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Web Based Application for Borrowing Inventory Items (Case Study at English Course Institution for Adults in Jakarta)

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Abstract— *Inventory management is an activity that belongs to all institutions because all institutions have inventory items. Activities in inventory management generally consist of data collection as a whole, expenditure of goods, receipt or procurement of goods, transfer of goods, borrowing, etc. In an Institute for English courses for adults in Jakarta often borrow inventory items to the warehouse in order to fulfill the completeness of decorations, furniture, or other inventory items needed for an event. Then for the current system, borrowing inventory items uses two methods, namely by email or telephone. This has an impact on the process of checking the availability of inventory items which takes longer because when the branch wants to borrow inventory items, to record and check the availability of inventory items the warehouse staff must be done manually. Inventory borrowing application is a web-based Inventory borrowing application. This application is built to facilitate the warehouse staff and branch staff in carrying out borrowing activities. In this study the authors used the SWOT analysis method, for the design using UML, and the SDLC development method. The hope is that web-based inventory borrowing applications can help branch staff and warehouse staff in borrowing, recording and checking inventory item availability.*

Keywords— *Inventory Items, Borrow, WEB, SWOT*

I. INTRODUCTION

Inventory represents one of the biggest numbers in a company's balance sheet, the effective inventory, and control is a critical function to help indemnify the persistent and continued success of operational, distribution and manufacturing of modern business entities[1]. Inventory management is an activity that belongs to all institutions because all institutions have inventory and other inventory items. Activities in inventory management generally consist of data collection as a whole, expenditure of goods, receipt or procurement of goods, transfer of goods, borrowing, and etc.[2]. Institutional course inventory is the recording or registration of goods belonging to a course institution into an inventory list of goods in an orderly and according to applicable provisions and procedures. An important inventory is carried out on non-consumable goods that are purchased through government funds, or obtained as exchanges, gifts or grants as well as the results of their own manufacturing efforts in the course institutions to support the teaching and learning process[3]. At English courses institution for adults in Jakarta often holds events. Like Halloween, Independence day celebration, additional classes (Life Club) and etc. Where at these events, each branch often borrows inventory items to the warehouse in order to fulfill the completeness of decorations, furniture, or other inventory items needed in these

additional events or classes. Then for the current system, borrowing inventory items uses two methods, namely by email or telephone. This has an impact on the process of checking the availability of inventory items which takes longer because when the branch staff wants to borrow inventory items, for recording and checking the availability of inventory items, the warehouse staff must do it manually and the first borrowed branch is not served first. From these problems, an application is needed that can facilitate branch staff and warehouse staff in borrowing inventory items and the warehouse staff in checking the availability of inventory items and recording.

A. Research Problems

Based on the background described above, then the outline of the problem is:

- 1) How to design and build Web Based Application for Borrowing Inventory Items?
- 2) How can branch staff and warehouse staff be able to record and check the availability of inventory items through the application that will be built?
- 3) How can branch staff and warehouse staff create report data about borrowing inventory items through the application that will be built?

B. Limitation of Research

In order for the research to be conducted is not too widespread, there are limits to this research:

- 1) Scope and case studies are conducted at an English Course Institution for adults in Jakarta.
- 2) Not all inventory items can be borrowed.
- 3) The numbering of inventory items will not be discussed here.
- 4) This application is limited to borrowing and checking the availability of inventory items, recording and reporting.
- 5) This application does not yet provide an inventory item receipt.
- 6) This application does not yet provide notification feature.

C. Objectives and Benefits

The expected goal and the benefits of this research are:

- 1) The application can be as a branch staff tool in borrowing inventory items.
- 2) Branch staff can check the availability of inventory items to be borrowed.
- 3) Branch staff and warehouse staff can make reports about borrowing inventory items.

II. STUDY OF LITERATURE

A. Previous Research

The Online Rental Car System By Sastikar et al. 2017[4]. The result is with web-based car rental management information system, could improve the time efficiency of rental history data transmission after using this application. The time difference in delivery becomes shorter to seconds compared to not using a web application. Data storage which is already computerized will ease the process for company in the data storage, retrieval and report, where all data stored in a database that creates data security and data processing process so that rental data stored neat, clear and not lost or spilled.

Rental House Management System By Gommans et al. 2014[5]. In conclusion, the software can be used as an inventory system to provide a frame work that enables the managers to make reasonable transactions made within a limited time frame. Each transaction made on the system go hand in hand with the data being updated in the database in our case it is Microsoft Access 2007 which is the back end.

The Application Inventory Control Systems in Warehouse By Ndlala et al. 2017[6]. The paper reveals that employing inventory control comes with a big price. There are many problems that an organization needs to attend to. It is evident that ineffective inventory control is the main problem. Furthermore, companies in developing countries do not use the basic inventory control techniques.

