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Sistem Tempahan Kediaman UTHM

UTHM Residential Booking System

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Abstrak: Sistem tempahan asrama merupakan satu aspek yang perlu dititikberatkan bagi sesebuah universiti. Kolej Kediaman Kampus Parit Raja merupakan salah satu kolej kediaman yang menggunakan sistem tempahan untuk menempah asrama untuk semua pelajarnya. Justeru, sistem berasaskan web ini diwujudkan bagi memudahkan pelajar mengetahui kolej dan bilik yang ingin digunakan ada atau tidak pada ketika itu. Sistem ini direka bentuk kepada dua bahagian iaitu bahagian pentadbir dan pelajar dan empat modul utama iaitu modul log masuk, modul pelajar, modul peruntukan bilik, dan modul tetapan. Projek ini dilaksanakan menggunakan model prototaip dan perisian pembangunan Bracket, MySqL sebagai pangkalan data dan PHP sebagai bahasa skrip. Sistem tempahan asrama akan menjadi cara yang ideal untuk menangani isu pengurusan penduduk kerana ia akan membolehkan permohonan dalam talian yang mudah. Oleh itu, asrama yang beroperasi tanpa sebarang masalah atau kesilapan membantu institusi pendidikan dalam mengukuhkan jenamanya sendiri.

Kata kunci: Sistem Tempahan 1, Sistem berasaskan web 2

Abstract: *The hostel booking system is an aspect that needs to be emphasized by a university. Parit Raja Campus Residential College is one of the residential colleges that used a booking system to book hostels for all its students. Thus, this web-based system was created to facilitate students to know if the college and room that they want to use are available or not at that time. This system is designed into two sections which are the administrator and student section and four main modules which are the login module, student module, room allotment module, and settings module. This project is implemented using the prototype model and Bracket development software, MySQL as the database and PHP as the scripting language. The hostel booking system will be the ideal way to handle resident management issues because it will allow for simple online applications. Therefore, a hostel that operates without any problems or errors aids the educational institution in strengthening its own brand.*

Keywords*: Booking System 1, Web-based system 2*

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1. Introduction

Parit Raja Campus Residential College is one of the residential colleges at University Tun Hussein Onn Malaysia (UTHM) that used a booking system to book hostels for all its students. Parit Raja Campus Residential College was formed as a result of UTHM's management planning which restructured the organization of the University Residential College by combining Tun Fatimah Residential College, Tun Dr. Ismail, and Tun Syed Nasir Residential College under one administration, starting on 1 February 2022. For the current system, UTHM uses the HOMS college selection system. HOMS, which stands for Housing Office Management System, is a new student housing application system created through a collaboration between the Information Technology Center, Student Housing Center, and outside vendors. The HOMS system will first concentrate on senior applications for residential colleges and online pre-registration for students. This hostel booking system project, it is actually not only will secure the data far better than the current manual system but also can record much more detailed data of an unlimited number of students. This hostel booking system will provide various functionality to the user and hotel receptionist. The activities regarding this system involve making a reservation/booking based on student demand, room cancellation, new students' registration, room types, and service, and logging in to the homepage. This system will be developed as a website platform using a structured analysis approach [1]. Therefore, providing a single platform for both is very important. The efficient operation of the hostel's operations is the goal of the management system [2].

Using the current management system, students are unable to choose the college that has been in HOMS because, in the system, there are 2 options only that are provided for students. The existing system does not organize all the information about their guests that help to understand them better and create personalized experiences for them. For instance, because there are so many students booking records, it becomes challenging for the administrator to locate the booking details for updating if they need to change the check-in date. Before the hostel's management registers new residents, they must implement appropriate resident planning and forecasting on the limited number of residents they are able to accommodate based on the different types of rooms.

The objectives of this system are to design a UTHM booking system using an object-oriented approach, to develop a UTHM residence booking using a web-based approach, and to test the developed hostel booking system for UTHM using functionality testing. The scope of this project is divided into several sections. Firstly, the case study to be investigated in this project is student residence booking at UTHM. This system is designed into two sections or portions which are the administrator section and the student section. The proposed system will be developed to offer a full-featured accommodation system to efficiently manage the entire residential booking in the university or college. Secondly, there are four main modules which are the login module, student module, room allotment module, and settings module. The login module helps the user to log in to the homepage only if the password and username match. The ability to sign in benefits users since it allows them to specify varied permissions for their roles and links the information they create to their accounts.

2. Literature Review

Existing application and website studies are carried out to guarantee that the system being designed is more effective than existing applications. This research will also help to prevent systems with the same characteristics but no enhancements. Comparisons are made during the development of the web-based system to identify improvements and goals that must be reached.

2.1 Web-Based System

According to Kambala, a web-based system is an application that accessed via HTTP that performs on a server and requires a computer to have an internet connection. This type of system can be accessed by the users by using any Internet browser [3]. There are two types of web-based systems: hosted systems and downloaded systems. The hosted system is the system that is made available to users after they have registered online. The downloaded system, on the other hand, refers to the system that has been downloaded and installed on the physical device. Next, we'll go through how to operate a webpage, the process is really basic, all the user needs are a browser and the URLs of the online applications. The most common browsers on the market are Chrome, Microsoft Edge, Firefox, and others. We need a server and database so that web applications may upload and share data with other people. We also need a host and a name. We can create our own server and database, but the cost and maintenance costs are quietly costly, therefore most people would rent the server from a server firm and pay monthly rental fees.

