Web-Based Library Information System Design at SMA S Assyfa Pasaman Barat, West Sumatra

Ratih Dwi Asworowati[1], Yotra Delfita[2]
[1, 2]Universitas Bina Sarana Informatika

Email:
[1] ratih.tww@bsi.ac.id
[2] yotradelfita12@gmail.com

Article Information	Abstract

Abstract. The library is a learning resource center that can support in achieving learning objectives, creating active, creative, effective, and fun learning towards quality learning. The library functions as a source of information, supporting learning for students and teachers at SMA S Assyfa West Pasaman, West Sumatra. The problem that exists is that the data collection process is still manual so that it slows down the performance of librarian in borrowing and returning books. By using the library information system design aims to maximize the performance of librarian with the help of web-based software in processing data quickly and precisely. The method used is the waterfall method with data collection techniques, namely observation and literature study. Web applications have convenience including easy access and flexibility, no need to install, fast server setup and can be updated easily. The results of this study can provide a solution to improve the service and performance of librarian in terms of managing library administrative data and speeding up transactions for borrowing and returning books by students.

1. INTRODUCTION

The library serves as a source of information, supporting student and teacher learning at SMAS Assyfa Pasaman Barat, West Sumatra. Based on interviews conducted with the SMA S Assyfa school, information was obtained that the data collection process was still manual so that it slowed the performance of librarian in borrowing and returning books. Data management that has not been computerized slows down the service process to students. By using the library information system design aims to maximize the performance of librarian with the help of web-based software in processing data quickly and precisely.

Design is a process to create and design a new system. Design is a process that aims to analyze, assess, improve and develop a system, both physical and non-physical systems that are optimal for the future by utilizing existing information. System design is a process after analysis of the system development cycle to design a system (Nur & Suyuti, 2018).

Website is a collection of information or a collection of pages that are usually accessed via the internet. Everyone in various places and at any time can use it as long as it is connected online on the internet network. Technically, a website is a collection of pages, which are incorporated into a particular domain or subdomain. Existing websites are on the World Wide Web (WWW) Internet (Firmansyah, 2020).

The system development method that is often used is the waterfall method. The Waterfall Model is a sequential software process, viewed as continuously flowing down (like a waterfall) through the phases of planning, modeling, implementation, and testing. The waterfall model provides a sequential or sequential software lifeflow approach starting from analysis, coding design, testing and support stages (sukamto & Shalahudin, 2018).

At this stage, the authors design and create programs using ERD (Entity Relationship Diagram), UML (Unitefed Modeling Language) diagrams used, namely Use Case Diagrams, Activity Diagrams, Component Diagrams and Deployment Diagrams" (Iriadi, 2017). SMA S Assyfa library still uses simple methods, both written data collection and Microsoft Excel in borrowing and returning books, searching for books, and calculating fines and borrowing costs. Obstacles that often occur include searching for books that actually exist but cannot be found due to the lack of structure in the preparation of books, frequent errors and data loss so that it affects book collections that are not properly recorded causing loss. It is hoped that this research can provide solutions in improving services for readers, collecting data on book collections accurately, borrowing books, returning books, making bookkeeping activities, calculating borrowing costs and fines.

1.1 LITERATURE REVIEW

Design is a process to create and design a new system. Design is a process that aims to analyze, assess, improve and develop a system, both physical and non-physical systems that are optimal for the future by utilizing existing information. System design is a process after analysis of the system development cycle to design a system (Nur & Suyuti, 2018).

The Waterfall Model is a sequential software process, viewed as continuously flowing down (like a waterfall) through the phases of planning, modeling, implementation, and testing. The waterfall model provides a sequential or sequential software lifeflow approach starting from analysis, coding design, testing and support stages (sukamto & Shalahudin, 2018).

Website is a collection of information or a collection of pages that are usually accessed via the internet. Everyone in various places and at any time can use it as long as it is connected online on the internet network. Technically, a website is a collection of pages, which are incorporated into a particular domain or subdomain. Existing websites are on the World Wide Web (WWW) Internet (Firmansyah, 2020).

"ERD is used for modeling relational databases, Entity Relationship Diagram (ERD) is a diagram that shows information created, stored, and used in business systems" (sukamto & Shalahudin, 2018).

