

Qspace: An Online Quiz Application

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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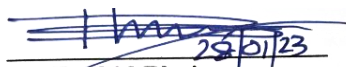
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APPROVAL

This Project titled “**Qspace: An Online Quiz Application**”, submitted by Mahfuzur Rahman, ID No: 191-15-12690 and Yeasin Arafat, ID No: 191-15-12746 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 26th January, 2023.

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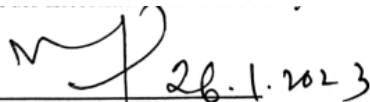
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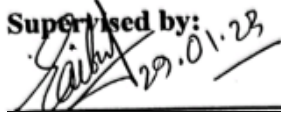
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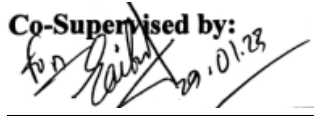
DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Mr. Saiful Islam, Assistant Professor, Department of CSE** Daffodil International University.

We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Everything around us is becoming online-based day by day. Recently the corona epidemic has made us understand the importance of being online-oriented. Many organizations are lagging behind due to a lack of necessary platforms. What if there was a platform through which students could give class tests and share class materials? We developed this project keeping all these things in mind. In this project, the user can log in as a teacher or student. Teachers can create rooms, add tasks, create quizzes, and add blogs. On the other hand, students can give quizzes, complete tasks, see results, and add blogs. There is also an option for public quizzes which will be available for all registered users. For implementing front-end, we used HTML, CSS, Bootstrap, ReactJs, and Redux. For the backend, we have used NodeJs, ExpressJs, and Mongoose and for the database, we have used MongoDB. We have also used Firebase authentication. Through this project, students can practice and give quizzes online.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This project is a web-based application. We are becoming dependent on online day by day. Everything is becoming online-based. Along with everything, education is also becoming dependent on online. With all of these considerations in mind, the primary goal of our project is to make online tests simple and available. The Corona pandemic [1] has made us understand the importance of online platforms better. Therefore, these platforms will play an important role as a preliminary preparation to deal with any possible future situations like corona pandemic. It will never replace institutional education, rather it will play a role as a helping hand to institutional education. This will give students more practice opportunities and will help to keep teachers and students connected. Teachers will be able to create room, where he/she can create quizzes, add tasks and add necessary posts. Students will be able to join those rooms and participate in those quizzes. By using this platform teachers will be able to connect with students virtually. Students will be able to finish their tasks and get the necessary materials from teachers. We are hoping that this platform will ease online learning and online exams.

1.2 Motivation

Everything has become online-based during this epidemic [1]. Many students and educational institutions have been hesitant to take quizzes and exams during this challenging time due to the lack of a proper platform. That period has made us understand better the need for an online platform. Many times taking classes' offline is not possible due to various reasons, hence it is important to make teaching easier and accessible from anywhere. Teachers and students should be connected in every situation to continue their education. Our project aims to solve and improve these issues.

1.3 Objectives

This web-based application will give an ideal alternative to the users. We would like to build a platform that is user-friendly. Our main objective is to make the online exam easier

and accessible from anywhere. It will help both teachers and students to continue their education in any situation like covid pandemic. We hope that this platform will help institutional education and also make online education easier for students. We will add many other features in the future to enrich this platform.

1.4 Expected Outcomes

As the number of internet users is increasing every day and everything is dependent online. Our platform will make sure the best experience for online exams and resource sharing. After the pandemic, every institution is planning to prepare alternative ways so that they can continue their education in every situation. An online platform can also be used as a helping hand for offline education. We are hoping that our platform will fulfill all of these needs. The teacher will be able to create and add the students to a room and then share the necessary information in that room. He/she will be able to create a public quiz or specific quiz for a subject/room. This feature will provide extra benefits to the teachers and students for continuing their education.

1.5 Project Management and Finance

A project requires finance and management for long-term usage. As our project will be non-profitable, most of our financial part will depend on public/corporate donations. But to get donations, we have to build a community, and we hope to do that through this project.

1.6 Report Layout

We told earlier that we are developing a web-based project, so our project description will be in six chapters. Those are:

- **Introduction:** We have covered every aspect of our project, including its inspiration, goals, management, and funding, in the Introduction chapter.
- **Background:** We have described the background, related works, and possible challenges of our project.
- **Requirement specification:** Here, we've discussed the project's use case diagram, business process modeling, and entity relationship diagram, as well as requirement analysis and specification.

- **Design specification:** Here we have describes the overview of the design which we have been used to complete our project.
- **Implementation:** It illustrates the implementation of the frontend and backend of this project.
- **Testing:** the testing process is discussed in this section.
- **Conclusion and future scope:** We have discussed the project's conclusion and future scope in this chapter.

CHAPTER 2

BACKGROUND

2.1 Introduction

Online education is becoming popular day by day due to the widespread use of the internet. Also, the popularity of online education has increased due to the corona epidemic. Our goal is to make online exams more straightforward and more accessible, as we know that most educational institutions were closed for almost one and a half years at the time of corona epidemic. Some institutions could continue their education through their online platform, but only some could conduct classes online because of the right platform. However, some of them could conduct classes but needed help to take the class tests and share necessary information about the test or classes. For this reason, most students have to drop their current semester/year. We try to ease those odds and make online exams accessible.

