. This page contains a form that must be filled in by the user according to the vehicle owned. Users must fill in each form requested as an identity, listing on the form in the form of vehicle type, vehicle number, purpose, and booking date.

Fig. 6 Booking View

3.3.4 Data Sparepart View

Sparepart is useful for displaying the availability of vehicle spare parts that are still available at the workshop.

Fig. 7 Data Sparepart View

3.3.5 Data Payment View

On the view page the user can make payments and see if the payment made has been successful. If the user has successfully made a payment, then the application will display a successful payment status, otherwise if the payment made fails then the application will display a pending payment status.

Fig. 8 Data Payment View

3.3.6 Information View

The Information page contains information about the workshop. To build trust with customers displaying company information is one way. Which in this feature displays the address and location of the workshop.

Fig. 9 Information View

Display a version of the website for employees.

3.3.7 Dashboard View

The dashboard page will be displayed after a successful login. This page displays several features and displays some information that refers to the managed data, such as the number of daily bookings, and the accumulation of all income which will be depicted using a graph.

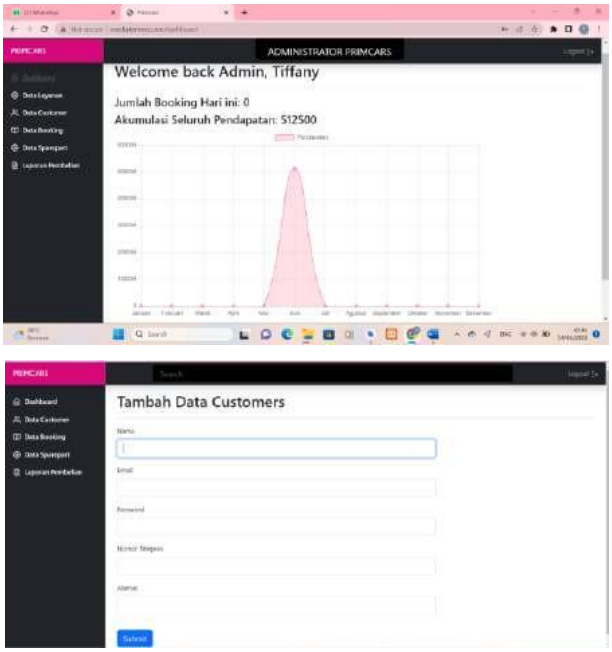


Fig. 10 Dashboard View Web

Other features that can be used by employees include inputting item data, viewing customer data, confirming payments, etc. Here are some views of the website version for employees.

Fig. 11 Other Features Web System

4. DISCUSSION

Developing software applications is a complex process that requires careful design and attention to detail. As has been done in the creation of this application, the selection of appropriate tools and technologies is crucial to ensure that the software runs efficiently and reliably. For example, the design stage, the use of the Kotlin programming language, and the decision to use the MySQL Database in the construction of the Android application and Website, are all very important factors in determining the quality of the software.

Overall, the software development process requires careful planning and attention to detail. The selection of the right tools and technologies has a huge impact on software performance and reliability. This article emphasizes the importance of thoroughly testing software to ensure optimal quality and reliability.

5. CONCLUSION

This research aims to develop a service booking application at a car repair shop, allowing customers to make bookings online, while employees can easily perform data collection and confirmation. The system consists of three main components: design, Android application and website as frontend, and MySQL database system as backend.

The software development process requires careful planning and selection of the right technology to ensure optimal quality and performance. Therefore, the use of the right tools and technology is the main key in achieving satisfactory results in software development.

Hopefully, this system can be adopted in various workshops to improve the interaction between customers and service providers. With this application, it is expected that customers can more easily book services in various conditions, creating a better experience in the relationship between customers and service providers in auto repair shops.

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