



Implementation of Extreme Programming in the Design of Hospital Daily Report Recapitulation System

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Abstract— This study seeks to understand the functionality, structure, and appearance of the Hospital Daily Report Recapitulation System at Hospital X in Bandung City. The information system design methodologies include extreme programming, data flow diagrams (DFD), context diagrams, and entity relationship diagrams (ERD), in addition to observation, interviews, and literature research. Using the programming language Visual Basic 2010 and the data storage tool Access 2019 from Microsoft. After the research was carried out, it turned out that the processing in the hospital daily report recapitulation system was still using a manual system using Microsoft excel as patient data information which resulted in making reports that had to be extra careful and thorough. In overcoming these problems, the author designs a hospital daily report recapitulation information system that processes patient data, moving patient data, outgoing patient data, and inpatient data to produce an output of the inpatient daily census recapitulation report in order to process data more efficiently and accurately and can also facilitate the preparation of reports needed to be faster, more complete, and precise.

Keywords— Daily Recapitulation, Design, Extreme Programming, System Information.

I. INTRODUCTION

In the rapid advancement of the 5.0 industrial revolution, the rapid growth of information technology, in healthcare services, many are competing to provide services to patients. The utilization of this technology in the scope of healthcare services, both medical and non-medical services, is one example (Bayu Ardhy Purbaningrat et al., 2023). The healthcare industry is only one of many that has been impacted by the recent surge in technological advancements, which have led to the digitization of medical records. Patients' identities, test results, diagnoses, treatments, and procedures are all part of their medical records. When a patient's medical history is organized and maintained using an electronic system, these records are known as electronic medical records. (Resolution No. 24, 2022, by the Minister of Health).

Referring to the above regulations, Hospitals are not exempt from Information Technology to support performance in providing services to patients. The efforts made by Hospitals to treat patients include the provision of inpatient care (Bayu Ardhy Purbaningrat et al., 2023). A hospital is an organization that deals with humans in the field of healthcare services. (Putu & Widana, 2019).

Especially in the Medical Record Reporting section, it is a unit tasked with providing statistical data on healthcare services and serving as a source of healthcare service information in the hospital (Diranti et al., 2023). Medical record documents themselves are highly confidential and may only be read or written with the patient's or the patient's family's consent according to the law. Files should not be outside the Medical Records room (Fitriany, 2023). In providing healthcare service statistical data, hospitals certainly need to conduct daily censuses. Hospital



daily census is the activity of recording or calculating inpatients performed every day in an inpatient ward for 24 hours (Diranti et al., 2023).

The implementation of an electronic-based system for inpatient daily census allows for more efficient and accurate data management. By implementing an electronic-based inpatient daily census system, it can streamline the workflow of the medical record unit. Electronic-based systems make it easier to generate reports and summaries based on recorded data (Nurhanifah & Ganesha, 2023).

In previous research on Medical Record Governance Analysis of Inpatient Daily Census Data using the waterfall method resulted in a summary report of daily census. In their research, patient data forms for admission, discharge, and transfer were processed into daily report summaries more efficiently and systematically compared to manual methods (Nurhanifah & Ganesha, 2023). On the other hand, the author employs the extreme programming technique. According to Li and Theory (2019), extreme programming is an approach to system development that aims to increase flexibility and efficiency by integrating several basic concepts without compromising software quality.

II. RESEARCH METHODOLOGY

Research methodology is the scientific approach to obtaining the necessary data by the author, beginning with the identification of issues in the inpatient data reporting and processing system (Bayu Ardhy Purbaningrat et al., 2023). As a rule, quantitative, qualitative, and mixed methods research are the three main approaches used by scientists (Waruwu, 2023).

Data Collection Method

The author utilizes qualitative analysis method in crafting this design with a descriptive approach. Qualitative analysis is a method developed based on field research results, with direct interaction between the researcher and data sources/respondents (Diranti et al., 2023). Descriptive research is a type of research that provides a detailed description of data or the condition of the research subjects or objects (Alifa Nur Azizah et al., 2023).

Observation

Observation is a technique for gathering information or data in research by directly observing the data and the issues to be discussed, then systematically recording them (Yeti Sulastri et al., 2023).

