Records Management System Journal (RMSJ)
Vol. 2, No. 2, February 2024, pp.80-89
ISSN: 2985-9697

Design and development of inikasir application as an android-based payment transaction media at sederhana restaurant

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Received 07 03, 2023; Accepted 15 02, 2024

ABSTRAK

Transaksi pembayaran di Warung Nasi Sederhana masih dilakukan secara manual sehingga kurang efektif dan efisien. Menggunakan cara manual ini rentan terjadi kesalahan dalam menghitung jumlah pembayaran, memerlukan beberapa waktu untuk menulis bukti transaksi pembayaran menggunakan nota, sulitnya mengontrol stok makanan dan laporan pendapatan yang masih menggunakan buku. Android merupakan salah satu teknologi canggih saat ini yang memiliki banyak fungsi. Aplikasi Inikasir merupakan suatu sistem yang dibuat untuk mempermudah perusahaan dalam melakukan transaksi pembayaran.Tujuan dari penelitian ini yaitu untuk merancang aplikasi inikasir sebagai media transaksi pembayaran berbasis android yang memiliki fungsi untuk mempermudah pengguna dalam menghitung transaksi secara otomatis, menyimpan data laporan penjualan dan menghasilkan struk pembayaran dengan lebih cepat dan efisien. Aplikasi ini dibuat menggunakan *flutter framework* dan Android Studio. Pengujian sistem menggunakan *black box testing* yang bertujuan untuk mengetahui suatu aplikasi dapat berjalan dengan baik sesuai fungsi yang diharapkan sebelumnya. Selain itu, pengujian dilakukan kepada karyawan kasir dan pemilik warung nasi untuk mengetahui keadaan transaksi penjualan sebelum dan setelah adanya aplikasi. Hasil dari pengujian ini menyatakan bahwa menggunakan aplikasi Inikasir sebagai media transaksi pembayaran berbasis android membuat transaksi pembayaran dan melihat laporan penjualan lebih cepat.

Kata Kunci: Aplikasi, transaksi, android

ABSTRACT

Payment transactions at Warung Nasi Sederhana are still done manually so they are less effective and efficient. Using this manual method is prone to errors in calculating the amount of payment, it takes some time to write proof of payment transactions using notes, it is difficult to control food stocks and sales reports that still use books. Android is one of today's advanced technologies that has many functions. The Inikasir application is a system created to make it easier for companies to make payment transactions. The purpose of this research is to design the Inikasir application as an Android-based payment transaction medium that has a function to make it easier for users to calculate transactions automatically, store sales report data and generate payment receipts more quickly and efficiently. This application is made using Flutter framework and Android Studio. System testing uses black box testing which aims to find out if an application can run properly according to the functions expected before. In addition, testing was carried out on cashier employees and rice shop owners to find out the state of sales transactions before and after the application. The results of this test state that using the Inikasir application as an Android-based payment transaction medium makes payment transactions and viewing sales reports faster.

Keywords: *Application, transaction, android*

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1. INTRODUCTION

The rapid development of information technology provides many benefits and conveniences in daily activities, including economic activities. Large-scale to micro-scale companies such as shops, home businesses, restaurants, or other small businesses can all utilize information technology. Payment transaction systems that use database and computing systems containing sales information are examples of information technology that are often used. With the payment transaction system, companies can now process data digitally on a computer instead of recording it manually on paper.

Transaction is a form of meeting that occurs between the seller and buyer that is mutually beneficial and is accompanied by evidence, data, or supporting documents to be inputted in the journal through recording (Mutmainah & Novia, 2022). Payment is an act of exchanging something (money/goods) with the same intent and purpose carried out by two or more people (Dewi & Malfiany, 2017).

Warung Nasi Sederhana is a company engaged in the culinary field located at Jalan Gempol Sari No.10, Kec. Bandung Kulon, Bandung City, West Java, 40215. The main activity carried out by Warung Nasi Sederhana is the business of selling Padang (West Sumatra) and Sundanese (West Java) food. Warung Nasi Sederhana's operating hours start from 08.00 - 21.00 WIB. Each food menu at Warung Nasi Sederhana has a distinctive taste, affordable prices and strategic location make Warung Nasi Sederhana much in demand by the surrounding community. In addition, Warung Nasi Sederhana provides on-site dining with the concept of prasmanan or takeaway food.

