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Implementation of the RAD Method in the Design and Development of the Melati Library Information System Tebat Agung Village Web-Based

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Abstract

The development of information technology offers solutions for library management, including at Melati Library in Tebat Agung Village, Muara Enim Regency, South Sumatra, which still uses a manual system. Issues include recording, book borrowing and returning, searching, and report generation, all of which are inefficient. This study aims to design a web-based library information system using the Rapid Application Development (RAD) method, which enables fast and structured system development. The system was developed using a descriptive qualitative approach, UML modeling, PHP programming language, and MySQL database. The resulting system simplifies book data management and is expected to improve the efficiency and quality of library services overall.

Keywords: *Library, Web, RAD, PHP, MySQL.*

1. Introduction

When data speaks and technology responds, a new space emerges to address challenges in smarter ways. Many communities have utilized information technology to meet their daily needs. With information systems available on both desktop and web-based applications, it is expected that they can address and assist the public by providing accuracy and ease in accessing up-to-date information[1]. An information system is a collection of information developed by humans, technological tools, and media to produce information that can serve as an essential communication network for certain parties[2]. The web is a collection of pages within an internet domain created for a specific purpose, interconnected, and widely accessible through a homepage using a web browser via a protocol commonly known as HTTP or Hypertext Transfer Protocol [3]. (Hutagalung et al., 2018:2) The creation of a library information system is highly feasible to facilitate librarians in managing library materials as well as in serving library users more efficiently[4]. A library is a unified work unit consisting of several sections: the collection development section, the collection processing section, the user services section, and the facilities and infrastructure maintenance section. [5] According to Ryanda (2023:3), the RAD method is one of the system development methods aimed at enabling faster development[2]. [6]RAD is a "high-speed" adaptation of the waterfall model, where rapid progress is achieved through a component-based construction approach (Hasanah, 2020:26). Melati Village Library in Tebat Agung is a village library located on Jln. Jendral Sudirman, Dusun 2, Tebat Agung Village, Rambang Niru District, Muara Enim Regency, South Sumatra, and has been operating since 2019. However, it still uses a manual system for data management. Staff record all book, borrowing, and returning data manually in a ledger, which often takes a long time and increases the risk of recording errors. Book data searches require staff to manually check the list, which can hinder visitor services. In addition, report generation is ineffective due to the absence of an automated system. In accordance with the needs arising from the problems above and the impact caused by the library's non-computerized data management, a website is needed to assist in processing book data at Melati Village Library in Tebat Agung. With this website, the activities of the library staff in managing book data are expected to become more effective and efficient. Therefore, the author is interested in implementing the RAD method in the design and development of a web-based information system for Melati Village Library in Tebat Agung.

2. Theoretical Basis

2.1. Definition of Implementation

Implementation is the application of ideas or thoughts that are well-planned and structured, with clear and measurable objectives and targets (Hariato et al., 2023). Implementation is also often referred to as execution, action, or the mechanism of a well-prepared and

detailed plan. This is because implementation involves actions or executions concerning a particular matter or object (Alfatih et al., 2022:2). In essence, implementation is an act of applying ideas arranged in a structured manner with clear goals to be achieved.

2.2. Definition of the RAD Method

[6] The RAD method is a "high-speed" adaptation of the waterfall model, where rapid progress is achieved through a component-based construction approach. If each requirement and project scope limitation is well understood, the RAD process enables the development team to create a "fully functional system" within a very short timeframe (Hasanah, 2020:26). The Rapid Application Development (RAD) method uses an iterative approach for system development. In this method, a working model is created in the early stages of development to determine user requirements [2]. It can be concluded that the RAD method is a system development model that uses a repetitive approach, enabling developers to create a system within a short period of time.

2.3. Definition of Design and Development

Design and development is a general term for creating or designing an object from the initial stage to the completion stage. The term originates from the word "design," which means planning, designing, or building (Ariansyah, 2017). Design and development involves illustrating, planning, and creating sketches or arrangements of several separate elements into a unified and functional whole [8]. It can be concluded that design and development is the process of translating the results of analysis into a software package, then creating the system or improving an existing one.

2.4. Definition of Information Systems

[7] An information system is a collection of several systems within an organization that gather, process, store, and distribute information to support decision-making and control within the organization (Sangga et al., 2020). [2] An information system is a set of information developed by humans, technological tools, and media to produce information that can serve as an essential communication network for certain parties (Ryanda, 2023). From the above definitions, it can be concluded that an information system is a series of data developed by several components—such as technology, humans, and media—which is then processed into information to support decision-making and control within the organization.

