



Design and Build a Web-Based Service Information System at the Sejahtera Medika Clinic in Rangkasbitung

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Abstract—Clinic is a health service facility that provides individual health services providing basic or specific medical services, organized by more than one type of health and led by medical personnel. The service activities carried out are in the form of public services. So far, the service system at the Sejahtera Medika Clinic starts from patient registration, input patient data, diagnoses and prescribes, payments and reports data that still uses the manual method, namely bookkeeping using a ledger. This causes several obstacles that often hinder the clinical management, especially in obtaining data related to patient service information. For this reason, it is necessary to develop a system that utilizes computer technology with a guaranteed security system, then the data is stored in a database and stored automatically. The development method used in this research is the Waterfall method, where there are 5 stages, namely: Analysis, Design, Implementation, Testing and Maintenance. In the implementation using UML (Unified Modeling Language) tools including Use Case Diagrams, Activity Diagrams, Class Diagrams and Sequence Diagrams.

Keywords: Information System; Website; Clinic; Waterfall

1. INTRODUCTION

Currently, the development of business competition is quite complex. Every business entity always tries to improve the quantity and quality of various aspects, including the information system aspect which plays an important role in supporting the development of an institution. The availability of fast, accurate and timely information will greatly assist management in carrying out operational activities, especially when they want to make important decisions by choosing a number of available alternatives. Sejahtera Medika Clinic is one of the health clinics located in Rangkasbitung and located at Jl. Jendral Ahmad Yani No. 41, Kadu Agung, Kec. Rangkasbitung Kab. Lebak Banten 42317. Sejahtera Medika Clinic was founded by Dhika Pratama, and started operating on March 12, 2004. At that time its name was still Balai Pendidikan Sejahtera Medika.

During operation, the Sejahtera Medika Clinic tries to provide the best service to patients. At this time the service system and recording are still using a manual system. So there are several obstacles that hinder the clinical management. Therefore, it is necessary to develop a system from the previous system and utilize computer technology with a guaranteed security system, data stored in a database and user-friendly operational use as a tool to maximize the service system at the Sejahtera Medika Clinic.

2. RESEARCH METHODOLOGY

2.1 System Basic Concept

The system is a collection of components or elements that have a relationship or relationship in which a collection of several elements can interact with each other in order to achieve certain goals.

According to [1] in his book Analysis and Design of Information Systems, the system is a network of interconnected procedures, gathered together to carry out an activity or to complete a certain goal. The system itself has certain characteristics or properties, namely having components (components), system boundaries (boundary), the environment outside the system (environments), interfaces (interfaces), input (input), output (output), processing (process), and goals (objectives) or a goal (goals). According to [2] the system is defined as a collection of things or elements that work together or are connected in a certain way so as to form a single unit to carry out a function in order to achieve a goal [3], [4].

2.2 Information System

An information system is a collection of sub-systems both physical and non-physical that are interconnected with each other and work together in harmony to achieve one goal, namely processing and becoming useful information[5], [6]

An information system is a collection of interconnected sub-systems that form a component which includes input-process-output related to the processing of information (data that has been processed so that it is more useful for the user) An Information System (SI) or Information System (IS) is an arrangement of people, data, processes, and interfaces that interact to support and improve some of the day-to-day operations of a business, including supporting the problem solving and needs of management decision makers and users who are experienced in their fields.



According to [2] information is the result of data processing so that it becomes an important form for the recipient and has usefulness as a basis for decision making that can be felt as a result directly at that time or indirectly in the future. To obtain information, it is necessary to have data that will be processed by the processing unit. Examples of information are employee lists by department, employee lists by class, recapitulation of sales transactions at the end of the month, and so on.

2.3 Waterfall Model

The waterfall model according to [7] is a process of activities from specification, development, validation, and evolution and represents them as separate processes such as requirements specification, software design, implementation, testing, and so on. The waterfall method has the main stages of the waterfall model that reflect basic development activities. There are 5 (five) stages in the Waterfall method, namely requirements analysis and definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintenance. The waterfall method has the main stages of the waterfall model that reflect basic development activities. There are 5 (five) stages in the Waterfall method, namely requirements analysis and definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintenance.

2.4 Unified Modeling Language (UML)

According to [8], [9] "UML (Unified Modeling Language) is a modeling language for systems or software with a paradigm (object-oriented)". Modeling is actually used to simplify complex problems in such a way that they are easier to learn and understand.

2.4.1 Use Case Diagram

Use case is an abstraction of the interaction between the system and the actor. Use case works by describing the type of interaction between the user of a system and the system itself through a story of how a system is used. Use case is a construct to describe how the system will look in the eyes of the user. While use case diagrams facilitate communication between analysts and users as well as between analysts and clients.

