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Development of Mosque Management Information System

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Abstract: Mosque Management Information system for Felcra Bukit Kepong is a system developed to perform data and information recording work on the Felcra Bukit Kepong Mosque. Currently, all the recording activities is done manually with handwritten in a book. This method is very subjective and inconsistent because sometimes human make mistake. Based on that situation, a Mosque Management Information system for Felcra Bukit Kepong was developed. This system accepts registration on mosque committee intended to manage their mosque's information. Through the system, mosque committee can record and store all their data in the system such as a list of mosque committee and event. Besides, congregation also can use the system to get information about the mosque such as duty roster of the mosque committee because the system is a web-based. The prototyping process model is selected to assist project development of Mosque Management Information system for Felcra Bukit Kepong. Prototype method implements the main phases that present in the system development life cycle methodology, including five phases, which are planning phase, analysis phase, design phase, prototype development phase and the implementation phase. The development of this system will assist mosque committee to have a better management information system for their mosque.

Keywords: Management Information, Mosque, Web Based Application

1. Introduction

Mosque is a place where Muslim worship. In Arabic, mosque is called masjid which means place of prostration [1]. The purpose of the mosque is a place for Muslim to pray or doing activities related to the religion of Islam such as study about Islam and celebrate festivals. Prayer, Ramadan vigils, funeral services, marriage and business partnerships, alms collecting and distribution and homeless shelter are common uses for mosque. As the time progress, many mosques have been built to provide facilities for Muslim to perform religious activities. Mosque buildings typically contain an ornamental niche(mihrab) set into the wall that indicates the direction of Mecca(qiblah) [2]. The development of mosque usually requires a lot of cost. Therefore, a good management is needed to ensure the well-being of the mosque.

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A case study was done at a Masjid Jamek Felcra Bukit Kepong located at Felcra Bukit Kepong, Muar, Johor on how the mosque committee manage their mosque. Based on the investigation, the system that the mosque committee used to manage information about the mosque is outdated. All mosque management is done manually. For example, attendance records and schedules of the mosque committee are recorded in the book. Besides that, all the information about the mosque such as services, staff and facilities are recorded in the record book. All of these activities are done by manual handwritten and excel spreadsheet. Next, if the mosque holds religious ceremony such as forum, the mosque committee will make an announcement about the ceremony after Friday prayers to attract the congregation to come to the ceremony. In addition, the mosque also makes advertising poster about the ceremony event and paste it on notice boards. Therefore, the congregation of the mosque will know the ceremony that will take place in the mosque.

The development of the mosque needs a lot of cost as well as mosque maintenance. Therefore, the mosque committee did various ways to raise funds to upgrade the quality of the mosque. The method used by the mosque is by putting small container called as donation box in the mosque area to allow mosque congregation donate the money. Every Friday, the mosque committee will collect the money from the donation box and record the amount in the record book. The collected money will be used to maintenance work or any activity to enliven the mosque. However, this method only works for those who come to the mosque but not for someone outside the mosque area. Currently, mosque faced a problem to collect fund for mosque activities and maintenance. This problem arises due to lack of donor. Most of the mosques receive the donation from surrounding residents.

From the observation's findings, a web-based management system is proposed for the mosque management. The system is called Mosque Management Information system for Felcra Bukit Kepong. With the new system, all the recording activities will be more proper. It is because the new system is computer based and does not involve any manual writing such as previous method. After that, all advertising about mosques can also be done online and more widely.

2. Related Work

2.1 Web Based Application

The technology that is going to be used for Mosque Management Information system for Felcra Bukit Kepong is web-based. These web-based applications involve a particular type of software that allows users to interact with a remote server through a web browser interface. Basically, a web-based application is any program that is accessible over HTTP over network connection rather than being stored in memory on a device. Usually web-based application run inside a web browser. However, web-based apps can also be client-based, in which a small part of the program is downloaded to the user's desktop but processing is done on an external server through the internet. There are a few advantages web-based applications. One of the advantages is the development of the web-based application requires low cost. Web-based applications allow user to access the system through a web browser. While the user interaction with the application needs to be properly tested on different web browsers. However, it is not necessary to create and test it on every potential operating system version and configuration. This situation will make the development and troubleshooting much easier. Furthermore, web-based applications are simple to set up and maintain because web-based application are hosted on a server and does not require installation on local devices. The cost of installing and updating will eventually reduce. On the other hand, web-based application may be accessible from anywhere as long as there is a web browser and an internet connection. This means the application can be use on any device connected to the internet such as mobile phone and tablet.