Web Based Application for Rental Car Using Object Oriented Analysis and Design Methods with Unified Approach By Gumilar et al. 2013 [7]. With the design of a new web-based system developed, the data needed is stored in a centralized system database that is expected to facilitate the search and processing of data and with the proposed system that is new to vehicle lending has accommodated existing business activities, among others, makes it easier for operators to do recording and searching data.

Application for Borrowing Goods in the Company Using RFID Technology By Dani Yusuf, 2017[8]. The result is Information systems for borrowing assets can help administration work become easier and company asset data becomes more computerized, the borrowing process and company asset reports can be easily presented.

B. Inventory Items

Inventory comes from the Latin "inventarium" which means a list of goods, materials and so on. [3] Inventory represents one of the biggest numbers in a company's balance sheet, the effective inventory, and control is a critical function to help indemnify the persistent and continued success of operational, distribution and manufacturing of modern business entities[1]. Inventory management is an activity that belongs to all institutions because all institutions have inventory and other inventory items. Activities in inventory management generally consist of data collection as a whole, expenditure of goods, receipt or procurement of goods, transfer of goods, borrowing, and etc[2].

C. Waterfall Development

Waterfall Development is the original structured design methodology still used today. With waterfall development-based methodologies, the analysts and users proceed in sequence from one phase to the next. This methodology is referred to as waterfall development because it moves forward from phase to phase in the same manner as a waterfall. Although it is possible to go backward in the SDLC (e.g., from design back to analysis), it is extremely difficult [9].

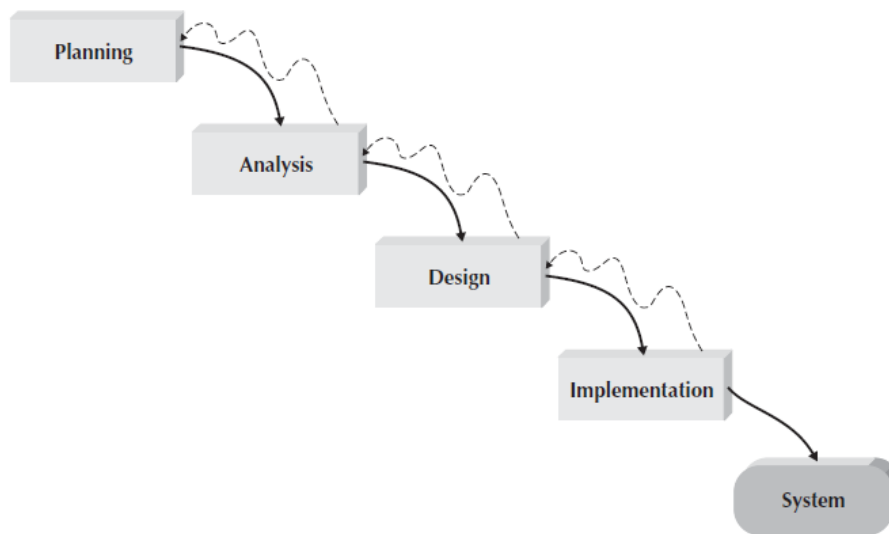


Figure 1 Waterfall Development

1. Planning
Planning Phase is a fundamental process for understanding why a system must be built and determining how the project team will build it.
2. Analysis
During this phase, the project team analyzes the current system, identifies opportunities for improvement, and develops concepts for the new system.
3. Design
This phase decides how the system will operate, in terms of hardware, software, network infrastructure, user interfaces, forms, reports, program specifics, databases, and files that will be needed. Although most strategic decisions about systems are made in developing system concepts during the analysis phase, the steps in the design phase determine exactly how the system will operate.
4. Implementation
The final phase in waterfall development is the implementation phase, where the system is built. This is the phase that usually gets the most attention, because for most systems it is the single most expensive part of the development process.

D. SWOT Analysis

SWOT Analysis, which stands for Strengths, Weaknesses, Opportunities and Threats analysis, is a system or process of considering the internal and external factors affecting the performance of an organization in relation to competitor or market situation[10]. SWOT Analysis is a strategic planning framework used in evaluation of an organization, a plan, a project or a business activity. SWOT Analysis is therefore a significant tool for situation analysis that helps the managers to identify organizational and environmental factors. SWOT Analysis has two dimensions: Internal and external. Internal dimension includes organizational factors, also strengths and weaknesses, external dimension includes environmental factors, also opportunities and threats [11].

E. Website

The website is a collection of interconnected web pages and the files are interrelated. The website consists of pages, and a collection of pages called the homepage. The homepage is in the top position, with related pages below it. Usually every page below the homepage is called a child page, which contains hyperlinks to other pages on the web. Website is one application that contains multimedia documents (text, images, sounds, animations, videos) in it that use the HTTP protocol (hyper text transfer protocol) and to access it using software called a browser [12].

