The UML Model of the Mosque Financial System

Ranti Eka Putri, Yossy Fadly, Dedi Purwanto

Abstract
The financial system in mosques is an important element in managing community funds transparently and accountably. However, many mosques still face difficulties in managing income and expenses, as well as in preparing timely and structured reports. This study aims to design and develop a UML (Unified Modeling Language) model for a web-based mosque financial system that facilitates the recording, reporting, and monitoring of finances. The developed UML model includes Use Case, Class, Activity, and Sequence diagrams to illustrate the business processes, from recording donations, approval of expenditures, to financial reporting. This system is expected to improve the transparency of mosque fund management, simplify access to reports by administrators and congregants, and ensure compliance with Sharia principles in fund management. Through the application of the UML model, the mosque financial system can operate more efficiently with better internal controls, providing a clear workflow for administrators. The results of this study are expected to serve as a reference for mosque administrators in enhancing the quality of their financial management.

Keywords: *Finance, Mosques, System, UML*

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Introduction

The mosque functions as a center for community activities for Muslims, including guidance, education, learning, empowerment, and celebrating religious holidays. [1] However, despite its significant role in social and religious life, the development of mosques in the era of modern technology is still considered suboptimal. With the advancement of technology, it is important for mosques to innovate, especially in terms of internal management, to ensure that mosques continue to grow and provide greater benefits to the community. One way to achieve this is by modernizing the mosque management system, including more efficient and structured financial management. [2], [3]

The financial system of a mosque is an important part of managing community funds, which must be carried out transparently and accountably. As the number of congregants increases and time progresses, financial management that is still done manually with traditional records becomes less effective and prone to errors. Many mosques face challenges in preparing timely, accurate, and easily understandable financial reports. This often leads to uncertainty regarding fund usage, which can potentially damage the congregation's trust in the mosque's financial management.

To address this, a technology-based system is needed to improve the efficiency of mosque financial management. One effective approach is to use the UML (Unified Modeling Language) model to design an information system that describes the flow and structure of mosque financial management. With UML, this system can be clearly visualized [4], [5], [6], making it easier for mosque administrators to manage income (such as alms, zakat, and donations), expenses (including operational costs and program activities), and to create more structured financial reports that are easily accessible to all relevant parties.

The web-based system developed using the UML model is expected to improve transparency and accountability. Additionally, this system will separate general funds from restricted funds. General funds are used for the operational needs of the mosque, such as electricity costs, building maintenance, employee salaries, and routine activities. Restricted funds, on the other hand, are funds collected for specific purposes, such as mosque construction, educational programs, or other social activities. The separation between general and restricted funds is crucial to ensure that the collected funds are used for their original purposes and to ensure clarity in management, minimizing misuse or errors in record-keeping.

Many mosques still use manual systems for financial management, which risk leading to errors in record-keeping and inaccuracies in fund allocation. This can lower the trust of the congregation in the mosque's financial management. Therefore, this study aims to develop a system that can enhance transparency and make it easier for mosque administrators to perform their duties. By using UML, this system can be clearly visualized, allowing mosque administrators to understand and manage the business processes more easily, from recording donations to preparing financial reports.

This research is in line with a study conducted by Wahyudi et al. (2024), which states, "A mosque, as a place of worship for Muslims, requires an efficient system to manage its finances. The manual management of mosque funds invites the possibility of errors and lack of clarity in financial reports. Therefore, the development of a technology-based financial management information system for mosques is crucial to ensure better transparency and accountability.[7]"

With the web-based system developed using the UML model, it is hoped that mosque financial management will become more orderly, transparent, and accountable. This will not only increase the trust of the congregation but also accelerate decision-making related to the use of mosque funds.

Literature Review

Finance is the activity of managing, planning, controlling, and storing funds by households, organizations, or companies. [8] In the context of mosques, although the tasks and

responsibilities of financial management may vary, mosque financial administrators are responsible for ensuring that funds are used effectively, transparently, and accountably. The management of mosque funds includes the separation of general funds for operations and restricted funds for specific purposes, such as mosque construction or special programs, to ensure that the funds are used according to their intended purposes.