2.2 Comparison of Three Systems

This part will study about the existing systems that are similar to the system that will be developed which is mosque management information system for Felcra Bukit Kepong. By studying the existing system, comparisons can be made with other systems. There are several existing systems which are Masjid Al-Hidayah TM, Masjid Putra, Putrajaya and masjid Puncak Alam. The three existing systems are studied and compared to the features of the proposed system. This includes the modules contained in the Proposed System. The comparison results are shown in Table 1. All the three existing system are web-based application. Other than, all the existing system also does not have login and registration, duty roster module and user management module compare to Mosque Management Information system for Felcra Bukit Kepong.

Table 1: Comparison

Module	Masjid Al-Hidayah TM	Masjid Putra, Putrajaya	Masjid Puncak Alam	Mosque Management Information system for Felcra Bukit Kepong
Type of system	Web-based	Web-based	Web-based	Web-based
Login and registration module	Not available	Not available	Not available	Available
Generate information mosque module	Available	Available	Available	Available
Donation Module	Not available	Not available	Available	Available
Duty roster module	Not available	Not available	Not available	Available
Event module	Available	Available	Available	Available
Budget module	Not available	Not available	Not available	Available
Feedback module	Not available	Not available	Not available	Available
User management module	Not available	Not available	Not available	Available

3. Methodology

Methodology is a structured approach to project delivery [3]. In general, a programmer would write code to address a problem or automate a procedure in software development [4]. When working on a project, methodology refers to the systematic processes that must be followed. Basically, the systematic process refers to the Software Development Life Cycle(SDLC). The SDLC focuses on several phases which are planning, analysis, design, implementation, testing and maintenance. Therefore, the right choice methodology essential for developing the proposed system. This section describes the project development phase and activities runs in each of these phases.

The prototyping process model is selected to assist project development of Mosque Management Information system for Felcra Bukit Kepong. Prototype method implements the main phases that present in the system development life cycle methodology, including five phases, which are planning phase, analysis phase, design phase, prototype development phase and the implementation phase. Figure 1 illustrates the phases in the prototyping model.

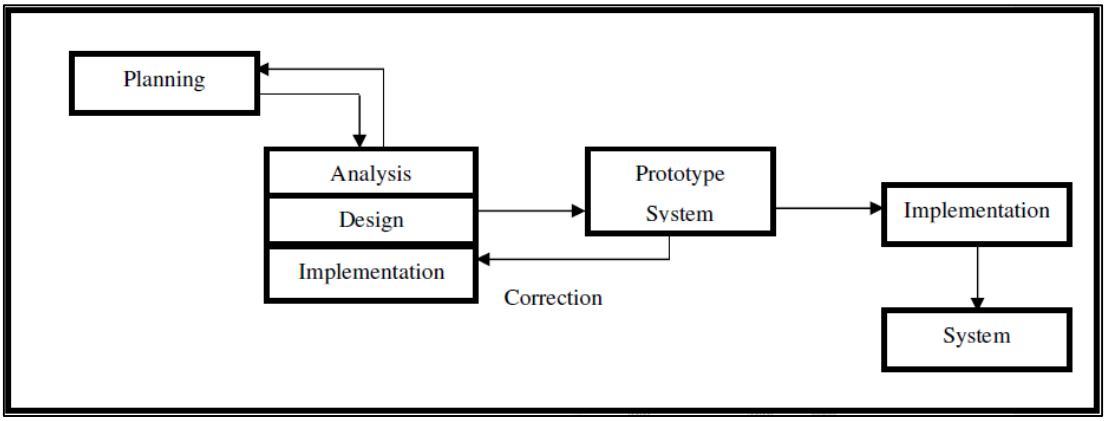


Figure 1: Prototyping Model

There are total of six phases from the prototype model. Table 2 show that each phase has its own activities and deliverable that need to follow during the entire project development. Besides that, table 3 shows the milestone for each activity after completion. Basically, all of these phases need to be done well and make sure that all objectives in each phase achieved so the project development will run smoothly.

