

DESIGN OF A DIGITAL LIBRARY SYSTEM BASED ON UML

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Abstract: The design of a digital library system based on Unified Modeling Language (UML) is carried out to visualize the components and workflows in a structured manner. UML is used to model various aspects of the system, such as user data management, search functionality, and digital collection management. Use case, class, sequence, and activity diagrams are utilized to represent the interactions between entities in the system. This design aims to improve the efficiency of digital library management by providing a software solution that is easy to implement, develop, and maintain.

INTRODUCTION

In recent years, the application of information technology in school libraries has become a strategic step to enhance the efficiency of library management. In this digital era, web-based libraries provide easier and faster access for students and staff to borrow, return, and search for books without having to physically visit the library. According to (Wahyuni et al., 2023), the implementation of a web-based library information system at SMA N 1 Binjai has simplified the process of borrowing and returning books electronically while reducing dependency on manual systems. The digital library system also enables users to access e-books, making book storage and distribution more efficient.

Unified Modeling Language (UML) is a modeling method widely used in designing information systems, including digital libraries. According to (Siyasih, 2021), the use of UML in developing library systems helps to clearly and structurally identify functional requirements, facilitating the creation of an efficient system that is easy to understand by both developers and users (S. Supiyandi et al., 2022). With UML, the system design process becomes more structured, starting from use case diagrams to class diagrams, ensuring that each element of the digital library system is well integrated. (Iqbal et al., 2020; Putri et al., 2022)

The development of UML-based digital library systems in schools can also improve the efficiency of library management. For example, at SMA N 1 Padang Cermin, the implementation of a web-based library has been proven to accelerate book management processes, record transactions, and provide wider access for students to access library collections anytime and anywhere (Styawati et al., 2023; Sulistiani et al., 2022). The use of UML in the design of digital library systems is expected to increase productivity and provide better services to both students and staff, with faster and more efficient access (C. R. Supiyandi & Hermansyah, n.d.).

RESEARCH METHODS

This study aims to design a digital library system using Unified Modeling Language (UML) as a design tool. The research methodology includes several key stages. First, data collection is carried out through in-depth interviews with school representatives to identify their needs and expectations regarding the digital library system. The data obtained from these interviews is analyzed to outline the system's functional and non-functional requirements. Subsequently, the system design is developed using UML diagrams, including use case diagrams to depict the actors and main use cases, and activity diagrams to show the process flow. After the design phase is completed, the researcher will proceed to the UI/UX design stage using Figma, which will be discussed in detail in a separate article.

RESULTS AND DISCUSSION

In the design of this digital library system, Unified Modeling Language (UML) is used. The diagrams applied include the Use Case Diagram and Activity Diagram.

1. Use Case Diagram

The prototype or UI/UX design can be accessed by the library admin as well as the students. The Use Case Diagram for the library operator or admin and the students in the Digital Library prototype is shown in the following image.