"LRS is described as a rectangular box and with a unique name. File records on LRS are placed in boxes. LRS consists of links between other record types, the number of links from LRS named by the files that appear on both record type links" (Kostaman & Sumaryana, 2018).

"UML (Unified Modeling Language) is one of the language standards that is widely used in the industrial world to define requirements, make analysis and design, and describe architecture in object-oriented programming" (sukamto & Shalahudin, 2018).

"Use case or use case diagram is a model for the behavior (behavior) of the information system to be made. The use case describes an interaction between one or more actors and the information system created" (Wijayanti et al., 2018).

"Activity Diagram is a diagram that describes the workflow (workflow) or activities of a system or business process or menu that is in the software" (Wijayanti et al., 2018).

Class diagrams or class diagrams describe the structure of the system in terms of defining the classes that will be created to build the system. Classes have what are called attributes and methods or operations.

"Sequence diagrams describe the behavior of objects in use cases by describing the life time of objects and messages sent and received between objects" (Wijayanti et al., 2018).

3. Method

This method describes the research and data collection techniques used in this study.

2.1 Software Development Method

The research method for designing a web-based library system at SMA S Assyfa is by using field research methods, literature studies and interviews. While the development of the software system used is using the Waterfall model. "The waterfall model is a linear sequential model or a classic life cycle. The waterfall model provides a device lifeflow approach" (Shalahuddin & Sukamto, 2018).

The method used in the development of this software uses the waterfall model which is divided into three stages, namely:

1. Needs Analysis

Conducted by interviewing the librarian of SMA S Assyfa, from the interviews obtained data about the processing of library materials consisting of checking, book inventory, classification, catalog, equipment and library materials, as well as the composition of personnel and their responsibilities.

2. System and Software Design

System design is a strategy to solve problems and develop the best solutions for those problems, this system design uses UML, ERD, and LRS.

3. Implementation and Unit Testing

Implementation is the implementation stage of the results of the design that has been carried out on the Website. Implementation aims to produce an information system that meets the needs. The steps taken are to implement the software or software needed by the system. Software used in Web-Based Library Information System Design At SMA S Assyfa uses the Waterfall model because it is serial in nature starting from the planning, analysis, design, and implementation processes on the system.

2.2 Data Collection Techniques

The data collection techniques used by the author, namely:

1. Interview

The information obtained came from Ibuk Yeni irawati, S.Pd as a resource person. The author asks questions that have previously been prepared and adapted to the required information and then the resource person provides the answers needed by the author. Interviews were conducted by the author with the resource person as librarian at the SMA S Assyfa library.

2. Literature Study

In this method, the author collects various sources of information and theories related to the subject matter of writing this Final Project by reading, studying, and seeking information through information concept books, basic database books, repositories, journals, and Google Scholar.

3. Result and Discussion

3.1 System Design Stage

3.1.2 Needs Analysis

A.User Requirements

In the requirements specification (system requirements) the design of a web-based library information system at SMA S Assyfa requires two users who can interact with each other in the system environment, namely the Member Section, and the Officer. The two Members have the characteristics of interaction with the information requirements system, such as the following:

a. Member needs scenario

b. Officer needs scenario

c. Service staff needs scenario

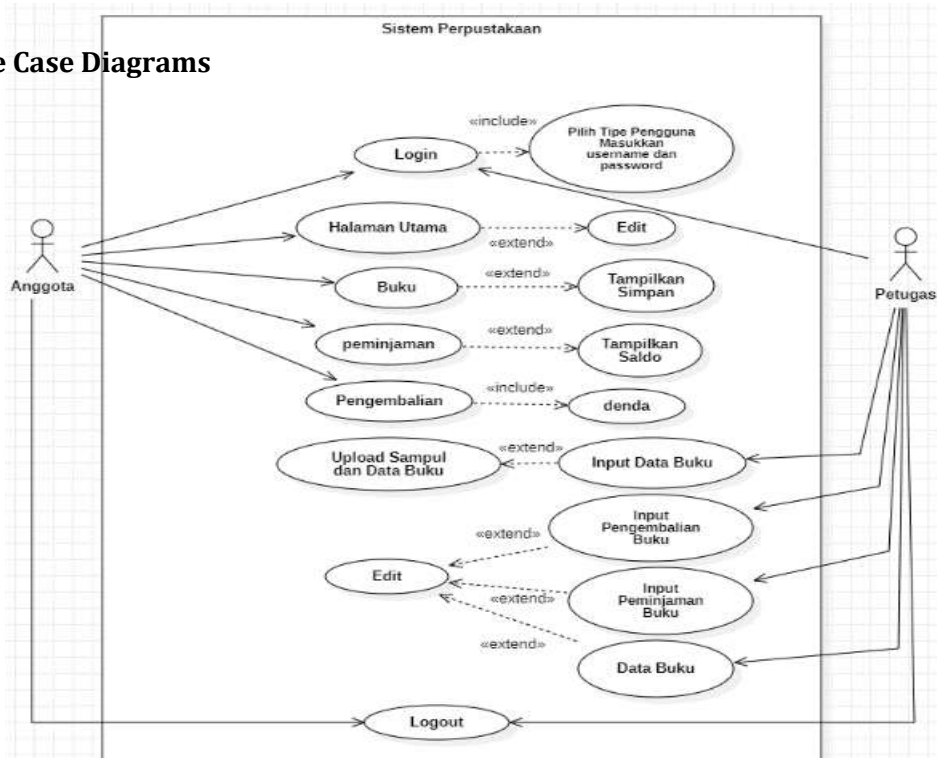B. Proposed System Requirements

3.1.3 Use Case Diagrams

Figure 1. Use Case Diagram of the Library System