2.5. Definition of Library

[2] A library is a room with a variety of book and magazine collections. Libraries are usually provided by schools, universities, or the government and serve as a place for students and the public to study and seek information (Riyanda, 2023). [5] A library is a unified work unit consisting of several sections: the collection development section, the collection processing section, the user services section, and the facilities and infrastructure maintenance section (Duha et al., 2020). From the above definitions, it can be concluded that a library is an institution or place that manages a collection of various types of information sources, such as books, magazines, and documents, which are provided for use by the general public, specific communities, or individuals.

2.6. Definition of Website

[7] A website is a collection of pages used to display information in the form of text, still or moving images, animations, sound, and/or a combination of all of these, whether static or dynamic, forming an interconnected structure in which each page is linked to others (Santoso, 2022:1). [3] The web is a set of pages within an internet domain created for a specific purpose, interconnected, and widely accessible through a homepage using a web browser via a protocol commonly known as HTTP or Hypertext Transfer Protocol (Marlina et al., 2021:2). From the above definitions, it can be concluded that a website is a collection of interconnected web pages that can be accessed via the internet using a web browser. A website consists of various elements such as text, images, videos, or other interactive content.

2.7. Definition of PHP

According to Santoso (2022:27), PHP stands for *PHP: Hypertext Preprocessor*. It was first created by Rasmus Lerdorf in 1994 [7]. PHP is a programming language known as a scripting language, meaning that PHP is a programming language embedded within other languages and applications [8]. From these definitions, it can be concluded that PHP is an abbreviation of *Hypertext Preprocessor*, a programming language primarily used for web application development. PHP is a server-side scripting language that runs on the server and is used to generate dynamic web pages.

2.8. Definition of MySQL

According to Riyanda (2023), MySQL is database management system (DBMS) software for SQL databases [2]. [7] MySQL is an implementation of a relational database management system (RDBMS) that is distributed for free under the GPL license (Pranata et al., 2020). From these definitions, it can be concluded that MySQL is an open-source relational database management system (RDBMS) that uses Structured Query Language (SQL) to manage and access data.

2.9. Definition of XAMPP

[7] XAMPP is an application that enables the creation of a local web server for developing projects locally. Many people use XAMPP because it is simple and very easy to run (Santoso, 2022:3). [8] XAMPP is Apache server software that offers many advantages, such as ease of use, no cost, and support for installation on both Windows and Linux (Putra et al., 2019). From these definitions, it can be concluded that XAMPP is open-source software that provides a local server development package to run web applications offline on a computer.

2.10. Definition of Database

A database is a collection of organized and logically related data, where each element or entity has a specific description or attribute (Widiarti et al., 2024:85). A database is information stored in a computer in an orderly manner so that it can be viewed using a computer program to retrieve information from it [9]. From these definitions, it can be concluded that a database is a systematically organized collection of data that can be easily accessed, managed, and updated.

2.11. Definition of Visual Studio Code

Visual Studio Code is a source code editor developed by Microsoft for Windows, Linux, and macOS. It includes support for debugging, built-in Git and GitHub control, syntax highlighting, intelligent code completion, snippets, and code refactoring (Agustini et al., 2019). According to Solihin et al. (2024), Visual Studio Code is a source code editor developed by Microsoft for Windows, Linux, and macOS. From these definitions, it can be concluded that Visual Studio Code is a code editor developed by Microsoft.

3. Research Methods

3.1. Data Sources

1. Primary Data
   The primary data in this journal was obtained by collecting data and information, and by studying the existing records at Melati Village Library in Tebat Agung, as well as through direct interviews with the head of the library, the technical services staff, and the user services staff at Melati Library.
2. Secondary Data
   The secondary data sources in this study were obtained using the document study technique.

3.2. Data Collection Techniques

The techniques used in this study were as follows:

1. Observation
   The observation method in this system was carried out by collecting data and information, as well as studying the existing records at Melati Village Library in Tebat Agung.
2. Interview
   The interview technique in this system was conducted through direct interviews with the head of the library, the technical services staff, and the user services staff at Melati Library.
3. Literature Review
   This study used the document study technique for data collection.

