

# DEVELOPMENT DAMRI BUS TICKET APPLICATION BASED ANDROID USING ONLINE PAYMENT

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## ABSTRACT

Damri Corporation is a state-owned enterprise engaged in the field of public transport services. One ministry is busing in the city of Bandung, Damri bus company in this city further improve service in order to attract passengers to use bus Damri. However, until now the service on the payment systems are still conventional Damri bus tickets using cash. As a result of the conventional still carrying cash Damri bus passengers hassle of having to spend money and have to go back yet again in the event of loss and theft is very unsafe. And as a result of which the company feels is the difficulty in monitoring the revenue in realtime. In line with that arises the question how to improve services to passengers Damri in Damri bus ticket payment. Therefore, to deal with the problem is happening the author will build a mobile application based on Android by utilizing QR code for scanning tickets Damri bus that has been encrypted into the QR Code and then take advantage of the API Ciwaru to be able to make payments bus tickets Damri non-cash and online , From the test results using the BlackBox and questionnaire to 50 respondents showed that 93% of users strongly agree that this application is very helpful in Damri bus ticket payment in Bandung. Therefore, to deal with the problem is happening the author will build a mobile application based on Android by utilizing QR code for scanning tickets Damri bus that has been changed into the QR Code and then take advantage of the API Ciwaru to be able to make payments bus tickets Damri non-cash and online , From the test results using the BlackBox and questionnaire to 50 respondents showed that 93% of users strongly agree that this application is very helpful in Damri bus ticket payment in Bandung.

**Keywords :** Android mobile applications, QR Code, APICiwaru, Damri, public transport, Bandung, payment.

## 1. INTRODUCTION

### 1.1 Background

An application of technology in the world of public transport services have an important role [1], the conventional services ranging accepted as a method that is less effective in providing public transport

services primarily in the payment system. Conventional payment systems with cash currently believed to be the methods that are less effective in ministry transportation services mainly in the payment system. Conventional payment systems with cash currently has many problems. The process is slow, such as pay the bus ticket with cash slow because of my change, then there are issues such as security with the loss of money and theft. Conventional payment system is actually now been overcome with the non-cash payment system using electronic money systems through online payment and utilize QR-Code technology, so that the transaction can be run 24 hours a day and in real time for the users connected to the internet. From the platform of its electronic money system actually has three types: based card (smartcard), the Internet, and mobile phones [2].

Department of Motor Transport of the Republic of Indonesia, better known DAMRI a transit public transport has long operated in the city and is preferred by passengers because cheap fare and the route of the bus DAMRI a point hustle of the city of Bandung and its location - the location of the university, so many passengers choose public transport DAMRI compared with other public transport especially for students who are studying in the city. DAMRI head office branch located area Bandung Jalan Soekarno Hatta KM. 11 No. 787, Babakan Penghulu, Cinambo, Gedebage, Bandung. DAMRI providing services with seven (7) business segments include: City Transport, Inter-City Transportation, Transport Inter Transboundary State, Transport Mode integrator, Transport Travel / Tourism, Government Assignment transport, and transport logistics. Where each type of service has different facilities and different tariffs.

Based on an interview with Mr. Kusmaya as assistant manager of marketing and business development DAMRI Bandung branch, he explained in the land transport business services are constraints on payment system. Due bus ticket payment process which is still done manually, causing the number of fraud against payment of a bus ticket revenue, and the difficulty of monitoring the revenue in real time

In addition to interviewing authors also disseminating questionnaires to passengers DAMRI by 80 respondents. From the results of questionnaires were distributed to 80 respondents mentioned the fact that 100% use a smartphone, 83% use a type of operating system android smartphone, 50% of bus users DAMRI, 40% agree technology QR-Code compatible to the bus DAMRI and 60% still having trouble with a bus ticket payment system DAMRI the manual. A large number of smartphone users certainly raises the opportunity to take advantage of the presence of smartphones as a means of transaction, so that then begs the question, how to make effective use of smartphones in the payment system bus DAMRI.

