



The Design of Quick Response Code Incoming Information Systems at POS SPP Bandung Based on Android

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Abstract

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This study aims to analyze, design, and build an information system at POS SPP Bandung. The authors obtained the necessary data using observation, interviews, and literature studies from several previous studies. Based on employee observations and interviews, the system in POS SPP incoming division was less efficient, because it took two employees to run the item scan system. The goal to be achieved is that the information system that we have designed can help the process of receiving goods or items to be more accurate and faster. And as it only requires one employee to carry out the process of receiving goods, making it more effective and efficient. Therefore, in this study, an Android-based item input information system design was made using UML and implemented with the Java programming language and MySQL as a database and quick response code feature for the scanning process.

Keywords: Information system, Scan items, Androids, UML

Abstrak

Penelitian ini bertujuan untuk menganalisis, merancang dan membangun sistem informasi di Pos SPP Bandung. Penulis memperoleh data yang diperlukan menggunakan metode observasi, wawancara, serta studi pustaka dari beberapa penelitian sebelumnya. Berdasarkan observasi dan wawancara pegawai, sistem yang berada di divisi incoming SPP Bandung saat ini kurang efisien, karena dibutuhkan dua orang pegawai untuk bisa menjalankan sistem scan item di incoming. Tujuan yang ingin dicapai yakni sistem informasi yang kami rancang dapat membantu proses penerimaan barang atau item menjadi lebih akurat dan cepat. Serta hanya membutuhkan satu orang pegawai untuk dapat menjalankan proses penerimaan barang, sehingga lebih efektif dan efisien. Oleh karena itu, dalam penelitian ini dibuat suatu perancangan sistem informasi input item berbasis android menggunakan UML dan diimplementasikan dengan bahasa pemrograman java serta MySQL sebagai database dan fitur quick response code untuk proses pemindaian.

Kata-kata kunci: Sistem informasi, Scan item, Android, UML



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1. Introduction

QR code or Quick Response code is a code in bars or white and black boxes that can store various kinds of information such as links, numbers, short messages, and others that can be scanned by a smartphone using a camera [1].

The Postal Processing Center (SPP) Bandung 40400 has the functions of planning, organizing, implementing and controlling, as well as being in charge of implementing the Collecting, Processing, Transporting, Delivery and Reporting (CPTD-R) policies effectively and efficiently in its working area.

There are several work units or divisions at the SPP Bandung post office, one of which is the incoming division, which has a role in receiving and sorting items or packages originating from branch posts in the Bandung area. There are six types of packages, namely, Special Express Packages (PKH), Economic Jumbo Packages (PJE), Ordinary Postal Packages (PPB), Express Packages (PE), international packages and local packages. Items or packages that have been sorted will be handed over to different divisions according to their type.

Based on the observations and interviews, the system at SPP Bandung was less efficient because it took two employees to run the incoming scan system; one employee operated a computer, and the other did a QR code scan of the item.

The goal to be achieved is that the information system that we have designed can help goods or items receipt to be more accurate and faster. And as it only requires one employee to carry out the process of obtaining goods, making it more effective and efficient.

2. Method

a. Materials for Designing a System or Application

1) Database

The database is a structured collection of data. So that it can add, access, and process data stored in computer databases, a database management system is needed [2].

2) Unified Modeling Language (UML)

UML (Unified Modeling Language) is one of the most reliable tools in the world of object-oriented system development that allows system developers to create a blueprint for their vision in a standardized, easy-to-understand form [3].

3) Java

Java is one of the programming languages used in making native android applications. This programming language is multiplatform, meaning that it works on various platforms, such as desktop, android, and even the Linux operating system [4].

