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DESIGN AND DEVELOPMENT OF AN ANDROID-BASED DELIVERY ORDER SERVICE APPLICATION FOR LAMONGAN DELIVERY

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ABSTRACT

Delivery order services are a popular way of having goods delivered. Besides making it easier to get the desired order, they can also help increase company sales, because in modern times people tend to prefer having goods delivered to their homes rather than buying directly at the point of sale. These ever-growing developments and capabilities have created a trend in which activities usually done on computers are now also done on mobile devices, including transactions over the internet, which has given rise to the term *online delivery order*. In this study, the author builds an Android-based Delivery Order application that helps promote the Lamongan Delivery courier service and thereby expands the reach of its services. The process began with observation, a field research method, to determine what information needed to be identified. Test results show that the application runs on smartphones with Android OS 4.4.x KitKat, Android 6.0 Marshmallow, and later Android versions, and that the system designed and built by the author meets the testing standard.

1. INTRODUCTION

The rapid development of technology has brought very large changes to human life. One of the biggest is an increasingly modern lifestyle. As technology grows more sophisticated, opportunities arise in every field to use it as a fast, efficient, and up-to-date channel for business marketing.

Information technology is now used in many aspects of human life, including trade and services. There are various ways to apply information technology in trade and services, for example using Android applications for online purchasing or online ordering systems. Ordering transactions that were once conducted face to face between seller and buyer can now be done online through an Android application.

Delivery order services are a popular way of having goods delivered. Besides making it easier to get the desired order, they can also help increase the sales of companies and other institutions, because in modern times people tend to prefer having goods delivered to their homes rather than buying directly from the seller.

On the other hand, recent technological developments are also a concern. According to Himawan et al. (2014), mobile devices are no longer used only to make or receive calls but are gradually taking on computer-like functions in a handheld form. The development of mobile devices has been accompanied by a drastic increase in the number of *mobile phone* and *smartphone* users in Indonesia, which has made mobile-based business applications increasingly attractive to business people and

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developers. According to data from a statistics website covering 2013 to 2018, as of June 2018 Android had become the favorite operating system in Indonesia, with a *market share* of almost 80%.

These ever-growing developments and capabilities have created a trend in which activities usually done on computers are now also done on *mobile* devices, including transactions over the internet, which has given rise to the term *online delivery order*.

Given the problems described above, a system is needed to make it easier and more practical to order products using Android. On this basis, the author chose this problem as the subject of a final project titled "Design and Development of a Delivery Order Service Application for Lamongan Delivery Based on Android," which will make it easier for consumers to order what they want without going to the point of sale.

1.1. Research Objectives

Every study has clear aims and objectives. The objectives of this study are as follows:

a. To design and build an Android-based delivery order service application for Lamongan Delivery in Lamongan Regency that can be used by the people of Lamongan Regency.
b. To make it easier for consumers to purchase products anywhere and anytime through an Android smartphone, without having to go to the store in person or order by telephone.
c. To implement the Android-based delivery order service application for Lamongan Delivery in Lamongan Regency so that it makes it easier for consumers to order products through the Lamongan Delivery application.

2. METHODS

Research methodology is the way a researcher obtains the data to be used in the research process to solve the problem under study. In this study, the researcher used the following methods:

2.1. Literature Study

At this stage, writing began with a literature study, that is, the process of collecting reference material on *Delivery Order*.

According to Himawan et al. (2014), mobile devices are no longer used only to make or receive calls but are gradually taking on computer-like functions in a handheld form. The development of mobile devices has been accompanied by a drastic increase in the number of *mobile phone* and *smartphone* users in Indonesia, which has made mobile-based business applications increasingly attractive to business people and developers.

2.2. Observation Method

Observation is a direct data-collection technique in which the researcher observes in the field, in this case the process of ordering and delivering products at Lamongan Delivery, so that the researcher can determine what information needs to be identified.

2.3. Interview Method

Interviewing is a data-collection technique in which questions and answers are held directly with the relevant informants in order to obtain the *valid* data that are sought.