Interview

Interview is defined as interaction with fellow humans, posing questions to gather information and data from parties related to the research being studied (Mulyadi & Syahidin, 2021).

In qualitative methods, there are various data collection techniques commonly used, with interviews being one of them (Waruwu, 2023). In gathering information and data, the author conducted interviews directly with staff members, the head of the sub-section, and the head of the medical records installation at one of the hospitals in Bandung City.

Literature Review

The author also supplements information regarding the research data needed based on references from previous journals.

System Development Methodology

The author employs the Extreme Programming system development, which is efficient software development by a technical team with practical principles and techniques in its development (Yeti Sulastri et al., 2023).

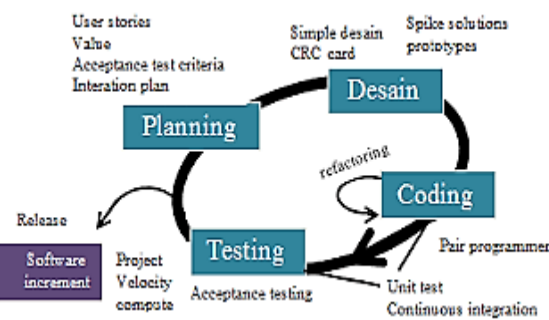


Figure 1. Extreme Programming Method

There are 4 stages in research using Extreme Programming, namely:

1. **Planning:** In this stage, the author needs to understand the system requirements, system outputs, development in system services, understand the features and functions of the system being developed (Yeti Sulastri et al., 2023).
2. **Design:** In this design stage, modeling is created to illustrate the relationship between data (Agustian & Arafat, 2021). To facilitate the design, the author uses data flow maps, flow diagrams, context diagrams, and entity-relationship diagrams.
3. **Coding:** The coding stage involves building the user interface using programming languages (Yeti Sulastri et al., 2023).
4. **Testing:** This stage ensures whether the system meets the needs of the users by testing the implemented system during the coding stage to identify any errors in the system (Sarasvananda et al., 2021).

Flowmap

Flowmap is a collection of mappings and flow diagrams that depict movement and location shifts within the system (Yeti Sulastri et al., 2023). Flowmaps are used as tools to help understand the process flow visually, identify problems or obstacles in the process flow, and design more efficient or effective solutions (Mahdani et al., 2023). In this flowmap, the author illustrates the journey of data starting from being collected by general administrative officers, then handed over to the daily census medical record officers, then the data is inputted into the system and archived into the database, then reported to the head of the reporting section to be processed into a summary report of the hospital's daily census, which will be reported to the head of the medical records department.

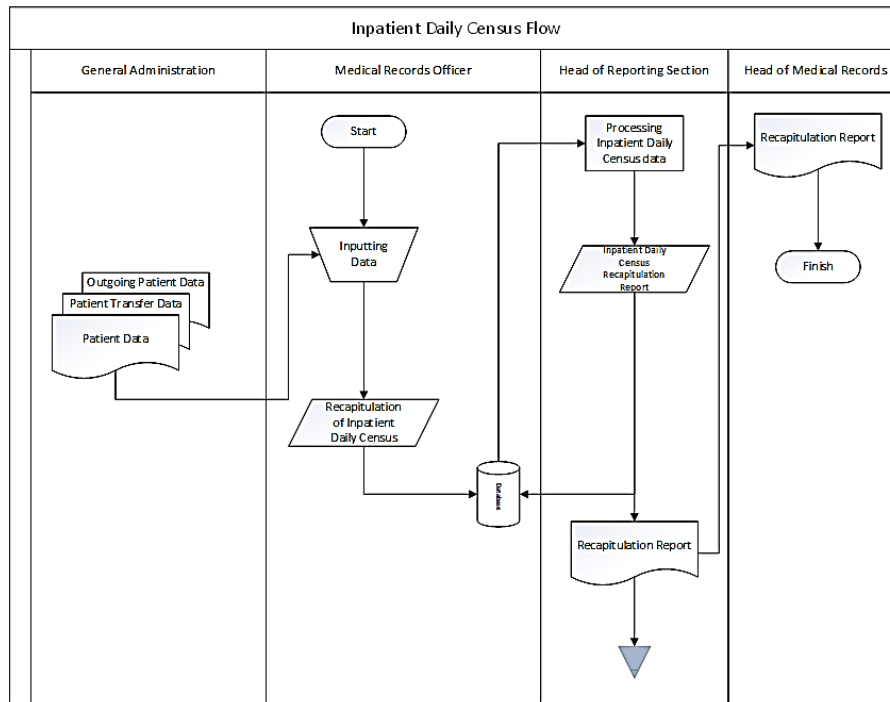


Figure 2. Designed Flowmap

Diagram Konteks

The context diagram is part of the data flow diagram that is used to explain the input, process, and output, thereby illustrating the system's scope (S et al., 2024).