UML (Unified Modeling Language) is a visual modeling method used to design object-oriented systems. UML makes it easier for programmers to understand, analyze, and develop applications, especially those intended for long-term use. Software applications require proper analysis and design, such as program flow, to ensure their sustainability and effectiveness. [9]

UML was first created by the Object Management Group in 1997 and serves as the standard language for visualizing, designing, and documenting systems. UML aims to simplify software development, efficiently meet user needs, and consider aspects such as scalability, reliability, and security.

UML diagrams include several main types, including [10]:

1 **Use Case Diagram**: This diagram illustrates the interaction between users and the system. With this diagram, the flow of actions of actors and their relationship to system functions can be easily understood, making it an effective first step in system modeling.
2 **Class Diagram**: This diagram is used to describe the classes within a package that align with the system's requirements. It includes the domain model as an abstraction of the database and the MVC (Model-View-Controller) modules, where the class boundary serves as the interface, the class control manages algorithms, and the class entity represents the database tables and program queries.
3 **Activity Diagram**: This diagram models the sequence of processes in the system vertically and is an extension of the Use Case diagram to visualize the process flow within a system.
4 **Sequence Diagram**: This diagram shows the sequence of interactions between objects in the system to achieve results based on the existing Use Case.

Research Methodology

This study aims to design a web-based mosque financial management information system using the UML (Unified Modeling Language) model. The focus is on designing a system that illustrates the financial management process flow in mosques, from recording income (such as alms, zakat, and donations), expenses (including operations and program activities), to generating structured financial reports. This system will also separate general funds from restricted funds.

General funds are used for the operational needs of the mosque, such as electricity costs and building maintenance. Restricted funds are those raised for specific purposes, such as mosque construction or social programs. The separation between the two is essential to ensure that the funds are used according to the agreed-upon objectives and to enhance transparency and accountability in mosque financial management.

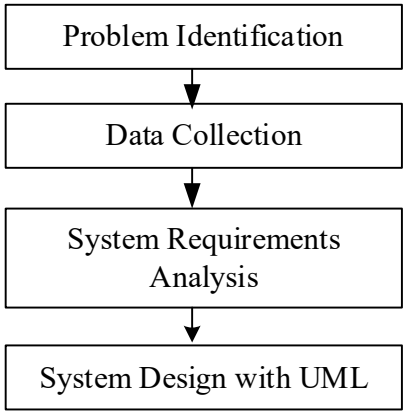

Figure 1. Research Stages

Here is the explanation of the research stages that systematically describe this research process:

1 **Problem Identification**, In the initial stage, the researcher identifies the issues in mosque financial management that are still being done manually. This research aims to identify the challenges faced by mosque administrators and find appropriate solutions to improve mosque fund management.
2 **Data Collection,** At this stage, data is collected through various methods such as interviews with mosque administrators, observations of the existing system, and gathering documentation of financial reports in use. The goal of data collection is to obtain a clearer picture of the current mosque financial management process.
3 **System Requirements Analysis,** Based on the data collected, the researcher then conducts an analysis to identify the system requirements. In this stage, the researcher identifies the features needed in the web-based mosque financial management system, such as recording income and expenses, separating general funds from restricted funds, and generating more structured financial reports.
4 **System Design with UML,** At this stage, the UML model is used to design the desired system. Use Case, Activity, and Sequence diagrams will be used to describe the process flow of mosque financial management, interactions between users and the system, and the steps required to record funds, manage expenses, and create more efficient reports.

With these stages, this research aims to develop a more structured and transparent system, as well as provide ease in managing mosque finances.

Results

This mosque financial system can be accessed by the system operator and by mosque congregants or community members. The UML model of the mosque financial system is shown below.

1. **Usecase Diagram**

   The mosque financial system can be accessed by both congregants/the community and the system operator, each with different access rights. Congregants or community members do not need to log in to access the information displayed by the system. The mosque's finances, including both income and expenses, are fully managed by the system operator. The use cases of the system are as follows.