Every day approximately 100 customers buy at Warung Nasi Sederhana. This sales activity still uses manual transactions using a receipt recorded by the cashier which slows down the work and takes a relatively long time. Then, calculations still use a standard calculator which is still often miscalculated. Furthermore, it is difficult to control the stock of food that has been sold or left because sometimes the cashier only writes the nominal to be paid by the buyer without writing the food sold. In addition, the preparation of income reports still uses books. The income report is only calculated based on total sales minus total expenses so that the business owner only knows the amount of revenue money without knowing the actual profit or loss.

The use of payment transaction applications can be felt by culinary entrepreneurs who have physical stores, ranging from speeding up sales transactions, helping accurate calculations of each transaction, facilitating bookkeeping and recording sales, to being equipped with external devices that can be connected to print proof of transactions automatically computerized. However, these technological developments have not been felt at Warung Nasi Sederhana.

Seeing from this phenomenon, an information system is needed that can facilitate the process of sales transactions and preparation of income reports that occur at Warung Nasi Sederhana. Based on this description, it is necessary

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2. LITERATURE REVIEW

A. Application

Applications are a collection of commands or codes that are arranged in a structured manner so that they can carry out a command given by humans through computer hardware so that they can help humans to provide the desired solution. Applications are also defined as the use or application of a concept that is the subject of discussion or as a computer program created to help humans carry out certain tasks (Pasaribu, 2021).

B. Transactions

Transaction is a form of meeting that occurs between the seller and the buyer for mutual benefit. Transactions will be inputted in the journal through recording evidence, data or supporting documents from the transaction process (Mutmainah & Novia, 2022).

C. Payment

Payment is an act of exchanging something (money / goods) with the same intent and purpose carried out by two or more people (Dewi & Malfiany, 2017). Payment is a mechanism used to transfer currency into goods, services or information from the payer to the recipient, either directly or through the medium of banking services (Suwarjo, 2019).

D. Android

Android is a Linux-based operating system designed specifically for mobile devices. Android provides a stable platform so that users can develop their own applications. Android is an operating system that does not distinguish between mainstream and third-party applications, android is a stable platform that makes it easy for programmers to create applications (Pratama, 2021).

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E. Restaurant

A restaurant is a company that provides food and beverages and is equipped with equipment and supplies for the preparation, storage and serving of these products in a permanent location with the aim of making a profit or profit (Minister of Tourism and Creative Economy No.11 of 2014).

F. Flutter Frame Work

Flutter is a cross-platform framework that aims to develop high-performance mobile applications. Flutter was publicly released in 2016 by Google. Not only can Flutter apps run on Android and iOS, but also Fuschia, Google's next-generation operating system, chose Flutter as its app-level framework.

Flutter is unique. Instead of utilizing web views or relying on device OEM widgets, Flutter renders each component of the display using a high-performance rendering engine. This trait provides the possibility to build apps that are as high-performance as native apps.

Flutter supports stateful hot-reloading during development, which is considered a major factor for improving development cycles. Stateful hot-reloading is basically implemented by injecting updated source code into the running Dart VM without changing the structure in the application, so all transitions and actions of the application will be preserved after hot-reloading (Kartiko et al., 2022).

G. Android Studio

According to Bagus et al., (2023) android studio is an Integrated Development Environment (IDE) for creating Android applications. Android Studio provides many additional capabilities in addition to being an Intellij code editor and a powerful development tool. When developing Android applications, this function is useful for increasing productivity because it allows for:

1) Flexible build system based on Gradle
2) Emulator with tons of features
3) One environment can be used to create apps for all Android gadgets
4) Instant run to update running programs without downloading new programs
5) Using template code from Github to create identical app features and importing code
6) Comprehensive testing tools and framework
7) Help with NDK and C++

H. Unified Modeling Language (UML)

In the business sector, UML is a standard language that is often used to determine needs, perform analysis and design, and explain object-oriented programming architecture (Putra & Andriani, 2019). According to Primadasa and Juliansa (2020) UML can be used to design and create an application with to document, specify and develop object-oriented systems. In addition, UML is also a language that describes an object-oriented software development system.