2.2 Comparison with the Existing Systems

A comprehensive comparison is carried out to determine the similarities and differences between the current systems, which include the HOMS, International Islamic University (IIUM) Hostel Registration Website, Gombak, Hostelworld Application, and Trivago Website, and the proposed web-based residential booking system. This comprises all of the modules of the UTHM Residential Booking System. The comparisons between these four systems are shown in Table 1.

Table 1: System Comparison

Features/System	**HOMS**	**International Islamic University (IIUM) Hostel Registration Website, Gombak**	**Hostelworld Application**	**Trivago Website**	**UTHM Residential Booking System**
System Type	Web Application	Web Application	Web Application Mobile Application	Web Application	Web Application
Login Module	✓	✓	✓	✓	✓
Dashboard	✓	✓	✓	✓	✓
User Profile Module	✓	✓	-	-	✓
Room Allotment Module	✓	✓	✓	✓	✓
Internet Requirement	✓	✓	✓	✓	✓
Setting Module	-	-	-	-	✓
Search Function	-	✓	✓	✓	-
Notification Function	-	-	✓	✓	✓

According to Table 1, all of these web-based systems can be compared based on several elements such as System type, login module, User Profile Module, Dashboard, Room Allotment Module, Internet Requirement, Setting Module, Search Function, and Notification Function. To access all existing and new web-based systems, users must have an internet connection. Only the International Islamic University (IIUM) Hostel Registration Website, Gombak contains all four sections, whereas the rest lack a dashboard and a user profile. The new system includes all elements, including the dashboard and user profile. According to a comparison of existing and planned web-based systems, the suggested application incorporates all four capabilities into a single web-based system. Therefore, users do not have to abandon to use of certain services. In addition, all functions in one website will reduce operating costs

3. Methodology

This chapter explains the methodology used for this project. The Prototyping Model is then discussed in Section 3.1. The requirements gathering and analysis phase, quick design phase, build prototype phase, initial user evaluation phase, refining prototype phase, and implementation and maintenance phase are all covered in sections 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5 and 3.1.6. Section 3.2 describes a workflow for web-based system development.

3.1 Prototyping model

The design of this system uses the Prototype model as suggested by Dennis et al. [10]. This system has been put into place using a prototype model, developed according to the standards of the Software Development Life Cycle (SDLC). A prototype is a minimal model that serves to introduce the system to potential customers and facilitate early testing. A prototype model is a software development method in which a prototype is built, tested, and refined until it is accepted or pleased by the user. Developers will need to create a prototype and hand it over to a user in order to get this kind of feedback. It is useful in making sure any attempt taken will produce something successful and coordinated while choosing the right methodology. The implementation of this system follows the Software Development Life Cycle (SDLC) methodology of using a prototype model. The suggested changes are subsequently implemented in the prototype, then delivered to the customer for feedback. Due to the project's primary objective of turning the prototype into a fully functional system, the prototyping model was selected as the software development strategy for this endeavor. A high-quality system can be developed quickly using this method without sacrificing efficiency. The prototyping procedure includes six steps.

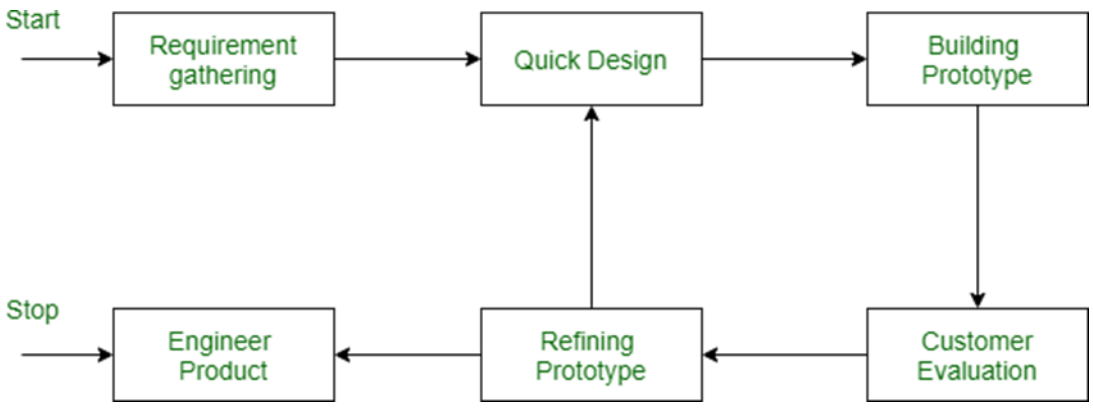

Figure 1: Prototyping Model [10]

3.1.1 The Requirements Gathering and Analysis Phase

The goal of this phase was to undertake a preliminary examination of the project's requirements in order to settle on a name for the project. The title of the project is UTHM Residential Booking System. The project report will be written at this stage, detailing the background of the project, the problems it faces, its objectives, its limitations, and its significance. College issues were uncovered through interviews with staff and students at Campus Residential College. Accordingly, a detailed strategy was drawn up to guarantee the production of the project would be carried out in a methodical approach. Therefore, a Gantt chart was created to serve as a roadmap for the project. The system's steady growth was predetermined by the Gannt chart.