F. UML

UML (Unified Modelling Language) is one of the most widely used language standards in the industry to define needs, create analysis & design, as well as describe the architecture in object-oriented programming [13]. UML can be used to visualize, determine, build, and document artifacts from incentive software systems. Software architecture makes UML diagrams to help develop software [14].

III. RESEARCH METHODS

A. Research Flow

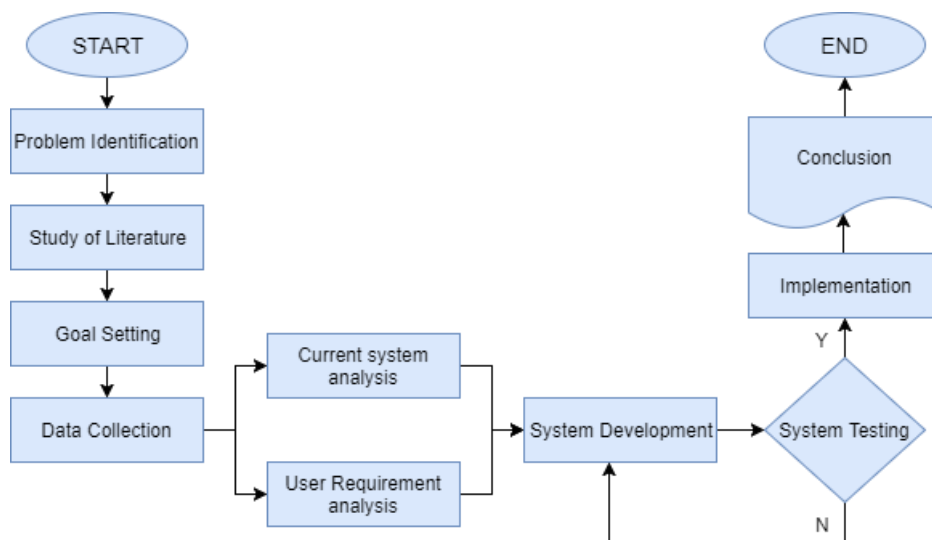


Figure 2 Research Flow

Based on figure 2 there are 10 core stages that will be carried out in this study. Starting from problem identification, literature study, goal setting, data collection, etc.

1. Problem Identification, this stage is to find out the problems regarding the process borrowing inventory items.
2. Literature Study, this step is to find references that will later be used to solve existing problems.
3. Goal Setting, this stage determines what will be done next to solve existing problems.
4. Data Collection, stages to collect data from observations and interviews at the research case study site.
5. Current System Analysis, the stages in which the current system is analyzed can identify problems that arise in more detail.
6. User Requirements Analysis, stages to adjust from the stage of determining the goal is in accordance with what the user wants.
7. System Development, the stage where you start to design the system and start making applications.
8. System Testing, stages where the system is tested before it can be used live.
9. Implementation, the stage where the system has been tested and can be used immediately by the user.
10. Conclusion, the stage when the system has been successfully implemented, then concluded whether the application is as expected or not.

B. Analysis Method

SWOT analysis [11] comparing the chances of external factors (opportunities) and threats (threats) with internal power factors (strengths) and weaknesses (weaknesses).

The explanation of SWOT as follows:

Table 1 Swot Analysis

	Current system	Proposed system
Strengths	<ul style="list-style-type: none"> ➤ Communication relationships between branch staff and warehouse staff are good. ➤ Procedure for borrowing items using e-mail or telephone. 	<ul style="list-style-type: none"> ➤ With the application for borrowing inventory items, communication between branch and warehouse staff in the process of borrowing goods is getting better, especially in terms of checking item availability and recording. ➤ Borrowing of inventory items is made easier by the web-based application.
Weakness	<ul style="list-style-type: none"> ➤ Detailed information on borrowing inventory items is sometimes unclear. ➤ The process of checking the availability of inventory items takes a long time. ➤ For recording of borrowing inventory items still uses a manual system. 	<ul style="list-style-type: none"> ➤ Information on availability of inventory items is clear. ➤ Minimize the time of checking the availability of inventory items that take a long time if checked by manual. ➤ For recording of borrowing inventory item automatically using the system.
Opportunities	<ul style="list-style-type: none"> ➤ Good internet connection and telephone. 	<ul style="list-style-type: none"> ➤ With web-based application for borrowing inventory items, the details of items, recording and checking the availability of inventory item can be done easily.
Threats	<ul style="list-style-type: none"> ➤ Miss communication between branch staff and warehouse staff. ➤ Lack of human resources that understand IT 	<ul style="list-style-type: none"> ➤ Warehouse and branch staff are more integrated ➤ Training is held on how to use this application.