1) Use Case Diagram
   Use case diagrams describe the interactions performed by actors to raise an event or functional requirement in the system to be created.
2) Activity Diagram
   Activity diagram is an activity that describes the process that occurs in the system and helps understand the overall process of one or more-use cases.
3) Class Diagram
   Class diagram is a diagram that explains the visual of the database structure that will be created. Class diagram consists of classes to build a system.

3. RESULTS

A. Design of Inikasir Application

In making a good application, the system design stage is needed first. The design stage aims to identify problems that must be solved or that will later be resolved. The system development method used in designing this application is Rapid Application Development (RAD). RAD is a software development process model that is incremental (develops little by little regularly) especially for short work time. The RAD model has three (3) main stages, namely requirement planning, RAD design workshop and implementation. The stages are detailed as follows:

1) Requirement Planning

At this stage will discuss the analysis of the cashier system with users and system analysis so that all objectives can be clearly identified so that they can get system specifications that are useful as a reference in designing the system. The following is a needs analysis and analysis of the required system:

a. Needs Analysis
   The needs analysis at Warung Nasi Sederhana is:
   a) The calculation still uses a calculator so a system is needed to calculate the total price automatically.
   b) Sales transactions still use paper notes so a Bluetooth printer is needed to print receipts as proof of sales transactions.
   c) Sales reports still use books and calculations still using a calculator so that a system is needed that can see sales data quickly.

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b. System Analysis
This system requires several things, namely:
a) The android version that can be used in this cashier application is at least Android SDK Level 22 (Lollipop 5.1) devices.
b) Minimum 2 GB RAM and 8 GB storage

2) Design Workshop

This stage consists of designing and building the system. To get a design that suits the needs, this stage involves the user.

a. Functional Requirements
Functional requirements include functions that must be performed by the system, namely:
a) Login Page
The login feature can help guarantee the security and integrity of data because the application of restrictions on the use of data so that the dissemination of information is only received by those who are entitled to it.
b) Add Product Page
The add product page is a page for adding products to be sold. On this page you can add the name of the product, the selling price of the product. Products, cost of goods sold, stock quantities and add product images.
c) Transaction Page
The transaction feature is a page for cashiers to make transactions. On this transaction page, all menus that will be sold and the purchase cart are available. The cashier chooses the product and the number of products purchased by the buyer and will automatically enter the purchase cart. If the cashier taps the purchase cart, the products purchased by the buyer will be seen. Then the cashier will press the payment method and confirm the purchase of the product and the sales transaction is complete.
d) Transaction History Page
The transaction history page will provide information about transactions that have been successful and there is a feature to print transaction history.
e) Report Page
The report page consists of a term report, profit and loss report and menu sales recap. The time period report will display information about total sales and total transactions per day, per week and per month. Furthermore, the income statement will display information about the total amount of net sales if reduced by the amount of cost of goods sold (COGS) will result in profit/loss per day, week and month. Then, the menu sales recap will display a recap of the menu sold per day.

b. Non-Functional Needs
In its implementation, this cashier application is required to have the following qualities:
a) Able to open within 5 seconds (Performance Quality)
b) Cannot be opened by other than the user (Security)
c) Able to be opened by Android devices up to version 13 (Reliability)

c. Database Structure Design
The design of this database structure has been adjusted to the conditions and needs of a Warung Nasi Sederhana. The following is the design of the database structure:
a) Account Information
Email Address: Text
Password: Text
b) Transaction information
Product category: Text
Product name: Text
Number of items purchased: Integer
Total price: Round Numbers
c) Add Product Information
Product name: Text
Selling Price: Integer
Stock quantity: Round Numbers
Cost of goods sold (COGS): Whole Numbers
Category: Text
Image: Image
d) Transaction history information
Transaction id: Text
Transaction time: Date
e) Transaction History Print Information
Transaction id: Text
Transaction Time: Date
Product item: Text
Product Item Total: Round Numbers
Total Price: Rp. Round Numbers
f) Timeframe Report Information
Date: Date
Total Sales: Round Numbers
Total Transaction: Round Numbers
g) Income Statement Information
Date: Date
Total Net Sales: Round Numbers
Cost of Goods Sold: Round Numbers
Profit/Loss: Integers
h) Sales Recap Information
Date Menu: Date
Total Price: Round Numbers

d. Home Page Structure Design
Furthermore, designing the initial page or interface of several menus that can be operated by the user or admin. The design of this application includes data or information input,

