

## DESIGN AND CONSTRUCTION OF WEB-BASED INVENTORY APPLICATION AT PT PLN ICON PLUS MEDAN BRANCH, NORTH SUMATERA REGION

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**Abstract:** Inventory is something that is always present in a large or small company regardless of the value of the inventory. Inventory is a material or goods that are stored that will be used to fulfill a specific purpose. The processing of work and supporting device data at PT PLN Icon Plus currently still uses an online spreadsheet application from Google which results in the processing of device/equipment data and inventory reports (stock) being ineffective and difficult to find links every time you access the spreadsheet application. The purpose of this study is to design and build a web-based computer application with the Model, View, Control (MVC) Codeigniter technique to process incoming and outgoing data of work and supporting devices where the benefits of the study can provide convenience to PT PLN Icon Plus employees in processing incoming and outgoing data of work and supporting devices. The application design in this study uses the Waterfall and UML methods. With the MVC Codeigniter technique, it is easy for the author to build this application in a structured manner and the results of the implementation of this application make it easier for employees to process goods data more efficiently.

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### INTRODUCTION

PT PLN Icon Plus is a subsidiary of PT PLN (Persero) which is engaged in information and communication technology, especially telecommunications network connectivity. In September 2022, PLN Icon Plus will have the status of a PLN subholding where PLN Icon Plus will not only act as PLN's IT Enabler but will also be the spearhead of PLN in building business lines outside of electricity or Beyond kWh. In carrying out its operations, PT PLN Icon Plus provides work and supporting devices so that telecommunications network connectivity can continue to run well where these devices or equipment must be managed properly so that information

regarding inventory (stock) can be easily accessed. Data processing of work devices and support at PT PLN Icon Plus currently still uses an online spreadsheet application so that all records of incoming and outgoing goods still use the application which often results in discrepancies caused by human error. Although the data can be accessed online, it still causes difficulties in finding links every time the spreadsheet application is accessed. This results in ineffective processing of device or equipment data and inventory reports.

According to Aji and Pratmanto (2021) in their research which discusses the design of a goods inventory information system to overcome the problem of recording expenses and income of goods which is still done manually, namely with Ms. Excel because the application cannot store data and information centrally in a database, so that there is often a discrepancy between the information obtained and data loss caused by human error (Aji & Pratmanto, 2021). Computer technology which is increasingly developing has become a tool that is widely used by companies or agencies in data processing. The use of well-systematic computer technology is able to support the process of processing data into information effectively and efficiently according to the needs of the company or agency that uses it. Users can easily get the information they need to improve their services (Kabes, 2019). Based on the problems faced and previous research literature, PT PLN Icon Plus needs a computer application so that inventory data management can be carried out centrally. The purpose of this study is to design and build a web-based computer application with the Codeigniter Model, View, Control (MVC) technique to process outgoing and incoming data for work and supporting devices where the benefits of the research can provide convenience for PT PLN Icon Plus employees to process outgoing and incoming data for work and supporting devices.

According to Novria et al. (2022) Application is a part of computer software that is created with a computer program to be used to perform a task desired by the user. An application is a ready-to-use program that can be used to run a number of commands from problem solving that uses one of the application data processing techniques on a computer or smartphone with the aim of obtaining more accurate

results and in accordance with the purpose of creating the application (Novria et al., 2022). According to Abdullah, a website can be interpreted as a collection of pages containing digital data information in the form of text, images, animations, sound and video or a combination of all of them that are provided via an internet connection so that they can be accessed and viewed by everyone around the world. Website pages are created using a standard language, namely HTML. This HTML script will be translated by a web browser so that it can be displayed in the form of readable information (Susilawati et al., 2020).