3.1.2 Quick Design Phase

In this step, a basic booking system design was created. It helps the developer make the prototype by helping the user understand how the system works. The design was made quickly, and it showed all the known parts of the software and was used as a starting point for prototyping. The term "system design" refers to a set of design efforts that result in functional requirements. This guideline had been chosen as the basis for the design of the system's components. In the early phase of the design, the Sketches System was intended. The interface system and database of the system can be illustrated more clearly in the Unified Modelling Language (UML). The Use Case diagram is developed to develop a system to fulfill the scope and goals set out in this planning process. The system's database was made so that it works with the inputs and outputs that were planned for the system interface. This database was made based on what the system needs and what works best. MySQL will be used to set up the database for this project.

3.1.3 Build Prototype Phase

Based on the specifications that were gathered during the fast design phase, the developer will make a real prototype. In this phase, the data that has been designed needs to be turned into a programming language. Build a prototype by, for example, making a temporary design that is focused on showing users, such as input and output samples. Notepad++, Moqups (Online mockup, wireframe, and UI prototyping Tool, Video Studio Code, and PhpMyAdmin will be used during this phase. In addition, because the proposed system places a high priority on user happiness, features, and CSS will be developed for it.

3.1.4 Initial User Evaluation Phase

The proposed system is delivered to the user for preliminary testing at this step. This assists the team in determining the qualities and weaknesses of the working model. The customer evaluates to see if the prototyping that has been developed is following the customer's wishes. Users and the supervisor will test every level of the system's development, including the programming code, to make sure that no issues will arise. Comments and suggestions are collected from the customer and provided to the developer of the project.

3.1.5 Refining Prototype Phase

The system needs to refine the prototype according to the user’s feedback and suggestions. The functionality of the home page interface and other interfaces will be tested in order to identify faults and fix programming code errors. The software and hardware requirements for the proposed system must be taken into account at this stage in addition to the programming code. Tables 2 and 3 indicate the software and hardware requirements for the proposed system, respectively.

Table 2: Software requirements for the proposed systems.

No.	Software	Function
1.	Visual Studio Code	To do the programming code for the whole web-based system.
2.	XAMPP	Act as the database for the system.
3.	MySQL	A stored program that you can pass parameters into and then return a value.
4.	HTML	Creating pages that are displayed on the world wide web.

Table 3: Hardware requirements for the proposed system.

No.	Hardware		Function
1.	Laptop	Processor	Intel(R) Core (TM) i5- 6200U CPU @ 2.30GHz 2.40 GHz
2.		Random Access Memory (RAM)	8.0 GB
3.		Hard Disk	239GB

3.1.6 Implementation and Maintenance Phase

During this process, the source code for the proposed system is made so that users of the system can test it. Included in the activities are testing the database, programming, testing the modules, and testing the whole system. Access from the database is used to test the database. Testing will be done to make sure that the program is built without any problems. Each module is tested to make sure it works as it should. System tests are important because system users take part in them. PHP, a programming language, will be used to set up the UTHM Residential Booking System. When the prototype is done, it will be tested by users. Process improvement will be done if the system does not meet the needs of the users and needs to be fixed. System maintenance is performed to reduce downtime and avoid problems.

3.2 System Development Workflow

The system's development workflow is a summary of the things that were done and what the experts came up with during each phase. Table 4 shows the phase that is used as the starting point for all projects and operations in the prototype model. The performance shows the results of the system operation that the person making the system does as part of the process of making the system.

Table 4: Software development activities and their task

Phase	Task	Output
Requirements Gathering Analysis	• Selection and determination of project titles.	• The problems that HOMS System is facing led to the development Residential Booking System
	• Identifies project objectives, problem statements, and project scope.	• Produce system objectives and system scope.
	• Presents the project plan for the Coordination Panels project.	• Obtain authorization and approval for the requested title
	• System implementation preparation and preliminary assessments to define current system problems, benefits, and weaknesses.	• Gantt chart generated
	• Analysis information obtained	• Gather information about the Booking System and study the current system problems to be solved by the new system.
	• Analyse Hardware and Software requirements.	• List the type of hardware and software used to build the system
	• A literature review was undertaken in order to compare the existing system.	• System comparisons are used to improve user-friendly systems and set goals.
	• The web-based information system programming language.	• Using PHP programming, SQL, and JavaScript.
	• Methodological selection	• Using prototype model methodology.
Quick Design	• Early phase of the design, the Sketches System was intended	• Design the flowchart of the system was developed
	• The interface system and database of the system can be illustrated	• Unified Modelling Language (UML) and the Use Case diagram are developed
	• Logical structure analysis such as Unified Modelling Language (UML) and Use Case diagram.	• Provide Unified Modelling Language (UML) and Use Case diagram
Build Prototype	• Developing the prototype of the UTHM Residential Booking System Module based on design and specification.	• Prototype of the UTHM Residential Booking System Module.
Initial User Evaluation	• Perform user evaluation to observe one user at a time and quickly evaluate how	• A full report of user evaluation to refine the prototype

	they can navigate the system while performing a task.	
Refining Prototype	• Refining the prototype of the UTHM Residential Booking System Module based on user evaluation.	• Prototype of the UTHM Residential Booking System Module
Implementing and maintaining	• Perform system testing	• Functional testing is conducted to evaluate the compliance of a system or component with specified functional requirements
	• Launch UTHM Residential Booking System, monitor system, and process examination.	• Full systems and document processing system test documentation can be produced.