Based on all that has been described by the DAMRI and results of questionnaires were obtained, the author will make a payment application bus ticket based mobile which will run on the Android platform, the author me choose Android because after the obtained results of the questionnaire related to the level of smartphone users android is higher than on other platforms, with this app hopes to overcome the problems that arise in the public transportation services company.

## 1.2 Purpose and Objective

The purpose of the research is based on the background described above is to build a Payment Application DAMRI Android-Based Bus Tickets Through Online Payment. As the application is ease of bus passengers DAMRI to streamline pemabayaran system bus tickets.

The objectives of the research will be carried out as follows:

1. Facilitate passengers to pay for bus tickets Damri by providing an optional addition to pay in a conventional way bus tickets can now pay using online payment technology qr code.
2. Facilitate passengers get paid the ticket quickly so that passengers can pay for tickets without carrying cash.

## 2. CONTENTS OF RESEARCH

### 2.1 Research methods

The methodology used is descriptive analysis method. Descriptive analysis method is a method that describe the facts and information in the current situation or event in a systematic, factual and accurate.

This research method has two stages, namely data collection phase and stage of software development [3]. The flow of the research is:

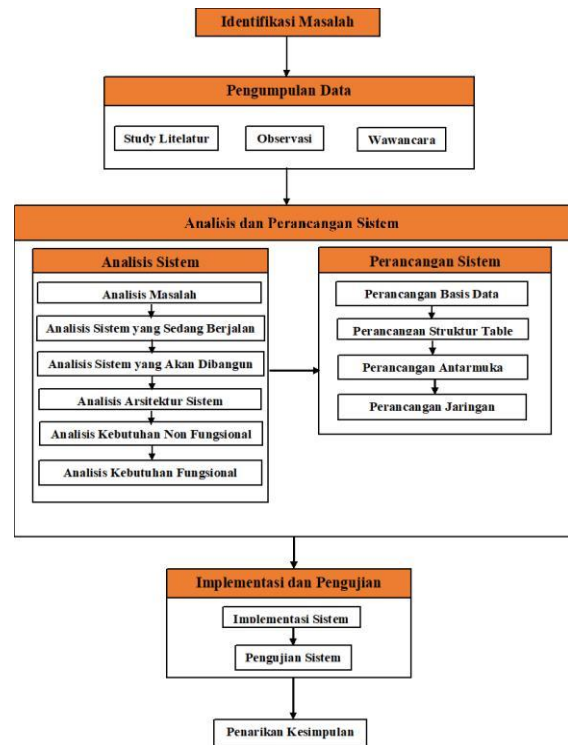


Figure 1 Flow Research

### 2.2 Software Development Methods

Software development method used is the waterfall method (waterfall).

### 2.3 Analysis of the Problem

#### 1. Passenger bus difficulty in paying the bus ticket.

The difficulty of passengers in the transaction pay Damri bus ticket for a bus ticket payment process has not been systematically, such as the provision of bus tickets in the form of paper tickets. Therefore it is necessary non-cash payment system using electronic money via online payment. Applications built will allow passengers to pay for a bus ticket Damri, but the development of this application is not to completely replace conventional payment system with cash.

#### 2. Bus passengers experiencing problems with cash

Still difficulty paying passenger in the comfort of a bus ticket with cash because it is less secure, easy-going loss and fraud plus presence money change.

Pay-ticket so that the process becomes slow.

## 2.4 Analysis System Built

The analysis system built is a complete system that will be built. Activities undertaken include payment activity Bus Tickets. The following is an analysis of the system built is the following:

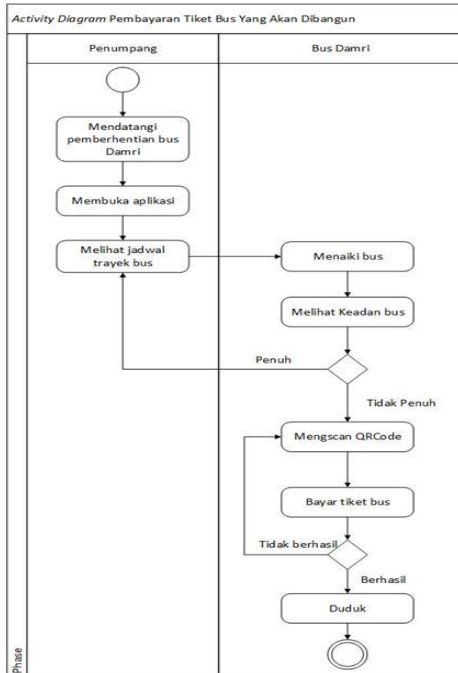


Figure 2 Flow System Built

## 2.5 System Architecture Analysis

Analysis of system architecture aims to identify the architecture to be built. The mobile platform is one of the selected system for front-end development of this software. Users of this mobile platform software that passenger. The following is analysis of the overall system architecture follows:

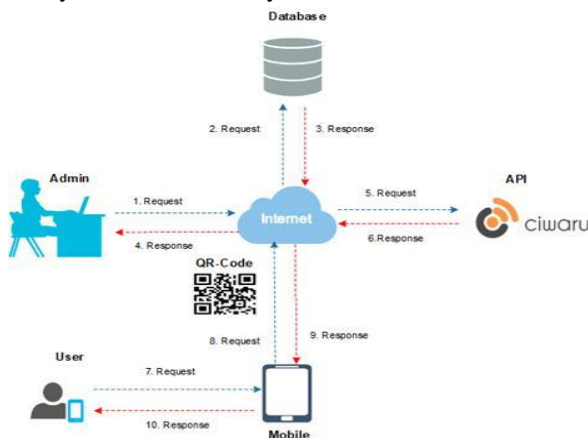


Figure 3 System Architecture

1. Admin perform data processing on the website.
2. Then the Internet network to transmit data that has been processed and stored in a database.
3. *database* responds and sends the results of the request.
4. Admin get info data is already processed.
5. Internet network sends a request to the API ciwarupay user request
6. Ciwaru API responds to provide information on a sald
7. Users using a mobile device and logging in, if the login data is not available, then the user must register first.
8. System verification of user login data stored in the database.
9. After a successful login, the user can start the application smartphone
10. Penggunayanganmelakukan payment of bus tickets, by the way mengscan QRCode code form that will be processed through the help of the internet.
11. The application will perform a scan QRCode request to the server
12. The server receives a request QRCode scan data from a mobile device.
13. After processing server to retrieve data from the database.
14. Users receive and view reports on the payments that have been successful.
15. Users save laporann payment to get into the bus.
16. Then the system stores all the data in payment transactions for the introduction of the company.

## 2.6 Analysis of Technology

As for the technology to be applied to applications that are being built are as follows

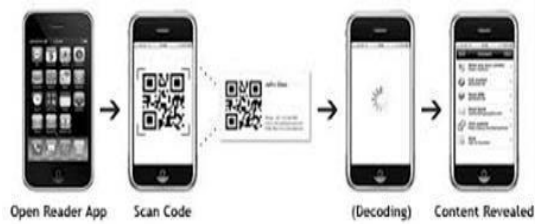
:

1. QR Code

Technology QR code on smartphone will

is used to process the scan, decode and read the content of the 2D barcodes such as QR codes, mobile use so-called mobile tagging. To be able to read a QR code, a person must have a QR code scanner. This scanner is usually from mobile phones that have cameras and scanners from third-party applications can be downloaded to almost any smartphone. After taking a picture of the QR code, application processing code and

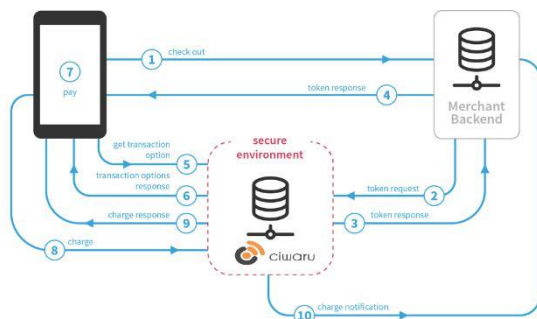
translated into readable text. The code may contain contact information or URL of a website company. The order of the process of reading and interpretation can be seen in the following figure:



