

Implementation of Dart Programming Language in Mobile-Based DRs Snack Sales Application Design

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ABSTRACT

DRs Snack has been making and selling snacks in the vicinity. However, they face problems in manually recording sales and generating accurate reports. Therefore, this project aims to design and implement a mobile-based sales system application that will help DRs Snack in managing sales and recording reports more efficiently. The main objective of this project is to design and develop a mobile-based sales system application with Dart programming language and Flutter framework that can help DRs Snack in recording sales transactions in real-time, generate sales and financial reports quickly and accurately, improve operational efficiency and decision making. The method used for system development is Extreme Programming, where this method has a development target through the determination of unclear needs or changes to the needs very quickly and through a small to medium-sized team. The results of this study can manage menus and orders that have been proven to increase operational efficiency. The implementation of this system is able to reduce the time required for order processing and improve the accuracy of data related to stock and revenue. With an integrated system, customer service can be improved and reduce human error in summarizing total payments and ensure accuracy in payments. The system enables better data analysis, especially in monitoring order history and sales recap to improve sales reports. Suggestions from researchers to maximize the features of existing features and add features to complement the features that are already running.

Keywords: Dart; Mobile App; Flutter; Sales; Extreme Programming

1. INTRODUCTION

MSMEs are one of the drivers of the nation's economy and have an important role in the economy in Indonesia because they can encourage and improve the economy in a sustainable and sustainable manner (Nuvitasari et al., 2019). While competition in the culinary industry continues to increase every year, business owners must develop new strategies to increase their sales. In the business world, the use of information technology is increasingly important. The growing technology will help and facilitate human activities. One of the benefits of technology that can be applied is to help small and medium enterprises (MSMEs), especially in managing food ordering services (M.Cs, 2021; Sumesta & Satyawan, 2024).

DRs Snack has been making and selling snacks in the vicinity. However, they face problems in manually recording sales and generating accurate reports. To solve this problem, they designed a mobile-based application with Dart programming language and Flutter framework that allows them to record sales in real-time and generate faster and more accurate reports. Therefore, this project aims to design and implement a mobile-based sales system application that will help DRs Snack in managing sales and recording reports more efficiently (Cholis, 2021).

The main objective of this project is to design and develop a mobile-based sales system application with Dart programming language and Flutter framework that can help DRs Snack in recording sales transactions in real-time, generating sales and financial reports quickly and accurately, improving operational efficiency and decision making.

The implementation of mobile-based sales system applications with the Dart programming language and the Flutter framework at DRs Snack is expected to provide benefits to increase productivity and efficiency in daily operations, increase accuracy and speed in preparing sales and financial reports, help DRs Snack in improving customer service and satisfaction.

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2. LITERATURE REVIEW

Mobile application development has become a major trend in the information technology industry as it allows users to access services and information quickly and efficiently through their devices (Fricitarani et al., 2023). Mobile-based sales systems provide convenience in buying and selling transactions, as shown by Johnson's (2019) research which found that mobile sales applications can improve operational efficiency and simplify inventory management through real-time stock monitoring and automatic transaction recording (Kurniawan, 2023). Dart, a programming language developed by Google, is designed for rapid front-end application development across multiple platforms and is often used in conjunction with Flutter, a framework that enables the creation of responsive and high-performance user interfaces. According to Brown (2018), Dart has advantages in terms of ease of use, performance, and support for fast and efficient mobile app development. Flutter, as an open-source framework, enables fast and cost-effective application development with a single codebase, and provides rich and flexible widgets for attractive and responsive UI design, as described by (Azhari et al., 2023).

Definition of System

A system is a collection or group of subsystems, parts, or components of any kind, whether physical or non-physical, that are interconnected with each other and work together harmoniously to achieve a single goal (Asari, 2018; Kartini et al., 2022)." Meanwhile, according to Mulyani, "a system can be interpreted as a set of subsystems or components that work together with the same goal to produce a predetermined output."

