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Friday Prayer Rotation System during Pandemic

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Abstract
Friday Prayer Rotation System during Pandemic offers a rotation-based system to be used by the mosque administration in Malaysia. It serves as a registration system to handle congregants' that want to perform Friday prayer during pandemic at the mosque. This system is a web-based application. This project is proposed to overcome some problems faced by the congregants, such as having to return home without performing prayers due to limited quotas in the mosque. This is because most mosque administrations in Malaysia use conventional and manual methods which are on a first come first serve basis. To develop this project, system prototyping is the most suitable method to implement. This method gives the client a quick overview of the design and functionality of the system. Along the way, improvement can be done during the review phase before the final product is released. The client can also participate in giving reviews before the final product is completed. Once completed, this system is expected to benefit mosque administration in managing the registration and attendance of congregants to the mosque for Friday prayers. This system will provide an easier and fair method for male Muslims to register for Friday prayer, compared to the existing approach. People do not have to worry about not being able to perform Friday prayer.

Keywords: *Friday prayer, mosque, rotation-based system, registration, pandemic*

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I. INTRODUCTION

Every Friday, every mosque in Malaysia will be flooded with people who came to perform Friday prayer. All Muslim men are obliged to perform Friday prayer at the mosque. Every week, all Muslim men are required to attend Friday prayers at the mosque. Typically, the mosque will be immediately full. However, the execution of Friday prayers in Malaysia has changed with the outbreak of Covid-19 virus. Only a limited number of congregants are permitted to perform prayer, which, when combined with the standard operating procedure (SOP) of 1-meter social distancing, makes the available prayer area reduced and unable to accommodate the whole congregants present at the mosque [1].

The changes made has caused conflicting views. According to a finding by Irwan Mohd Subri and his research team, 13.9% of 560 respondents does not agree about the implementation of 1-meter social distancing in the mosque for congregational prayer [2].

During the third Movement Control Order (MCO) in August 2021, the government has given loosen the restrictions to most activities, including religious activities [3]. Most of the mosque in Malaysia set a quota of allowed congregants in the mosque in a first come first serve method. This has caused some people came to the mosque but then not allowed to enter and perform prayers due to full quota.

The project will be implemented using the prototype system method, where it gives the flexibility to modify the system before the final product is released. It is hoped that this system will help the management of mosques in Malaysia to apply more effective registration procedures for Friday prayers. This will provide a fair method for all congregations who wish to perform Friday prayers.

II. BACKGROUND STUDY

A particular rotation system scheduling issue that arises in many areas of life, including, for example, industrial facilities, hospitals, public institutions, and airline corporations, is the scheduling of rotating human resources. The rotating system scheduling problem tries to schedule human resources in a way that satisfies constraints on shift sequence and ensures that there are enough shifts covered each day [4]. There are numerous constraints that must be met to create feasible schedules. The demands can be specified in a variety of ways, different legal requirements must be met, and employee satisfaction must be considered [5].

Masjid Sultan Badlishah, Universiti Utara Malaysia (UUM) is in the UUM campus. Since the implementation of SOP for pandemic Covid-19, the university management has introduced a registration process for students and staffs to book their place for Friday prayer. Even though this registration is being done

in a system (UUM Portal), it still lacks practicality. Every week, students and staff need to book in Portal to secure a place at the mosque and it is not convenience for them to do that every week. With this system, it will only take one registration process and then the system will automatically assign the date of prayer for the user. The system admin on the other side, must set the date of prayer for every month, so that the system can assign the date to the user. This system is a transformation from manual system that trouble users, to an automatic system that can benefits everyone.

III. METHODOLOGY

Among the method and approach in Software Development Life Cycle (SDLC), it is concluded that system prototyping is the most suitable approach in developing the system. Figure 1 shows the systems prototyping methods.