## **RESEARCH METHODS**

### **Research Stages**

The stages that the author carried out in this study followed the stages of the software development life cycle (SDLC) method, namely waterfall (Hafni & Irwan, 2022). Waterfall is one of the SDLC models that uses a systematic and sequential approach (Ningsih & Nurfauziah, 2023) starting from the system requirements level then moving on to the analysis, design, coding, testing/verification stages (Amrin et al., 2020). The sequential development flow contained in the waterfall method is as follows (Tjahjanto et al., 2022):

1. Requirement Analysis. At this stage, the author collects data to determine the scope of existing needs. Then, he carries out the data analysis process, namely the process of collecting the required data with data collection techniques which are then processed and presented to answer the research problems (Santoso et al., 2024).
2. Design, namely the application design stage where the author uses the Unified Modeling Language (UML) design.
3. Program Code (Coding), namely the stage of writing application program code that is built according to the design stage.
4. Testing, namely the trial stage of the application that has been built at the program code stage to ensure that all parts of the application run according to the design stage.
5. Implementation, namely the application implementation stage to be operated by

users. In addition, at this stage, maintenance is also carried out in the form of improving the implementation of system units, correcting errors, and improving the system according to needs.

### Method of Collecting Data

The data collection methods used in this study are observation and literature study (Siahaan et al., 2017). The observation method used can be in the form of direct observation or sensing of an object, condition, situation, process or behavior (Yusra et al., 2021), while literature study is looking for references from scientific sources that support related research (Moto, 2019).

### Application Design Using UML

Unified Modeling Language (UML) is a standard specification language used to document, specify and build software. UML is a methodology in object-oriented system development and is also a tool to support system development (Pohan et al., 2022). Some UML diagrams that the author uses in this study include the following:

#### Use Case Diagram

Use case diagram is a modeling for the behavior of the information system to be created. Use case describes an interaction between one or more actors with the information system to be created. Roughly, use case is used to find out what functions are in a system and who has the right to use those functions (Sopriani & Purwanto, 2023).

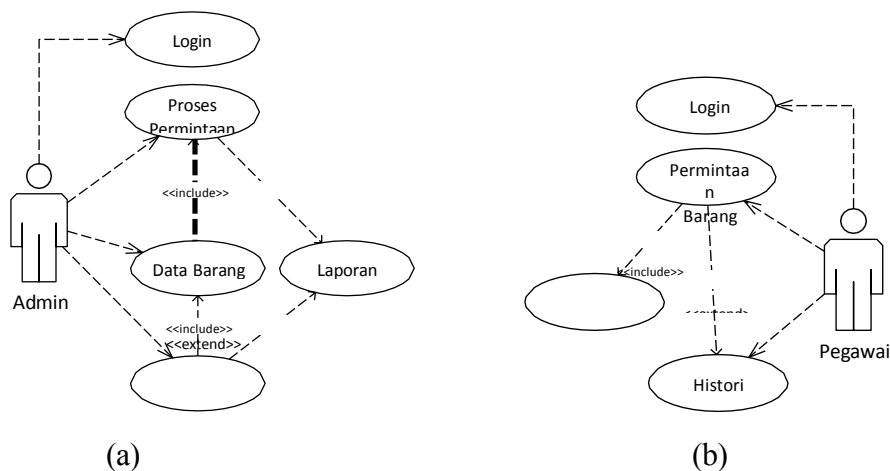


Figure 1. (a) Application Use Case Diagram Design for Admin; (b) Use Case Application Diagram Design for Employees

### Activity Diagram

An activity diagram is something that explains the flow of activities in a program that is being designed, how the process starts, the decisions that may occur, and how the system will end (Sandfreni et al., 2021).