Definition of Flutter

Flutter is an SDK for developing high-performance mobile applications, applications for iOS and Android, from a single codebase created by Google with an open source license (Tjandra & Chandra, 2020).

Definition of Darts

Dart is a programming language developed by Google, designed for rapid application development across multiple platforms such as web, server, desktop, and especially mobile applications using the Flutter framework (Leonora & Ginting, 2023).

MySQL

MySQL is one type of database server that is very popular, this is because MySQL uses SQL as the basic language to access its database. MySQL is Open Source, this software comes with source code (the code used to create MySQL) (Winanjar & Susanti, 2021).

3. METHOD

The research method used in this research begins with observation, which is observing the problems that occur in operational activities. Then proceed with interviews, to obtain information about the problems faced and get a direct perspective from the partners. Followed by field studies, collecting data directly, and validating findings from observations and interviews, and getting more accurate data. Then the literature study to add references and enrich knowledge about the topics discussed (Ariyanti et al., 2020; Ibrahim et al., 2023).

The system development method used is Extreme Programing, a method that uses an Object-Oriented approach, suitable for small-scale teams that are expected to be able to deal with rapid changes.

Planning

This stage is the initial stage in system development, where several planning activities are carried out such as identifying problems, analyzing needs, to determining the schedule for implementing system development. In the planning stage, the main goal is to deeply understand user needs and expectations. Through interviews, observations, and field studies, user requirements were collected. The owner and staff of dRs Snack provided input regarding the problems they faced with the manual record-keeping system and the features they wanted in the new application. The list of desired features and issues that needed to be addressed was compiled in the product backlog. Each backlog item was described in detail, including its priority based on urgency and benefit to users.

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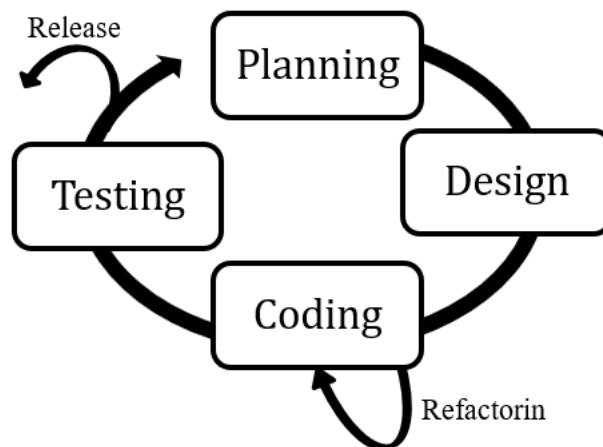


Fig.1 Extreme Programming Method

Design

In this stage, interface modeling, system modeling, and database modeling are carried out. The design stage focuses on creating a system design and application architecture that will be developed. Creating a user interface prototype that is intuitive and easy to use by dRs Snack staff. UI/UX design is done by considering ease of navigation and accessibility to speed up the process of recording and processing data.

Coding

This stage is a continuation of the design stage that has been made into the form of a user interface using the Dart programming language. In this stage, a more efficient data structure is built. The coding phase is where the design is implemented into executable code. The development team works collaboratively and performs pair programming (two programmers working together on one computer) to improve code quality and speed up task completion. Refactoring is making continuous improvements and enhancements to the code to improve the efficiency, readability, and maintainability of the code. Refactoring is done without changing the functionality of the application.

Testing

After coding is complete, the system testing stage is carried out to find out whether there are errors that appear when the application is being used, and to find out whether the system built is in accordance with the needs. After completion, it can only be released (Cholis, 2021). Testing is a key component in XP to ensure that the application functions as expected. The application is tested based on real usage scenarios faced by dRs Snack staff. This testing includes all the main features such as order recording, payment calculation, and sales recap generation. End users (dRs Snack owners and staff) were given the opportunity to try the application and provide feedback. This feedback is used to make further improvements and adjustments before the app is fully launched.