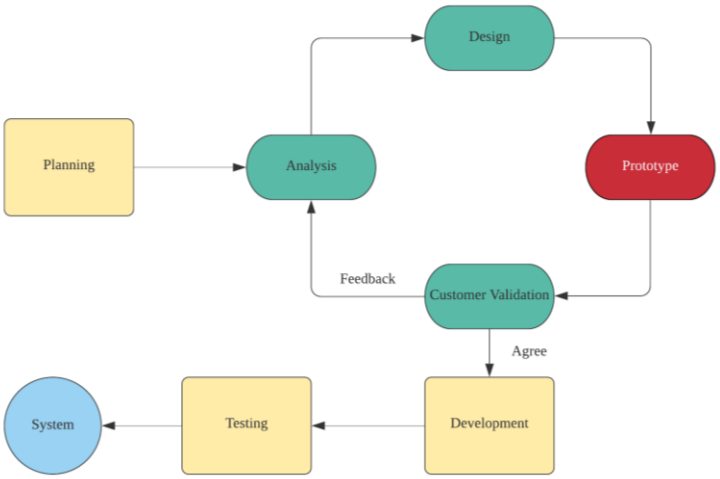

Figure1: Flow for system prototyping methods

3.1 PLANNING PHASE

During this phase, the main task is to identify the main problem that leads to this project. Along with that, all essentials such as goals, methodology, expected outcomes, software applications and tools that will be used must be clearly stated in this phase. The timeline of the project also needs to be created as a guide for the project development, usually in the form of Gantt chart.

3.2 ANALYSIS PHASE

During this stage, analysis will be performed to identify the system requirements. The analysis for this project could be carried out by performing research on a system comparable to this project. Moreover, the analysis may be carried out by discussing the functions that must be included in the system with the supervisor. The analysis can also be carried out by conducting a question-and-answer session with target clients, notably the mosque administration. Other than that, analysis also need to be conducted based on the problem in real life, which is the restriction during MCO. Some of the analyses are the mosque must ensure that there is a social distance of 1 meter between each congregation [2]. In addition, every person needs to scan MySejahtera (Malaysian apps for location during pandemic) QR code before entering the mosque. In the first phase of MCO 3.0, generally only 50 congregates can perform congregational prayer at the mosque that can contained more than 1,000 people at one time.

3.3 DESIGN PHASE

After all criteria and specifications have been properly specified, the design process will begin. In this project, applications such as Figma and Adobe XD will be utilized to create the user interface to present a visual illustration of the system design and functionalities of the web application.

3.4 PROTOTYPE PHASE

The prototype will be constructed in accordance with the design that was finalized during the design process. The prototype does not have to have all the features that have already been specified, but solely those that are required for the system to perform successfully. There will be some software used to create a prototype. Among them are Visual Studio Code for editing the code, Xampp as a platform for testing the website before it goes online, and phpMyAdmin for administering the system's database.

3.5 CUSTOMER VALIDATION/REVIEW

After the prototype has been finished, it will be subjected to customer verification. The supervisor will do the verification procedure in this project. If the supervisor is pleased with the prototype that has been created, the next step can begin. If the supervisor believes that the prototype does not fulfil the requirements that has been determined earlier and has inadequacies in terms of functionality, the prototype must start again from the analysis phase to discover the system's weaknesses and flaws.

3.6 DEVELOPMENT

If the prototype has been validated, the project's system development process can start. All additional criteria in terms of functionality, design, and so on will be implemented into the system. The development consists of front-end and back-end development of the system. To be more precise, the system built in this phase is what the final product will looks like. PHP, Bootstrap framework, and MySQL are the programming language and other tools that are being used to develop the system as a web-based application. This development is adjusted accordingly to the review and opinion of supervisor, stakeholders, and respondents.

3.7 TESTING

Before this project's system can be made available online, it must pass several tests. This step is critical to ensure that the launched system does not have defects that can interrupt the entire system. Hiring volunteers to test the system is one of the possible techniques to carry out this test. Volunteers must not be engaged at any stage of the project's development. Each test should identify the challenges encountered by the volunteer, and the problem should be resolved before proceeding to the next test.

3.8 SYSTEM

The last stage is the system's own existence. The system will be made available online for usage by the intended client, the mosque management. This phase will also include system maintenance and updates to ensure that the system is free of errors and bugs. Any problems arise after the system has been completed must be solve by updating the system through minor updates or creating a new version of the system.

IV. DESIGN AND DEVELOPMENT

Table 1 below lists the functional requirements for the Friday Prayer Rotation System during Pandemic.

Table 1: The functional requirements for the Friday Prayer Rotation System during Pandemic.