3. SYSTEM DESIGN

System design is a general overview of the stages involved in building the application. The purpose of general system analysis and design is to describe an existing system or a new system to be developed logically according to requirements.

The system proposed for the *online order* procedure at the Lamongan Delivery store via Android smartphones is as follows:

1. Customers install the *mobile commerce* application on their own Android smartphones.
2. Customers can register if they have not previously registered on that device.
3. Once registered, customers can log in with the password they registered.
4. If the password is correct, the customer enters a menu containing About Us, Order Product, Delivery Service, Payment Confirmation, Order History, Rates, My Account, Contact Us, Criticism and Suggestions, and Logout.
5. To order a product in this application, customers type the order they want and fill in their details,

including the address of the store selling the ordered product and the destination address for delivery.

6. After customers have decided to order a product, a form appears for checking the total payment before the order checkout process.
7. Payment in this system is made by COD (*Cash on Delivery*), with the total delivery price and purchase price already shown in the application menu.
8. Customers can view the list of orders they have placed in the order history menu.

The Lamongan Delivery architecture is built on three system layers: client/server, web server, and database.



Figure 1. Lamongan Delivery Architecture Design

Figure 1 shows the Lamongan Delivery architecture design. The mobile application runs on an Android smartphone. The web service is connected to the Android application using the JSON library to access the database. On the *client* side, the Lamongan Delivery application is installed first, and with the support of the Android Internet Service the application can run. The stored data are retrieved by the system from the web service server, which uses the JSON library.

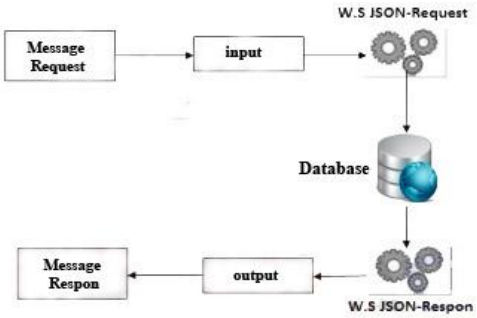


Figure 2. Web Service Architecture Design

Figure 2 shows the web service architecture design used in Lamongan Delivery. First, the *client* sends a request message to the JSON request containing the input the client wants. The request is then passed to the database, and the result is returned through the JSON response. The output is then sent as the response message that the client wants.

The system design used is the Data Flow Diagram (DFD), including a *context diagram*, together with the CDM (*Conceptual Data Model*) and the PDM (*Physical Data Model*).

3.1. Context Diagram

By creating a context diagram of the system, this structured approach describes the system in outline, which is then broken down into more detailed parts.