4. RESULT

Design Stage

During the design phase, the design is implemented in accordance with the user requirements identified through the interview process, observation, and field studies. The owner and personnel of dRs Snack provided feedback on the issues they encountered with the manual recording system and the features they desired in the new application. During this phase, a preliminary inventory of the desired system features and the issues that must be resolved is also recorded and subsequently organised in the product backlog.

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Activity Diagram of Proposed System

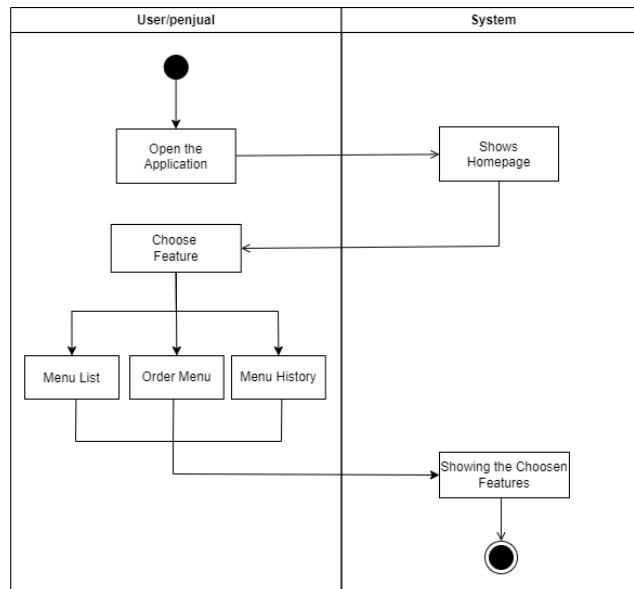


Fig 2. Activity Diagram of Proposed Homepage

It represents how a proposed system will operate. This diagram is used to design a new solution by describing the proposed workflow.

Use Case Diagram

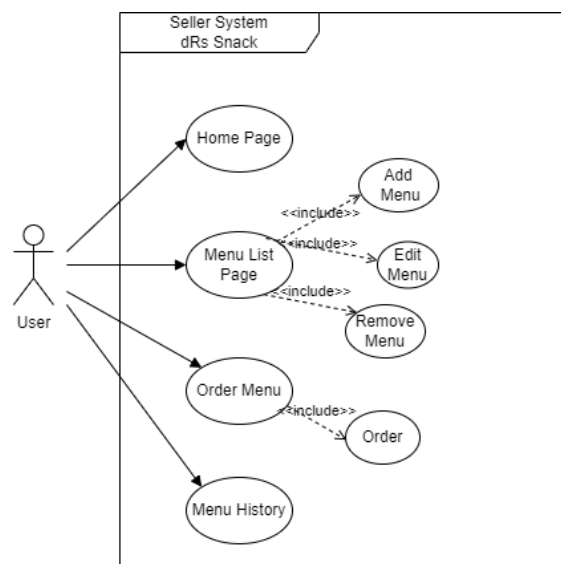


Fig.3 Usecase Diagram of DRs Snack Application

Use cases identify the functionality that the system has, the user's interaction with the system and the relationship between the user and the system functionality (Setiyani, 2021). The use case uses a scenario which is a description of what the user does with the system or vice versa. The following use case for the DRs Snack application:

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Entity Relationship Diagram (ERD)

Entity-Relationship Diagram (ERD) yang telah dibuat untuk aplikasi dRs Snack mencakup entitas utama yang terkait dengan manajemen menu dan pesanan. Berikut gambarannya:

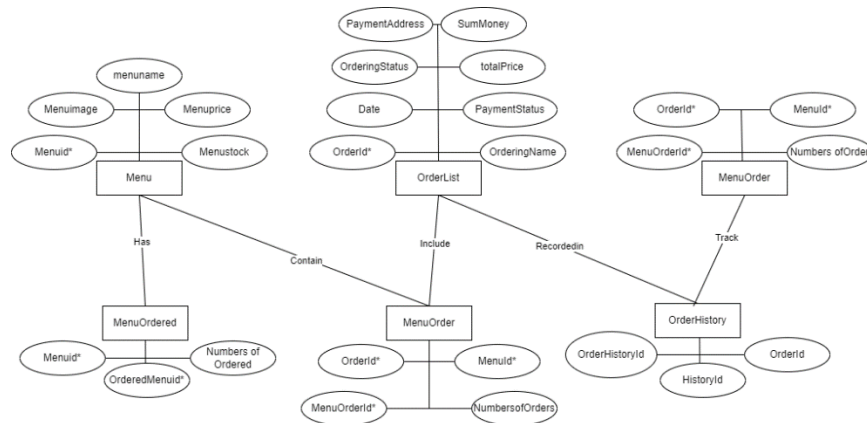


Fig.4 Entity Relationship Diagram

This ERD provides a clear picture of how data related to menus, orders, and customers are organized and interconnected in the application, thus enabling effective and efficient data management.

Sequence Diagram

A diagram that describes the behavior of objects in a use case by clarifying the life time of objects and the messages sent and received between objects. To create a sequence diagram, it is important to know the objects involved in a use case and the methods owned by the class that is instantiated into the object.

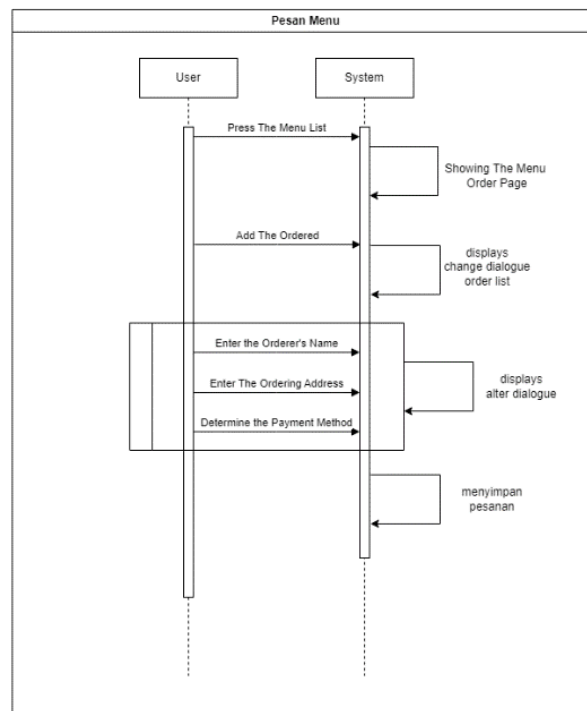


Fig.5 Add Menu Sequence Diagram

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This diagram helps understand the interaction and data flow between the user, user interface, application server, and database in the process of adding menus.

System Flowchart

The "Menu List" flowchart describes the process flow to display the list of menus available in the application.

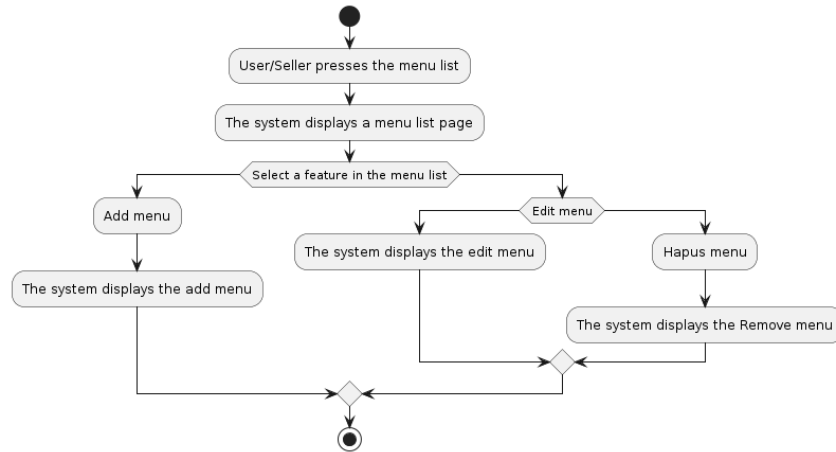


Fig.7 Menu List Flowchart

System Implementation

At the system implementation stage there is a user interface of the mobile-based Based DRS Snack Sales Application.