4. Result and Discussion

System analysis is a technique for compiling and analyzing data, identifying flaws, and breaking down a system into its component parts. A system's aims and objectives are to be determined when performing a system analysis. It is a technique for resolving issues that enhances the system and guarantees that each of its parts works effectively to accomplish its objectives. System design is the process of creating a new system by modifying an existing one and specifying the modules that will make up the new system. An Object-Oriented was employed in the system's development. Flow charts, Use Case Diagrams, and entity relationship diagrams (ERD) are examples of object-oriented approach diagrams.

4.1 Use Case Diagram

Use-case diagrams illustrate a system's high-level functionality and scope. Use-case diagrams also show how the system and its actors interact with one another. For example, figure 2 below shows the interaction between the actor and its functionalities for the proposed UTHM Residential Booking System. Class diagram below is based on object orientation principles and can be used at various phases of a project such as the analysis phase, design phase, and implementation phase. Therefore, Class diagrams are a vital part of this mobile application development.

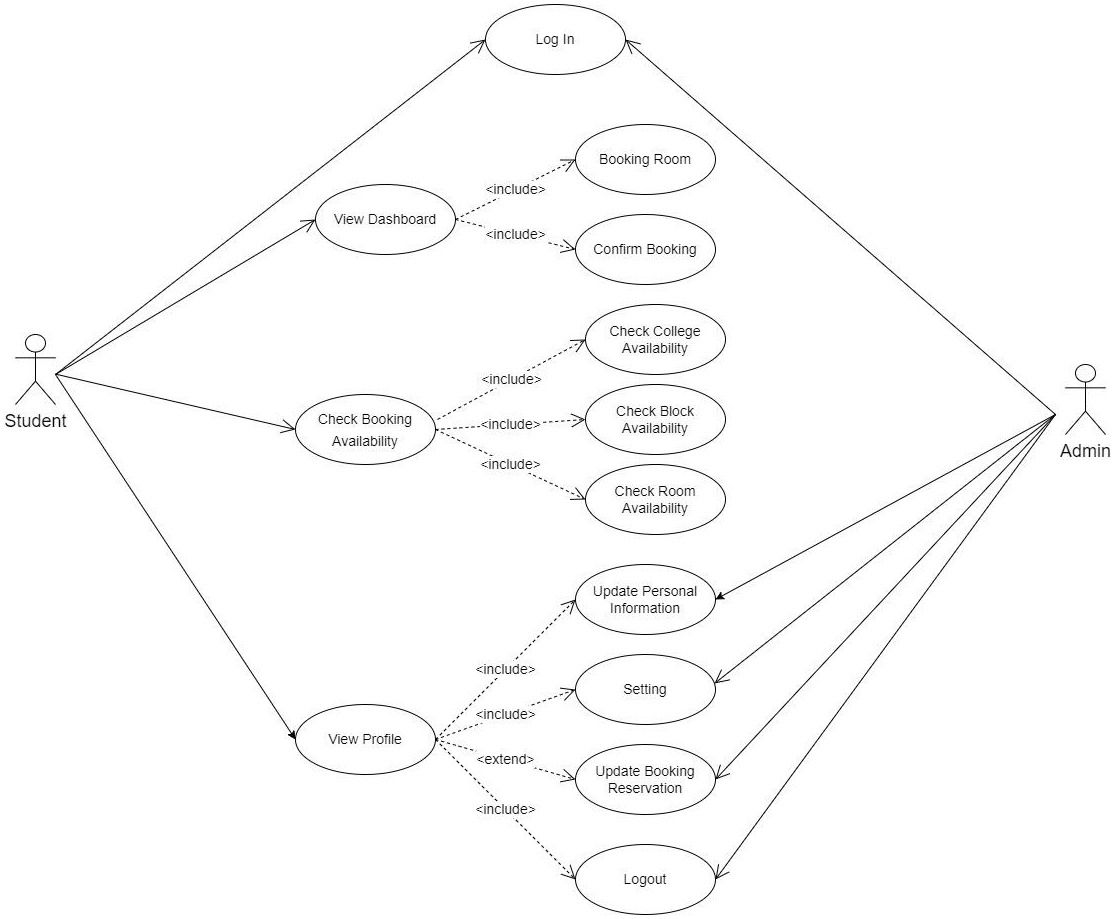

Figure 2: UML Use Case Diagram of Booking System

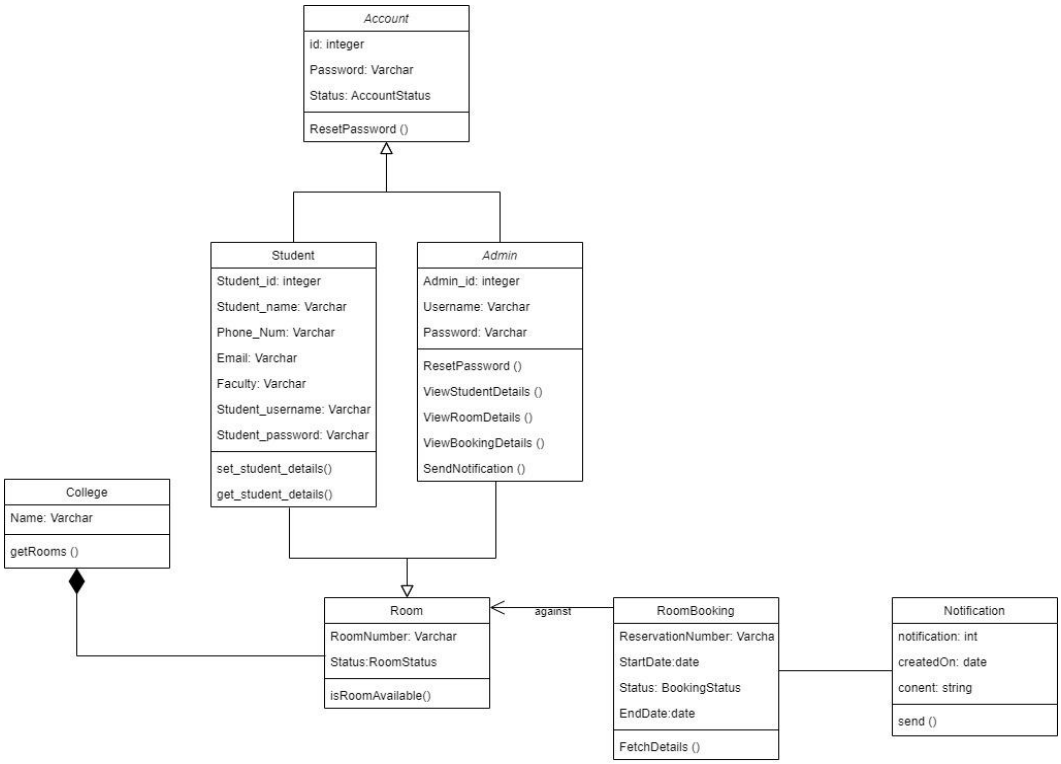

Figure 3: Class Diagram of Booking System

4.2 Database Design (ERD)

Database design is the organization, storage, and management of data according to a database model [7]. The database design for this project is shown by illustrating an Entity Relationship Diagram (ERD). An entity-relationship diagram (ERD) is a picture that shows the information created, stored, and used by a system [8]. Figure 4 shows the ERD diagram for the hostel booking system