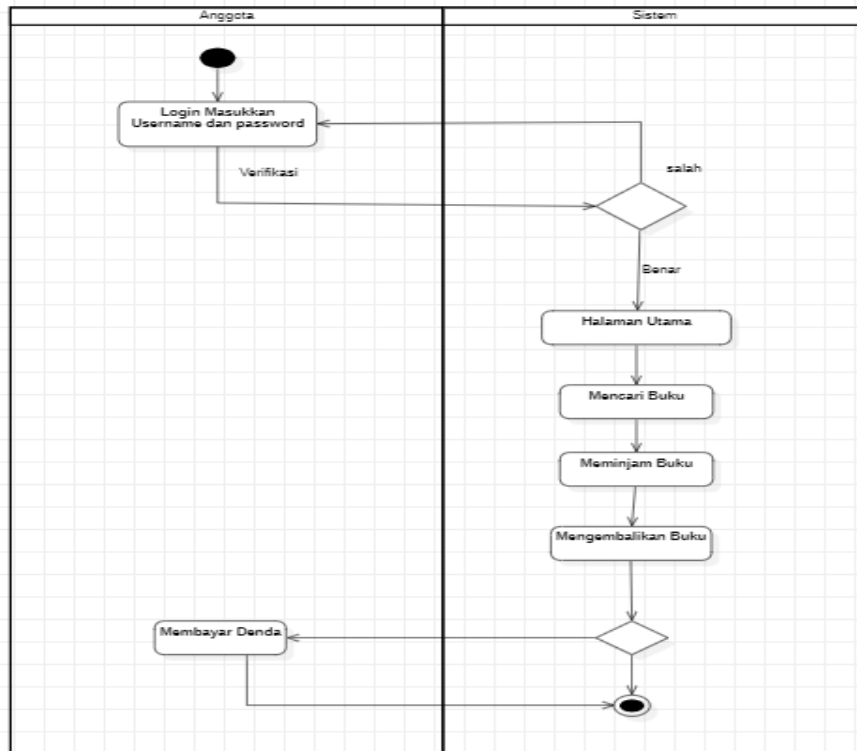### 3.1.4 Activity Diagram Design

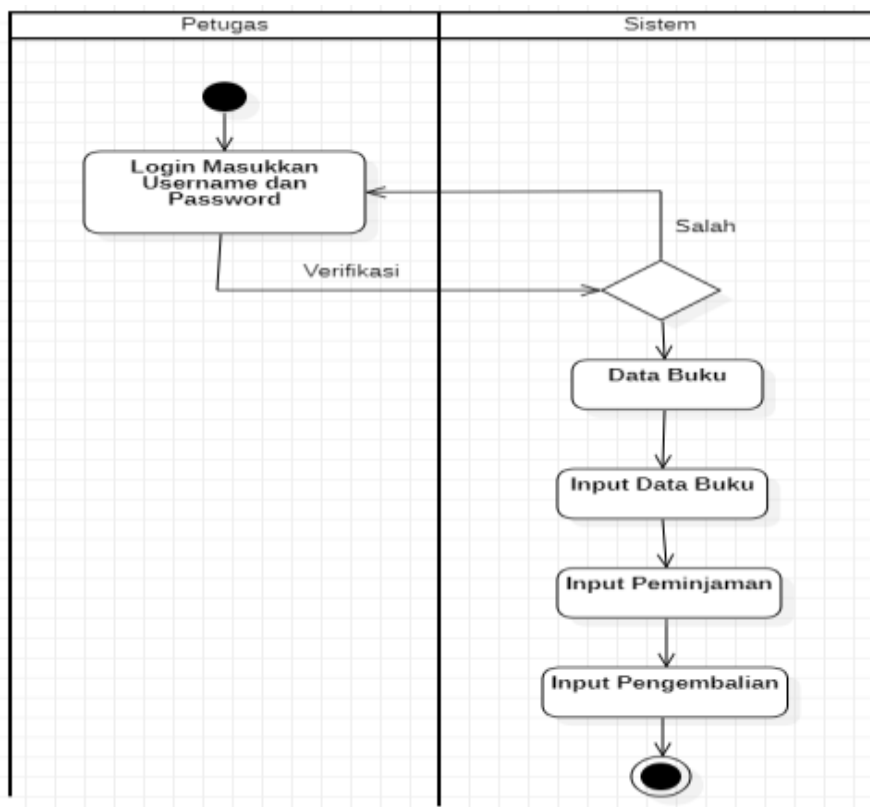**Figure 2. Member Activity Diagram**

Figure 3. Officer Activity Diagram

3.1.5 Prototype Design

Prototype design is an interface design