Fig.8 Homepage

The interface of the "DRS SNACK" app has several main functions. The app's logo and name serve as a visual identity. The "Today's Order Transaction" section displays the number of orders and daily revenue, helping users monitor sales performance. The three navigation icons at the bottom of the screen open the menu list page, menu order

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page, and order history respectively, allowing users to view the menu, place orders, and access order history. The status bar at the top of the screen shows the time, data usage, and battery level, providing users with important information at a glance.



Fig.8 Menu List

The figure above is a screenshot of the "Menu List" page in the "DRs Snack" app. This page displays several food items complete with photos, names, prices, and the amount of stock available. Each menu item has two icons on the right to edit or delete the item. At the bottom of the screen is an "Add Menu" button that allows users to add new menu items.



Fig. 9 Menu Message

On this page, the buyer user can place an order by clicking the "+" symbol which then, the order amount can be

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seen between the "+" and "-" symbols, the "-" symbol functions as reducing the menu to be purchased, or maybe clicking the wrong menu that you want to order.

Blackbox Testing

Blackbox test is a software testing method that focuses on application functionality without regard to the internal structure or application code (Wibowo et al., 2023). Black Box testing is done by running the application with the aim of finding errors and checking whether the system can run properly as needed. The following is a Black Box testing table (Aziz et al., 2020).

Table 1
BlackBox Test

No.	Testing	Test Case	What to expect	Testing Results	conclusion
1.	When clicking the menu list feature	Click the menu list feature	Menu list page displayed	As expected	Valid
2.	Edit Menu	Click the edit icon in the menu list feature	Display alterDialog edit menu	As expected	Valid
3.	Delete Menu	Click the delete menu icon in the menu list feature	A confirmation popup is displayed whether to delete or not.	As expected	Valid
4.	Order menu	Click the message button on the menu message feature	Order list alterdialog displayed after adding an order	As expected	Valid
5.	Order History	Click the desired date	Display the list of orders in the selected date	As expected	Valid

From the test results above, it can be concluded that all features tested in the DRs Snack application function properly and in accordance with the expected specifications. This test shows that the application has met the needs of users in terms of recording orders, editing menus, deleting menus, ordering, and tracking order history.

5. DISCUSSIONS

The application design process for DRs Snack began with identifying user requirements through interviews and observations. An application architecture design was created to cover key components such as order recording, payment calculation, and sales recap. A user interface design (UI/UX) was created to ensure ease of use, with initial prototypes tested by users to obtain feedback.

At the implementation stage, the design was translated into code with development done iteratively. Key features such as order recording, automatic payment calculation, and sales recap were developed and tested by end users. This implementation aims to reduce human error and improve efficiency in dRs Snack operations.

Testing showed that all the main features functioned as expected. The menu list, edit menu, delete menu, ordering, and order history features were tested with real usage scenarios and the results were valid. The entire application was successfully tested and is ready to be used to improve operational efficiency at dRs Snack.

6. CONCLUSION

After designing the system and implementing it through the sales application that has been created, and based on the data analysis and discussions that have been conducted, it can be concluded that the system designed for menu and order management has been proven to improve operational efficiency. The implementation of this system is able to reduce the time required for order processing and improve the accuracy of data related to stock and revenue. With the integrated system, customer service can be improved and reduce human error in summarizing the total payment and ensure accuracy in payment. In addition, the system enables better data analysis, especially in monitoring order history and sales recap to improve sales reports. This research contributes significantly to optimizing business operations and improving the quality of customer service at dRs Snack.

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