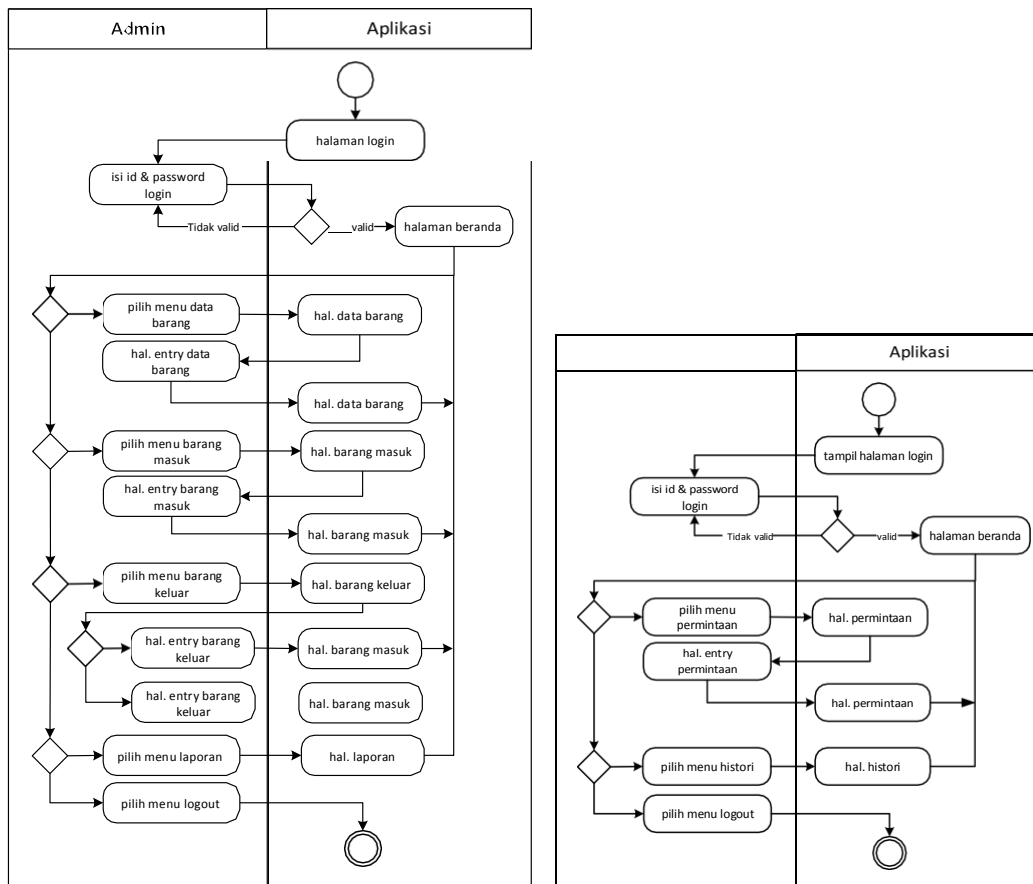


Figure 2. Application Activity Diagram Design

### Class Diagram

Class Diagram is a specification that when instantiated will produce an object and is the core of object-oriented development and design (Andhika et al., 2022).

### Sequence Diagram

The function of Sequence Diagram is to focus on identifying methods in the system. Sequence Diagram is used to explain and model use cases (Sutrisno & Karnadi, 2021).