of the system to be created. The following is the interface design of each actor, namely Members (User) and officers (Admin).
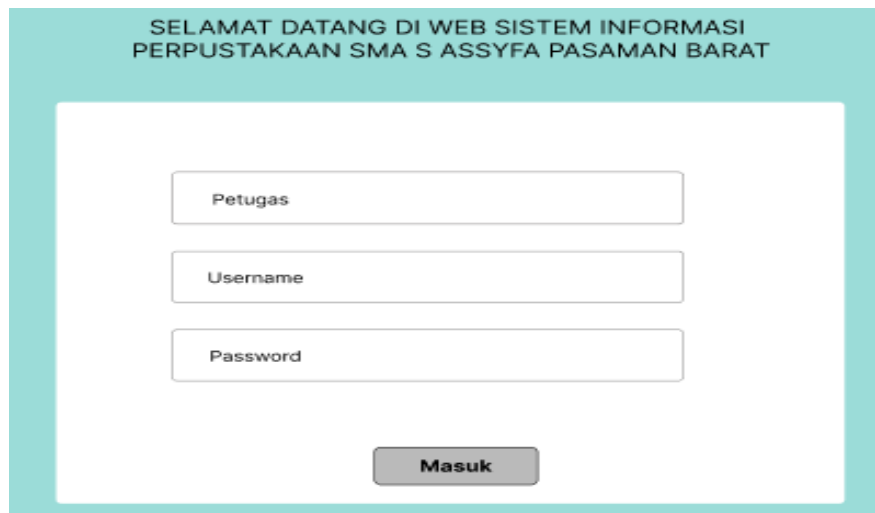
a. Main Page Interface Before Log In
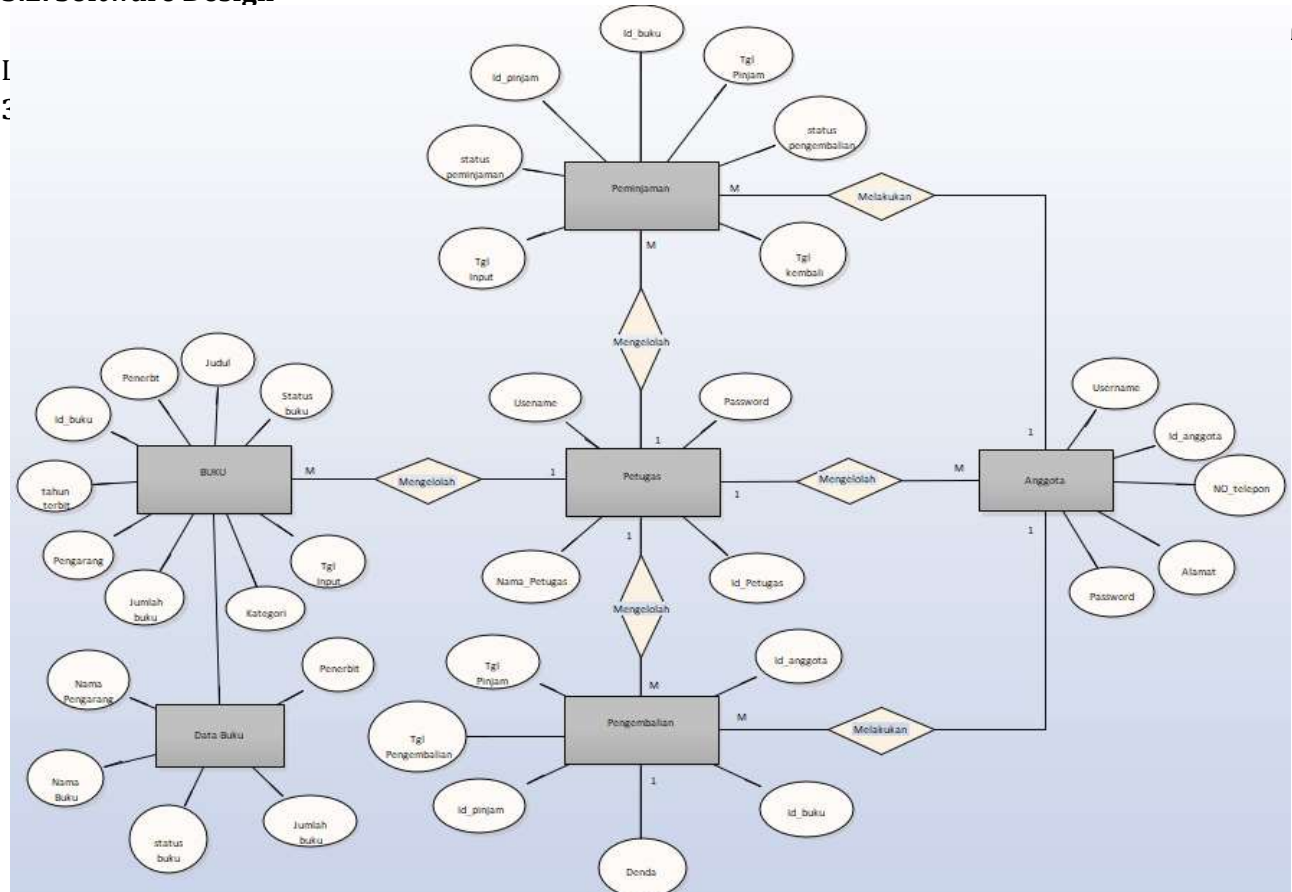