4) Android

Android is an operating system for Linux-based mobile devices that includes an operating system, middleware, and applications. Android provides an open platform for developers to create their applications [5].

b. Method

1) Data Collection Technique

a) Observation

Observation refers to a data collection technique done by conducting direct observations and researching whether the system under study exists or not in the information systems study program. The authors made direct observations to get data on the packages or items managed by the incoming division.

b) Interview

An interview is one method of collecting data to obtain information that will be used by asking several questions. The authors conducted direct interviews with the employees in the incoming division to acquire information data on deficiencies or problems contained in the system used that day.

c) Qualitative research case studies

Case studies are qualitative research in which researchers conduct in-depth exploration of programs, events, processes, and activities against one or more people. A case is bound by time and activity, and the researcher collects detailed data using various data collection procedures and in a continuous time [6].

2) Software Development Method

The design of this system uses the waterfall method. The waterfall model provides a sequential software life flow approach starting from analysis, coding, design, and testing. The following are the stages of the waterfall method:

a) Software Requirements Analysis

A process of gathering requirements is carried out to specify the software requirements needed by the user.

b) Design

Software design is the process of translating software requirements from the requirements analysis stage to a design representation to be implemented into a program at a later stage.

c) Coding

Design Programs must be translated into software programs. The result of this stage is a system that has been in the form of a program or application by the design that has been made at the design stage.

d) Testing

Testing focuses on the software's *logic* and functionality and ensures that all parts have been tested. This is done to minimize errors and ensure that the output produced is as desired. In this study, the testing method used was black box [7].

3. Results and Discussion

a. Software Requirements Analysis

1) Use Case Diagram

Use case is a series or description of a group that is interrelated and forms a system regularly that is carried out or supervised by an actor [8]. In Figure 1, there are two actors, namely admin and employees. Actions that can be taken by admins are logging in, adding employee accounts, managing items, and managing reports. While it is almost the same as admin, employees cannot add accounts. The Use Case Diagram is presented in [Figure 1](#).



Figure 1. Use Case Diagram

2) Activity Diagram

Activity diagram models the workflow of business processes and the sequence of activities in a process. This diagram is similar to a flowchart because it models the workflow from one activity to another or from activity to state [9]. An activity diagram is the development of a use case that has a flow.

Figure 2 describes the activity or workflow when inputting data items, starting from logging in. If the login is successful, users enter the dashboard display which has three menu options for items input, namely the mixed item menu, international item menu, and local item menu. The employee selects the menu according to the type of item to input. After that, the employee performs the data item input process. Activity diagram is presented in **Figure 2**.