C. Use Case Diagram

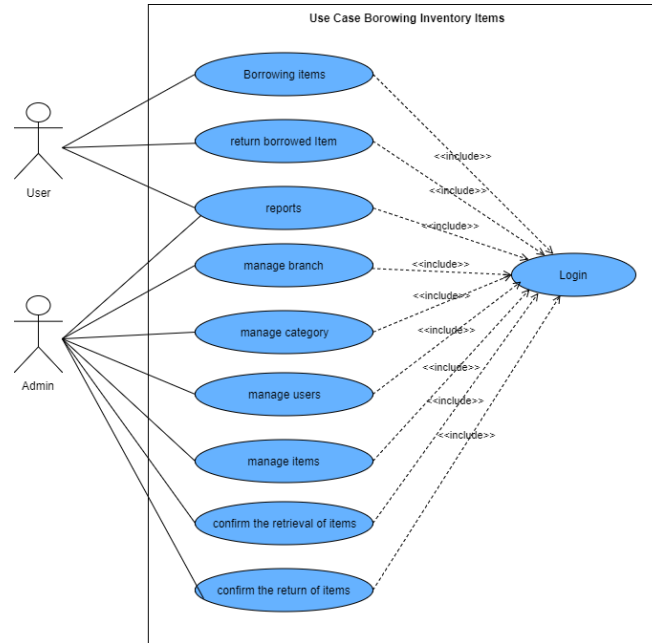
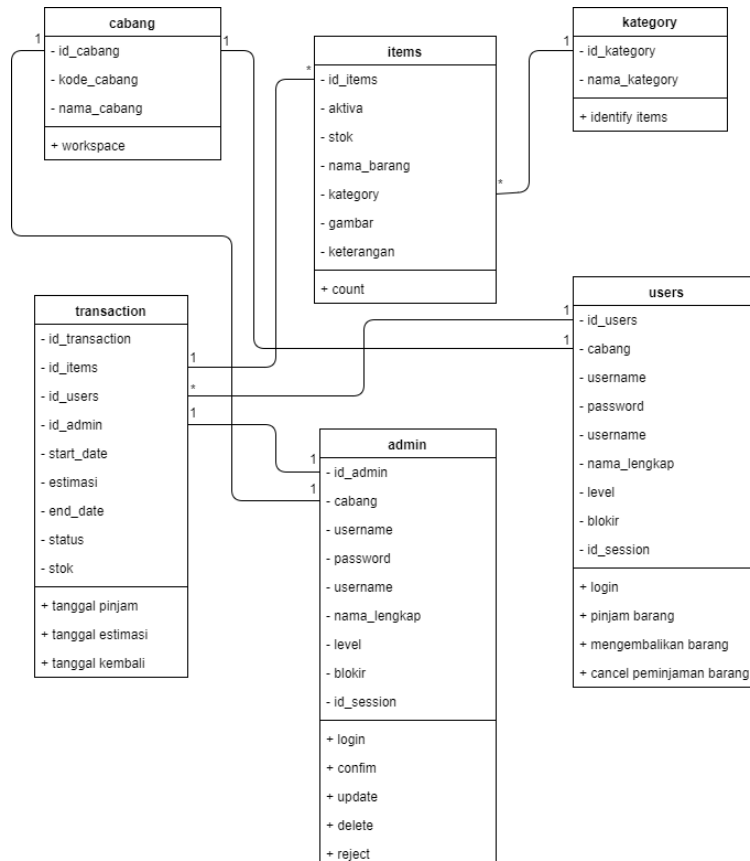


Figure 3 Use Case Diagram

The results of this study are described in the form of Unified Modelling Language (UML) and User Interface (UI) design. Use case diagrams describe the main functions of a system and the various types of users that interact with it. The use case is used to identify and communicate the requirements for the system to programmers who must create a system. Figure 3 describes in use case there are 2 actors namely user and admin. Interaction in the system described user and admin can perform certain activities in borrowing inventory items, managing user & managing inventory items, and etc.

D. Class Diagram



E. System Testing

1. System Testing Login

Login (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty your username and password, then immediately click the Login button.	There is an error message that requires you to fill in your username and password.	Corresponding
2.	Fill in the username that has not been registered and fill in the password randomly, then click the Login button.	There is an error message that contains "Gagal Login, Cek Username dan Password".	Corresponding
3.	Fill in the username that has been deleted by the admin, then click the Login button.	There is an error message that contains "Gagal Login, User Sudah Tidak Aktif".	Corresponding
Login (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Enter username and password correctly, then click the Login button.	Login is successful and the user is directed to the main page according to the role of the user.	Corresponding

2. System Testing Borrowing Inventory Items

Borrowing Inventory Items (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty form borrowing inventory item, then immediately click the Submit button.	The system does not save requests	Corresponding
Borrowing Inventory Items (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	fill in the borrowing form and click the submit button	The system save the request	Corresponding