Table 2: Software Development Activities and Task

Phase	Activity	Deliverables
Planning	- Identify problems, scope and objectives	- Gantt Chart - Proposal
Analysis	- Interview and observe client - Gather all the information	- Functional requirement - Non-functional requirement - Class diagram - Use Case
Design	- Make the wireframe of the system before develop the system - Design the interface of the system based on the requirement	- Using Fluid UI to design the wireframe - Using PHP programing language to develop the system - Use MySQL to store the database - Interface of the system
Implementation	- Conduct testing of the system - Repair the fault of the system	- PHP programming
Prototype 1	- Detect error and any improvement that can be done to the system - Fix all the error that identified and proceed to Prototype 2 - If there any error or weaknesses, it will be repeated back to analysis phase	- Prototype system - Make sure system meet user requirement

Implementation and Testing	- All the mosque committee and supervisor will test the system	- Test effectiveness of the system - Fix all the error immediately

Table 3: Activities that will be counted as milestones after completion

Initial Prototype	- First prototype from design phase - Look for errors and improved upon - Repeat process refining phase and user evaluation until user is satisfied	- PHP Programming - First prototype - Prototype version is updated
Prototype n (Final)	- Detects for errors and fixed	- Prototype system
Presentation	- Present the final system in front of a panel	- Final report and completed system

Functional requirements define the function of the developed system, while function is described as specific behavior that convert input to output. A functional requirement specifies a behavior or action that the system must support [5]. Table 4 shows the functional requirements of the proposed system.

Table 4: Functional requirement of developed system

No	Module	Description
1.	Login & registration module	• The system should allow user to login into the system using registered username and password. • The system should only allow a user to log in as a user with a valid username and password. • The system should alert the user for any invalid input. • The system should redirect user to that respective main menu upon successful login. • The system should allow new user to register into the system. • The system should record all the information registered by the user.
2.	Donation Module	• The system should allow mosque committee to insert information on funding assistance required. • The system should display all the information inserted by the mosque committee. • The system should allow congregation to view all information on funding assistance required. • The system should allow congregation to make a donation via online banking.
3.	Duty roster module	• The system should allow mosque committee to edit the schedule. • The system should allow congregation to view the schedule. • The system should display the schedule.

4.	Event module	• The system should allow mosque committee to insert all information about event. • The system should display all the information about the event inserted by the mosque committee. • The system should allow congregation to view the information about the event.
5.	Expenses module	• The system should allow mosque committee to insert all information about mosque expenses. • The system should display all the information about the mosque expenses inserted by the mosque committee. • The system should allow congregation to view the information about the mosque expenses
6.	Feedback module	• The system should allow congregation to drop a comment. • The system should allow mosque committee to view the comment.
7.	User management module	• The system should display all information about registered user. • The system should allow administrator to edit and delete all information about registered user.

Non-functional requirements define the criteria that is used to judge the operation of a system, rather that the specific behavior or function of the system [6]. Table 5 shows the non-functional requirements of the developed system.

Table 5: Non-functional requirement of developed system

No	Requirements	Description
1.	Performance	The system should be usable at all times
2.	Operational	The loading time required for a website is no more than 1 minute
3.	Security	The system should be able keep all the data safe.
4.	Cultural and political	The system should be able to work on any web browser

User requirements define the expectation of user from the functionality of the system. Table 6 shows the user requirements of the developed system.

Table 6: User requirements of developed system

No.	***User Requirements***
1.	All users must be able to enter a valid id and password to enter the system
2.	All new user must be able to register in the system
3.	Mosque committee should be able to insert information about mosque.
4.	Congregation should be able to search any information they want about the mosque.

5.	Mosque committee should be able to insert information on funding assistance required.
6.	Congregation should be able to view all information on funding assistance required.
7.	Congregation should be able to make a donation via online banking.
8.	User should be able to generate report about the donation.
9.	Mosque committee should be able to insert all information about event.
10.	Congregation should be able to view the information about the event.
11.	Mosque committee should be able to edit the schedule.
12.	Congregation should be able to view the schedule.
13.	Mosque committee should be able to insert all information about mosque expenses.
14.	Congregation should be able to view the information about the mosque expenses.
15.	Congregation should be able to drop a comment.