Figure 1: Use Case Diagram of Students

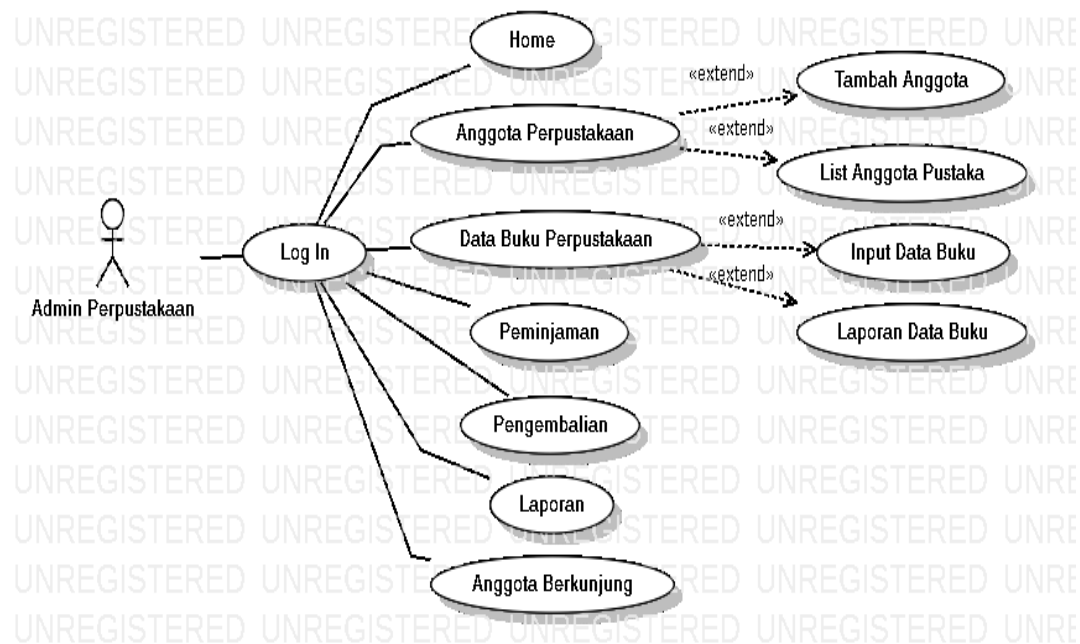


Figure 2: Use Case Diagram of Library Admin

2. Activity Diagram

The activity diagram for the library operator or admin and the students in the Digital Library prototype can be seen in the image below.