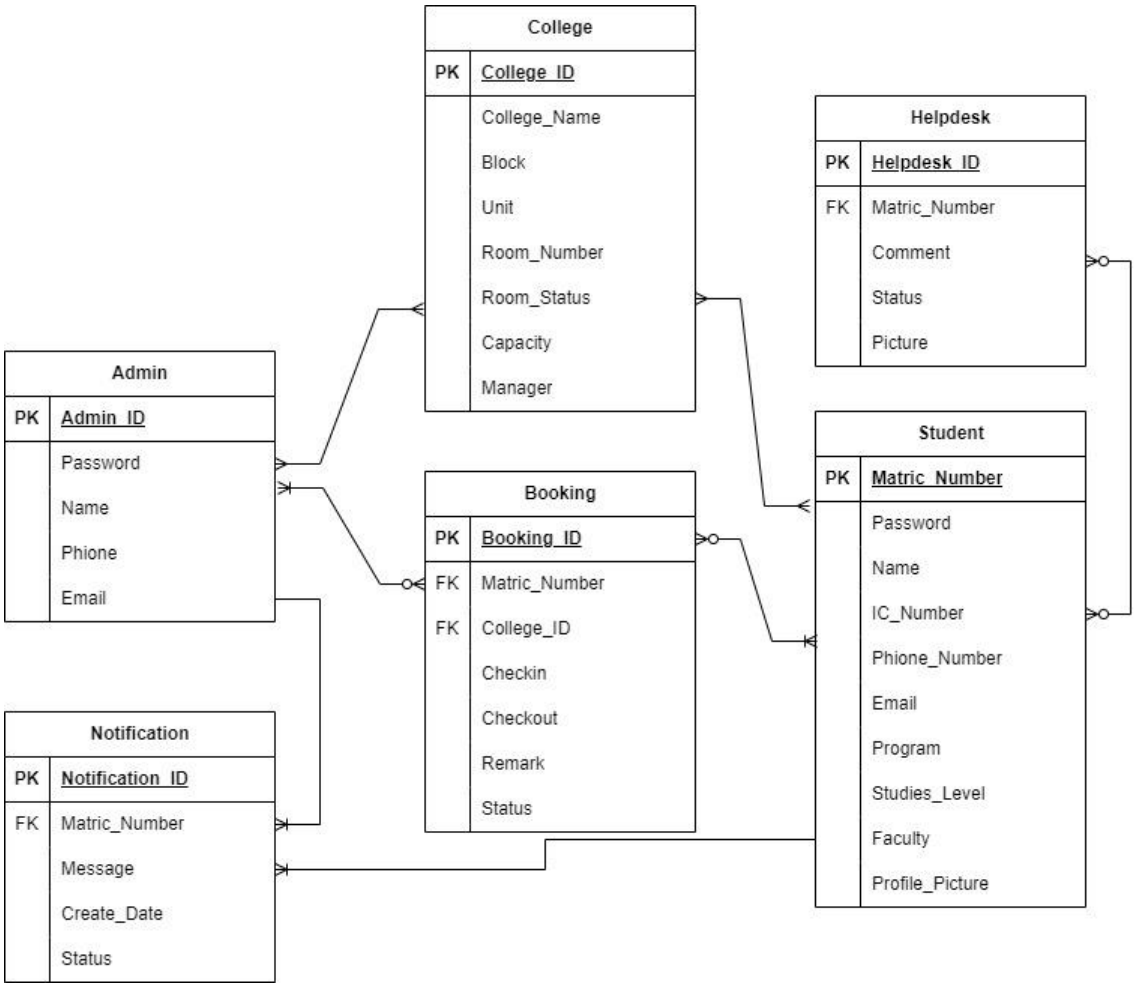

Figure 4: ERD Diagram

4.3 Flowchart

Flowchart will show the different entry points and alternate paths for student and admin. The flow roughly will be drawn from one operation to another. The Figure 5 and figure 6 below shows the flowchart for UTHM Residential Booking System.