3.1 Use Case

The Use Case Diagram consists of actors, use cases, communication links, system boundaries and relationships between use cases. The Use Case Diagram is used to show the relationship between the actor (user) and the use case (module) [7]. This diagram is very effective for understanding the scope of the system. Figure 2 shows the use case for this system. There are 7 module for the system which is donation module, expenses module, login/registration module, feedback module, event module, duty roster module and user management module. For this system, there are 4 actors which is bendahari, setiausaha, congregation and administrator.

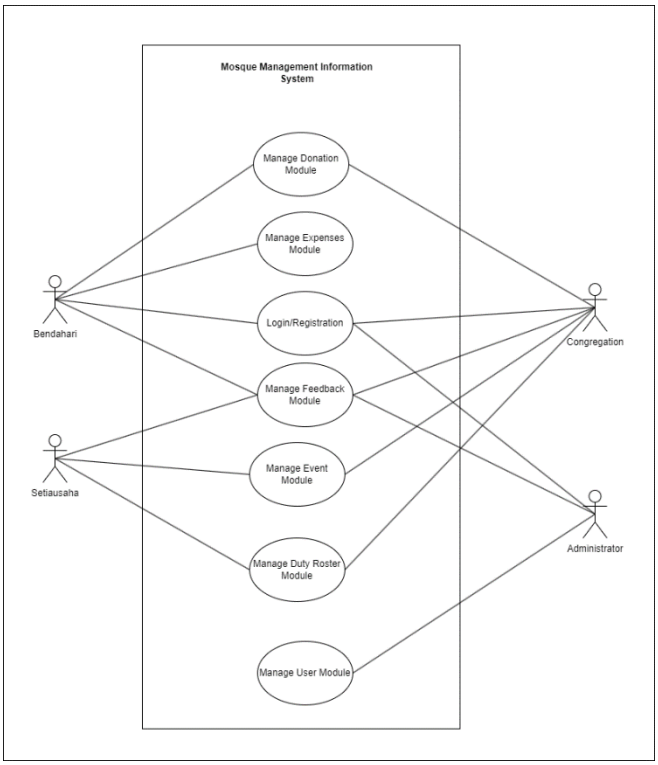


Figure 2: Use Case Diagram

3.2 Class Diagram

A class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects. Basically, it illustrates the classes in a system, attributes and operations of each class and also the relationship between each class. Figure 3 shows the class diagram of the proposed system.