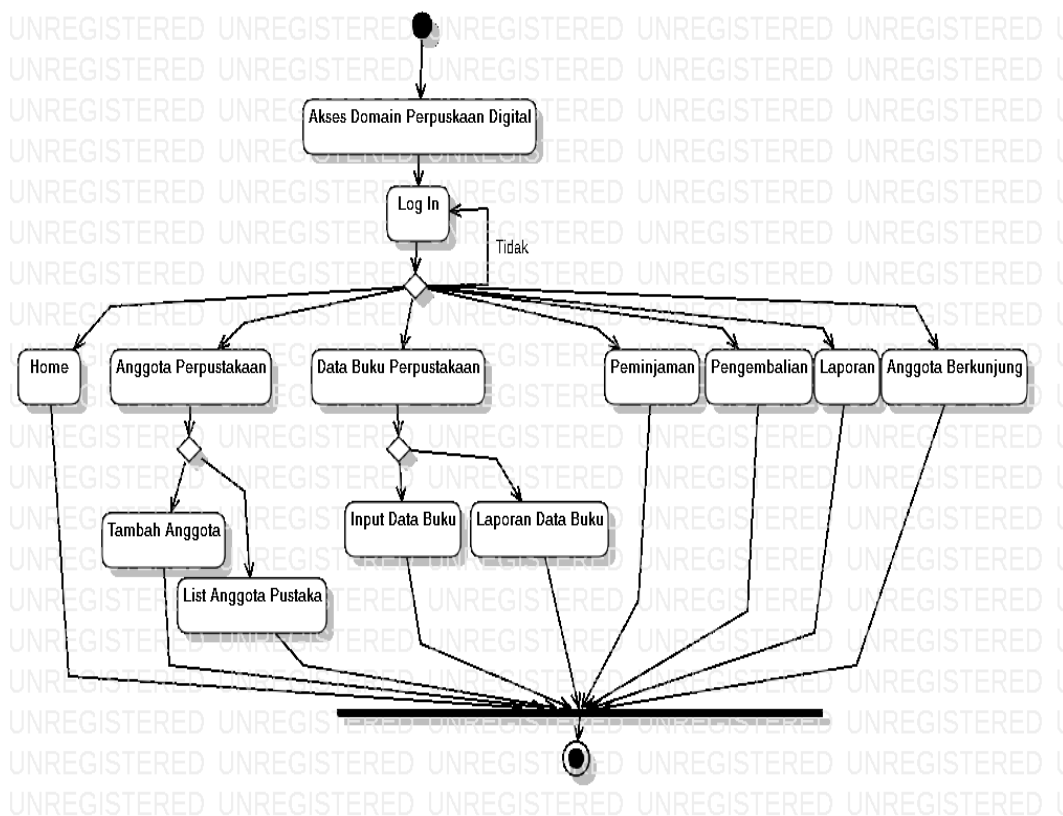


Figure 3: Activity Diagram of Library Admin

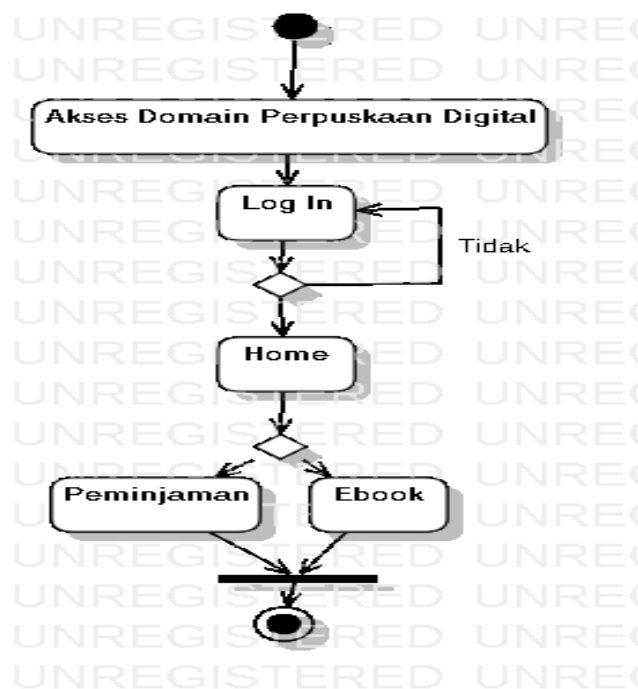


Figure 4: Activity Diagram of Students

CONCLUSION

This research successfully developed the design of a digital library system using Unified Modeling Language (UML). The design process involved the creation of key diagrams, such as Use Case Diagrams and Activity Diagrams, which effectively illustrate system interactions and process flows. The Use Case Diagram provides a clear understanding of the roles and actions performed by the library admin and students, while the Activity Diagram details how the main processes in the system operate. With these design outcomes, it is hoped that they will serve as a useful guide in the development of a more effective digital library system, which can improve library management and operations.

REFERENCE

- Iqbal, S., Al-Azzoni, I., Allen, G., & Khan, H. U. (2020). Extending UML use case diagrams to represent non-interactive functional requirements. *E-Informatica Software Engineering Journal*, 14(1), 97–115. <https://doi.org/10.37190/E-INF200104>
- Putri, R. E., Yusman, Y., & Puspita Sari, I. (2022). Perancangan Sistem Informasi Bimbingan Dan Konseling Berbasis Website. *Nasional Teknologi Informasi Dan Komputer*, 6(1). <https://doi.org/10.30865/komik.v6i1.5904>
- Siyasih, F. (2021). RANCANG BANGUN SISTEM PERPUSTAKAAN DIGITAL (STUDI KASUS : SMK 1 BANDAR LAMPUNG). *Jurnal Informatika Dan Rekayasa Perangkat Lunak (JATIKA)*, 2(3), 368–374. <http://jim.teknokrat.ac.id/index.php/informatika>
- Styawati, S., Samsugi, S., Rahmanto, Y., Andraini, L., & Ismail, I. (2023). Penerapan Perpustakaan Digital Pada SMA Negeri 1 Padang Cermin. *Journal of Engineering and Information Technology for Community Service*, 1(3), 95–103. <https://doi.org/10.33365/jeit-cs.v1i2.168>
- Sulistiani, H., Isnain, A. R., Yasin, I., Mega, E. D., Virgilia, A., & Akbar, A. (2022). PENERAPAN DAN PELATIHAN PERPUSTAKAAN DIGITAL PADA SMK N 1 PADANG CERMIN. *Jurnal Widya Laksmi: Jurnal Pengabdian Kepada Masyarakat*, 2(2). <https://doi.org/10.59458/jwl.v2i2.38>
- Supiyandi, C. R., & Hermansyah, S. K. (n.d.). *DESAIN UI/UX SISTEM INFORMASI HUTAN MANGROVE MENGGUNAKAN METODE RAPID APPLICATION DEVELOPMENT (RAD)*.
- Supiyandi, S., Zen, M., Rizal, C., & Eka, M. (2022). Perancangan Sistem Informasi

Desa Tomuan Holbung Menggunakan Metode Waterfall. *JURIKOM (Jurnal Riset Komputer)*, 9(2), 274–280.

Wahyuni, S., Sari, R. M., Zen, M., & Praja Kelana, M. (2023). IMPLEMENTASI SISTEM INFORMASI E-LIBRARY BERBASIS WEB PADA PERPUSTAKAAN SMA N 1 BINJAI THE IMPLEMENTATION OF INFORMATION SYSTEM ON WEB-BASED E-LIBRARY IN THE LIBRARY OF SMA N 1 BINJAI. *Journal of Information Technology and Computer Science (INTECOMS)*, 6(1).