2.4.2 Sequence Diagram

Sequence diagrams are used to describe behavior in a scenario. Its purpose is to show the series of messages sent between objects as well as interactions between objects, something that happens at a certain point in the execution of the system.

2.4.3 Activity Diagram

Describes a series of flow of activities, used to describe activities that are formed in an operation so that it can also be used for other activities such as use cases or interactions.

2.4.4 Class Diagram

Is a relationship between classes and a detailed description of each class in the design model of a system, also shows the rules and responsibilities of entities that determine the behavior of the system. Class diagrams also show the attributes and operations of a class and the constraints associated with connected objects. Class diagrams typically include: Classes, Relationships, Associations, Generalization and Aggregation, Attributes, Operations /Method), and Visibility, the level of external object access to an operation or attribute. Relationships between classes have information called multiplicity or cardinality.

3. RESULT AND DISCUSSION

The Waterfall method is a system development method where one phase to another is carried out sequentially. In the process of implementing this Waterfall method, a step will be completed first starting from the first stage before proceeding to the next stage. The advantage of using this waterfall method is that requirements must be defined more deeply before the coding process is carried out, besides that the implementation process is carried out in stages from the first stage to the last stage in sequence. Besides that, the Waterfall method also allows as few changes as possible for the project to take place.

3.1 Current System Analysis

3.1.1 Patient Registration Procedure

A. Patients come to the clinic and register with the administration if the patient is already registered or an old patient, the patient can immediately submit the patient's treatment card and go directly to the destination poly and wait in the waiting room, and if the patient has not been registered or is a new patient, the patient must write down personal data first in the registration book, then the patient can go directly to the intended poly and wait in the waiting room.

- B. The patient is waiting for the doctor's call for an examination, if the patient has been called, he can go directly to the doctor's room for an examination.
- C. The patient receives a re-treatment card and is given a patient history card containing the diagnosis of the disease and the prescription for the medicine.
- D. The patient goes to the pharmacy to take medicine by showing the patient history card to the pharmacy staff, the patient will receive the medicine and pay the cost of treatment and medicine.

3.1.2 Administration Procedure

- A. The administration asks the patient's status, if the old patient is the administration will receive the patient's treatment card, if the new patient the administration will direct the patient to register the patient in the registration book, the administration will make a new patient's medical card. When the administration already has a patient treatment card containing patient data, the administration will make a patient history card.
- B. The administration directs the patient to the designated poly waiting room and the administration will provide a patient history card to the doctor.
- C. Administration reports patient data and submits it to the head of the clinic.
- D. Administration checks patient data before submitting a report to the head of the clinic, if it is correct the report will be immediately given and if it is still wrong the report will be regenerated.

3.1.3 Doctor Procedure

- A. The doctor receives the patient's medical card and the patient's history card after receiving the doctor will immediately call the patient in the order.
- B. The doctor examines the patient after that the doctor sees the patient's medical record data which contains the previous patient's history card, if it is the doctor will record the diagnosis of the disease and the patient's drug prescription on the patient's history card.
- C. The doctor returns the patient's medical card and gives the patient's history card.

3.1.4 Pharmacy Procedure

- A. The pharmacy receives and views the patient history card from the patient which contains the diagnosis of the disease and the patient's drug prescription.
- B. The pharmacy will provide details of the patient's medical expenses and drugs based on data from the patient history card and the pharmacy will receive the patient's medical expenses and drugs.
- C. The pharmacy provides medicine according to the information on the patient history card.
- D. The pharmacy will compile the patient history card into the patient's medical record.

3.2 Implementation of System Design

A. Use Case Diagram

There are 2 actors in the picture above, namely admin and doctor. Where the admin can access all services/menus on the website, while doctors can access patient data, patient ledgers and finances. Both actors must first login to enter the system.

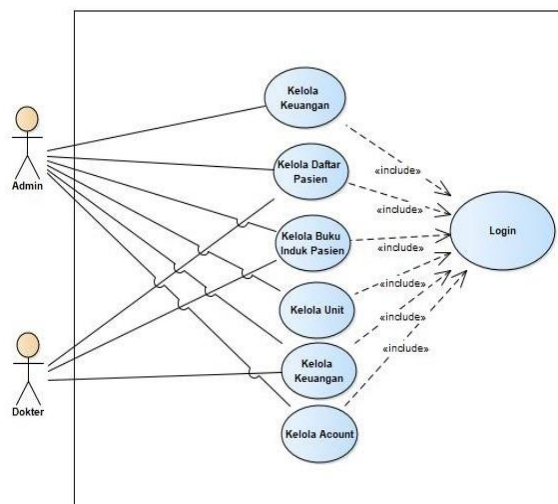


Figure 1. Use Case Diagram Main Page

B. Activity Diagram

Describes the activities displayed by the system. Admin inputs patient data to be stored in the database.