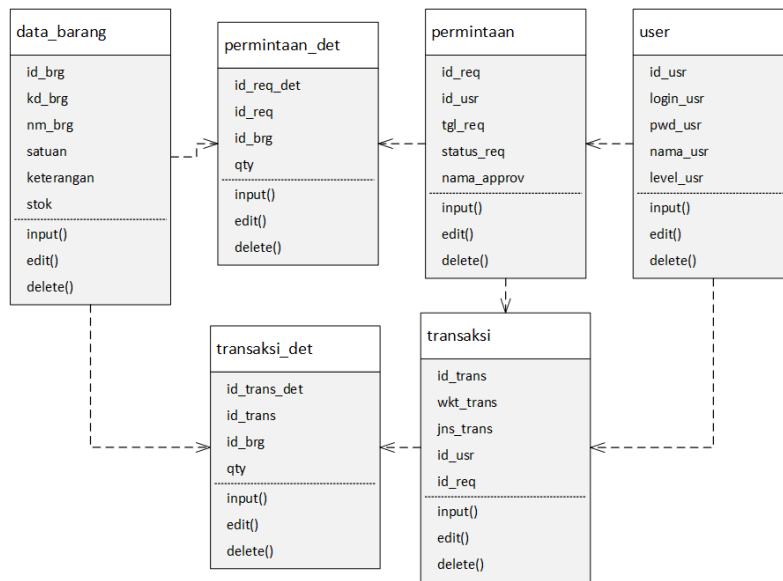


Figure 3. Application Class Diagram Design

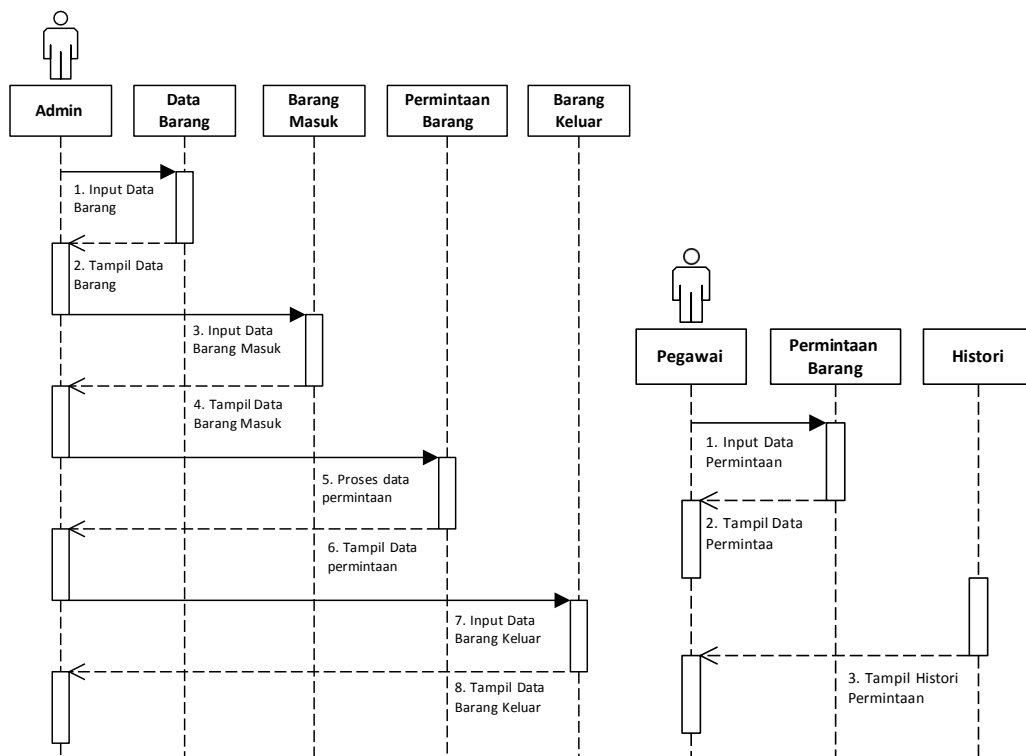


Figure 4. Application Sequence Diagram Design

**Model, View, Controller**

Model View Controller (MVC) is a concept introduced by the inventor of Smalltalk (Trygve Reenskang) to make one type of network data packet into another type of data along with the processing (model) of the manipulation process

(controller) (Kadarsih & Andrianto, 2022).

1. Model, Is a part of the program code that handles the database. The contents of the model are parts (functions) that are directly related to the database to manage data such as entering data, updating data, deleting data in other words, data manipulation, but cannot be directly related to the view (Ramadhani et al., 2024).
2. View, is a part of the program code used to manage the program interface or display, from data input to the program output display.
3. Controller, is a part of the program code that connects the model and view. The controller contains commands that are responsible for processing data and sending it to the program interface. The controller functions to receive requests and data from the user and then determine what should be processed by the application.

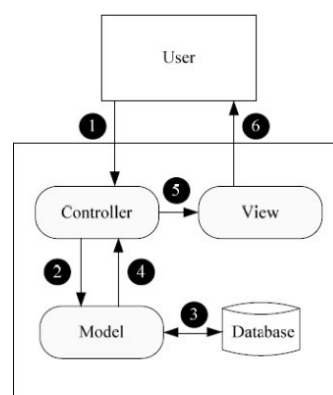


Figure 5. MVC architecture (Suendri, 2018)

## RESULTS AND DISCUSSION

### Login Page

The Login page is used to verify application users. In accordance with the design of the use case above, application users have two levels, namely admin and employees as guests. Guest level users can submit requests for goods while admin level users can process unit data, goods, incoming goods, outgoing goods, requests for goods from guests, and user management.