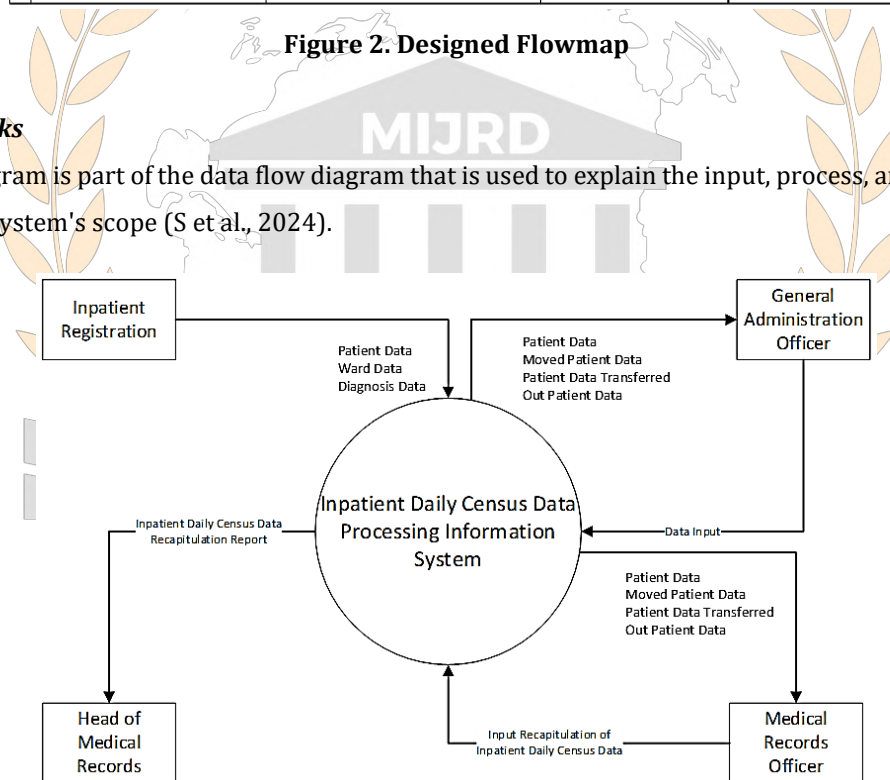


Figure 3. Designed Context Diagram

Data Flow Diagram (DFD)

A data flow diagram (DFD) is a modification of information and a representation of information flow, with its application from inputs and outputs in graphical representation (Yeti Sulastri et al., 2023). The benefit of using

DFD is to facilitate users in mastering the field of computers to understand the system to be worked on (Rangga et al., 2021).

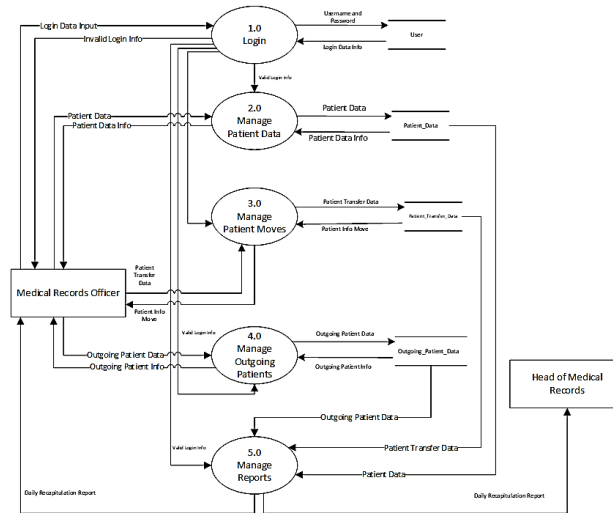


Figure 4. Designed DFD

Entity Relationship Diagram (ERD)

One tool for database design is the entity relationship diagram (ERD), which may display the relationships between objects and entities as well as the characteristics that were specified for them (S et al., 2024).