Requirement ID	Requirement Description	Priority
FPRS_01	**REGISTER**	
FPRS_01_01	The system should allow user to register with their phone and create password.	M
FPRS_01_02	The system should generate a unique ID for each user when they register.	M
FPRS_01_03	The system should allow user to fill their email, name, age, and address.	M
FPRS _02	**LOGIN**	
FPRS _02_01	The system should allow user to login with their phone and password.	M
FPRS _02_02	The system should redirect new user to registration page.	M
FPRS _02_03	The system should let user to receive email if they forgot their password by using 'forgot your password' link.	D
FPRS _03	**USER PROFILE**	
FPRS_03_01	The system should let user to view their details.	M
FPRS_03_02	The system should let user to edit their details.	D
FPRS_03_03	The system should let user to change their password.	O

FPRS_04	**SYSTEM ADMINISTRATION**	
FPRS_04_01	Administrator can set the available quota of people allowed to attend the Friday prayer.	M
FPRS_04_02	Administrator can view and handle all user data (except password).	D
FPRS_05	**ROTATION CALCULATION**	
FPRS_05_01	The system should process data and run the algorithm for rotation.	M
FPRS_05_02	The system should assign user with a turn to attend Friday prayer.	M
FPRS_05_03	Administrator can run the algorithm in the system.	M
FPRS_06	**NOTIFICATION**	
FPRS_06_01	The system should send notification to the user who are allowed to attend the mosque by email.	M
FPRS_06_02	The system should send notification to the user who are allowed to attend the mosque by text messages.	O
FPRS_07	**SEARCH AND BROWSE**	
FPRS_07_01	The system should display the list of people allowed to attend the Friday prayer every week.	M
FPRS_07_02	The system should allow user to search their name based on their attribute (name, email).	M

Use case diagram as shown in Figure 2 is used to visualize the operation or the function that will be perform by the system [6]. It also visualize what type of interaction can be done between user or admin with the system.

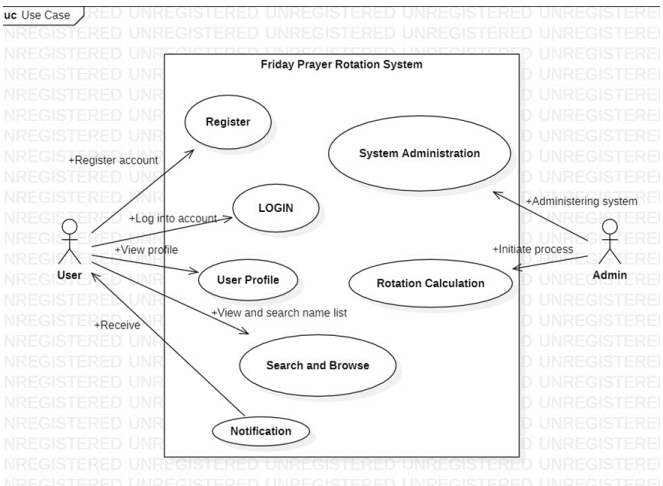

Figure 2: Use Case Diagram

Class Diagram represent the system and is basically the blueprint of the system. It shows the connection between each function in the system.