**Figure 4** Proses Scanning QR Code

2. Ciwaru Payment Gate Way

Technology Ciwaru Mobile Payment Gateway SDK is used for applications in order to make payments online. Chronology of transactions to be conducted during the online payment happens to be portrayed as follows:



**Figure 5** Proses Flow Transactions

1. Checkout: pressing customer checkout button on the application so as to make an application to request to the Merchant Server.
2. Token request: Merchant Server will make the request to include ordering information to Ciwaru server to obtain tokens.
3. Token Response: Ciwaru server will respond to the request and sends the token. Merchant Server will send the results of the response to the mobile customer.
4. Get transaction options: Mobile SDK will display the payment option.
5. Pay: Customers select payment method and make a payment.
6. Charge: Charge Mobile SDK sends a request to Ciwaru backend for payment processing.
7. Charge response: Mobile SDK to get a response from Ciwaru Backend and applications

customers will deal with the status of the response as success / failure / pending status.

8. Charge notification: Ciwaru Backend sends a notification to the Merchant Server to confirm the transaction has been completed.

**2.6 Software Requirements Specification**

Software requirements specification requirements are divided into two non-functional requirements and functional. Functional software requirements specification for mobile systems can be seen in the following table:

**Table 1** Functional Specifications Software on Mobile Platforms

code SKPL	Software Requirement Specification Functional Mobile Software
SKPL-FM-01	Mobile systems provide facilities for passengers to register into the system
SKPL-FM-02	Mobile systems provide facilities for passengers to log into the system
SKPL-FM-03	Mobile systems provide facilities for passengers to view user profiles
SKPL-FM-04	Mobile systems provide facilities for passengers to manage the payment of bus tickets
SKPL-FM-05	Mobile systems provide facilities for passengers to manage charging balance
SKPL-FM-06	Mobile systems provide facilities for passengers to send a request mengscan QR Code
SKPL-FM-07	A mobile system capable of accessing Ciwaru Pay balance data via API
SKPL-FM-08	Mobile systems provide facilities for passengers to look at historical data
SKPL-FM-9	Mobile systems provide facilities for passengers to send demand balance check
SKPL-FM-10	Mobile systems provide facilities for passengers to see the bus lines
SKPL-FM-11	Mobile systems provide facilities for passengers to logout

**Table 3 Software Functional Specifications on Web Platform**

code SKPL	Requirement specification Functional Software web
SKPL-FW-01	Web systems provide login facility to admin
SKPL-FW-02	Web systems provide facilities for admins to managing data bus lines
SKPL-FW-03	Web systems provide facilities for admins to see user data
SKPL-FW-04	Web systems provide facilities for admins to see transaction data bus ticket payment
SKPL-FW-05	Web systems provide facilities for admins to see data bus
SKPL-FW-06	Web systems provide facilities for admins to <i>logout</i>

**2.7 Analysis of Non-Functional Requirements**

Non Functional Needs Analysis is an analysis system that can be done to determine the specifications of the system needs to be built to the table below.

**Table 2 Specifications Software Non**

code SKPL	Requirement specification Non Software fully functional Mobile
SKPL-NF-01	The system can be accessed for 24 hours without stopping and realtime
SKPL-NF-02	System that d for mobile platform
SKPL-NF-03	System that d for mobile minimal use Android operating system version 6.0 marshmallow
SKPL-NF-04	System that d for mobile could executed in <i>smartphone</i> which has camera
SKPL-NF-05	The system can run with have an internet connection