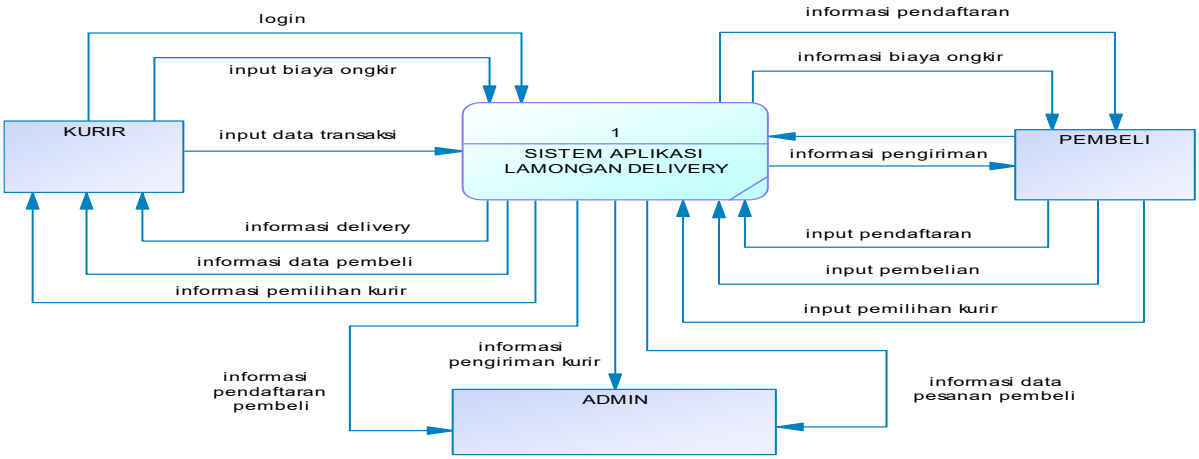


Figure 3. Context Diagram

3.2. DFD Level 0

DFD Level 0 is an elaboration of the context diagram of the Lamongan Delivery application. This level is already oriented toward processes and is a complete combination that involves all external entities.

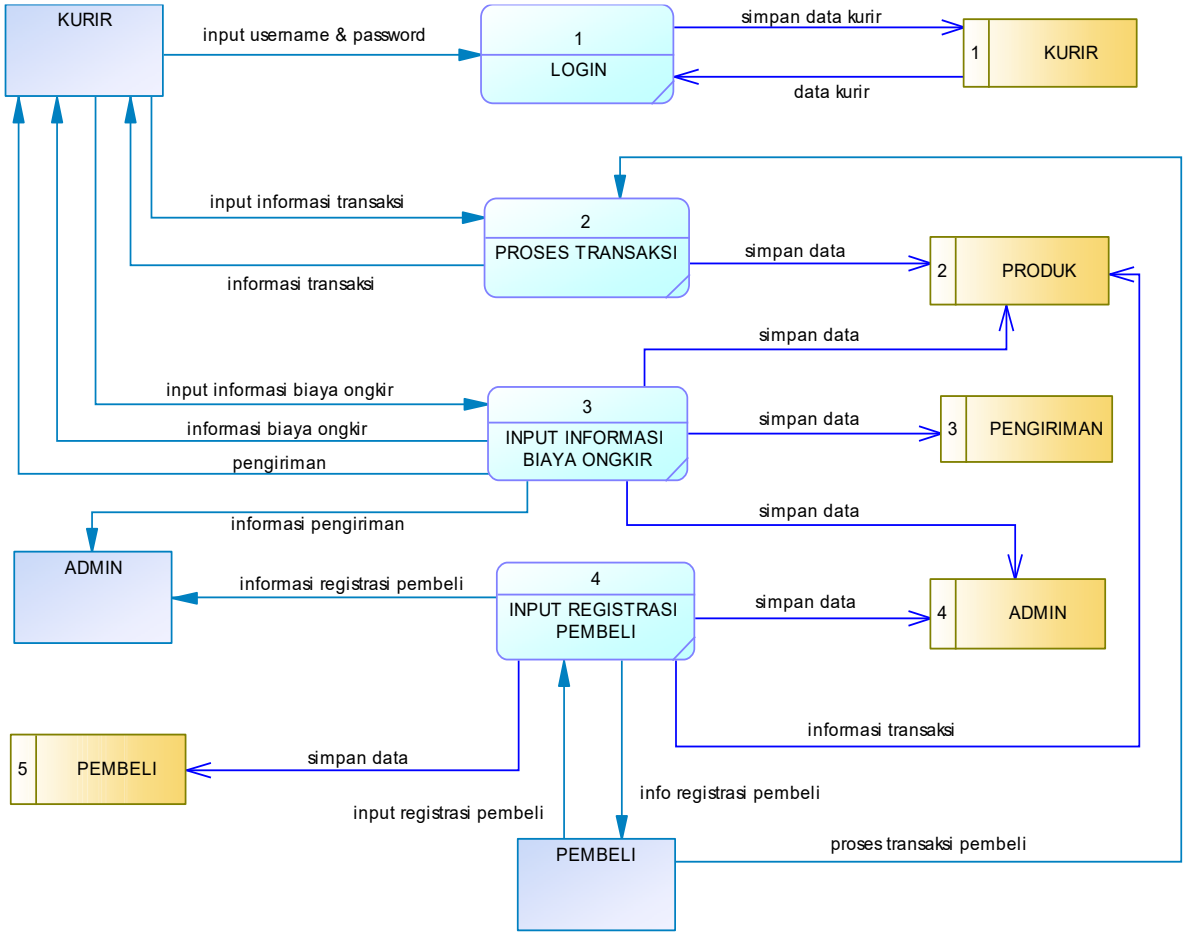


Figure 4. DFD Level 0

3.3. CDM (Conceptual Data Model)

The CDM (*Conceptual Data Model*) is a data concept related to the user's view of the data stored in the database. The CDM is created in the form of tables without data types, describing the relationships between tables for the purpose of implementation in the database.