Figure 4. Login page

3.2. Software Design

Figure 5. Entity Relationship Diagram

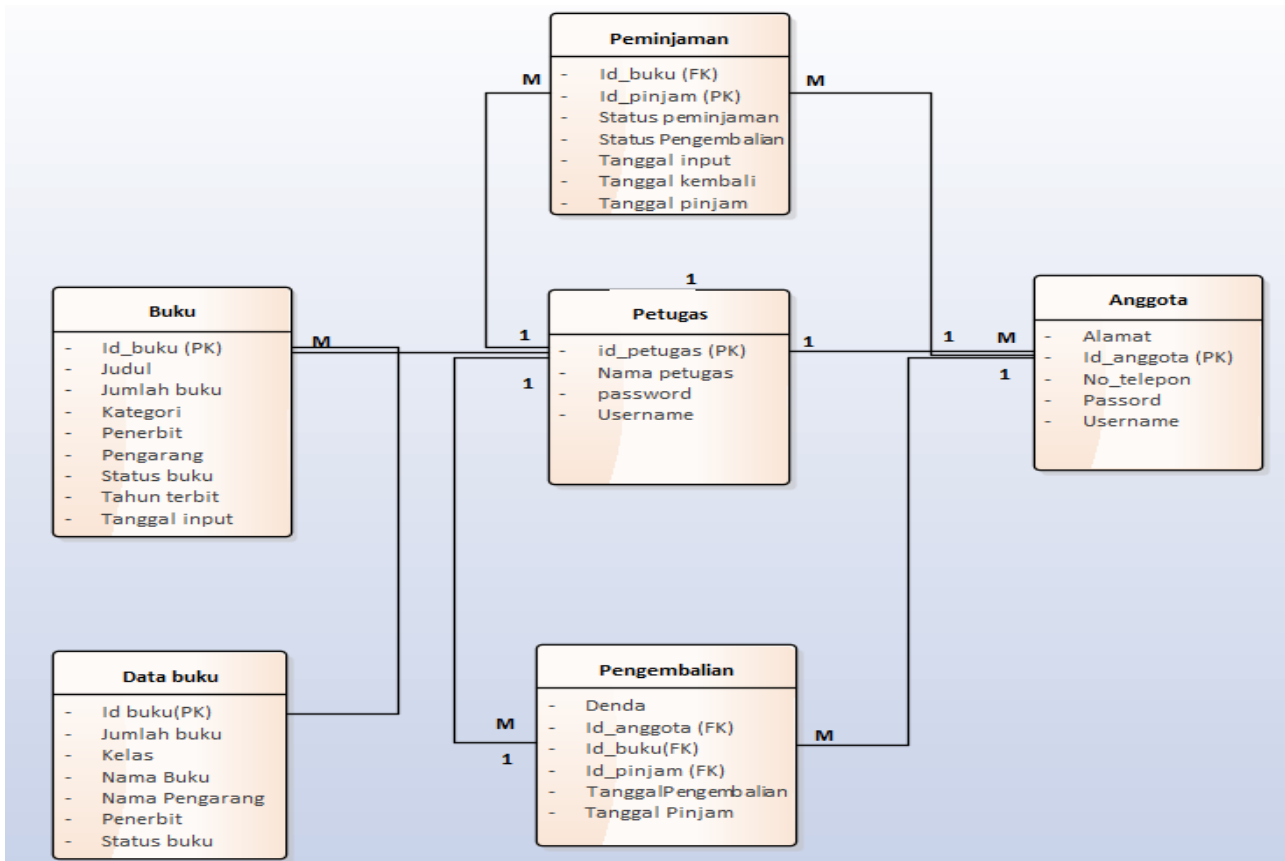### 3.2.2 Logical Record Structure (LRS)

Figure 6. Logical Record Structure

3.2.3 File Specification

Making a database in making a website is very important this is because the database is used as a data or information storage medium. The following are the file specifications on the library information system website:

1. Member File Specification

Name	: Member
Acronym	: Member
File Type	: Master File
File organization	: Indexed Sequential
File Access	: Random
Media	: Harddisk
Function	: To store member access data
Field Key	: Id_Member
Software	: Xampp