### Incoming and Outgoing Goods Page

Transactions of incoming and outgoing goods are distinguished on each page but with the same display design. Transactions of incoming and outgoing goods can only be done by users with admin level. Transactions of incoming goods will automatically

increase the stock of goods while transactions of outgoing goods will automatically decrease the stock of goods. Information on stock of goods can be seen on the goods data page.

Figure 6. Login Page

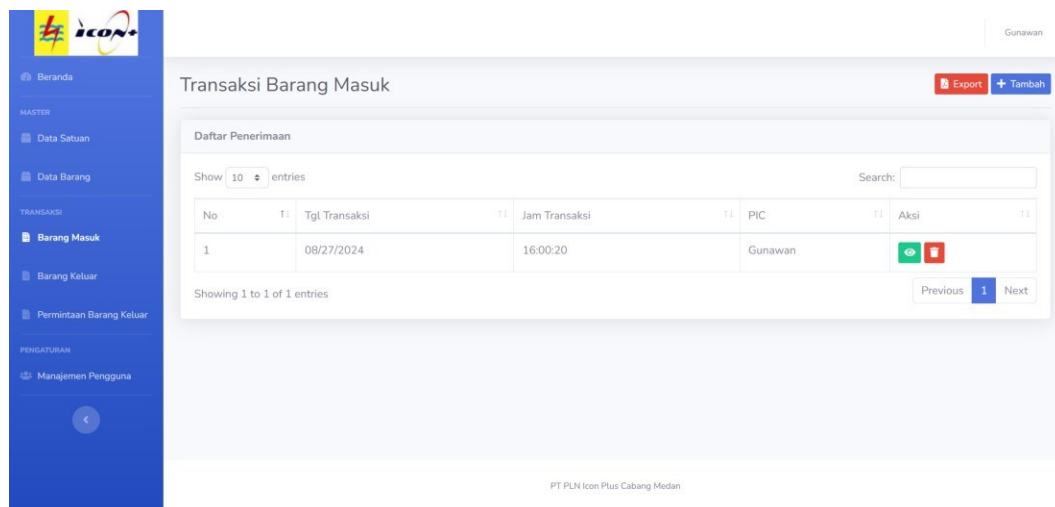


Figure 7. View Incoming Goods Transaction Data Page

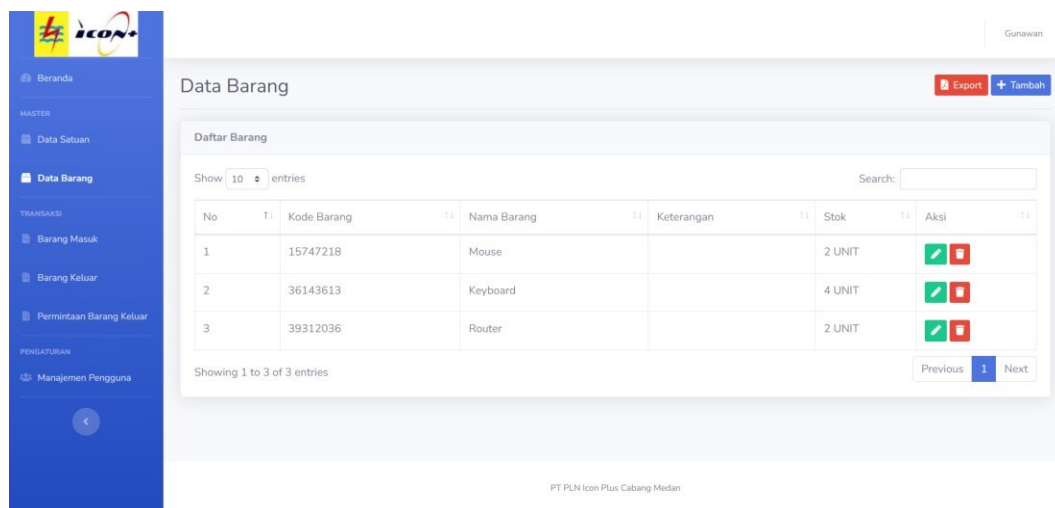


Figure 8. View Item Data Page



### Item request page

The item request page can be accessed by both guest and admin level users. Only guest level users can submit item requests (figure 7), while admin level users will process incoming request data (figure 7). The number of items that can be approved by admin level users in the item request process can also be edited to be adjusted based on the remaining stock of items (figure 8). Furthermore, guest level users can find out the status of the application made, namely processed, approved or rejected.