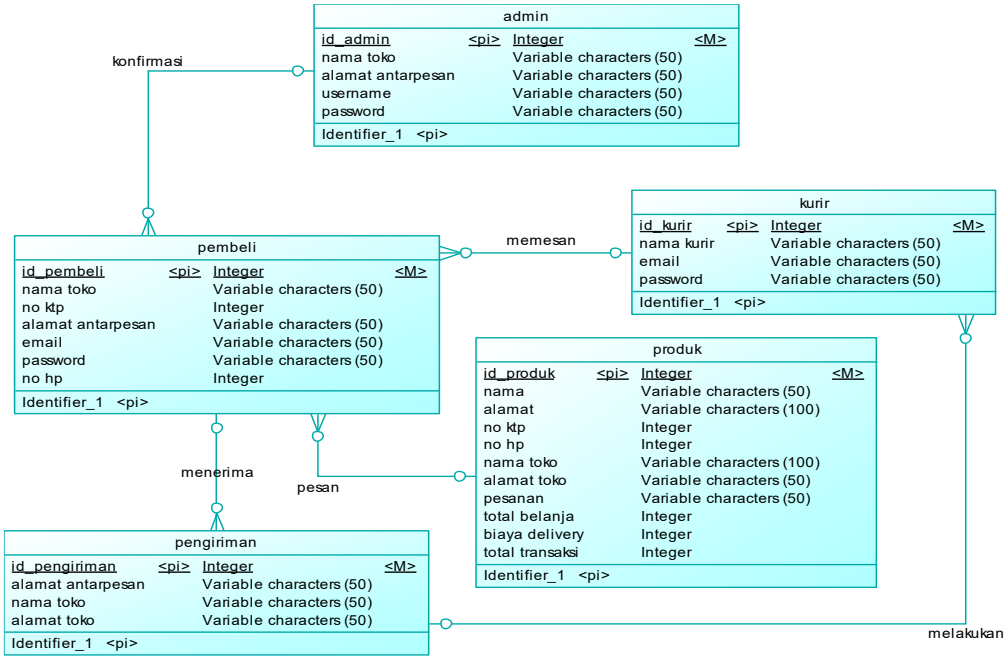


Figure 5. CDM (*Conceptual Data Model*)

4. RESULTS AND DISCUSSION

This section presents the display, or layout, of the application that has been built.

4.1. *Main Menu Display*

The main menu displays a slider of the latest product information and the delivery order, delivery rates, purchase history, how to order, contact us, suggestions, and logout menus. The main menu display can be seen in Figure 6.



Figure 6. Main Menu Display

4.2. *Delivery Order Menu Display*

This menu displays the detailed order form found in the main menu after a customer logs in successfully. To order a product, the consumer must fill in the form in this menu completely. After filling in the form and writing the desired order, the customer simply presses the continue button, and the ordered product is automatically saved in the purchase history while waiting for the courier to confirm the transaction cost. The delivery order menu display can be seen in Figure 7.



Figure 7. Shopping Cart Menu Display

4.3. Edit Order Menu Display

This menu is used by buyers who want to edit an order in the Lamongan Delivery delivery order service application, provided they have previously placed a product order. If they want to order again or add to or reduce an order, they can go to the update order menu. The edit order menu display can be seen in Figure 8.