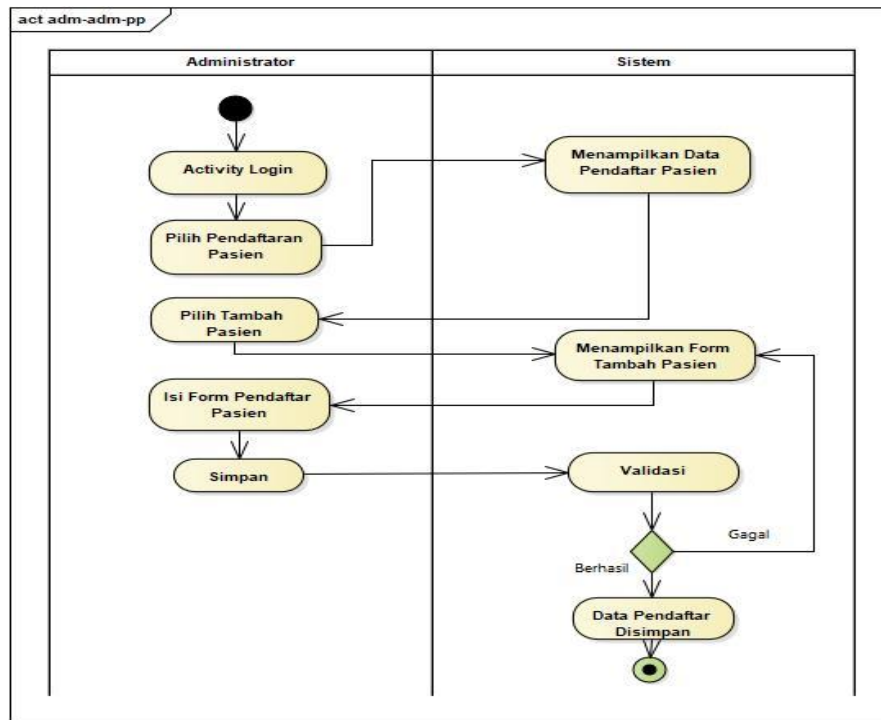


Figure 2. Patient Registration Activity Diagram

C. Sequence Diagram

Describes a scenario or series of steps taken in response to an event to produce a certain output, and what changes occur internally and what output is produced.