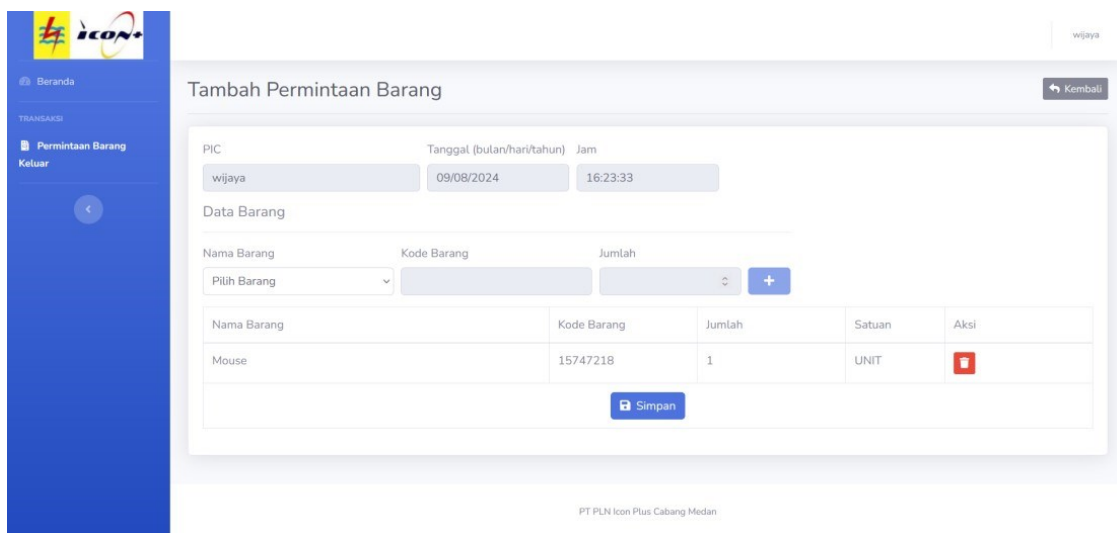


Figure 9. Add Item Request page

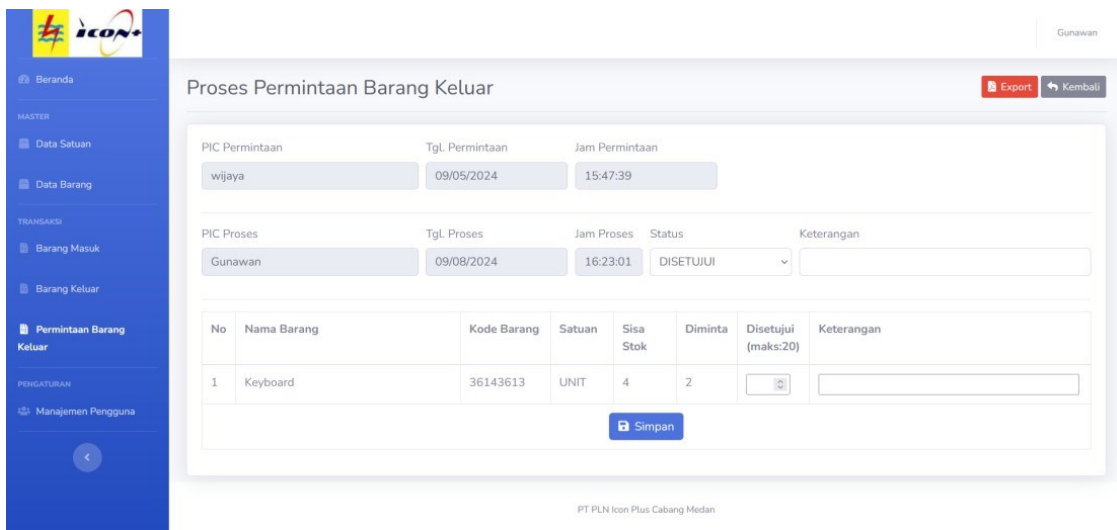


Figure 10. Add Item Request page

## CONCLUSION

The entire process of executing the application program code always starts from the Controller as the regulator of the next program code execution processes, namely processing data (retrieve, add, change, delete) in the database through the Model and sending the data to each page through the View or directly calling the page through the View. With the MVC technique, the process of building this web-based inventory application becomes easier and more structured so that the author can easily find application errors when running. This inventory application has been successfully built and implemented at the PT PLN Icon Plus Medan Branch office so that the processing of inventory data at the PT PLN Icon Plus Medan Branch office becomes more efficient. This application implements single sign on where the application is able to identify the user level with only one login display so that the person in charge of the data processed in the application can be easily identified. This web-based inventory application