**Functional in Mobile Platforms**

**Table 4 Non Software Specifications Functional in Web Platform**

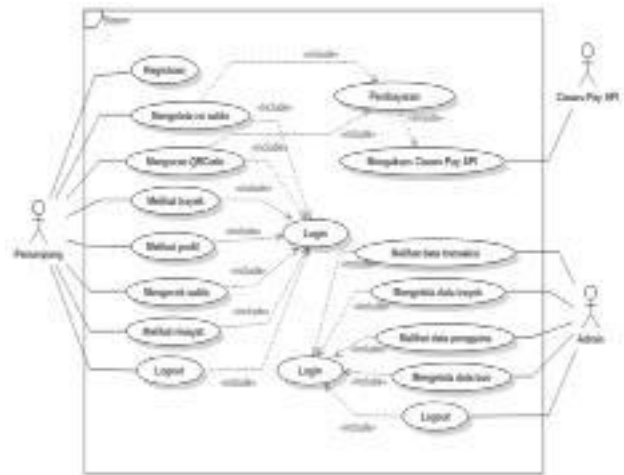
code SKPL	Requirement specification Non Software functional web
SKPL-NF-01	The system can be accessed for 24 hours without stopping and realtime
SKPL-NF-02	The system can only be used by the User Admin
SKPL-NF-03	The system is able to manage multiple users

**2.8 Functional Needs Analysis**

analysis needs functional could defined as planning and describes the process activities that will be applied to the system to be built. analysis Functional requirements are modeled by using the tools Unified Modeling Language (UML), while using the system analysis stage includes Unified Modeling Language Use Case Diagram, Use Case Scenario, Activity Diagram, Class Diagram and Sequence Diagram.

**2.9 Use Case Diagram**

*Use Case Diagram* is a model to describe the behavior (behavior) software to be created.



**Figure 6 Use Case Diagram**

The definition of an actor used to translate the description of the role of an actor in the use case diagram. As for the definition of an actor in use case diagrams can be seen in the following table:

**Table 5 Definition Actor**

No.	Actor	Description
1	Passenger	passengers are user android mobile application which will using existing features
2	CiwaruPay FIRE	Actor with this role has authority as a data bridge between application n and CiwaruPay FIRE
3	Admin	Admin is the user website Damri Bandung, which is employee parties Damri bus in Administratio part n Marketing and Business Development

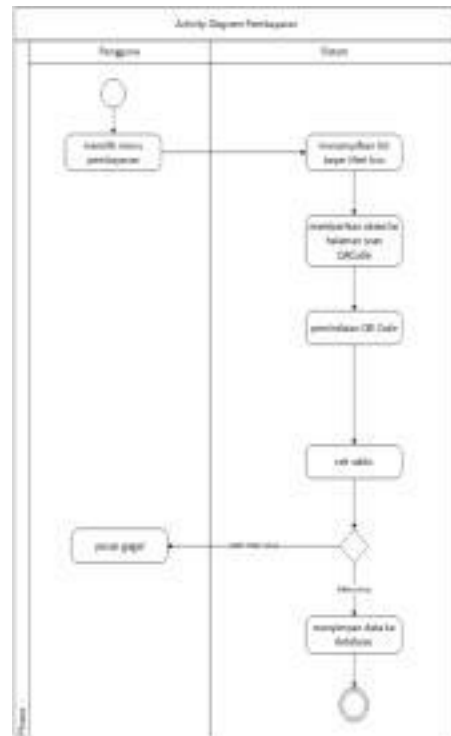
Identification is used to describe the use case description of a use case on a use case diagram. The identification of the use case diagrams can be seen in the following table:

**Table 6 Definitions Use Case**

No.	Use Case	Description
1	Registration	Functionality to the user to register into the system
2	Login	Functionality to the user application for admission to the application
3	logout	Functionality to the user to exit the application
4	View profile	Functionality to the user to see the profile
5	Payment	Functionality to the user to make payment on the bus
6	Manage contents balance	Functionality to the user to manage the contents of balance
7	Check Balance	Functionality to the user to do a balance check
8	Look Route	Functionality to the user to see a list of route
9	Look History	Functionality to the user to see history
10	Access CiwaruPay FIRE	The functionality of the application for CiwaruPay access API