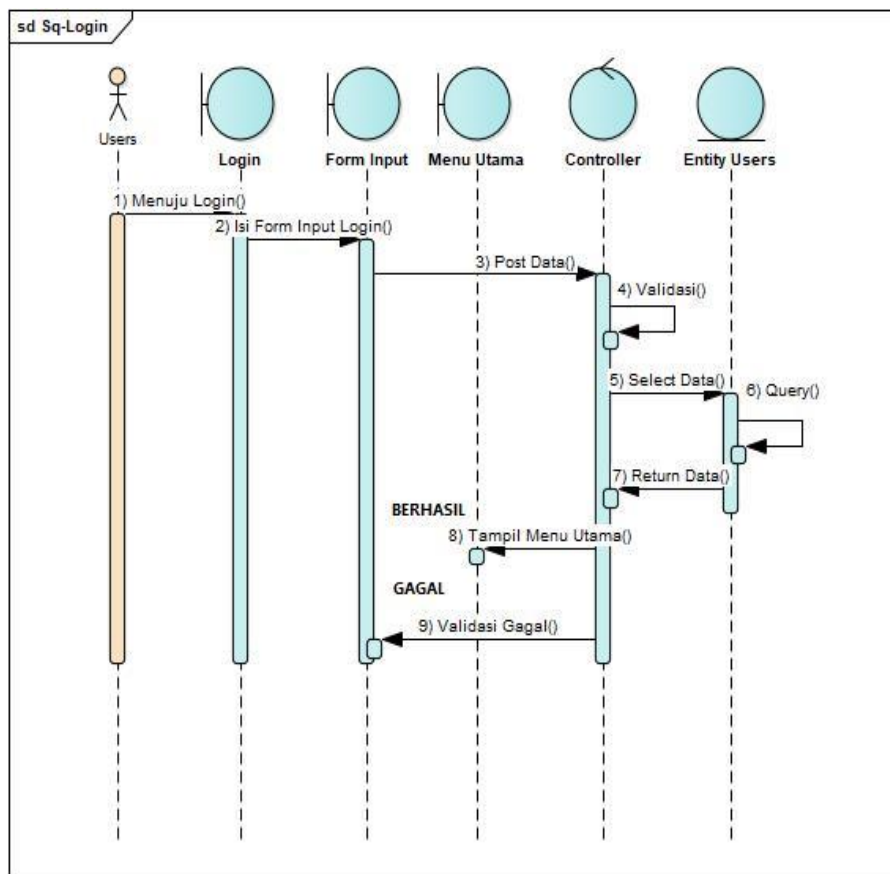


Figure 3. Sequence Diagram of Login

D. Class Diagram

This class diagram has several functions, the main function is to illustrate the structure of a system. The following are other functions: Shows the structure of a system clearly. Improve understanding of the general figure or schema of a program

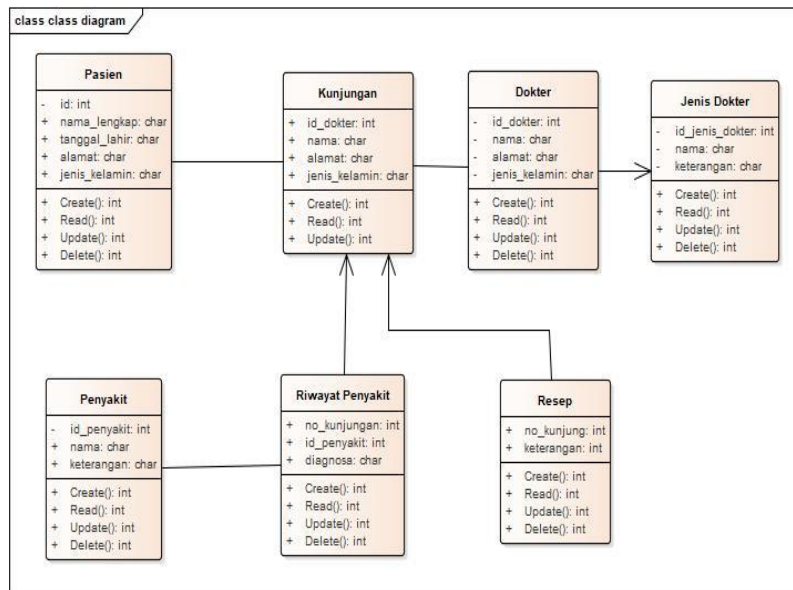


Figure 4. Class Diagram

E. Display Login Page

This page displays the username and password fields. If the data entered is correct, it will go to the main system page (dashboard).

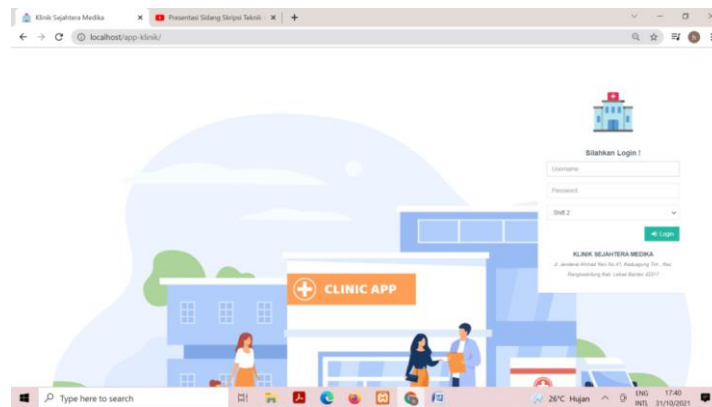


Figure 5. Display Login Page

F. Display of Main Page

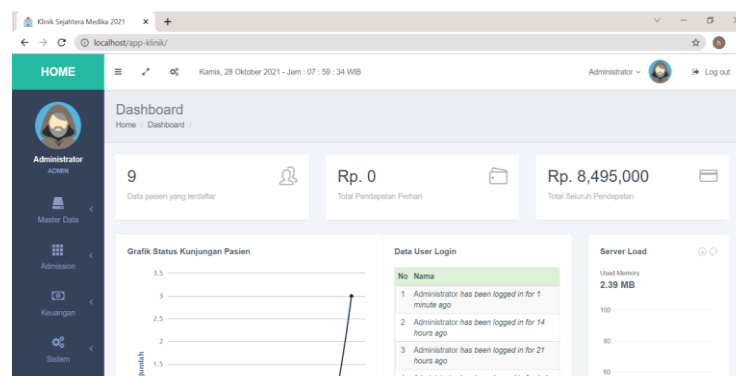


Figure 6. Display of Main Page (Dashboard)

Displays the main administrator page and menus that can be accessed by admins.