3. System Testing Return Borrowed Items

Return Borrowed Items (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Click the confirm button on the item to be returned.	The system save the data and will appear to the system admin	Corresponding

4. System Testing Reports

Reports (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty form report, then immediately click the Submit button	The system does not display reports.	Corresponding
Reports (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Fill in form report, then immediately click the Submit button	The system display reports.	Corresponding

5. System Testing Manage Branch

Manage Branch (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty form branch, then immediately click the Submit button	The system does not save data.	Corresponding
Manage Branch (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Fill in form branch, then immediately click the Submit button	The system save the data	Corresponding

6. System Testing Manage Category

Manage Category (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty form category, then immediately click the Submit button	The system does not save data.	Corresponding
Manage Category (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Fill in form category, then immediately click the Submit button	The system save the data	Corresponding

7. System Testing Manage Users

Manage Users (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty form user, then immediately click the Submit button	The system does not save data.	Corresponding
Manage Users (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Fill in form user, then immediately click the Submit button	The system save the data	Corresponding

8. System Testing Manage Items

Manage Items (Negative Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Empty form Item, then immediately click the Submit button	The system does not save data.	Corresponding
Manage Items (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Fill in form item, then immediately click the Submit button	The system save the data	Corresponding

9. System Testing Confirm of Retrieval of Items

Confirm of Retrieval of Items (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Click the confirm button on the item the user has taken	The system save the data and will appear to the system user	Corresponding

10. System Testing Confirm The Return of Items

Confirm The Return of Items (Positive Case)			
No	Test Scenario	Results Expected	Conclusion
1.	Click the confirm button on the item that the user has returned.	The system save the data	Corresponding