**2.10 Activity Diagram**

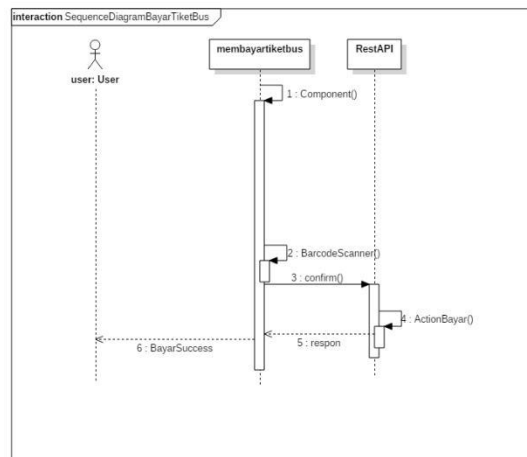
Here is an explanation of Activity Diagram of the system to be built.



**Activity Diagram Figure 7 Payment**

**2.11 Sequence Diagram**

The diagram is a picture of the interaction of each class and the object in each use case in a time sequence. This interaction is by sending a series of data between a class that contains the objects that interact.



**Sequence Diagram Figure 8. Payments**

## 2.12 Class Diagram

Here's Class Diagram to describe the state of the system to be built

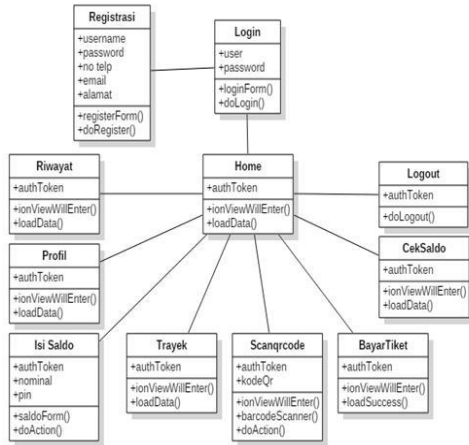


Figure 9 Class Diagram

## 2.13 Implementation and Testing

Implementation of the system that is steps to implement the design that has been done on the system so it is ready for operation to the public. Here is an implementation of the interface that has been made.



Figure 10 Interface Login

### 12.13.1 Technology Implementation

#### 1. QR Code

Here is the implementation of QR Code technology is used in a system built on the research is to mengscan qr code contained on the bus.



Figure 11 Scanning QR Code

## 2. API Ciwaru

Ciwaru API technology implementation that is used in a system built on the research is to fill the balance obtained from Ciwaru pay. The Ciwaru API implementation is as follows:

```

<? Xml version = "1.0" ?>
- <doc>
- <assembly>
<Name> soap_ciwaru </ name>
</ Assembly>
  <Members>
  <member
name = "P:
soap_ciwaru.My.MyWebExtension.Computer"
>
  <Summary> Returns
information about the host computer. </
Summary> </ member>

1. <member
name = "P: soap_ciwaru.My.MyWebExtension.User">
  <summary> Returns
information for the current Web user.
</ Summary>
  </ Member>
  <member
name = "P:
soap_ciwaru.My.MyWebExtension.Request">
  <Summary> Returns Request
object. </ Summary>
  </ Member>

  <member
name = "P:
soap_ciwaru.My.MyWebExtension.Response"
>
  <Summary> Returns Response
object. </ Summary>
  </ Member>

  <member
name = "P: soap_ciwaru.My.MyWebExtension.Log">
  <Summary> Returns the
Asp log object. </ Summary>
  </ Member>

  <member
name = "T: soap_ciwaru.My.MyWebExtension">

  <Summary> Module used to define
the properties that are available in the My
Namespace for Web projects. </ Summary>
  <Remarks />
  </ Member>

  <member
name = "P:
soap_ciwaru.My.Resources.Resources.Reso
urceManager ">

```

```

        <Summary> Returns the
cached ResourceManager instance used by
this class. </ Summary>
        </ Member>

        <member
name = "P: soap_ciwaru.My.Resources.Resources.Cult
ure ">
        <Summary> Overrides the
current thread's CurrentUICulture property
for allresource lookups using this strongly
typed resource class. </ Summary>
        </ Member>

-        <member
name = "T: soap_ciwaru.My.Resources.Resources">
        <summary> A strongly-typed
resource class, for looking up
localized strings, etc. </ Summary>
        </ Member>
</ Members>

</ Doc>

```

**Figure 12 Implementation of APICiwaru**

### 2.14 BlackBox Testing

Application test scenarios conducted with the aim of testing the website can be done properly and in accordance with blackbox testing purposes.