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data processing which ultimately produces output in the form of reports or transaction details. The following initial page can be seen in the table below:

Table 3.1 Home Page Structure Design

Menu	Sub Menu
Admin Login	Email Password
Home	Transaction menu Add product menu Transaction history menu Report menu
Transactions	Product menu Category menu transaction input sales
Add Product	New product input
Transaction history	Transaction data menu Print transaction
Report	Report data menu time period per day Report data menu Time period per week Report data menu term per month Report data menu profit and loss per day Income statement data menu loss per week Income statement data menu loss per month Menu recap menu sold per day
Logout admin	

e. Use Case Diagram
To describe the process carried out by the user, it can be explained using a use case diagram. Making this use case refers to functional requirements. The use case diagram is shown in the figure below:

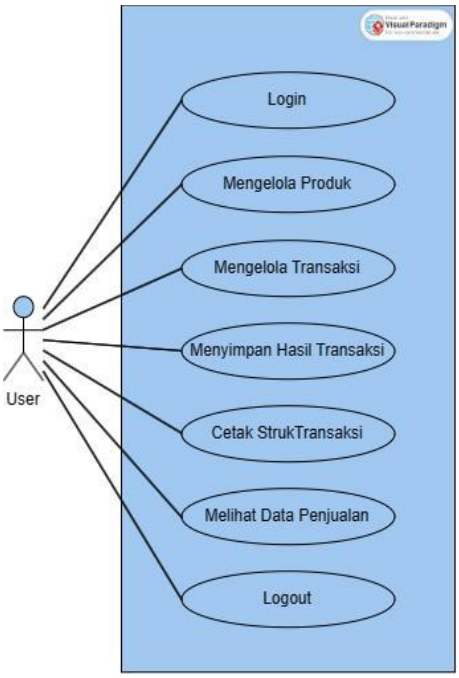

Figure 3.1 Use Case Diagram

f. Activity Diagram
The depiction of activities that have been made in the use case diagram will be described in the activity diagram. There are several activities that will be shown in the core activity diagram in this application, namely:

a) Transaction Activity Diagram
This activity is related to the transaction process. The user will input product data and the number of products that the customer will buy and will automatically be calculated by the sister. In addition, the user can choose whether the proof of transaction will be printed into a receipt or saved directly to the database. The transaction activity diagram is shown in Figure 2 Transaction Activity Diagram.

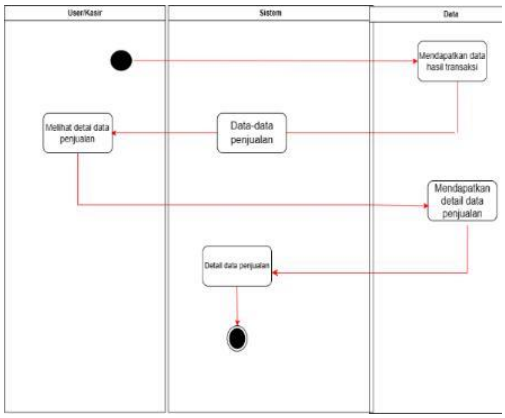

Figure 3. 2 Transaction Activity Diagram

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b) Sales Data Activity Diagram
This activity relates to the processing of sales data. Users can see in detail the sales data that resulting from the transaction process that has been performed. Activity diagram data sales can be seen in the picture under here:

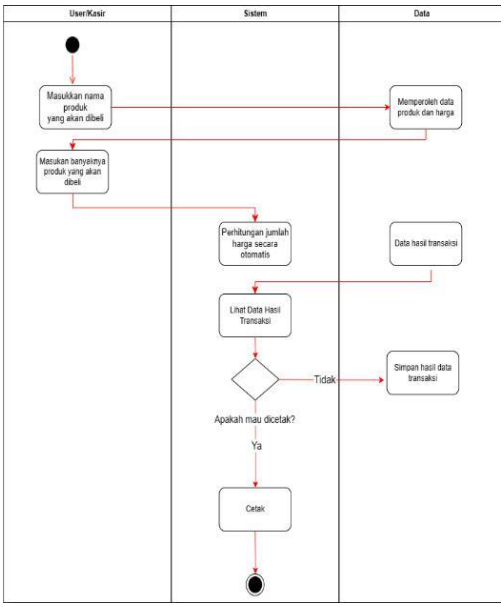

Figure 3.3 Activity Diagram of Sales Data

g. Class Diagram
Class diagram is a diagram that explains the visual of the database structure that will be created. Class diagram consists of classes to build a system. Class Diagram can be seen in the picture below:

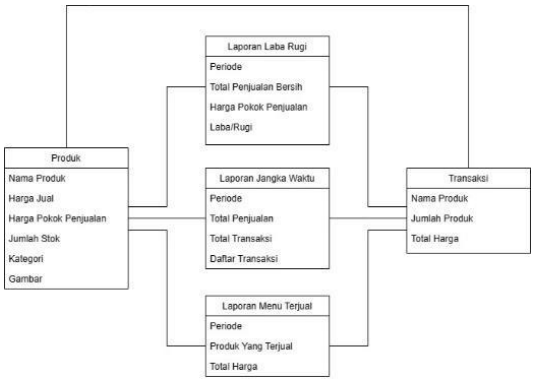

Figure 3. 4 Class Diagram

B. Design of Inikasir Application

1) Login Page
The login page is the page for user enters the application.

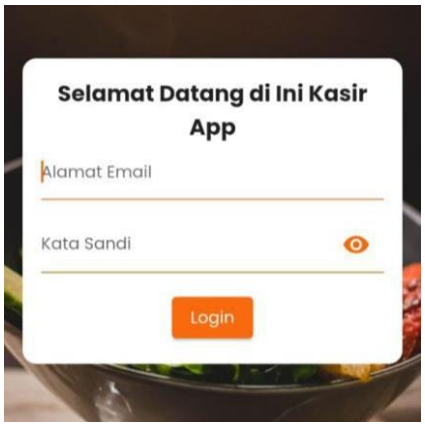

Figure 3.5 Login page

2) Transaction Page
When the user has logged into the application, the application will display the transaction page in the form of product names, category names and this page will carry out the transaction process carried out by the cashier with the buyer.

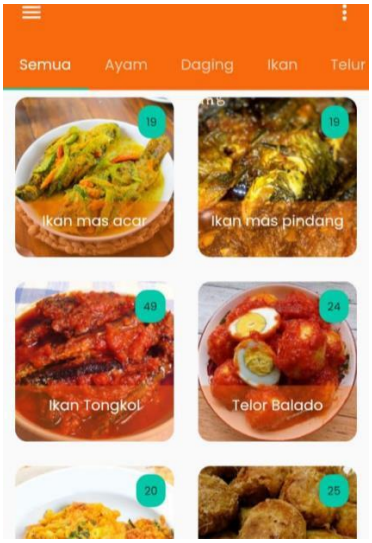

Figure 3.6 Transaction Page

3) Add Product Page
On this page the user can add products that will be sold. If the user has filled in all the data and submit the data, the product will be automatically displayed on the transaction page.

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Figure 3.7 Add Product Page

4) Transaction History Page
The transaction history page will provide information about transactions that have been successful and features are available to print history transaction history.

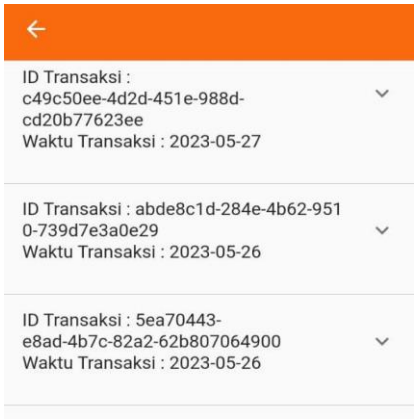

Figure 3.8 Transaction History

5) Transaction Print Page
The following is a page when the transaction will be printed. The user can press find a printer to connect with a Bluetooth printer then press print data to print the transaction.

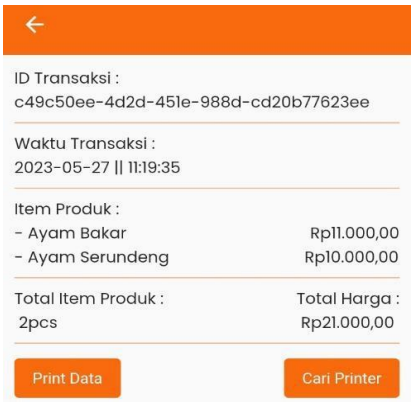

Figure 3.9 Print Transactions

6) Term Report Page
The term report page is a report that will display the total sales and number of transactions.