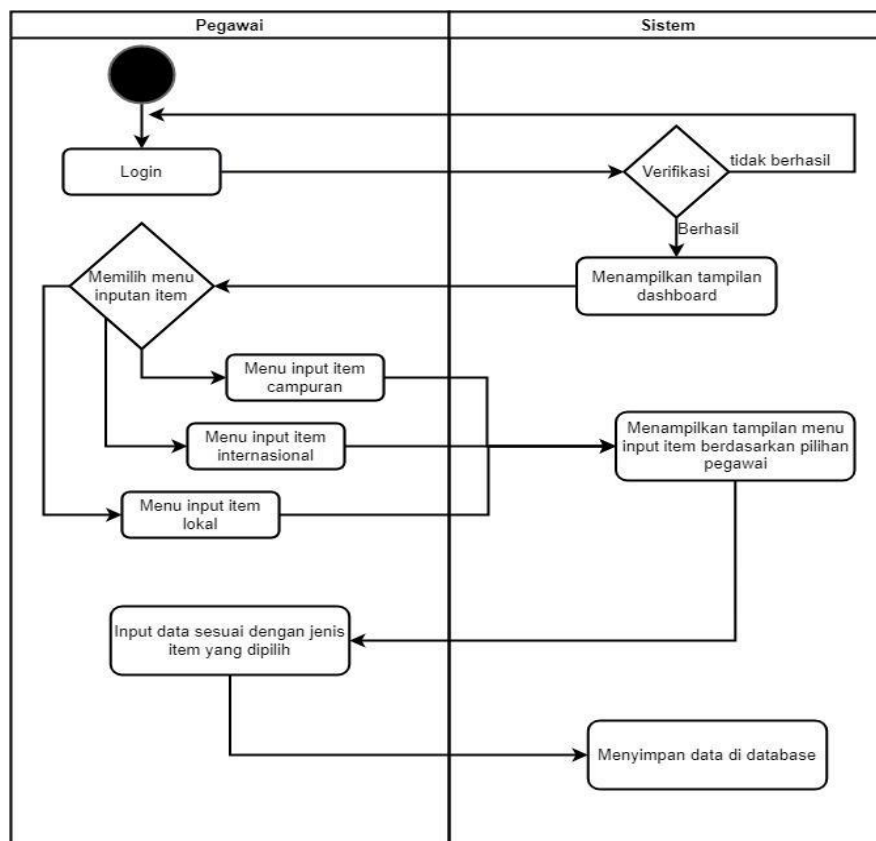


Figure 2. Activity Diagram

3) Class Diagram

The class diagram describes the system's structure in terms of defining the classes that will be created to build the system [10]. Figure 3 illustrates the class diagram of the Sipos system. The admin class and employee are derived from the user. Mixed item, international_item, and local_item are instances or children of the item class. The mixed_origin, international_origin, and local_origin are the children of the parent class, namely the

item_origin class. Meanwhile, the report class is based on the parent classes, which consist of the user class, the item origin class, and the item class. Class diagram is presented in **Figure 3**.

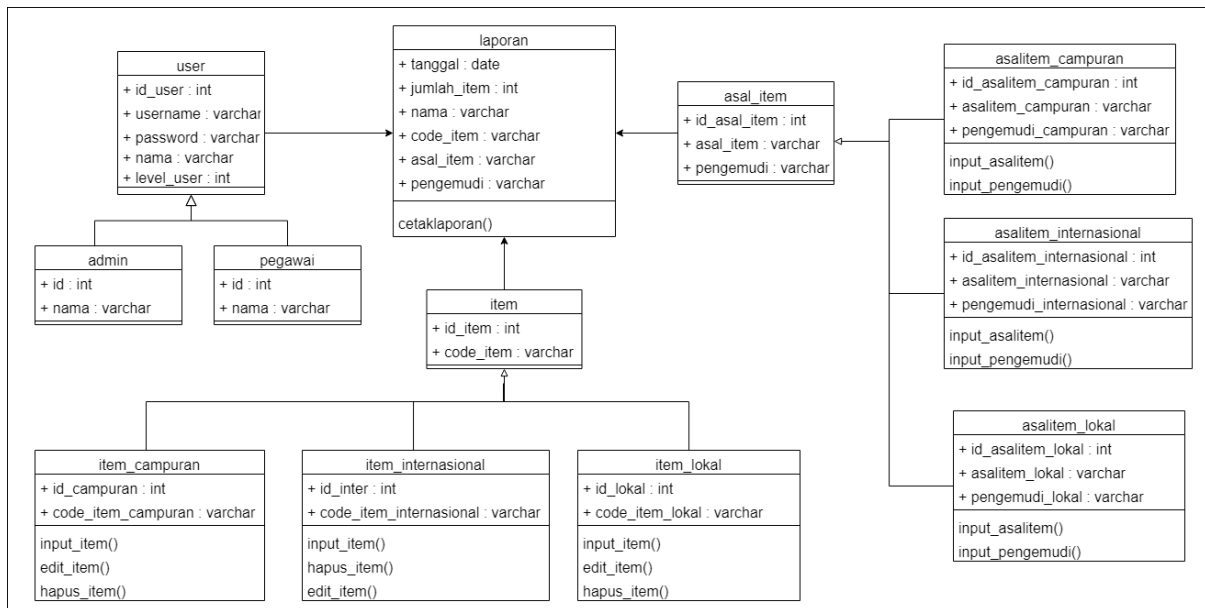


Figure 3. Class Diagram

b. Design

1) Login Display

It refers to the view is the initial view when the application is opened. This is where the user performs the login process by entering the username and password and then proceeding by clicking the login button. Figure 4 represents the above statement. Login page is presented in **Figure 4**.