Table 1. Member File Specification

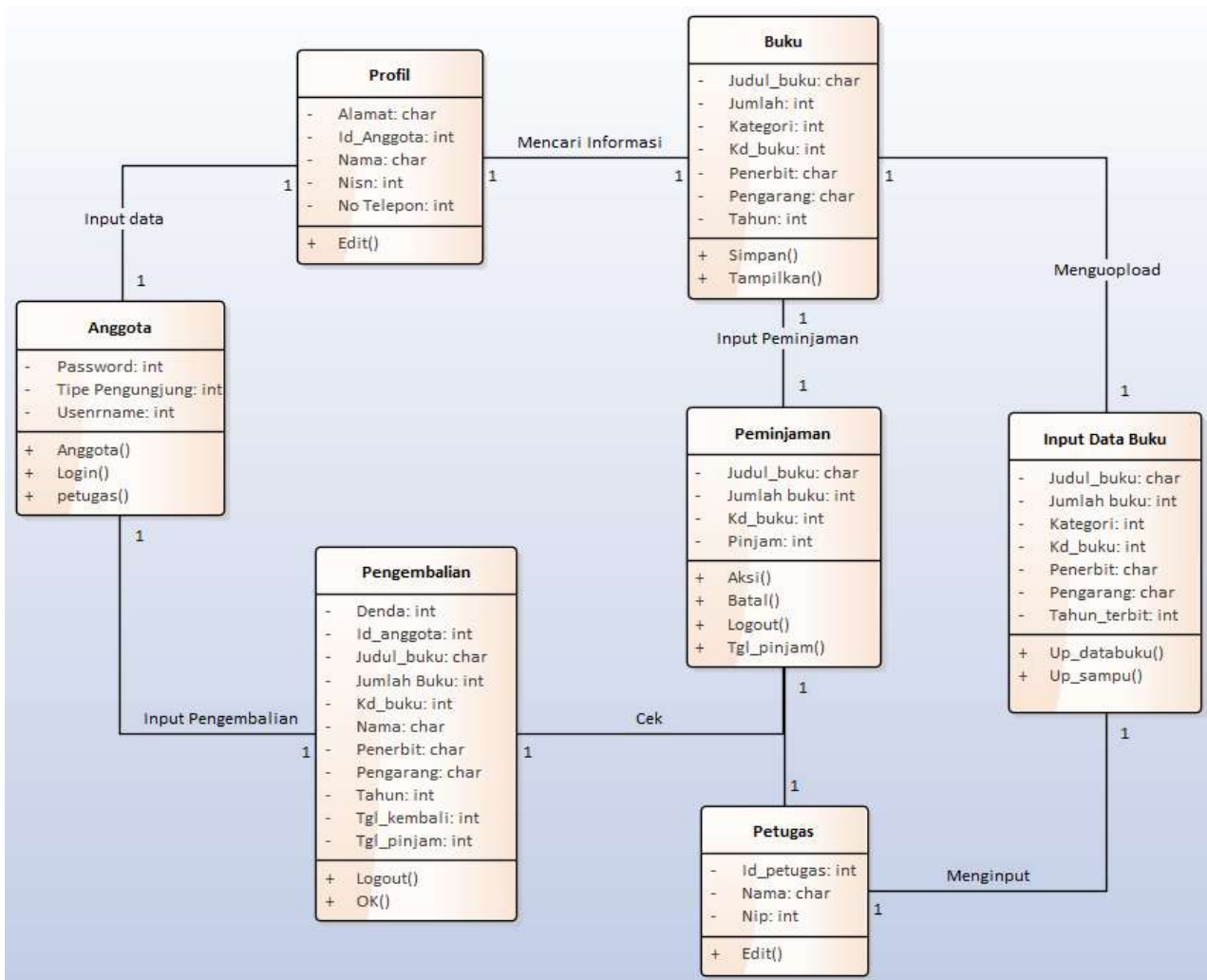| No	Data Element	Acronym	Type	Length	Description
1	member code	Id_member	*Int*	4	*Primary key*
3	Name	Name	*Varchar*	25	
4	TTL	Ttl	*Date*	20	
5	Address	Address	*Varchar*	25	
6	No phone	No phone	*Varchar*	13	
7	User Type	User Type	*Varchar*	6	
8	*Username*	*Username*	*Varchar*	7	
9	*Password*	*Password*	*Varchar*	6	