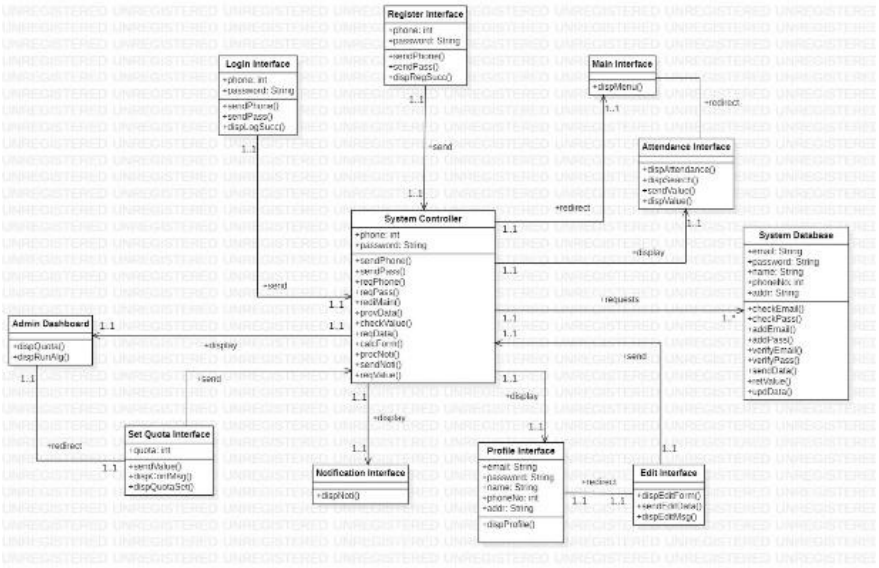

Figure 3: Class Diagram

V. PROTOTYPE DEVELOPMENT

The prototype development phase is the phase prototype started to be built. Starting from database connection and simple functionalities, the prototype will be used in evaluation testing. The following figures show the screenshots of the prototype. Figure 4 shows the registration page, Figure 5 shows the 'creating the profile' page, Figure 6 shows main page, Figure 7 shows the slot page and Figure 8 shows the profile page.

For new user, they need to create their account by filling up their name, email, and password in the given form. After they click *Daftar* (Register) button, a pop-up message *'Sila lihat emel anda'* (Please look at your email) will appear. A confirmation image will be sent to the user's email, and they need to verify by clicking *'sahkan akaun anda'* (confirm your account) button in the messages. It will redirect the user to the create profile page.

Figure 4: Registration Page

In creating your profile page, user need to enter their details such as age, phone number and their address. Once done, users need to click the *'Simpan'* (Save) button to save their details. Simultaneously, system will redirect them to the homepage of the website.

On the navigation menu, there is *'Jadual'* (Schedule) and *'Profil'* (Profile) button. The *'Jadual'* will direct the user to the list of users with their assigned date for performing Friday prayer. This date has been assigned automatically by the system based on the date of Friday in each month, which is configured by the system admin every month. For the *'Profil'*, users can view their account details and they are able to edit by clicking *'Edit'* button.