Figure 8. Recipient Data Entry Menu Display

4.4. Courier Confirmation Form Menu Display

This menu is used when a buyer's order has been received and the courier sets off immediately for the place specified by the buyer to buy the ordered product. The courier immediately informs the buyer through the application of the total product price and the total delivery cost via the courier menu, which is sent to the buyer in the purchase history. The Courier Confirmation Form menu display can be seen in Figure 9.

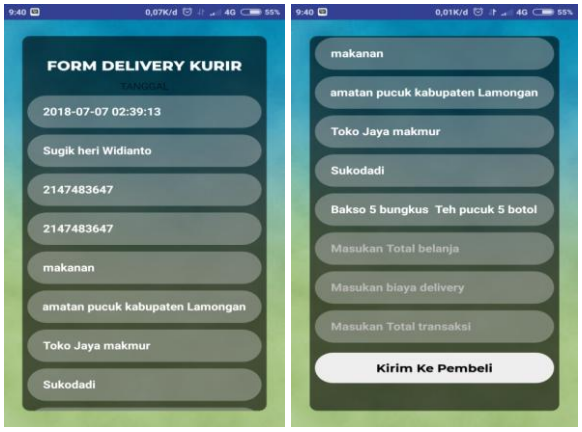


Figure 9. Courier Confirmation Menu Display

4.5. *History and Confirmation Menu Display*

The order history can be viewed on the order history page, and the order confirmation menu is used to confirm the order of products that have been ordered. Buyers are required to confirm "received" once the goods have been received, and to confirm "not yet" if they have not been received. The payment confirmation display can be seen in Figure 10.

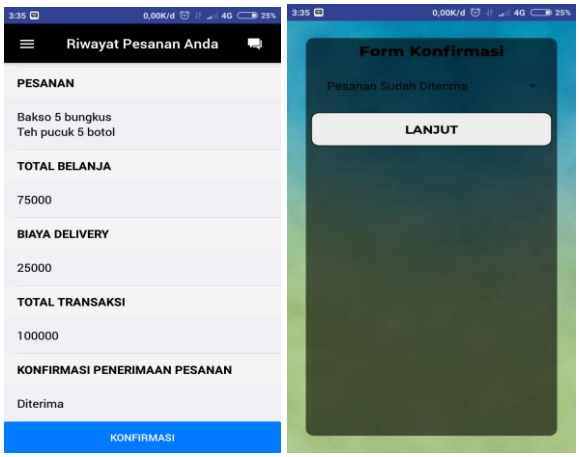


Figure 10. Purchase History and Confirmation Menu Display

4.6. *Order List Menu Display*

This menu is used to manage order data. The admin can view order details, process, edit, cancel, and delete customer orders. The order list display can be seen in Figure 11.

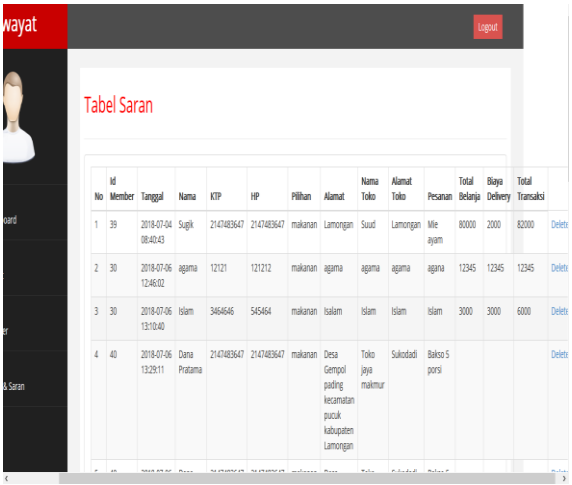


Figure 11. Order List Menu Display

4.7. Buyer Data Menu Display

The buyer data menu is used by the admin to view data on buyers who have registered as members through the Android application; buyer data automatically appear on this page. The admin can also delete buyer data if a buyer is no longer active in placing orders. The buyer data menu display can be seen in Figure 12.