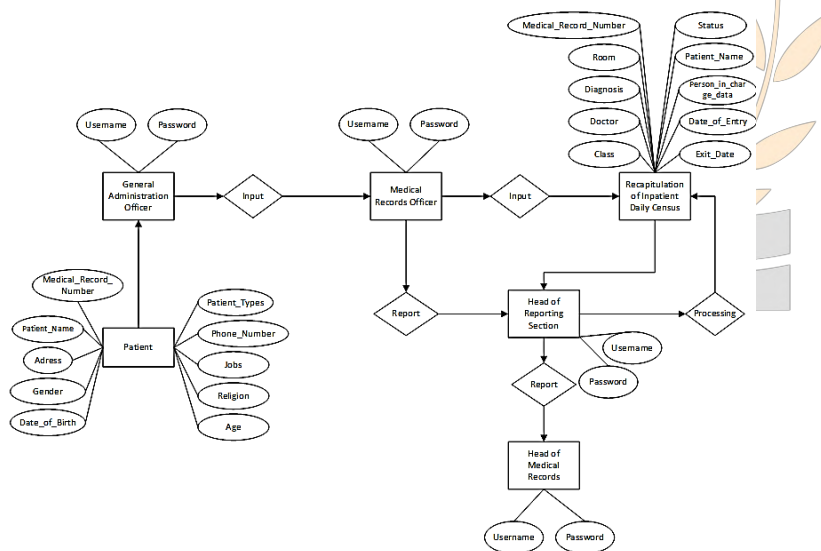


Figure 5. Designed ERD

III. RESULTS AND DISCUSSION

The result of the author's design is an illustration of medical record officers inputting daily census data to be reported to the reporting head. After conducting the research, the following system for designing daily report recapitulation of hospital was created:

System Validation Test

At this point, we run a battery of tests on the system using black box methodology. According to Sultan Aditia (2023), black box testing is all about the system's functionalities and how well they handle problems.

Table 1. Test Results

No	Test Case	Output	Descriptions
1.	Running the application	Displaying the login page	Appropriate
2.	Entering username and password	-If successful, the main page will be displayed. -If unsuccessful, an incorrect username or password message will be displayed.	Appropriate
3.	Selecting the patient data menu on the main page	Displaying the patient data form	Appropriate
4.	Selecting the menu for relocated patient data on the main page	Displaying the form for relocated patient data	Appropriate
5.	Selecting the menu for discharged patient data on the main page	Displaying the discharged patient data form	Appropriate
6.	Selecting the menu for inpatient patient data on the main page	Displaying the inpatient patient data form	Appropriate
7.	Selecting the inpatient report menu on the main page	Displaying the report form	Appropriate
8.	Selecting the 'display' button on the inpatient report form	Displaying the daily inpatient recapitulation report	Appropriate
9.	Selecting the 'back' button on the report form	Displaying the main page	Appropriate
10.	Selecting the 'exit' menu on the main page	Displaying the login form	Appropriate

In Table 1 above is the result of black box testing of the hospital's daily report recapitulation system.

Login Form

The login form is used to start using the application. Figure 6 shows the login form.

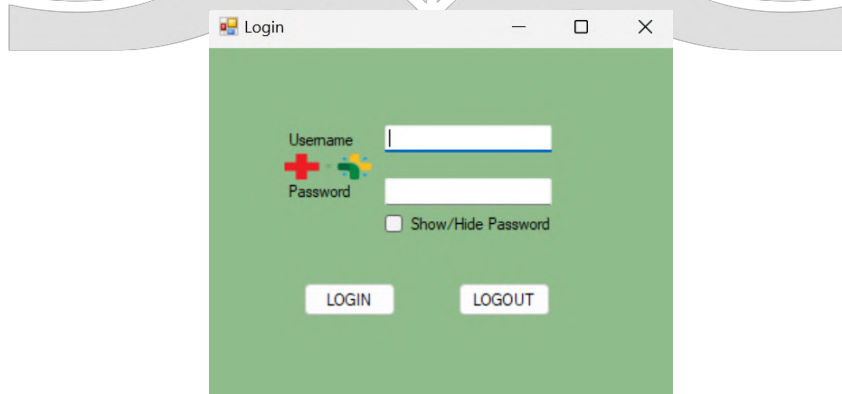


Figure 6. Login Form

Main Page

The main page of the hospital's daily report recapitulation system is depicted as follows. The main page aims to select forms or reports according to the user's needs.