has limitations when run via mobile devices because the screen size of the mobile device is limited so that the appearance of this inventory application is less than optimal. In subsequent research, this inventory application can be developed into a mobile-based application.

## REFERENCE

- Aji, S., & Pratmanto, D. (2021). SISTEM INFORMASI INVENTORY BARANG MENGGUNAKAN METODE WATERFALL. *Indonesian Journal on Software Engineering (IJSE)*, 7(1), 93–99. <http://ejournal.bsi.ac.id/ejurnal/index.php/ijse>
- Amrin, A., Larasati, M. D., & Satriadi, I. (2020). Model Waterfall Untuk Pengembangan Sistem Informasi Pengolahan Nilai Pada SMP Kartika XI-3 Jakarta Timur. *Jurnal Teknik Komputer AMIK BSI*, VI(1), 135–140. <https://doi.org/10.31294/jtk.v4i2>
- Andhika, D. I., Muharrom, M., Prayitno, E., & Siregar, J. (2022). RANCANG BANGUN SISTEM PENERIMAAN DOKUMEN PADA PT. REASURANSI INDONESIA UTAMA. *Jurnal Informatika Dan Teknologi Komputer*, 2(2), 136–145.
- Hafni, H., & Irwan, I. (2022). Perancangan sistem Pencatatan Kreatif Siswa Berbasis Desktop Pada SMK N 9 Medan. *KOMIK (Konferensi Nasional Teknologi Informasi Dan Komputer)*, 6(1). <https://doi.org/10.30865/komik.v6i1.5875>