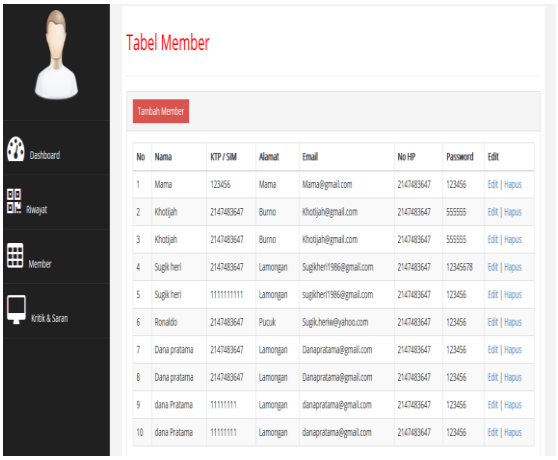


Figure 12. Buyer Data Menu Display

4.8. Criticism and Suggestions Menu Display

The criticism and suggestions data menu is used by the admin to view the criticism and suggestions sent by customers, which are used to develop the application, to convey opinions and criticism, and to improve the quality and performance of the Lamongan Delivery application. The data automatically appear on this page. The admin can also delete criticism or suggestions from customers if desired. The View Criticism and Suggestions menu display can be seen in Figure 13.

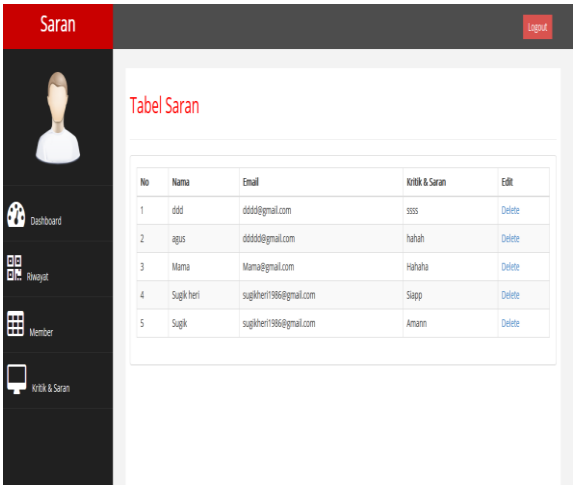


Figure 13. Product Category Menu Display

Test results for the Lamongan Delivery application were obtained using several brands, types, and Android versions of different smartphones as *samples*. The results of the final testing stage are shown in Table 1.

Table 1. Device Testing Results

No	Brand	Type	Android	Screen Size	RAM	Result
1	Samsung	V-SM G313HZ	KitKat	4 inches	512 MB	Successful
2	Advan	i45	Lollipop	4.5 inches	1 GB	Successful
3	Xiaomi	Redmi 4X	Marshmallow	5 inches	3 GB	Successful
4	Oppo	Neo7	Lollipop	5 inches	1 GB	Successful

5	Samsung	Tab 5a	Lollipop	8 inches	2 GB	Successful
6	Vivo	Y28L	KitKat	4.7 inches	1 GB	Successful
7	Sony	E3 Dual	KitKat	4.5 inches	1 GB	Successful
8	Samsung	Ace 4	KitKat	4 inches	512 MB	Successful
9	Xiaomi	4A	Marshmallow	5 inches	2 GB	Successful

Based on the samples tested with smartphones of different Android versions, types, and sizes to try out the Lamongan Delivery application, it can be concluded that this Android-based Lamongan Delivery application is feasible for use.

5. CONCLUSION

Based on the research and design results in the previous sections, the author draws the following conclusions:

1. The application was designed and built using the React Native platform, with the JavaScript programming language for Android as the *client* and PHP as the web *server*, connected to a MySQL database for data storage. JSON (*JavaScript Object Notation*) is then used as the link for exchanging data between the two different programming languages.
2. Based on the black box test results above, the system designed and built by the author meets the testing standard. It can therefore be concluded that the software is free of syntax errors and functionally produces the expected results, so the Lamongan Delivery application is feasible for use.
3. The Lamongan Delivery application can be used on Android smartphones running Android OS 4.4.x KitKat, Android 6.0 Marshmallow, and later Android versions above them.

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