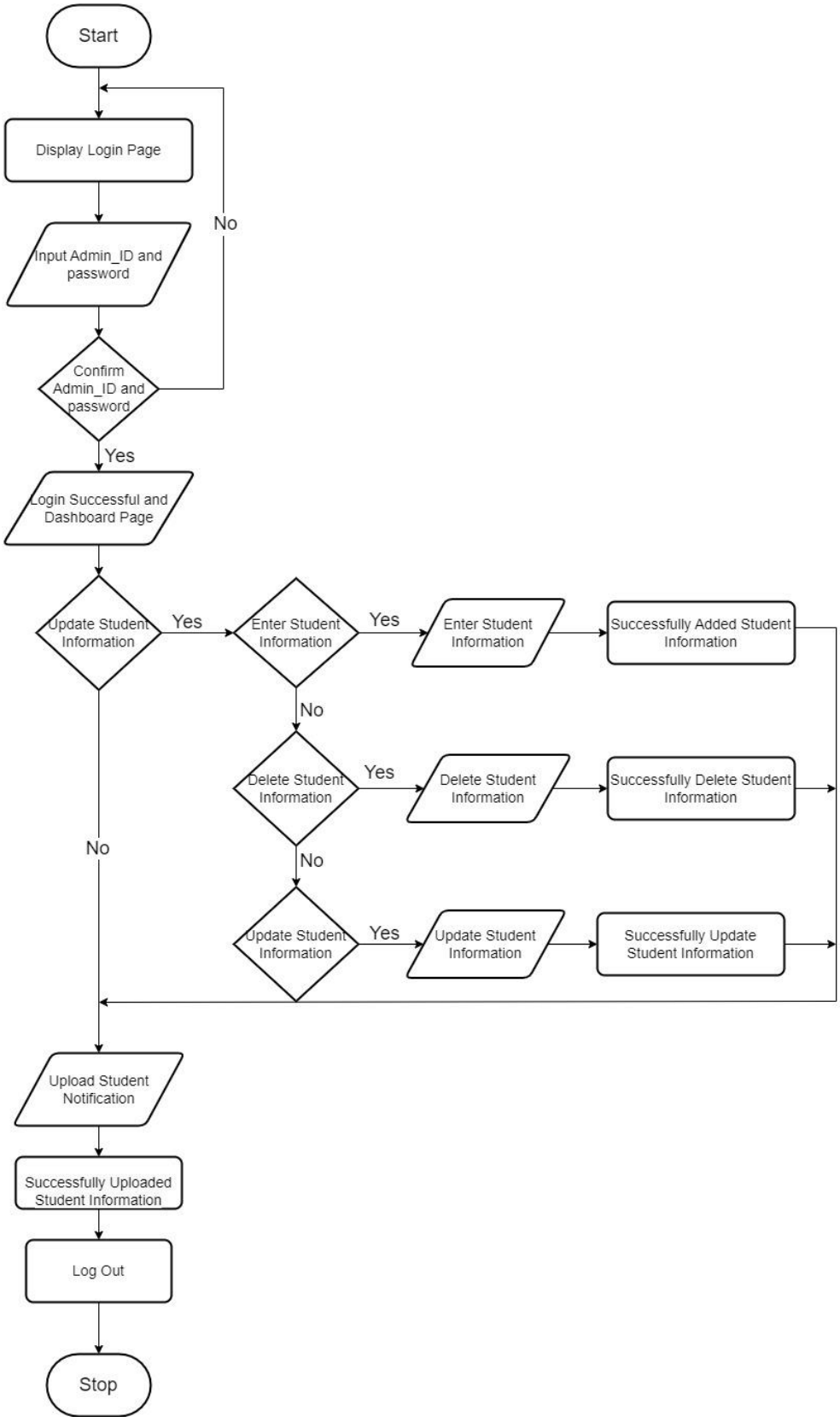

Figure 5: Flowchart for Admin

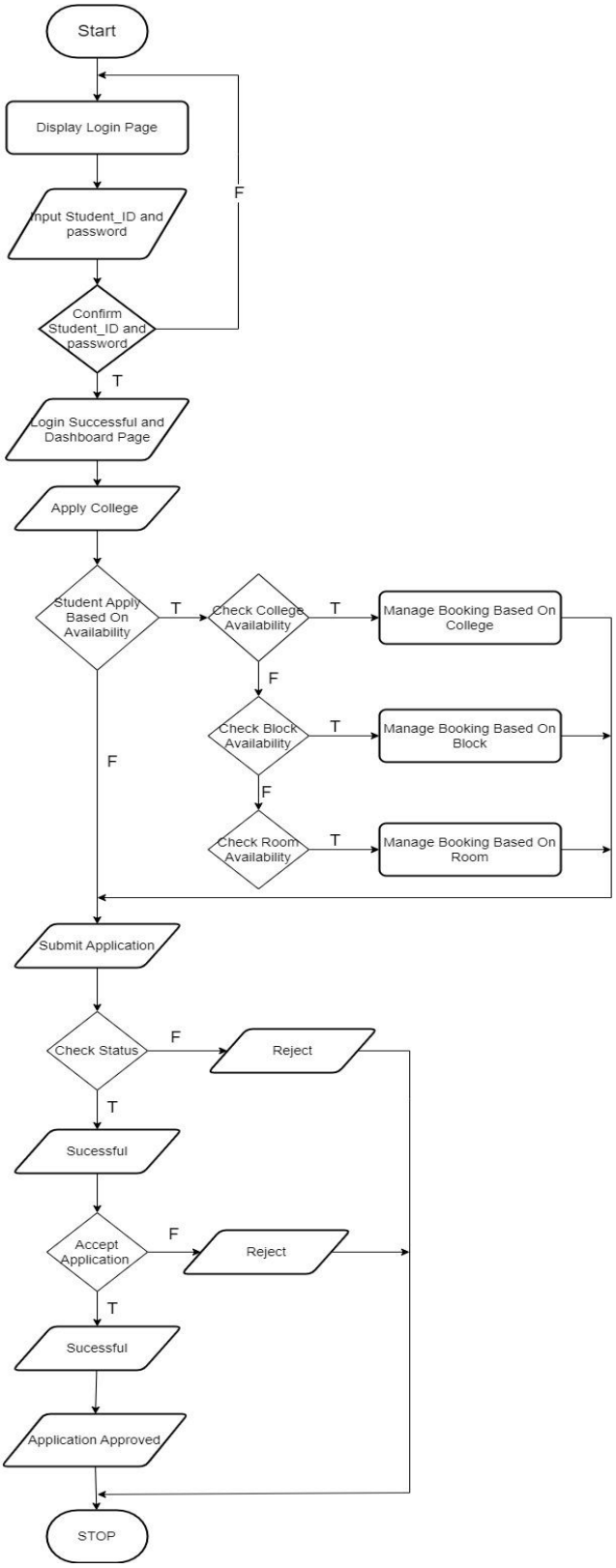

Figure 6: Flowchart for Student

4.4 Interface Design

The user interface (UI) design ensures that the interface is easy to review, understand and use.[9] It gives an overview of the structure and design of the page. The application system interface is very important to help users to use the system more easily. The following are the interfaces that have been designed using moqups application.