3.2.4 Class Diagram

Figure 7. Class Diagram
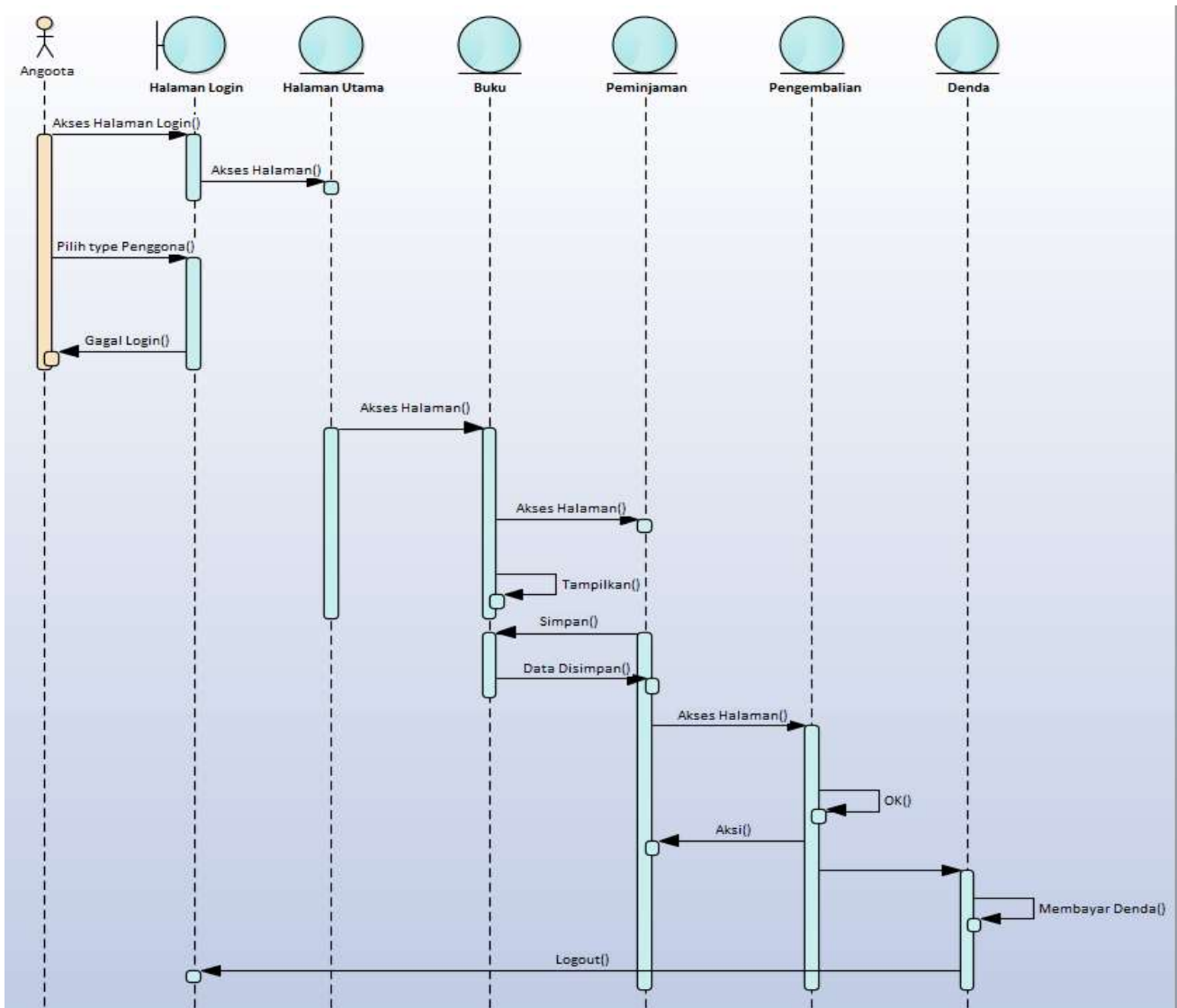
3.2.5 Sequence Diagram

Figure 8. Officer Sequence Diagram

Conclusions and Recommendations

Based on the results of research that has been carried out on the title Web-Based Library Information System Design at SMA S Assyfa Pasaman Barat, West Sumatra. It can be concluded that this web helps and facilitates students, teachers and employees in finding and obtaining information on books in the library. The creation of this web is able to provide easy data management for librarian.

From the conclusions and research conducted, it is possible to find some suggestions as follows to update the interface and information system because over time new features will be born that are more pampering for users. Suggest that members or officers can use the information system in accordance with

the procedures that have been submitted so that the information system can be used according to its function. It is hoped that this research will continue to the next stage, namely programming so that it can provide maximum results.

References

Firmansyah, M. A. (2020). *Pengantar E-Marketing*. Qiara Media.

Iriadi, N. & N. R. (2017). Perancangan Sistem Informasi Penjualan Minuman Kemasan Berbasis Web Pada Toko Bambu Sejahtera Bekasi. *Jurnal Khatulistiwa Informatika*, *V*(1), 42.

Kostaman, N., & Sumaryana, Y. (2018). Aplikasi pemesanan tiket oto bus budiman berbasis online. *Jumantaka*, *1*(1), 121–130. http://jurnal.stmik-dci.ac.id/index.php/jumantaka/article/view/275

Nur, R., & Suyuti, muhammad arsyad. (2018). *Perancangan mesin-mesin industri*. Deepublish.

Sukamto, R., & Shalahudin, M. (2018). *Rekayasa Perangkat Lunak: Terstruktur dan Berorientasi Objek*. Informatika Bandung.

Wijayanti, D., Asworowati, R. D., & Yulius Kety Ananta. (2018). Sistem Informasi Penerimaan Pengemudi Berbasis Web Dengan Metode Prototype : Studi kasus PT. Dinamika Makmur Sentosa Cikarang. *IJCIT (Indonesian Journal on Computer and Information Technology*, *3*(2), 177.