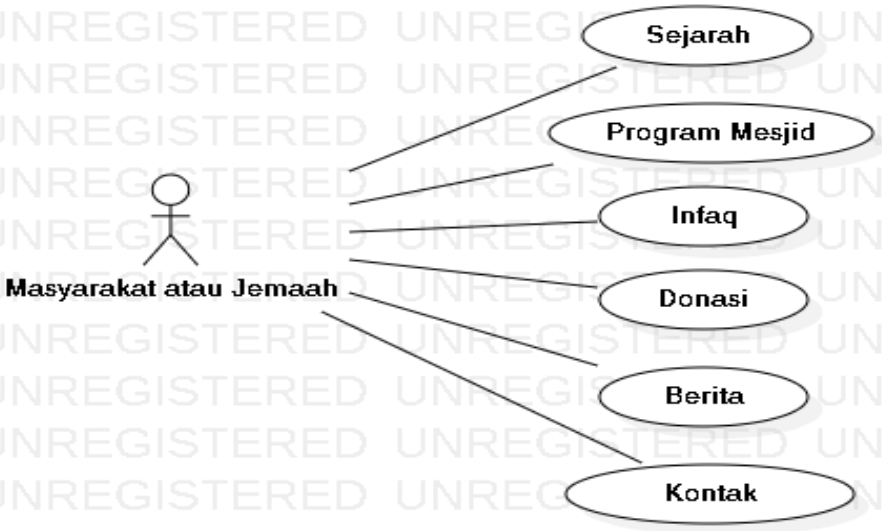

Figure 2. Use Case Diagram for Congregants

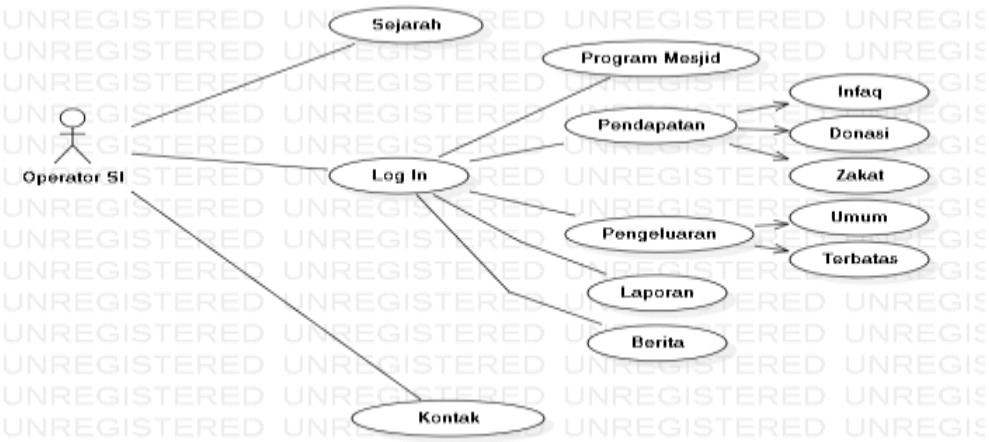

Figure 3. Use Case Diagram for the System Operator

2. Sequence Diagram

Figure 3 illustrates the sequence of activities carried out by congregants or community members when accessing the Mosque Financial Information System. The process begins when congregants or community members open the Main Page, which serves as the system's main page. On this page, they can view the main menu, which is directly accessible without any login.

Next, congregants or community members can select one of the information options provided by the system, namely Mosque History, Mosque Programs, Infaq, Donations, News, or Contact. The menu selection is made according to the type of information they wish to obtain. Once a menu option is selected, the system displays the corresponding information page containing content that has been published by the mosque administrators.