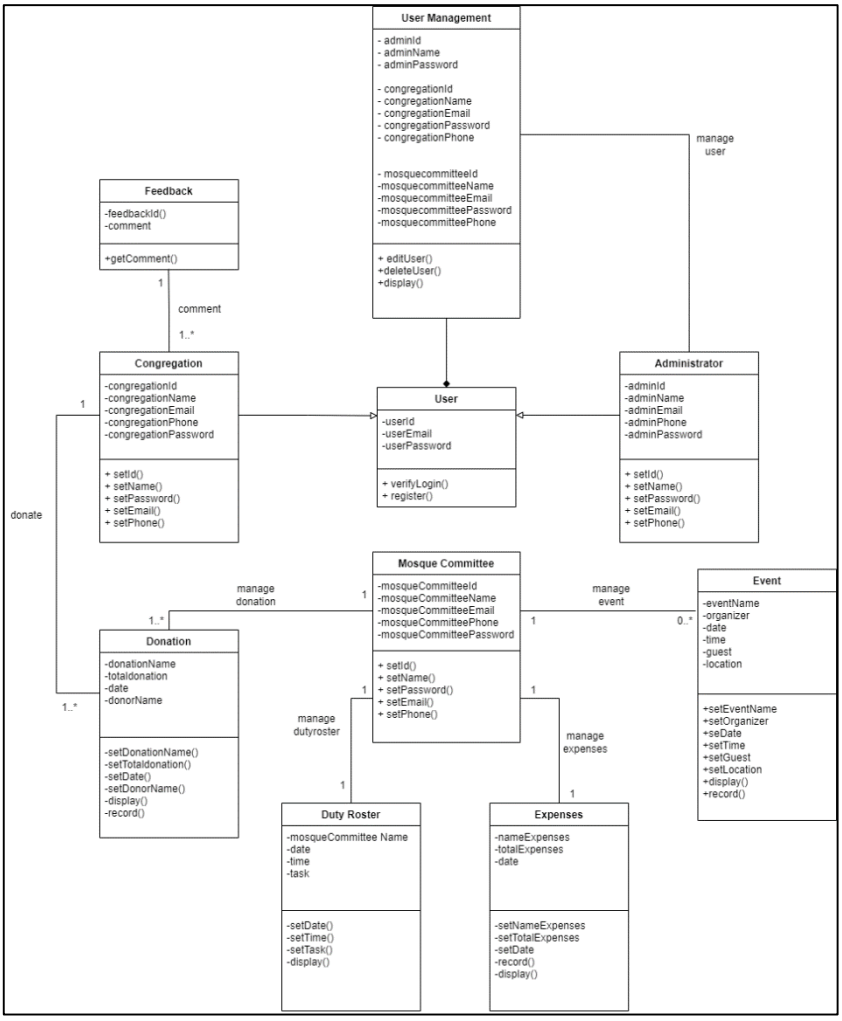


Figure 3: Class Diagram

3.3 System Architecture

System architecture is a conceptual model that defines a system's structure, behaviour and other aspect of the system. An architecture is a description of a system's component and how the component communicate with one another while systems are compelled to follow a specific architecture [8]. Figure 3 shows the system architecture of Mosque Management Information system for Felcra Bukit Kepong.

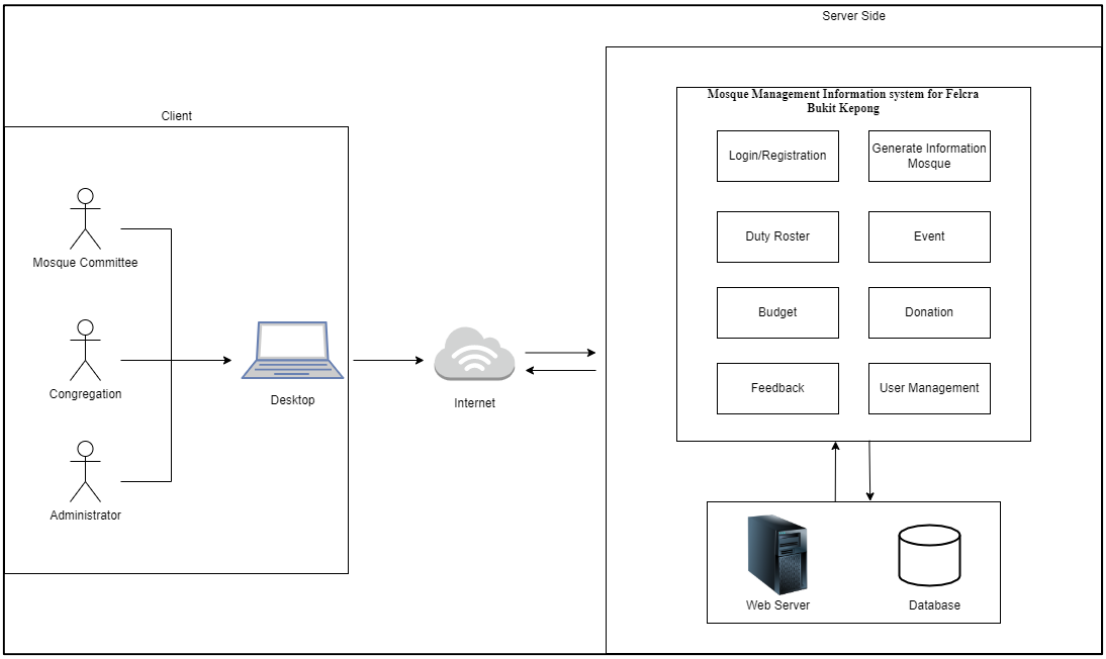


Figure 4: System Architecture of Mosque Management Information system

4. Results and Discussion

4.1 System Implementation

The implementation phase is the phase to develop a system using a programming language that has been selected during the beginning of system development. The implementation phase must always refer to the system requirements specifications and design documents. The programming language used for development of mosque management information system is HTML which is standard markup language for creating web page and for the backend, PHP is used. The database used for this system is MySQL.