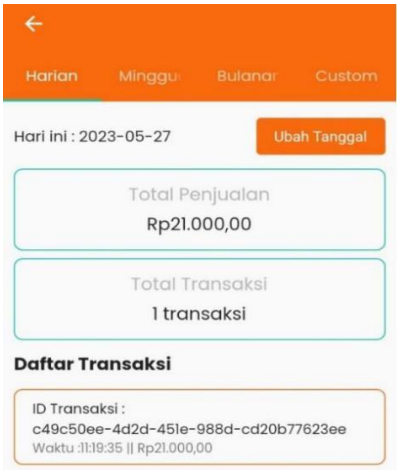

Figure 3.10 Timeline Report Display

7) Income Statement Page
The income statement page will display information about the total amount of net sales if reduced by the amount of Cost of Goods Sold (COGS) will result in profit/loss.



Figure 3.11 Income Statement

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8) Sold Menu Recap Page
The sold menu recap page is a recap of the menu sold per day. On this page the user can see the products and the number of products sold each day.

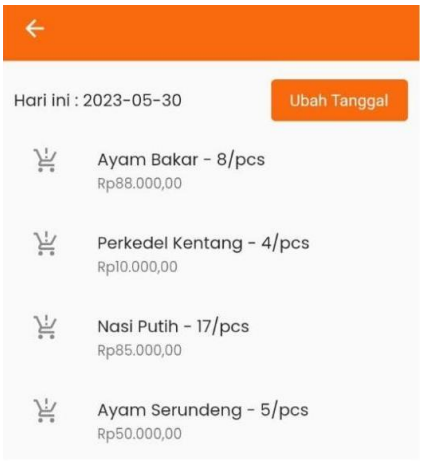

Figure 3.12 Sold Menu Recap

9) Logout page
The logout page is a feature to User exit from application.

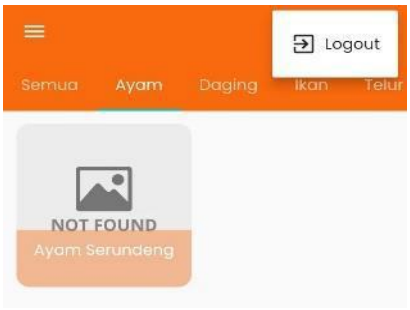

Figure 3.13 Logout page

C. Test Results

At this stage, test the performance of the application software using a smartphone. This test aims to validate the correctness of the system design that has been done in the previous discussion. The smartphones tested are listed in table 3.2 Smartphone Device Testing.

Table 3.2 Smartphone Device Testing

No	Smartphone	Android Versi	Hasil
1	Oppo A5s	Versi 8.1	Running
2	Realme 5i	Versi 9.0	Running
3	Oppo A15	Versi 10.0	Running
4	Oppo A55	Versi 11.0	Running

In addition, testing of the cashier application is carried out using the black box testing method. Black box testing is a test method to ensure that the functions in the application can process input correctly and produce the correct output. Black box testing in more detail is described in table 3.3 Black Box Method Testing.

Table 3.3 Black Box Method Testing

No	Skenario Pengujian	Hasil yang diharapkan	Kesimpulan
1	**Login kasir**	Berhasil login sesuai username dan password	**Valid**
2	**Kasir**	Bisa menambah menu makanan	**Valid**
		Bisa melakukan transaksi penjualan makanan	**Valid**
		Bisa mencetak struk penjualan	**Valid**
		Bisa melihat laporan penjualan	**Valid**
3	**Logout kasir**	Berhasil logout dari aplikasi	**Valid**

Furthermore, the trials before and after the application is made can be seen in table 3.4 Trials Before and After the Application.