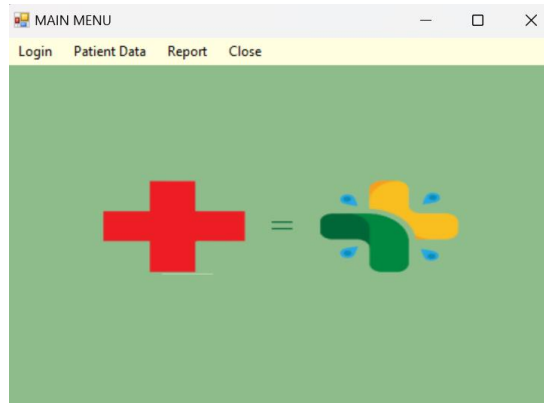


Figure 7. Main Page Form

Patient Data Form

The display on this form contains information about patients visiting the hospital. This form is used to enter patient identities.

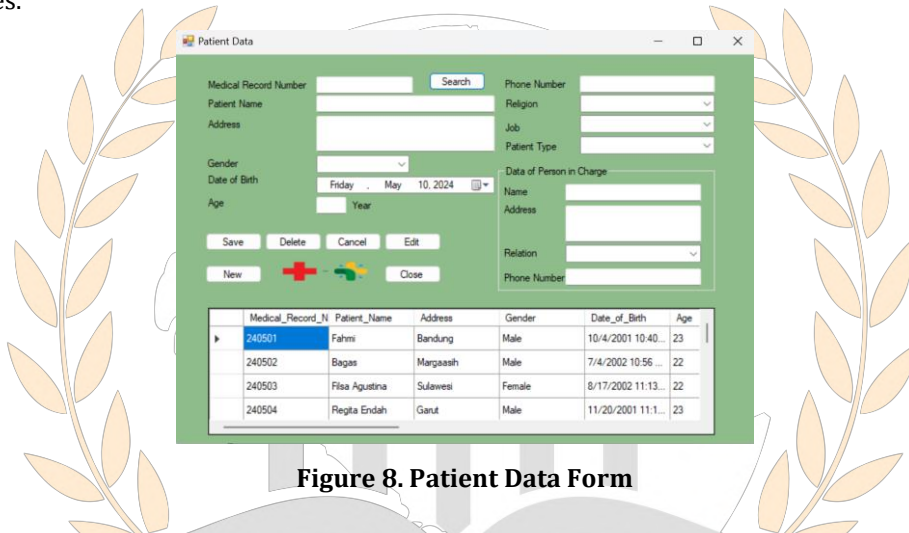


Figure 8. Patient Data Form

Relocated Patient Data Form

The display on this form is used to input data of patients relocated from their previous ward.

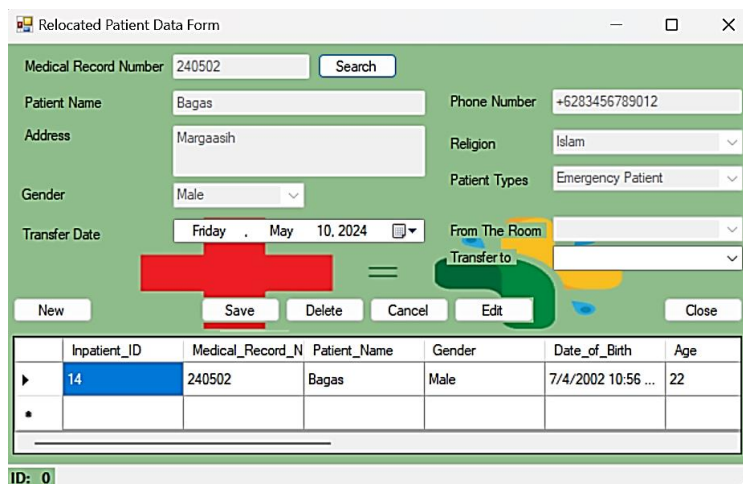


Figure 9. Relocated Patient Data Form

Discharged Patient Data Form

This form's display is used to input data of patients who will be discharged from the ward.