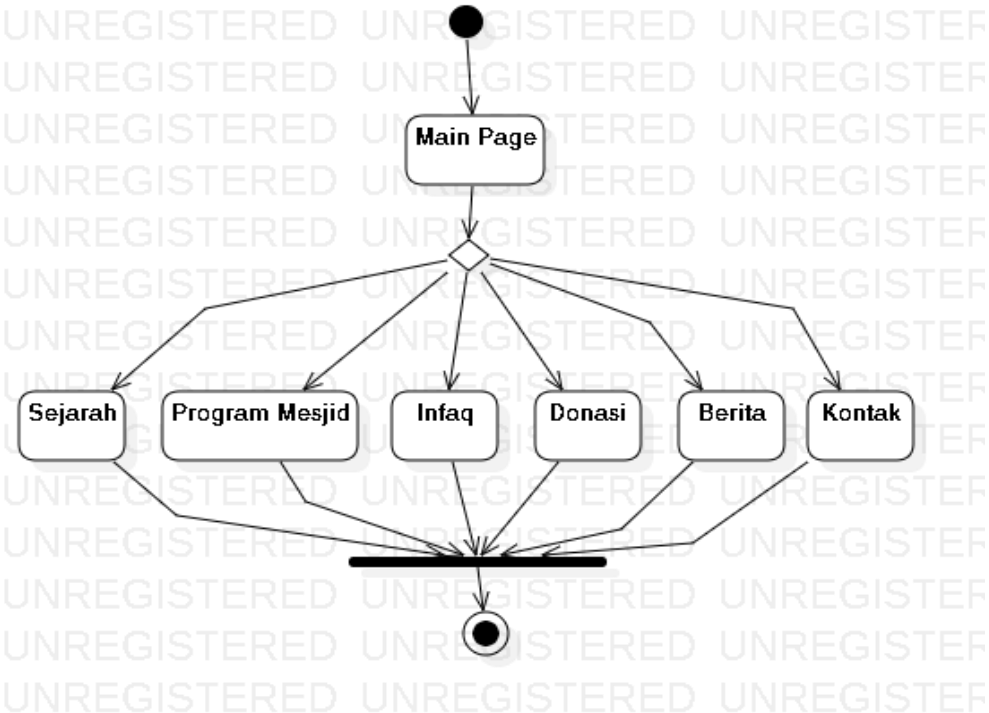

Figure 4. Activity Diagram for Congregants

Figure 5 shows the activities performed by the system operator in managing the Mosque Financial Information System. From the Main Page, the operator selects the Log In menu and

enters a username and password. After successfully logging in, the operator gains access to the Income, Expenditure, Report, Mosque Programs, and News menus.
In the Income menu, the operator records receipts based on the categories of Zakat, Infaq, and Donations. Through the Report menu, the operator generates financial reports for both Public and Restricted access. Thus, the operator has full authority to record, manage, and present the mosque's financial information in the system.

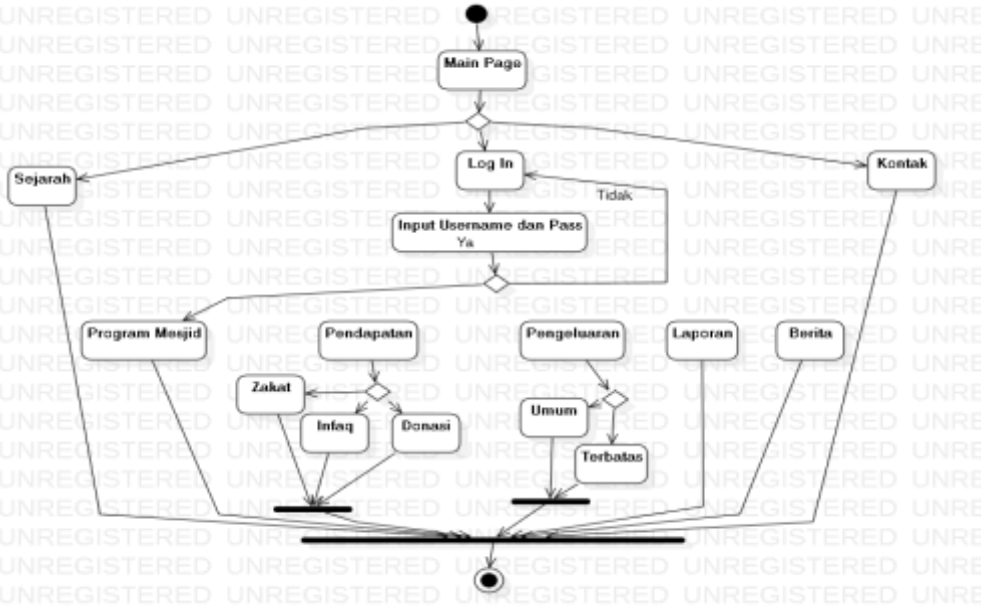

Figure 5. Activity Diagram for the Information System Operator

3. Sequence Diagram

Figure 6 describes the sequence diagram for congregants or community members. This diagram shows their interaction with the system through the History, Mosque Programs, Infaq, Donations, News, and Contact menus. Congregants or community members select one of these menus, the system processes the request, and then displays the requested information. All interactions are view only.