Figure 4. Login Page

2) Display Dashboard Page

The admin dashboard display will appear after the user has finished the login process. The appearance of the employee dashboard is almost the same as that of admin, but there are no additional employee features and user data. PKH PID PPB, International, and local are three types of options that users can choose to enter items according to their item.

Meanwhile, report is an option to display report data based on data items that have been entered by the user. Add employee is an option to display the add employee form, and the last is user data, which is the option to display user data who can log in to the application. The dashboard page is presented in [Figure 5](#).



Figure 5. Dashboard Page

3) Display of Item Data Input Page

This appears when the user selects the PKH, PID, PPB option on the dashboard page. In this view, the user enters item data. There are two techniques for entering item data. First is user types the item code and then clicking the button with the plus icon. Second is user enters the item data by scanning the barcode or QR code on the item; by pressing the scan icon button located at the bottom right corner. The page is presented in [Figure 6](#).

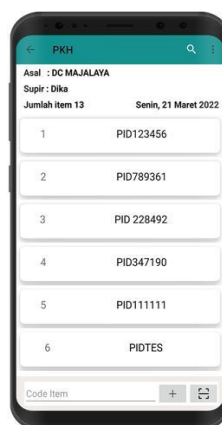


Figure 6. Item Data Input Page

4) The Item Origin Input Page

Displays when the user enters data from the item. First, the user click the dot button located at the top right corner. After that, a form will appear at the bottom of the screen, which is then filled in by the user. The item origin input display is presented in [Figure 7](#).



Figure 7. Input Origin of the Item Page

5) Add User Page

Is the display that appears when the user selects add user on the dashboard page, and this is among the user features that can only be done by the admin. The display of the added user page is presented in [Figure 8](#).



Figure 8. Add User Page

6) User Data Page

User data display appears when the user selects the option to add data contained on the dashboard page. On this page, the system displays all application user data. And this page can only be accessed by the admin. The user data page display is presented in [Figure 9](#).

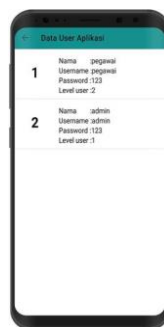


Figure 9. User Data Page

7) Report Data Page

Report page displays when the user selects the report menu on the dashboard page. On the report page, there are three options, namely, mixed item reports, international item reports, and local item reports. The display of the report page is presented in **Figure 10**.



Figure 10. Report Data Page

c. Testing

Black box testing is a test that is only carried out on the functional requirements of the system or another name, namely behavior testing [11]. Login testing is presented in **Table 1**.

Table 1. Login Testing

Activity Test	Expected Realization	Test Results	Conclusion
Opening the application.	Entering the login.	Displaying the login page.	Successfully
Entering username and password, then pressing the login button.	Validate username and password with data in the database.	Validation was successful.	Successfully

Input and displaying data testing is presented in **Table 2**.

Table 2. Input and Displaying Data Testing

Activity Testing	Expected Realization	Test Results	Conclusion
Entering mixed item data, international items, and local items by typing manual code	Data successfully saved and then displayed according to its type	Data is saved to a database and then displayed according to type.	Successfully
Entering mixed item data, international items, and local items using the scan QR code feature.	Data was successfully saved and displayed according.	Data is saved to a database and then displayed according to type.	Successfully

Testing report data download is presented in **Table 3**.

Table 3. Testing Report Data Download

Activity Test	Expected Realization	Test Results	Conclusion
Download mixed item reports, international items, local items Downloaded.	Report data in accordance with the data contained in the database.	Report data successfully downloaded.	Successfully

4. Conclusion

This research produces a data input system using the Java programming language and My SQL database. This application consists of a login page, dashboard page, item input page, added user page, user data page, and report page. In general, the users of this item data input application system are admins and employees. This application can speed up the input of goods data to employees, especially during entering goods data.

This application has three types of goods input, namely mixed, international, mixed goods data input. Its features include input data, delete data, edit data, search data, and print reports. The application created by us is a beta version and can be developed further.

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