F. System Implementation

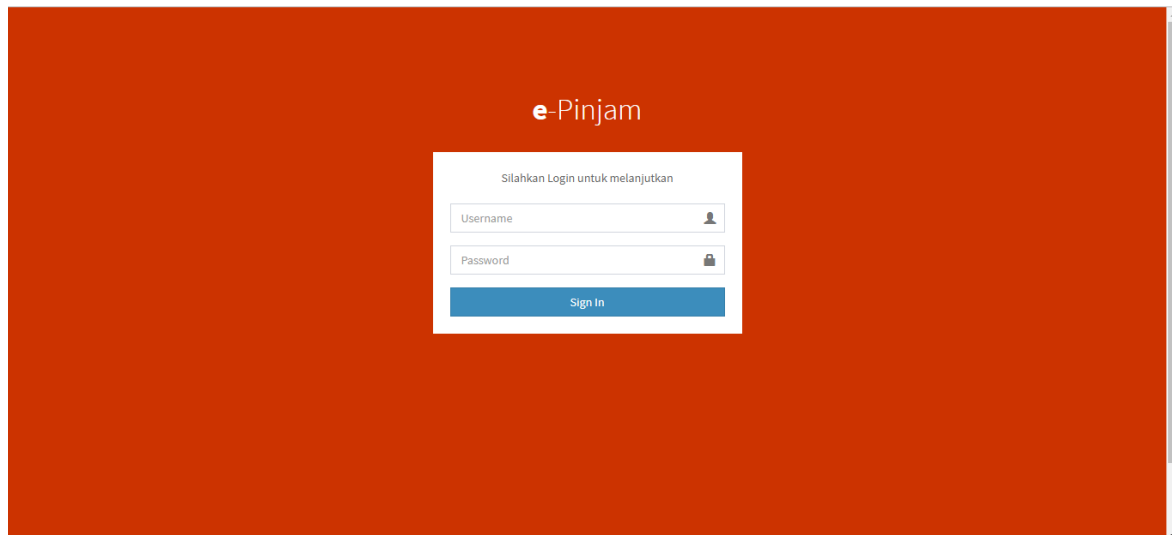


Figure 4 Screenshot Login

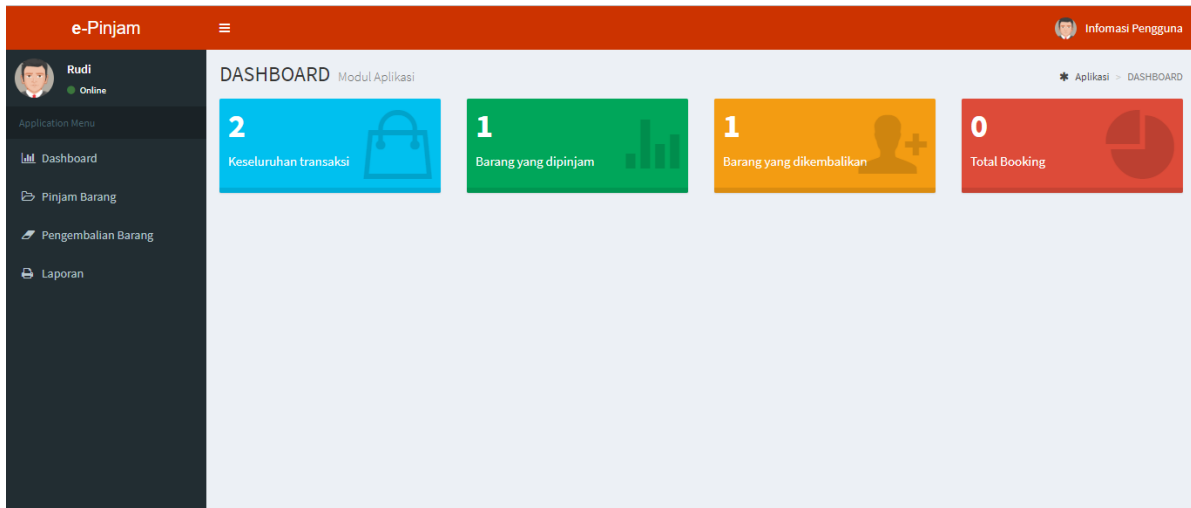


Figure 5 Screenshot Dashboard

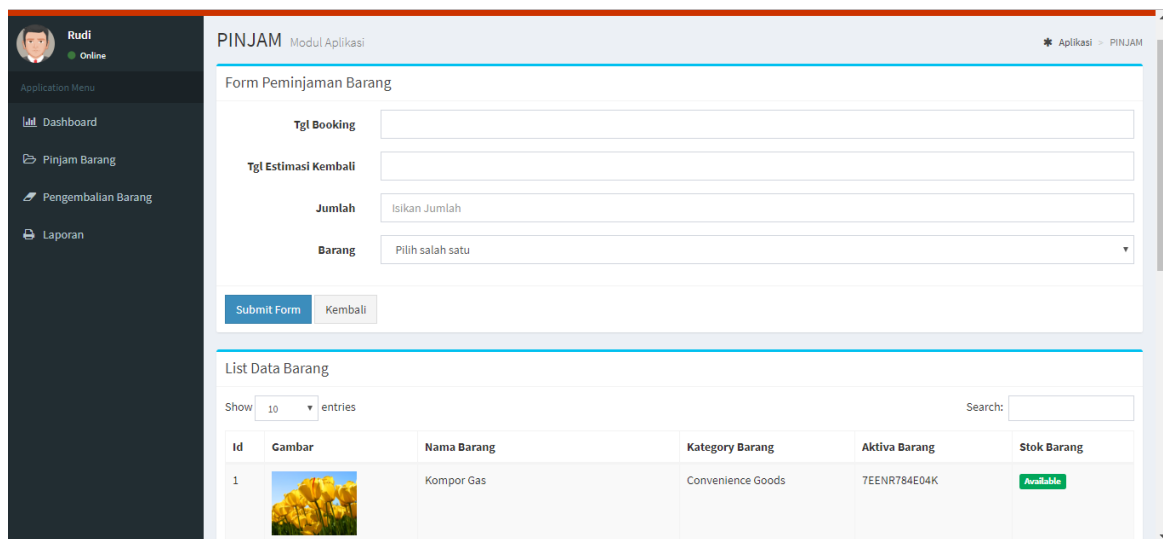


Figure 6 Screenshot Form Borrowing Inventory Item

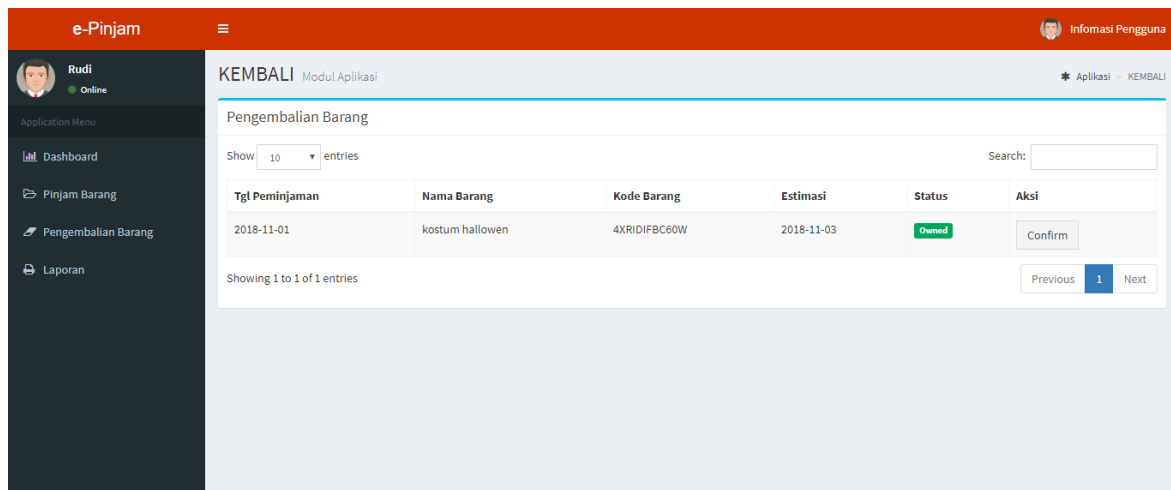


Figure 7 Screenshot Return of Borrowed Inventory Items

Report Status

Nama User	Nama Cabang	Nama Barang	No Barang	Tgl Peminjaman	Estimasi Kembali	Tgl Pengembalian	Status	Jumlah Barang
Rudi	Jakarta Sudirman	Kompor Gas	7EENR784E04K	2018-11-30	2018-11-30		Booked	0
Rudi	Jakarta Sudirman	PANASONIC Corded Phone	5AOWRV2BD4GS	2018-11-15	2018-11-17	2018-11-11	User Confirm	1
Rudi	Jakarta Sudirman	kostum halloween	4XRIDIFBC60W	2018-11-01	2018-11-03		Borrowed	1