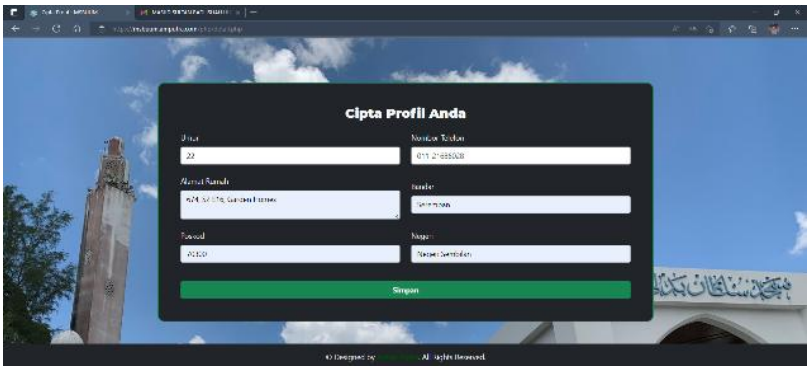

Figure 5: Creating Profile Page

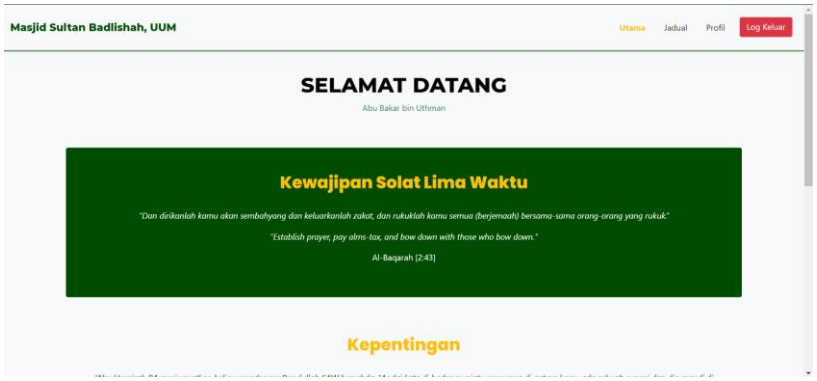

Figure 6: Home Page

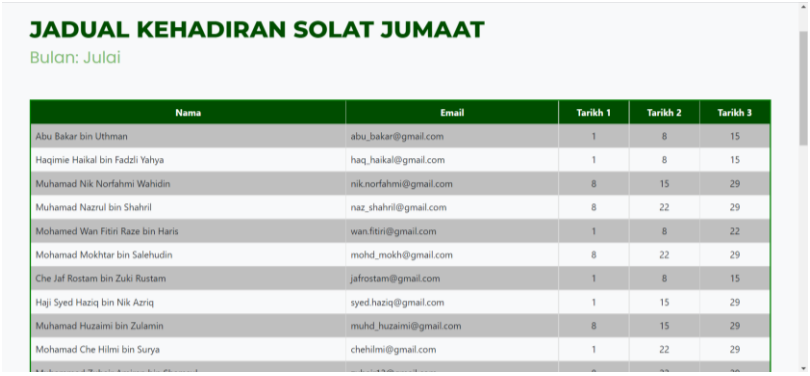

Figure 7: Slot/schedule Page

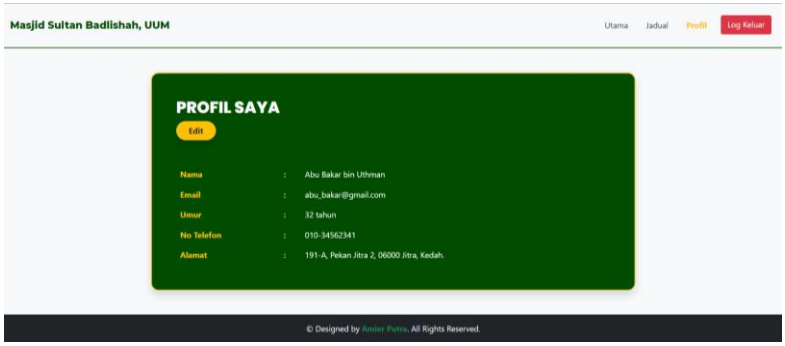

Figure 8: Profile Page

VI. EVALUATION

To evaluate the system, the system must go through a usability testing/evaluation. Usability testing focus on user or participants experience during using the system. This type of testing will observe whether the user can achieve the predetermined goal too. The number of participants involved in this evaluation is at least 15 random male students from Universiti Utara Malaysia (UUM). Only male is recruited because female did not perform Friday prayer. The participants are recruited randomly in the UUM campus

There are two (2) procedures that have been carried out for the evaluation. The first one is a face-to-face evaluation session while the second procedure is a virtual evaluation session. Face-to-face evaluation session was conducted for participants who had the opportunity to undergo the evaluation in the presence of the developer, while virtual evaluation session was conducted for participants who could not undergo a face-to-face evaluation with the developer due to time constraints and other problems.

6.1 Step to conduct evaluation

The participants will be explained briefly about the system, such as the functionality and the flow of the website. The participants will be given a user manual and be presented with a slide to explain the step to test the website. The participants start the evaluation by opening the website with the given domain (msbuum.amputra.com) on their computer/laptop or smartphone. The participants will register with their email. Validation email will be sent to the participants' email, and they need to verify their registered email by clicking '*Sahkan email anda'* button in the email.

Participants will be redirected to login page. They need to login with their email and password. Participants then will be redirected to another page to create their profile (age, telephone number, address, etc.) and they need to click submit. Participants' information will be stored in the database, and they will be redirected into the website. Participants will be needed to check their turn to perform Friday prayer by clicking *'Jadual'* tab. If success, participants can browse through the whole website to evaluate the flow, design, and usability of the website.

Once completed, the participants will be given a Google Form to fill in their evaluation for the website. The participants response will be recorded. For virtual evaluation session's participants, they will be given the Google Form. The Google Form contains the link to the website and user manual. All the instruction to evaluate has been written in the user manual.

6.2 Findings

The findings and result from the evaluations for this study are explained below. Figure 9 shows that majority of the respondents are satisfied with the flow of the website.