The main flow of this system is user need to log in the system as one of the three types of users which are mosque committee, administrator and congregation. For new congregation, congregation can register into the system by clicking the register button. Congregation can access which are donation module, event module and duty roster module. Congregation also can make any comment in comment section. In donation module, congregation can make a donation to the mosque online. Figure 5 shows the donation module for congregation. Congregation also can view all the upcoming event that will take place at the mosque. Figure 6 shows the event module for the congregation. Congregation also can view the duty roster in duty roster model. Lastly, congregation also can make any comment about the system or mosque in the comment section.

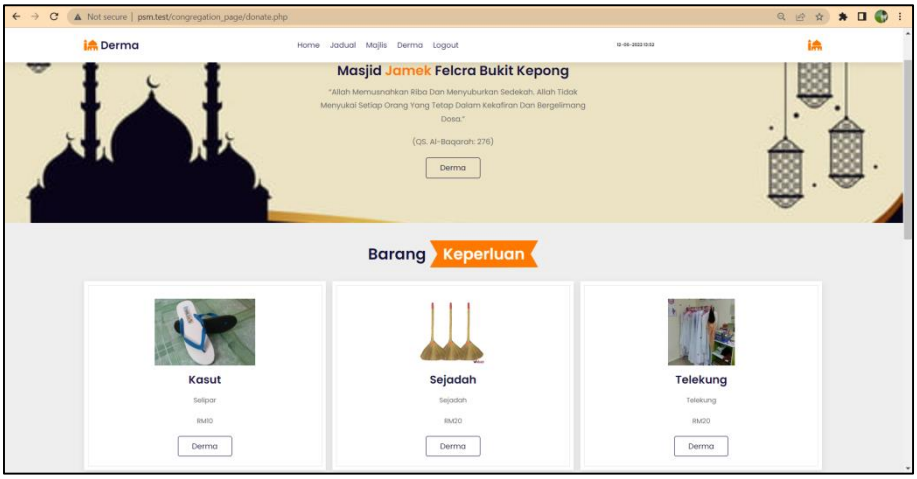


Figure 5: Donation Module for Congregation

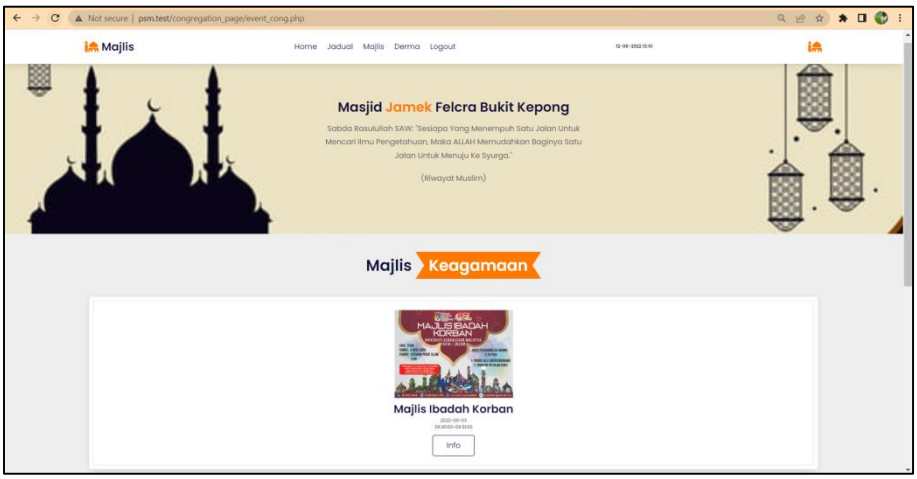


Figure 6: Event Module for Congregation

Mosque committee can login as two type of user which is Bendahari and Setiausaha. Bendahari can update, delete and record all the information about the expenses of the mosque. Figure 7 shows expenses module for Bendahari. Bendahari also can manage all information about donation such as view all information about donors. Figure 8 shows donation module for Bendahari.