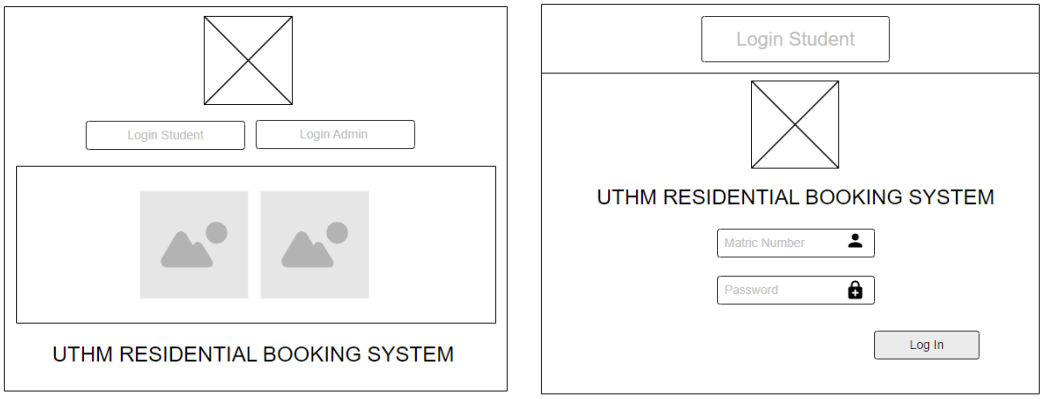

Figure 7: Homepage and Admin Interface

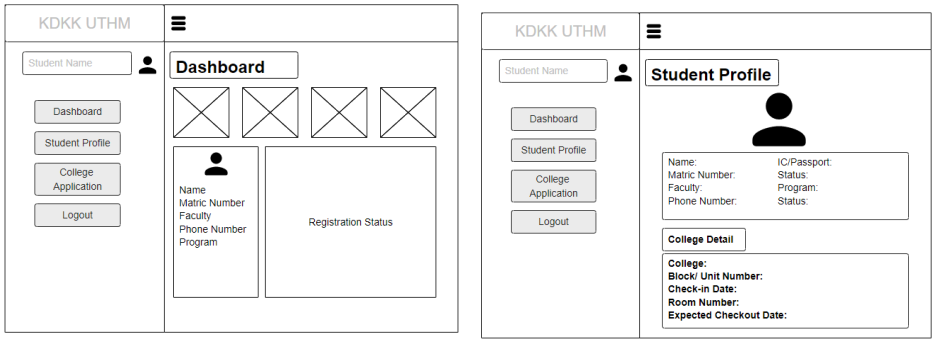

Figure 8: Dashboard and Profile Interface

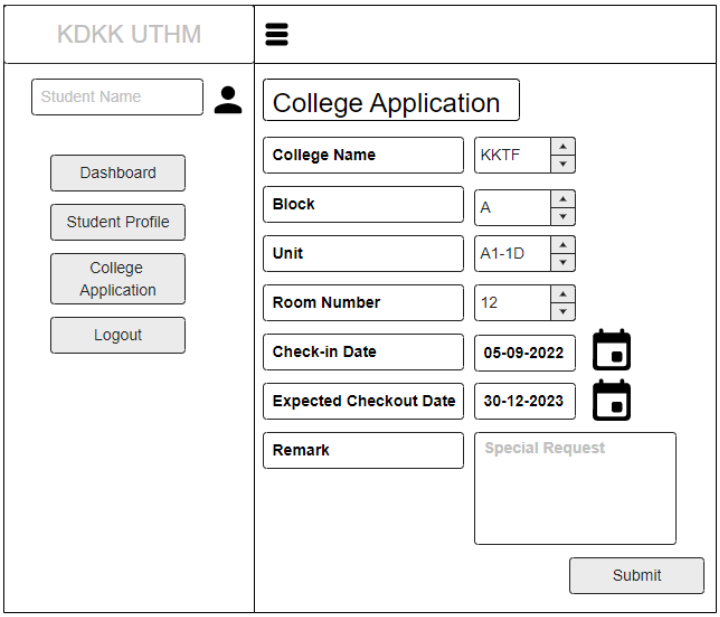

Figure 9: Booking Interface

4.5 Testing

It's important to present the user testing results in a clear, concise, and organized manner to ensure that stakeholders can understand and act upon the findings effectively. It is the whether the result is passed or failed, depending on the testing when the user executes the web-based system.

Table 5: User Testing for Each Module

CHECKLIST STATEMENT	PASS	FAIL
Module 1: Login Module		
The system should allow the user to log in to the system using a valid username and password	✓	
The system should alert the user for any invalid input	✓	
The system should redirect the user to their respective profiles upon successful login	✓	
Module 2: Student Module		
Store student details such as information like profile details, contact information, educational details, and others	✓	
Display basic information for the particular student such as name, IC/passport number, student ID and student status.	✓	
Module 3: Room Allotment Module		
Display details of students staying in the room	✓	
Display hostel information of the student such as location, block/unit no, room type, room/bed no, check-in date, and expected check-out date.	✓	
Module 4: Setting Module		
Allows add, edit, and delete students' records, notification email for student, building block information, room details, course details, and others.	✓	

Table 6: Scenario Test Plan for Login Module

Module: Login Module				
Test Case ID	Description	Expected Result	Actual	Pass/Fail
M1-1	To check whether administrator can login for an account	The user should be able to login into the system	The user has successfully logged into the system.	Pass
M1-2	To check whether a student can login into the system	The user should be able to login into the system	The user has successfully logged into the system	Pass
M1-3	To check whether the system will restrict login whenever a wrong credential is entered	The system should restrict login when an incorrect credentials has been entered	The system restricted the login when an incorrect or no credentials has been entered	Pass

Table 7: Scenario Test Plan for Student Module

Module: Student Module				
Test Case ID	Description	Expected Result	Actual	Pass/Fail
M1-1	To check whether the system can store student details	The user should be able to store student details	The user has successfully store student details	Pass