- Kabes, R. R. F. (2019). PENGARUH PENGGUNAAN SISTEM KOMPUTERISASI TERHADAP KINERJA PEGAWAI PADA DINAS PENDIDIKAN, PEMUDA DAN OLAHRAGA KABUPATEN FAKFAK. *Jurnal Ekonomi Peluang Fakultas Ekonomi Dan Bisnis UKIM*, 13(2), 291–304.
- Kadarsih, K., & Andrianto, S. (2022). IMPLEMENTASI MODEL VIEW CONTROLLER (MVC) DALAM RANCANG BANGUN SISTEM INFORMASI PERPUSTAKAAN SMK NEGERI 2 OKU SELATAN. *Jurnal Teknik Informatika Mahakarya (JTIM)*, 5(1), 63–69.
- Moto, M. M. (2019). Indonesian Journal of Primary Education Pengaruh Penggunaan Media Pembelajaran dalam Dunia Pendidikan. *Indonesian Journal of Primary Education*, 3(1), 20–28.
- Ningsih, W., & Nurfauziah, H. (2023). PERBANDINGAN MODEL WATERFALL DAN METODE PROTOTYPE UNTUK PENGEMBANGAN APLIKASI PADA SISTEM INFORMASI. *Jurnal Ilmiah Metadata*, 5(1), 83–95.
- Novria, R., Kurniawan, B., & Suryanto, S. (2022). Aplikasi Pemesanan Makanan Di Bebek dan Ayam Tekaeng Menggunakan Php dan Mysql. *Jurnal Informatika Dan Komputer (JIK)*, 13(1), 15–26.
- Pohan, M. I., Hariyanto, E., & Izhari, F. (2022). Pengacakan Soal Ujian Online Berbasis Web Menggunakan Algoritma Knuth Shuffle Pada SMK Gelora Jaya Nusantara Medan. *Bulletin of Information Technology (BIT)*, 3(4), 294–300. <https://doi.org/10.47065/bit.v3i1>
- Ramadhani, A., Permana, A. A., Yansah, A. A., Fahriza, A. S., & Hendry, H. (2024). Perancangan Aplikasi Manajemen Surat Keluar Responsive Dengan Bootstrap Berbasis Web. *Bulletin of Computer Science Research*, 4(4), 368–375. <https://doi.org/10.47065/bulletincsr.v4i4.342>
- Sandfreni, S., Ulum, M. B., & Azizah, A. H. (2021). ANALISIS PERANCANGAN SISTEM INFORMASI PUSAT STUDI PADA FAKULTAS ILMU KOMPUTER UNIVERSITAS ESA UNGGUL. *Sebatik*, 25(2), 345–356. <https://doi.org/10.46984/sebatik.v25i2.1587>
- Santoso, M. I., Farta Wijaya, R., Sitorus, Z., Iqbal, M., & Marlina, L. (2024). ANALYSIS OF GOOGLE USER SENTIMENT TOWARDS UNIVERSITAS PEMBANGUNAN PANCA BUDI BASED ON REVIEWS GOOGLEUSING THE NAÏVE BAYES ALGORITHM. *Bulletin of Engineering Science, Technology and Industry*, 2(2), 226–238. <https://bestijournal.org>
- Siahaan, M. D. L., Elwiwani, E., Surbakti, A., Lubis, A. H., & Siahaan, A. P. U. (2017). Implementation of Simple Additive Weighting Algorithm in Particular Instance. *International Journal of Scientific Research in Science and Technology (IJSRST)*,

6(3), 442–447. [www.ijrst.com](http://www.ijrst.com)

- Sopriani, E., & Purwanto, H. (2023). PERANCANGAN SISTEM INFORMASI PERSEDIAAN BARANG BERBASIS WEB PADA PT. XYZ (DEPARTMENT IT INFRASTRUCTURE). *JSI (Jurnal Sistem Informasi) Universitas Suryadarma*, 10(1), 127–138.
- Suendri, S. (2018). PENERAPAN KONSEP MODEL VIEW CONTROLLER PADA PERANCANGAN SISTEM MANAJEMEN SOFTWARE BERBASIS WEB. *JISTech (Journal of Islamic Science and Technology)*, 3(2), 36–45.
- Susilawati, T., Yuliansyah, F., Romzi, M., & Aryani, R. (2020). MEMBANGUN WEBSITE TOKO ONLINE PEMPEK NTHREE MENGGUNAKAN PHP DAN MYSQL. *JTIM: Jurnal Teknik Informatika Mahakarya*, 3(1).
- Sutrisno, J., & Karnadi, V. (2021). APLIKASI PENDUKUNG PEMBELAJARAN BAHASA INGGRIS MENGGUNAKAN MEDIA LAGU BERBASIS ANDROID. *JURNAL COMASIE*, 04(06), 31–41.
- Tjahjanto, T., Arista, A., & Ermatita, E. (2022). Information System for State-owned inventories Management at the Faculty of Computer Science. *Sinkron : Jurnal Dan Penelitian Teknik Informatika*, 6(4), 2182–2192. <https://doi.org/10.33395/sinkron.v7i4.11678>
- Yusra, Z., Zulkarnain, R., & Sofino, S. (2021). PENGELOLAAN LKP PADA MASA PENDMIK COVID-19. *Journal Lifelog Learning*, 4(1), 15–22.