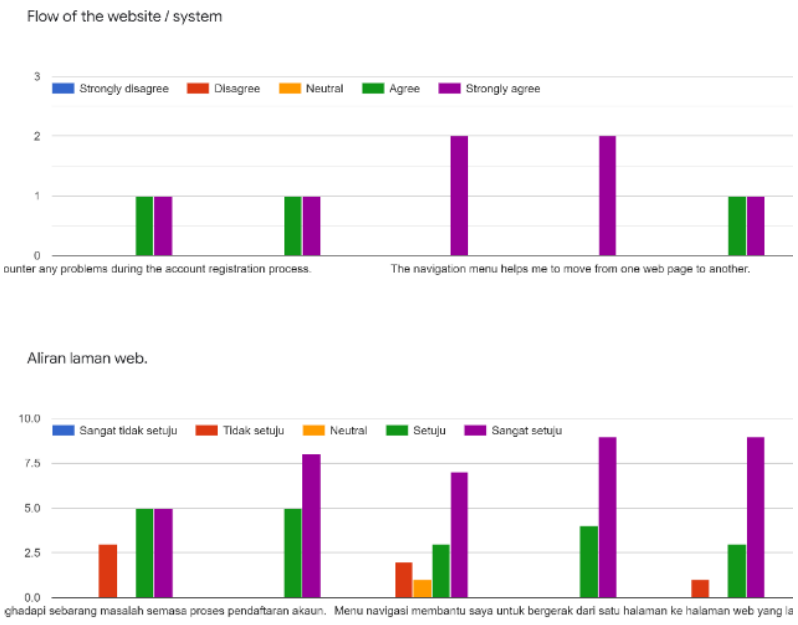

Figure 9: Flow of the Website

Figure 10 shows that on average, 85% of the respondents are happy and satisfied with the website/system design in each aspect given in the form.

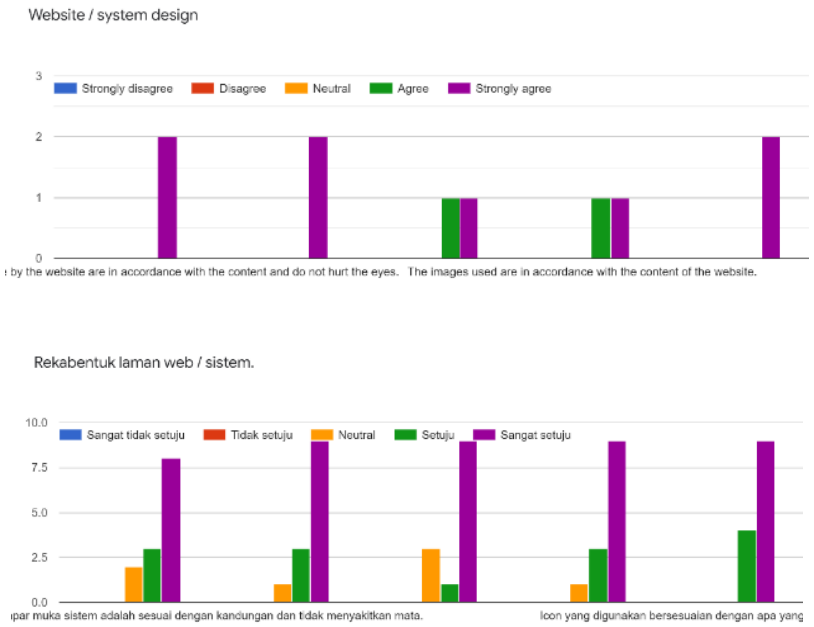

Figure 10: Website System Design

Figure 11 below shows the feedback from the respondents about their impression on the system. There is much feedback that provides insights about what can be done to improve the system.

Figure 11: Feedback

6.3 Outcomes

Based on the results obtained from the evaluation conducted, it can be concluded that there are various improvements that need to be made into the system. Most of the respondents suggest turning the website into dark mode for better user experience. The registration process also needs to be simplified, so that user can reach the main function of the system in a shorter time. Respondent complaints the pop-up messages are appearing too frequently when they log in into the website.

VII. CONCLUSION

This system is designed to provide a better solution for managing something that required rotation-based situation. The backend algorithm does not only work with this system, but it can also be used in other system or situation such as managing shifts worker, school laboratory usage and other else. This paper aimed to create a dynamic algorithm that benefits the society.

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