Table 3.4 Before and After Tests Application

No	Objective Testing	Testing time		Testing Result
		Manual	App	
1	Performed a sales transaction of 3 grilled chicken 2 potato cakes 1 rice	47,67 sec	19,13 sec	Applications can make sales transactions faster
2	Conduct sales transactions 2 chicken serundeng 2 chicken rendang 4 rice 1 potato cakes	1 min 06 sec	23,19 sec	Applications can make sales transactions faster
3	Conduct sales transactions 2 grilled chicken 1 geprek chicken 1 tuna 2 rice 1 potato cakes 1 corn cakes	1 min 18 sec	26,19 sec	Applications can make sales transactions faster
4	Conduct sales transactions 5 rice 3	1 min 20 sec	31,10 sec	Applications can make sales transactions

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	chicken serundeng 1 grilled chicken 1 chicken geprek 2 fish tuna			faster
5	Conduct sales transaction 1 pickled fish 1 pindang fish 2 grilled chicken 1 potato vermicelli 1 egg balado 5 rice	1 min 23 sec	38,30 sec	Applications can make sales transactions faster
6	Recap total sales	9 min 8 sec	10,89 sec	App can see total sales recap faster
7	Recap total transaction	32 sec	8,8 sec	App can see total sales transaction recap faster
8	Profit and loss statement	None	7,4 sec	App can see Profit and loss statement faster
9	Recap of sold menu	None	12,1 sec	App can see Recap of sold menu faster

D. Discussion

Based on observations and interviews with the owner of a Warung Nasi Sederhana, sales transaction activities are carried out by the cashier who is responsible for all transaction activities and sales reports.

The flow or process of sales transactions at a Warung Nasi Sederhana starts with the buyer choosing the product to be purchased. Then, the waiter will wrap the product to be purchased, if the buyer wants to use a note, then the buyer goes to the cashier mentioning the product purchased, the cashier writes down the product purchased and adds up the total price using a calculator. After the cashier mentions the total price to be paid then the buyer pays, the cashier writes down the total price in the revenue book and the transaction is complete. To see the sales data recap, the cashier will add up all the income that has been written in the book using a calculator so that it will generate total revenue and the number of transactions.

From the process above, it can be seen that running transactions and sales reports using manual methods takes a relatively long time and tends to make frequent errors due to manual calculations using a calculator. Therefore, a system is needed, namely an android-based payment transaction application that will facilitate work and produce more accurate data. If using the Inikasir application for sales transactions the cashier will input the product and the number of products purchased by the buyer, after that the cashier must ensure that the product and the number of products are correct according to what the buyer buys, then the application will calculate the total price automatically and the cashier mentions the total price to the buyer, the buyer will pay, the cashier prints a receipt and gives change if any.

The sales report will be automatically recapitulated by the application so that the owner is easier to see the sales report. This sales report consists of a time period report where the owner can see the total sales and total transactions per day, per week, and per month. Furthermore, the profit and loss report are the owner can see the profit/loss per day, week and month. Finally, the owner can see a recap of the menu sold per day.

The Inikasir application was created using the Flutter framework for the application framework. In this application there are several features such as login, add products, sales transactions, transaction history, print transaction history, sales reports and logout.

The android-based Inikasir application is beneficial for Warung Nasi Sederhana because with this application it can make sales transactions quickly and see sales reports quickly. This opinion is seen based on the results of the cashier application test that has been carried out at Warung Nasi Sederhana.

4. CONCLUSIONS AND SUGGESTIONS

A. Conclusion

Based on the results of the project with the title "Design and Development of Inikasir Application as an Android-Based Payment Transaction Media at Sederhana Restaurant" can be concluded as follows:

1) The design of the Inikasir application as a medium for android-based payment transactions is made based on the initial conditions that exist in a Warung Nasi Sederhana. For sales transactions and sales reports are still manually then with this cashier application sales transactions and sales reports will be done quickly. This makes it easier for cashiers and owners because when the cashier transaction only inputs the product purchased by the buyer, the application will automatically recap it so that the sales report can be seen quickly.

2) Results Implementation of the Inikasir application began around May 26-30, 2023. The trial began by giving verbal explanations to cashiers and owners of Warung Nasi Sederhana. Cashiers and owners of Warung Nasi Sederhana are greatly helped by the existence of this application, because it makes it easier and less time-consuming to conduct sales transactions.

B. Suggestions

Based on the project that has been carried out at Warung Nasi Sederhana, the suggestions that are recommended as input are:

1) Because the human resources at Warung Nasi Sederhana are not very proficient in using the application, training should be held to improve their ability to use the system, know how to protect data and update data so that they can develop a better system.
2) In order for this system to be used continuously and useful for users, it is necessary to follow up such as three to six months whether this system will be updated again by adding other features.

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