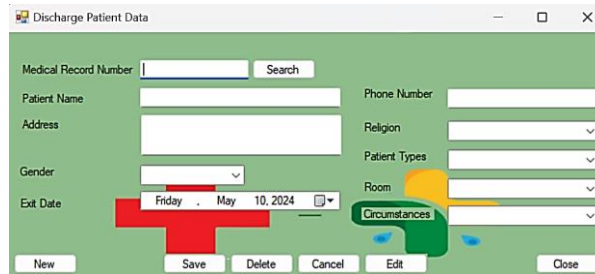
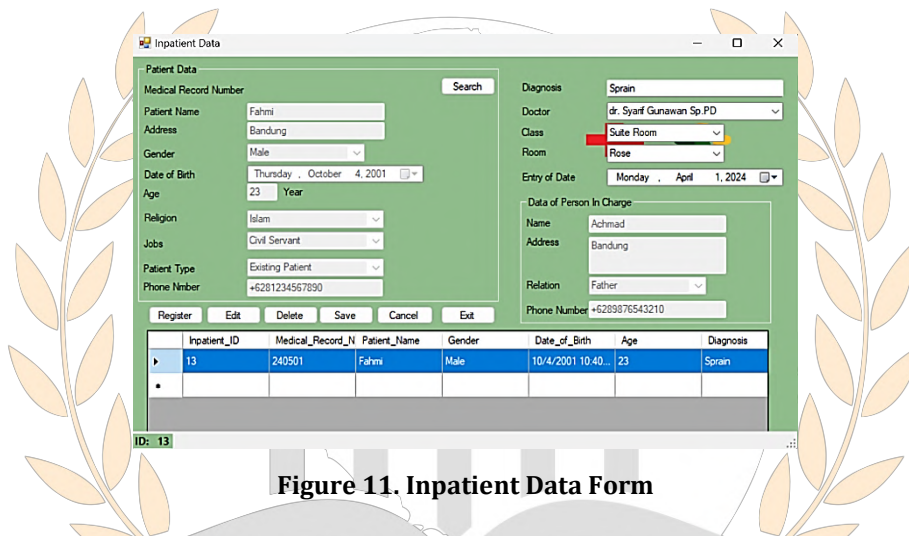


Figure 10. Discharged Patient Data Form

Inpatient Data Form

This form is used to create a recapitulation report of the hospital's daily inpatient census.



Inpatient_ID	Medical_Record_N	Patient_Name	Gender	Date_of_Birth	Age	Diagnosis
13	240501	Fahmi	Male	10/4/2001 10.40...	23	Sprain

Figure 11. Inpatient Data Form

Inpatient Report Form

The display on this form is used to select the data to be displayed.

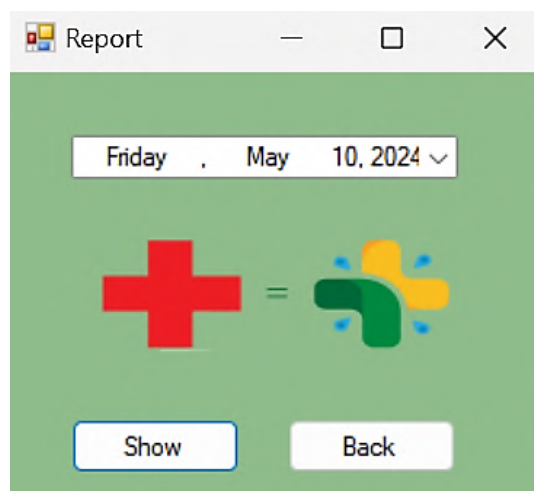
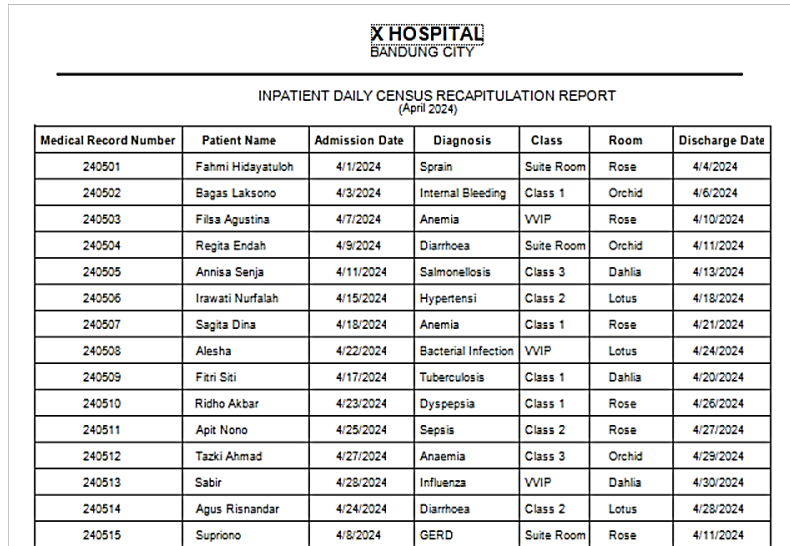