4. System Analysis And Design

4.1. Proposed Class Diagram

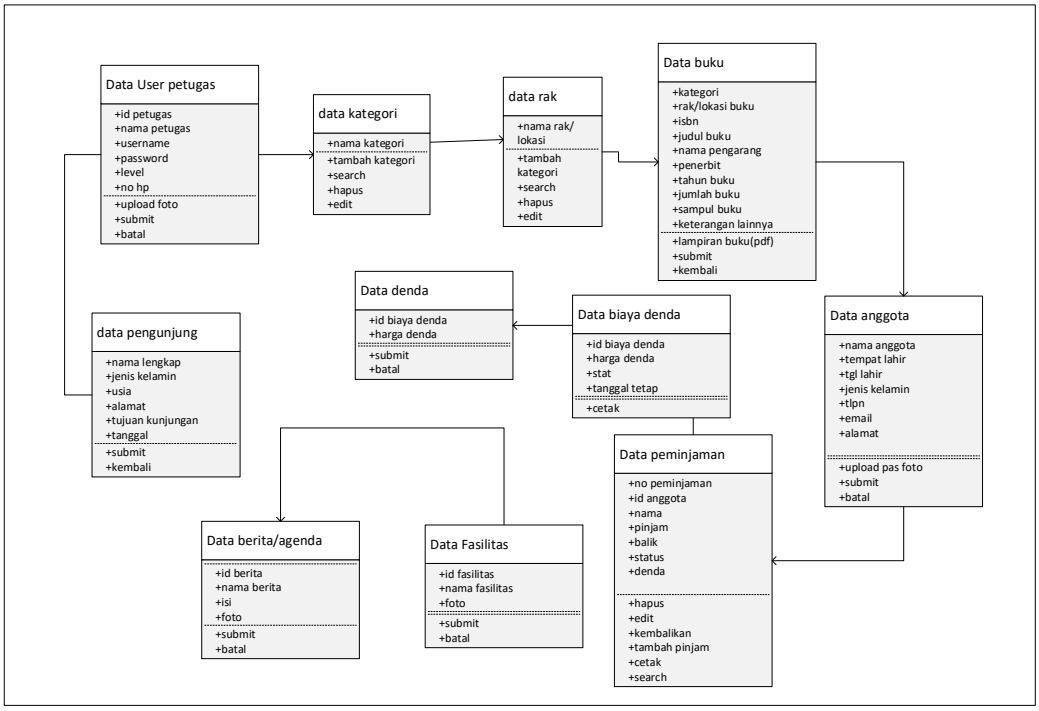

Fig. 1 : Proposed Class Diagram

This class diagram illustrates the data structure in the library management system. There are several main entities, namely staff user data, login, visitor data, category data, rack data, book data, member data, borrowing data, and returning data.

5. Implementation and Testing

5.1. Interface Implementation

The following is the homepage interface implementation of the Melati Library website:

Fig. 2 : Visitor homepage interface implementation of the library

The following is the admin dashboard interface implementation:

Fig. 2 : Admin dashboard interface implementation

The following is the interface implementation of the add member data form:

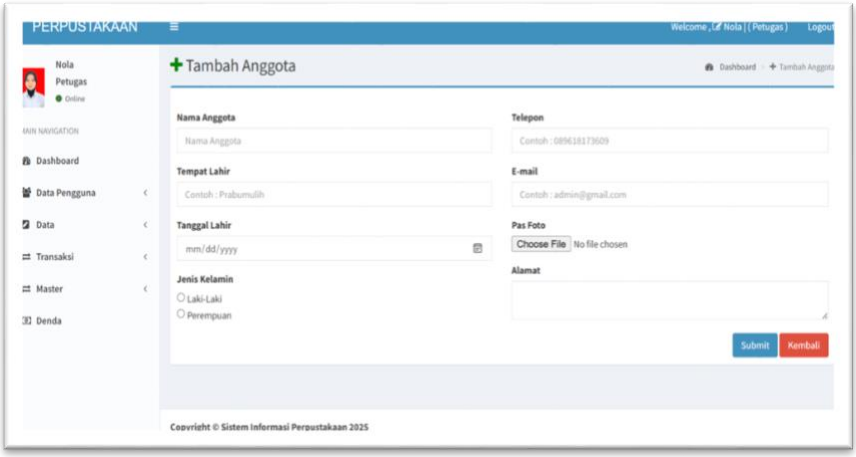

Fig. 3 : Add member data form interface implementation

The following is the interface implementation of the add visitor data form:

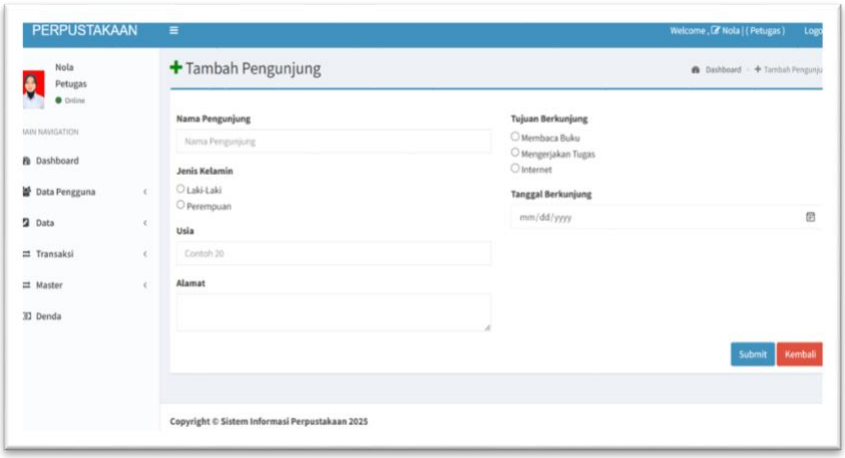

Fig. 4 : Add visitor data form interface implementation

The following is the interface implementation of the add book data form:

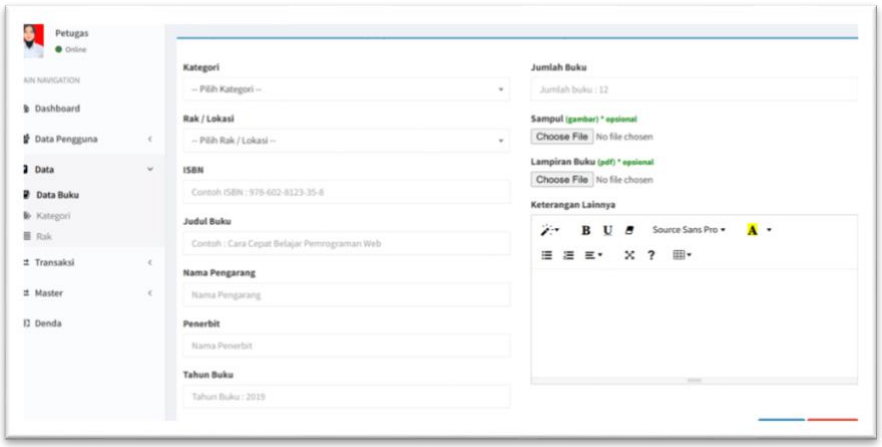

Fig. 5 : Add book data form interface implementation

The following is the interface implementation of the category data form:

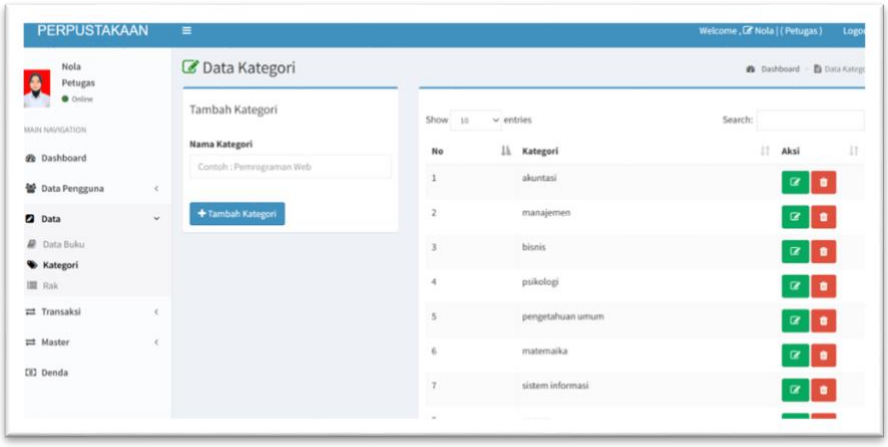

Fig. 6 : Category data form interface implementation

The following is the interface implementation of the bookshelf data form:

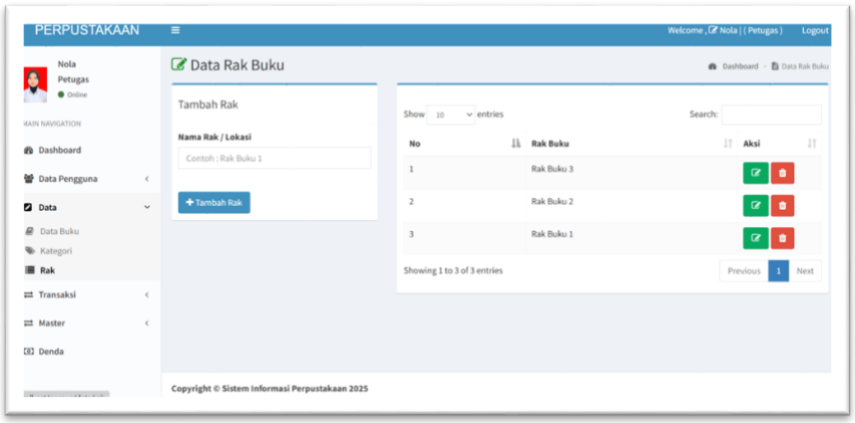

Fig. 7 : Bookshelf data form interface implementation

The following is the interface implementation of the book borrowing form:

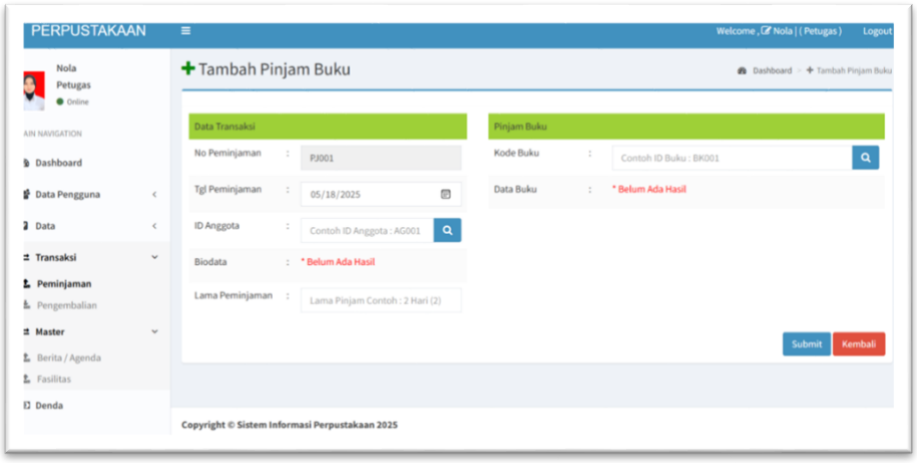

Fig. 8 : Book borrowing data form interface implementation

The following is the interface implementation of the book return form:

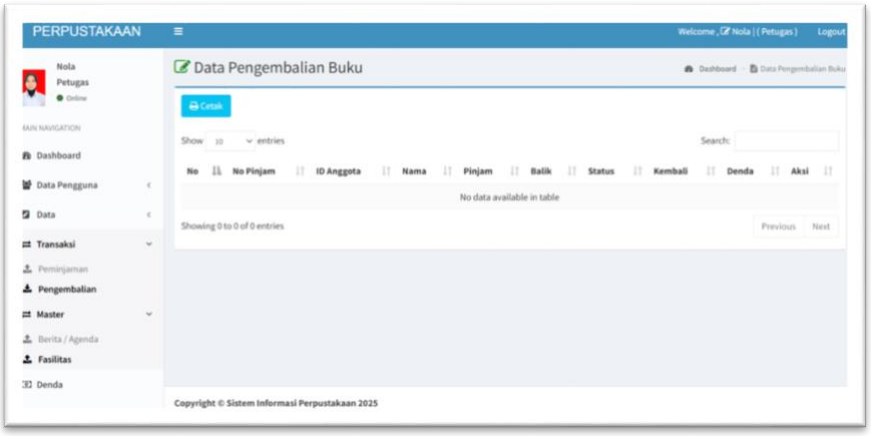

Fig. 9 : Book return form interface implementation

The following is the interface implementation of the fine data form:

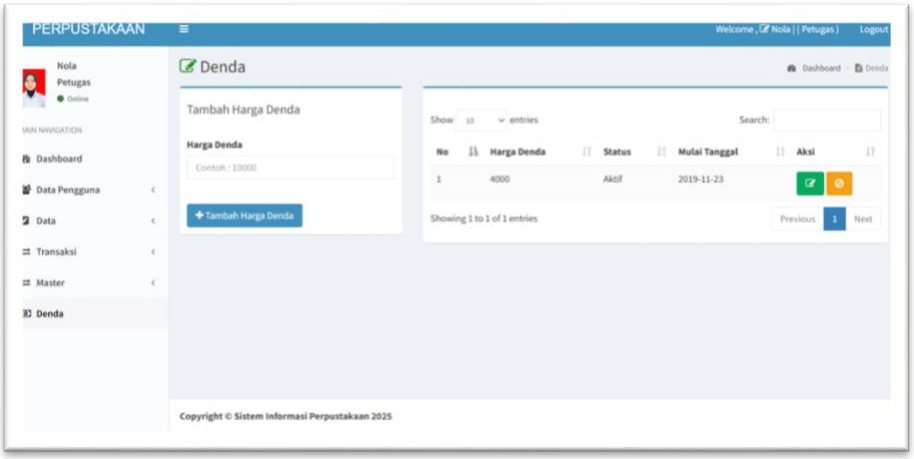

Fig. 9 : Fine data form interface implementation

5.2. System Testing

All functions in the interface including login, management of member data, books, borrowing, returns, shelves, categories, facilities, news, visitor attendance, and fines operate properly as long as the input provided is valid. The system rejects invalid inputs, so all tests are considered valid based on the blackbox testing method.

6. Conclusion

Here is the conclusion based on the research results at Melati Library, Tebat Agung Village:

1. Melati Library in Tebat Agung Village previously used a manual system for managing book data, borrowing, returns, and reporting. This caused slow service processes, increased the risk of recording errors, and made data retrieval difficult.
2. By applying the Rapid Application Development (RAD) method, the researcher successfully developed a web-based library information system. This system was designed to accelerate the development process and deliver results that are more structured and aligned with user needs.
3. The developed system provides features such as management of member data, visitors, books, categories, bookshelves, borrowing and returning transactions, fine management, news, and library facilities.
4. The system was developed using the PHP programming language, MySQL database, and XAMPP web server, and implemented with Visual Studio Code.
5. The built system is capable of improving the efficiency and effectiveness of library management, speeding up services, minimizing recording errors, and simplifying reporting processes. Additionally, this system serves as an academic reference and a practical example of implementing the RAD method in a real project.

References

[1] A. C. Sofyan, Yuliton Gobai, "Rancang Bangun Sistem Informasi Perpustakaan Online Berbasis Web Pada Perpustakaan Daerah," *J. Ilm. Sist. Inf. dan Tek. Inform. "JISTI,"* vol. 3, no. 1, pp. 78–85, 2020.

[2] F. Ryanda, "Rancang Bangun Sistem Informasi Perpustakaan Menggunakan Metode Rapid Application Development Pada Sma Negeri 1 Hinai Berbasis Website," *Jutesa - J. Teknol. dan Sains*, vol. 1, no. 1, pp. 15–24, 2023.

[3] P. M. Ariansyah and K. Wijaya, "Rancang Bangun Sistem Informasi Akademik Berbasis Web: Studi Kasus: SD Negeri 18 Tanah Abang," *J. Pengemb. Sist. Inf. dan Inform.*, vol. 2, no. 3, pp. 138–156, 2021, doi: 10.47747/jpsii.v2i3.562.

[4] D. D. Hutagalung and F. Arif, "Rancang Bangun Sistem Informasi Perpustakaan Berbasis Web Pada Smk Citra Negara Depok," *J. Chem. Inf. Model.*, vol. 53, no. 9, pp. 1689–1699, 2018, doi: 10.1017/CBO9781107415324.004.

[5] E. Duha and C. Juliani, "Perancangan Sistem Informasi Peminjaman Buku Perpustakaan Berbasis Web Pada Smp Negeri 3 Huragi," *J. SAINTIKOM (Jurnal Sains Manaj. Inform. dan Komputer)*, vol. 19, no. 1, p. 24, 2020, doi: 10.53513/jis.v19i1.222.

[6] F. N. Hasanah, *Buku Ajar Rekayasa Perangkat Lunak*. 2020. doi: 10.21070/2020/978-623-6833-89-6.