Figure 7: Expenses Module for Bendahari

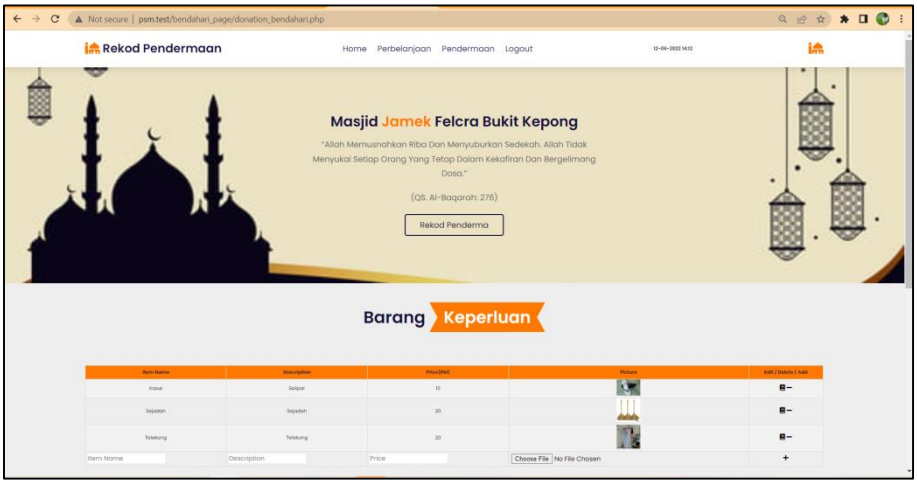


Figure 8: Donation Module for Bendahari

Setiausaha can record all the event information at the mosque in event module. Setiausaha also can edit or delete all the information about the event. Figure 8 shows the event module for Setiausaha. Other than that, Setiausaha also can manage duty roster of mosque committee. Figure 9 shows the event module for Setiausaha. Figure 10 shows the duty roster module for Setiausaha

Figure 9: Event Module for Setiausaha

Figure 10: Duty Roster module for Setiausaha

Last user is administrator. Administrator can edit or delete all the information about the user. Other than that administrator also can view all the feedback given by the others user.

4.2 System Testing

System testing is the last process that will de done in system development. System testing is the process of checking the system for the occurrence of defect or otherwise. The results of testing on the mosque management information system can provide information about the system requirement whether it is successfully made or failed. Table 7 shows the tests performed. The test is conducted by the one of the mosque committee, Encik Imam Ahmad bin Mustani. Figure 11(a) on appendix A shows the testing and evaluation form for section A and figure 11(b) on appendix A shows the testing and evaluation form for section b.

Table 7: Test Performed

ID	Requirements	Description	Result
Registration/Login Test_001_001	REQ_101 REQ_102 REQ_103 REQ_104 REQ_106	• User log in to the system as mosque committee, congregation or admin. • New user register into the system.	Successful
Registration/Login Test_001_002	REQ_105	• User enter invalid data to log in and system display error message.	Successful
Donation Test_002_001	REQ_201 REQ_202 REQ_203	• Congregation donate the amount that congregation want in the system. • System displays all the information about the donation.	Successful
Duty roster Test_003_001	REQ_301 REQ_302	• Mosque committee edit all information about duty roster. • Congregation view the duty roster.	Successful
Event Test_004_001	REQ_401 REQ_402	• Mosque committee can edit information about event.	Successful

		• System displays all the information about the event.	
Expenses Test_005_001	REQ_501 REQ_502	• Mosque committee can edit information about expenses. • System displays all the information about the expenses.	Successful
Feedback Test_006_001	REQ_601 REQ_602	• Congregation enter comment • Administrator view comment	Successful
User Management Test_007_001	REQ_701 REQ_702	• Administrator edit the information of the user • Administrator delete user	Successful