Figure 12. Inpatient Report Form

Report Result

This report result is obtained from the Inpatient Data form.



Medical Record Number	Patient Name	Admission Date	Diagnosis	Class	Room	Discharge Date
240501	Fahmi Hidayatulloh	4/1/2024	Sprain	Suite Room	Rose	4/4/2024
240502	Bagas Laksono	4/3/2024	Internal Bleeding	Class 1	Orchid	4/6/2024
240503	Filisa Agustina	4/7/2024	Anemia	VVIP	Rose	4/10/2024
240504	Regita Endah	4/9/2024	Diarrhoea	Suite Room	Orchid	4/11/2024
240505	Annisa Senja	4/11/2024	Salmonellosis	Class 3	Dahlia	4/13/2024
240506	Irawati Nurfalih	4/15/2024	Hypertensi	Class 2	Lotus	4/18/2024
240507	Sagita Dina	4/18/2024	Anemia	Class 1	Rose	4/21/2024
240508	Alesha	4/22/2024	Bacterial Infection	VVIP	Lotus	4/24/2024
240509	Fitri Siti	4/17/2024	Tuberculosis	Class 1	Dahlia	4/20/2024
240510	Ridho Akbar	4/23/2024	Dyspepsia	Class 1	Rose	4/26/2024
240511	Apit Nono	4/25/2024	Sepsis	Class 2	Rose	4/27/2024
240512	Tazki Ahmad	4/27/2024	Anaemia	Class 3	Orchid	4/29/2024
240513	Sabir	4/28/2024	Influenza	VVIP	Dahlia	4/30/2024
240514	Agus Risnandar	4/24/2024	Diarrhoea	Class 2	Lotus	4/28/2024
240515	Supriono	4/8/2024	GERD	Suite Room	Rose	4/11/2024

Figure 13. Recapitulation Report of Daily Inpatient Census

IV. CONCLUSION

In conducting the daily census of the hospital, it is still found to be done manually, while the latest Minister of Health regulation requires it to be computerized. Therefore, the author developed a hospital daily recapitulation system program to support the manual daily census work in hospitals. The author designed a hospital daily census reporting system that processes patient data, transferred patient data, discharged patient data, and inpatient data using the extreme programming method. The output produced in this system contains patient medical record numbers, patient names, admission dates, patient diagnoses, patient rooms, ward classes, and patient discharge dates from the hospital to make data processing more efficient and accurate and to facilitate report generation based on input data.

V. SUGGESTIONS

If hospitals want to improve the accuracy and efficiency of their data processing and the ease with which they can generate reports, they should establish a system to recapitulate the daily inpatient census. Because the system is still in its infancy, there must be an introduction to it before its implementation can begin, and manual processes must be adapted in order for the system to be structured. While perusing a page's layout, a reader's attention will naturally wander to the wording and formatting on the page.

Unlike the more unnatural "Content here, content here," the letter distribution in Lorem Ipsum is more or less normal, which is what makes it seem like legible English. Just searching for "lorem ipsum" will reveal a plethora of baby websites, since many desktop publishing programs and web page editors now use it as their default model text. Over the years, there have been several variations, some of which have developed unintentionally while others contain intentional changes (such as the addition of humor).



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