**Table Scenario Testing Website for Admin**

No.	Component tested	Scenario	examination
1.	Page Early	Displays display Echo	BlackBox
2.	Page Registration	Filling the data yourself complete true and false	BlackBox
		Fill data with incomplete	
		clear personal form data	
3.	Page Login	Fill username and password with data already registered	BlackBox
		Fill username and password which have not been registered	
		Do not fill the login form	
4.	Page View profile	Displays profile user / member	BlackBox
5.	Page Information Route	uploading information route with data correct input	BlackBox
		uploading information route with data Incorrect input	

6.	Page Look Information Transaction	Displaying information payment transactions bus tickets	BlackBox
7.	Page Information Bus	uploading information bus with the data correct input	BlackBox
		uploading information bus with the data Incorrect input	
8.	Page Look Information users	Displaying information users who already use application pay for a bus ticket Damri	BlackBox

### 2.15 conclusion BlackBox

Based on the results of blackbox testing conducted by the test case above, it can be deduced as follows:

If the data is entered correctly, the system will issue information in accordance with what is expected.

If the data entered did not match, the system will show an error message according to his guilt. So that when entering data must comply with the rules contained in the system, so that a functional system can mengeluarkan appropriate results.

There is still a problem in testing the user registration and notification of scanning as it is still running on the application.

### 2.16 testing the questionnaire

Testing of the questionnaire are data-processing technique which is a step in processing the data that has been found to be the result of research that can be deduced. This study was conducted via an online questionnaire. This is done in order to determine the extent to which applications are built can help communities in sharing information around the state, and also in order to solve the problem of the difficulty in propagating and get information about the surrounding circumstances described in the identification of problems.

Here is a question questionnaire that will be submitted to the respondents who will be using the Payment Application Development Damri Android-Based Bus Tickets Through Online Payment can be seen in the following table:

**Table 8 List of Questions**



No.	Question
1.	Does This application allows you to make payments Damri bus ticket?
2.	Does it speed up your application in making payments Damri bus ticket?
3.	Does this application help you provide information Damri bus lines?
4.	Is the application easy to learn?
5.	Is the application easy to use?

To determine the threshold score calculation results can be seen in the following table

:

**Table 9 Table Score Calculation**

Value	Information
0% - 50%	Strongly Disagree
51% - 100%	Disagree
101% - 150%	Doubtful
151% - 200%	Agree
201% - 250%	Strongly agree

### 2.17 Testing Results kuisoner

Based on the results of calculations for the percentage of beta testing to users of smartphones, it can be concluded that the Payment Application Development Damri Android-Based Bus Tickets Through Online Payment is as follows:

1. 93% of users strongly agree that this application is very helpful in paying Damri bus ticket in Bandung.
2. Users 91% strongly agree that this application is very helpful in speeding up the process of paying Damri bus ticket in Bandung.
3. Users 90% strongly agree that these applications can ease in knowing information about Damri bus lines in the city of Bandung.
4. Users 83% strongly agreed that the application is easy to learn.
5. 84% of users strongly agreed that the application is easy to use in sharing information.

## 3. CLOSING

### 3.1 Conclusion

The following conclusions based on the analysis and implementation.

1. Payment Application Damri bus tickets already to facilitate the public especially Damri bus passengers in the payment process

Damri bus tickets in the city to be more systematic, fast and making it easier for passengers to make payments Damri bus ticket.

2. Payment Application Bus Ticket Damri already to facilitate passengers in obtaining information Damri bus lines in the city, so passengers can find out the purpose and the price trajectory they are going.

### 3.2 advice

The suggestions for the development of applications in the next time period, there are some suggestions that can be done, among others:

1. Developing applications that can be integrated with other parties.
2. Developing applications that can be used in the region other than the city of Bandung. Developing applications that can issue a notification in the form of sound

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