M1-2	To check whether a administrator display basic information for the particular student	The user should be able to display basic information for the particular student	The user has successfully display basic information for the particular student	Pass

Table 8: Scenario Test Plan for Room Allotment Module

Module: Room Allotment Module				
Test Case ID	Description	Expected Result	Actual	Pass/Fail
M1-1	To check whether user can view details of students staying in the room	The user should be able to view details of students staying in the room	The user has successfully view details of students staying in the room	Pass
M1-2	Check if a user can display hostel information.	The user should be able to display hostel information of the student	The user has successfully display hostel information of the student	Pass
M1-3	To check whether the system will restrict login whenever a wrong credential is entered	The system should restrict login when an incorrect credentials has been entered	The system restricted the login when an incorrect or no credentials has been entered	Pass

Table 9: Scenario Test Plan for Setting Module

Module: Setting Module				
Test Case ID	Description	Expected Result	Actual	Pass/Fail
M1-1	To check whether administrator get notification from students who register new college	The user should be able to get notification	The user has successfully got notification	Pass
M1-2	To check whether a student can receive alert notification if they get or	The user should be able to receive alert notification	The user has successfully received alert notification in the system	Pass

	rejected from their registration			
M1-3	To check whether the system will allows add, edit, and delete students' records	The system should allow add, edit, and delete students' records	The system restricted allow add, edit, and delete students' records	Pass

5. Conclusion

To sum up the project description, the project was created using PHP and My SQL based on the user's requirements and an analysis of the current system, with room for future improvement. This chapter discusses the advantages, disadvantages, and recommendations of the UTHM Residential Booking System. It is designed to inspire others to take an interest in the booking system using web-based system and what can be done with it. This project is just one example of this.

Acknowledgment

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