Figure 8 Screenshot Reports

Figure 9 Screenshot Manage Users

Figure 10 Screenshot Manage Category

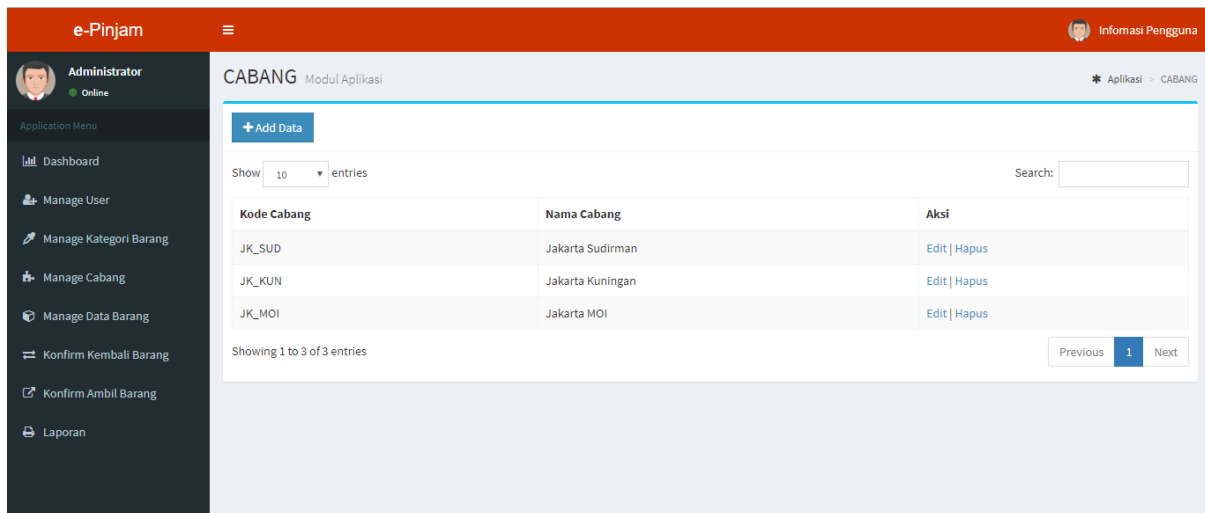


Figure 11 Screenshot Manage Branch

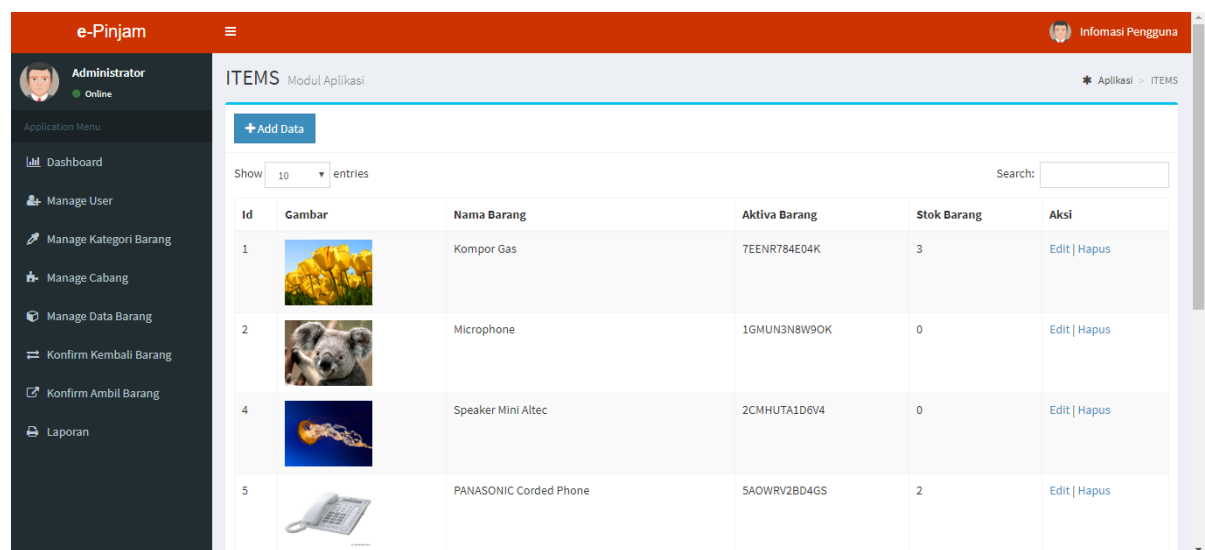


Figure 12 Screenshot Manage Inventory Items

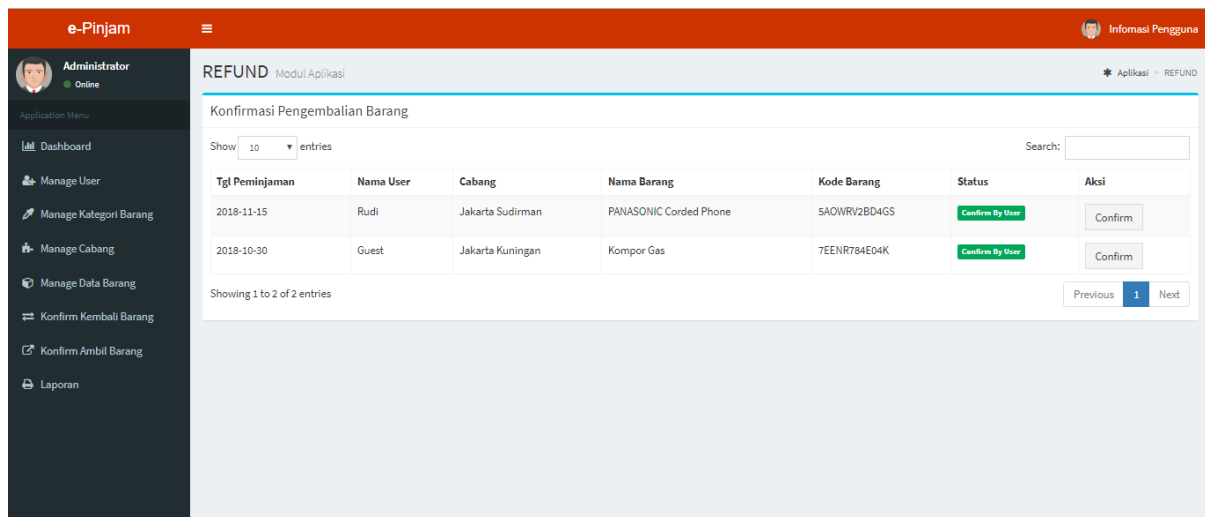


Figure 13 Screenshot Confirm The Return of Items

The screenshot shows the 'e-Pinjam' application interface. The main content area is titled 'BOOKING Modul Aplikasi' and 'Konfirmasi Pengambilan Barang'. It features a table with the following data:

Tgl Peminjaman	Nama User	Cabang	Nama Barang	Kode Barang	Status	Konfirm	Batal
2018-11-21	Rudi	Jakarta Sudirman	Kompas Gas	7EENR784E04K	Booked	Confirm	Cancel
2018-11-29	Guest	Jakarta Kuningan	Kompas Gas	7EENR784E04K	Booked	Confirm	Cancel
2018-11-22	Guest	Jakarta Kuningan	Kompas Gas	7EENR784E04K	Booked	Confirm	Cancel
2018-10-13	Guest	Jakarta Kuningan	Speaker Mini Altec	2CMHUTA1D6V4	Booked	Confirm	Cancel

The interface also includes a sidebar menu with options like 'Dashboard', 'Manage User', 'Manage Kategori Barang', 'Manage Cabang', 'Manage Data Barang', 'Konfirm Kembali Barang', 'Konfirm Ambil Barang', and 'Laporan'. The bottom of the screen shows 'Copyright © 2018 Personal Corporation. All rights reserved.' and 'Ver 1.0'.

Figure 14 Screenshot Confirm of Retrieval of Items

IV. CONCLUSIONS

After being described application, the application for borrowing inventory items can be concluded:

1. This application is useful as an e-Borrow by utilizing web-based technology that can facilitate branch staff in performing inventory tracking activities, can be monitored with application activities that can be used to integrate an application.
2. This application can record and check the availability of inventory items so that branch staff can find out the status of availability of inventory items.
3. This application can display loan loan report data according to the desired period of branch staff or warehouse staff.

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