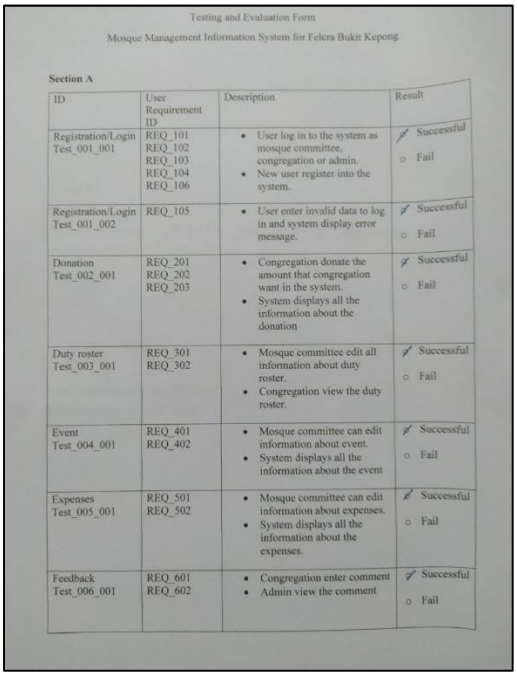
5. Conclusion

The use of the existing manual system of paper and book is not suitable for use today because it burdens the mosque committee of Felcra Bukit Kepong. In an interview with head of mosque committee of Felcra Bukit Kepong, he expressed his desire to change the existing system to digital. This situation made the Mosque Management Information system for Felcra Bukit Kepong was introduced. The system is able to record all the information about the mosque such as event information, donation and duty roster. Mosque Management Information system for Felcra Bukit Kepong is developed intended for provide a solution to the problems faced by the mosque Felcra Bukit Kepong. By make it online, all advertising about the mosque such as upcoming ceremony and donation can be done more easily. The main reason to build this system can assist the mosque to manage the mosque in a more convenient and effective way. Lastly, the system run smoothly and meet the user requirement.

Acknowledgment

The authors would like to thank the Faculty of Computer Science and Information Technology, Universiti Tun Hussein Onn Malaysia for its support.

Appendix A



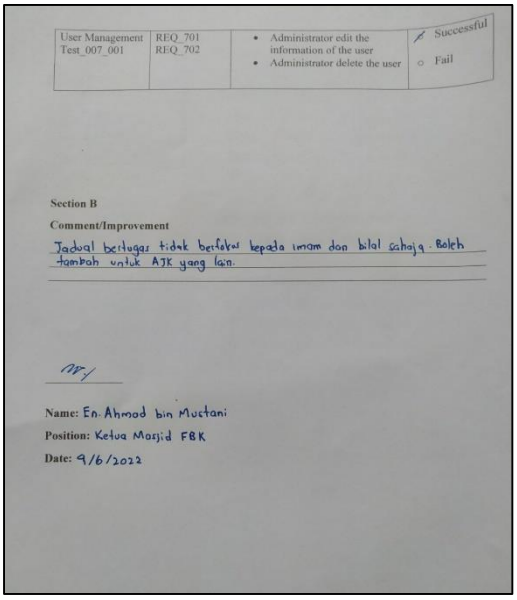
Testing and Evaluation Form

Mosque Management Information System for Felcra Bukit Kepong

Section A

ID	User Requirement ID	Description	Result
Registration/Login Test_001_001	REQ_101 REQ_102 REQ_103 REQ_104 REQ_106	• User log in to the system as mosque committee, congregation or admin. • New user register into the system.	✓ Successful ○ Fail
Registration/Login Test_001_002	REQ_105	• User enter invalid data to log in and system display error message.	✓ Successful ○ Fail
Donation Test_002_001	REQ_201 REQ_202 REQ_203	• Congregation donate the amount that congregation want in the system. • System displays all the information about the donation	✓ Successful ○ Fail
Duty roster Test_003_001	REQ_301 REQ_302	• Mosque committee edit all information about duty roster. • Congregation view the duty roster.	✓ Successful ○ Fail
Event Test_004_001	REQ_401 REQ_402	• Mosque committee can edit information about event. • System displays all the information about the event	✓ Successful ○ Fail
Expenses Test_005_001	REQ_501 REQ_502	• Mosque committee can edit information about expenses. • System displays all the information about the expenses.	✓ Successful ○ Fail
Feedback Test_006_001	REQ_601 REQ_602	• Congregation enter comment • Admin view the comment	✓ Successful ○ Fail

Figure 11(a): Testing and Evaluation Form for section A



User Management Test_007_001	REQ_701 REQ_702	• Administrator edit the information of the user • Administrator delete the user	✓ Successful ○ Fail

Section B

Comment/Improvement

Jadual bertugas tidak berfaktor kepada imam dan bilal sahaja. Boleh tambah untuk AJK yang lain.

Name: En. Ahmad bin Mustani

Position: Ketua Masjid FBK

Date: 9/6/2022

Figure 11(a): Testing and Evaluation Form for section B

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