G. Patient Registration Page Display

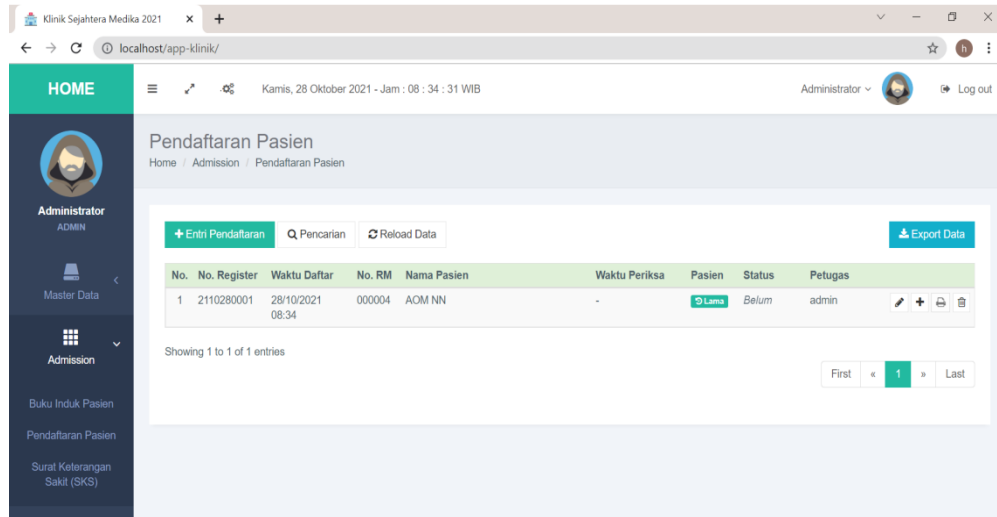


Figure 7. Patient Registration Page Display

On this page the admin can input patient data, such as population identification number, name, address and others.

H. Payment Page View

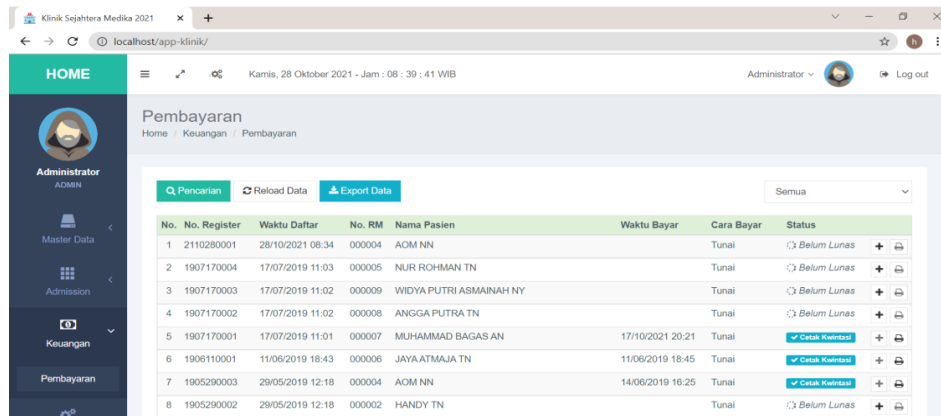



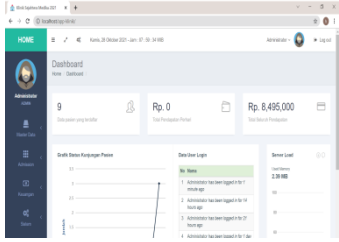
Figure 8. Payment Page View

Displays the patient's billing history and the total to be paid.

I. Blackbox Testing

Table 1. Blackbox Testing Login

No.	Testing	Expected results	Testing Results	Conclusion
1	Login application	The application displays the login form	Displays the username and password form 	Valid
2	Email dan Password right	The application displays the main form	The application displays the main form	Valid

No.	Testing	Expected results	Testing Results	Conclusion
				

4. CONCLUSION

The design of the Information System at the Sejahtera Medika Clinic is a development of an ongoing system. Where the system is running, it still uses a manual system so that services are still less than optimal, such as difficulties in searching data, classifying patients and making reports. By using a web-based information system, the clinic can easily record patient information, update patient data and search for patient data. In addition, the patient's medical record data is also more organized so that the patient's history can be seen easily for decision making in the next examination. In future research, it is hoped that the development of the existing system will cover all matters relating to clinical information systems. In the future, it is hoped that the system can be developed into a mobile application to make it more accessible to users, especially patients.

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