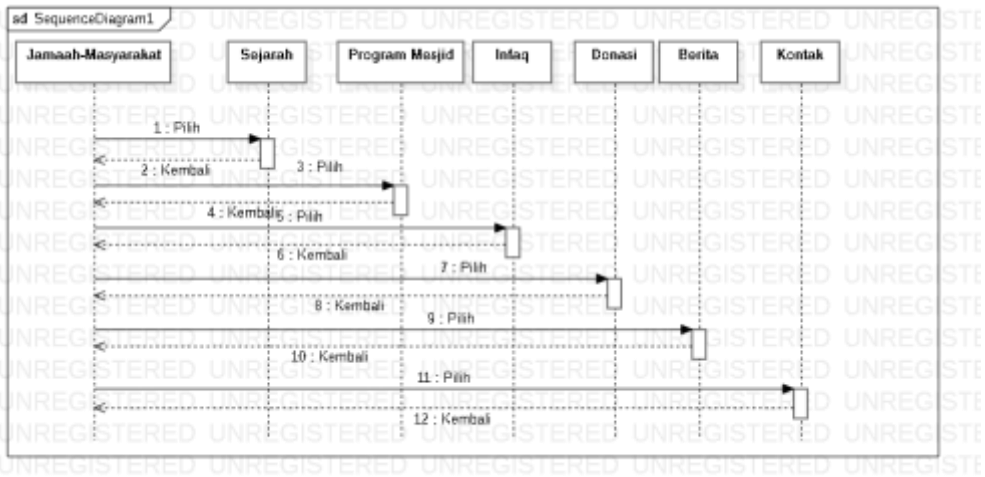

Figure 6. Sequence Diagram for Congregants

Figure 7 also describes the workflow of the operator when managing the system. The operator first logs in and then accesses the History, Mosque Programs, Income, Expenditure, Report,

and News modules. Each data management request (add, edit, delete, or display) is processed by the corresponding module, and the result is returned to the operator

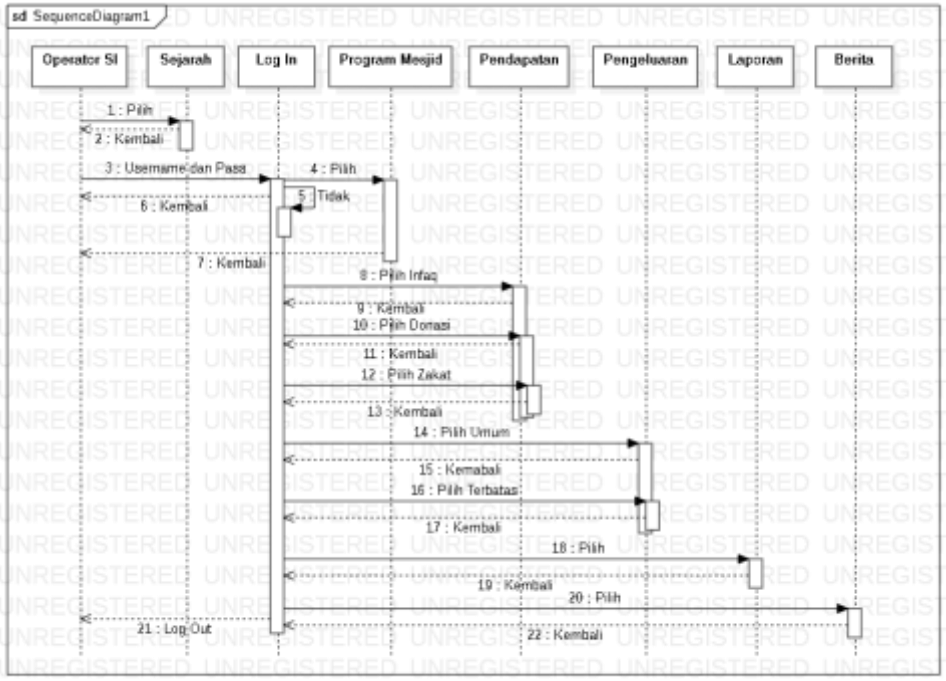

Figure 7. Sequence Diagram for the Information System Operator

Conclusion

This study successfully developed a UML model for the mosque financial system. By using UML, the mosque financial management process can be visualized in a more systematic and easily understandable way for mosque administrators. This not only simplifies record-keeping and reporting but also enhances transparency and accountability in fund management. The resulting UML model is expected to be a solution for mosques that still manage their finances manually, as well as provide a solid foundation for the development of more complex systems in the future.

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