2.2 Related Works

There is a huge number of educational websites worldwide and in our country. But in our country, most of the online education platforms are made for their institution. Worldwide there are two popular platforms named **Kahoot!** [2] and **Quizizz** [3].

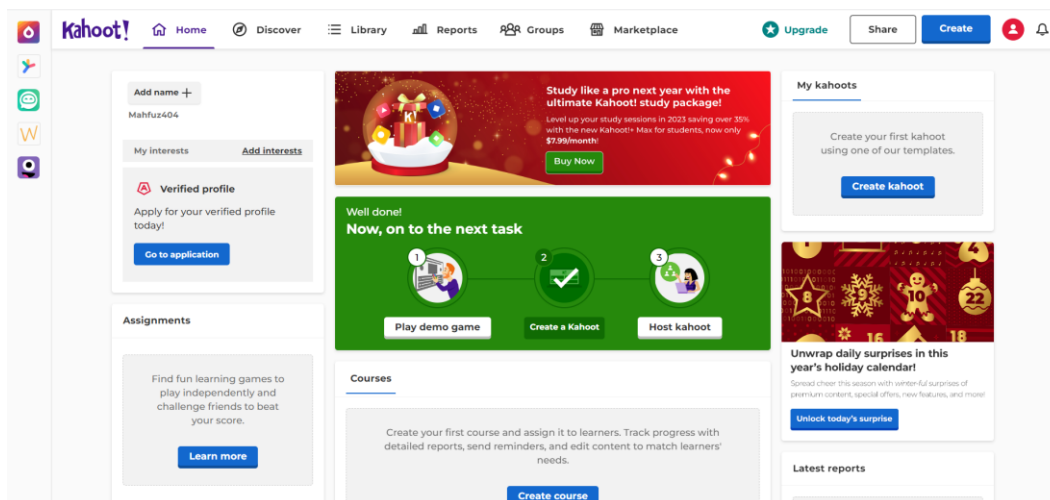


Figure 2.2.1: Related work Kahoot home page

The content and interface Kahoot! Provides, is for children. They have also the feature of taking quizzes and creating rooms/courses.

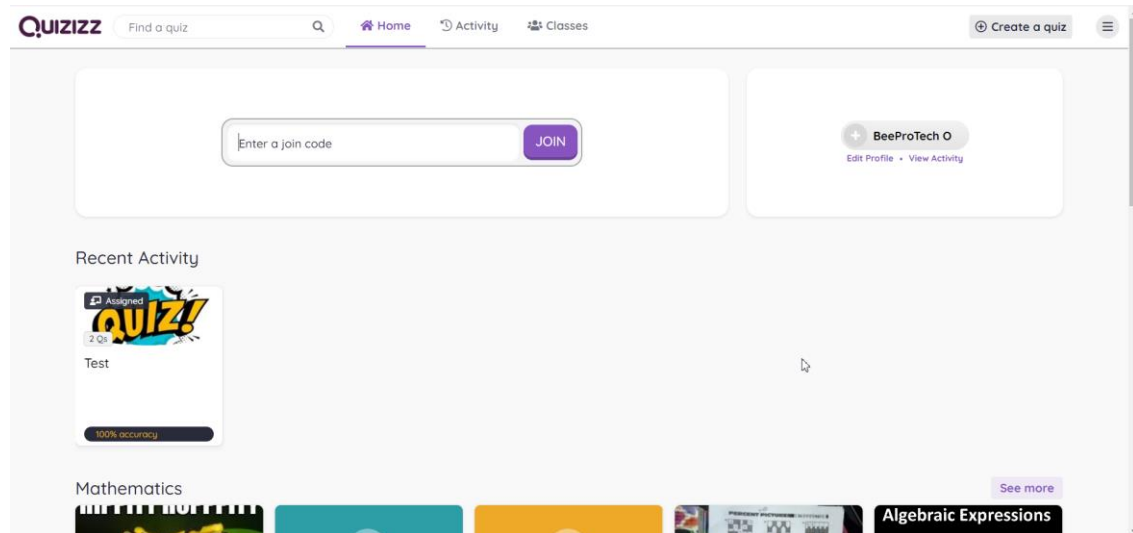


Figure 2.2.2: Related work Quizizz home page

This website is also a quiz-based website. The presentation of questions and content they provide is for children or for classes from 1 to 5.

These two popular websites are available but in our country, these types of platforms are only for their own institution.

2.3 Comparative Works

Every system has some limitations and drawbacks. “Qspace” is different from the related works in some points. Our platform will give an interface for all users, which is very important for usage purposes. Our website will provide specific course management and blog feature, which will help the teachers and students to manage their courses effectively. We also have a user-friendly environment for tracking quiz dates which will help the students to maintain their schedules. And these made our project more effective for our target audience.

2.4 Scope of the Problem

Our project “QSpace” will ease the odds of the online exam system. We have provided a filter and display system for the next seven days' quizzes so that users can keep track of their schedules. Easy to create a quiz and room for teachers. Teachers can also post blogs for specific subjects. Teachers can also assign tasks to the students. Participating in a quiz is also simple. For course quizzes, one has to join the room first and the public quiz will open for all the users. Since QSpace is a web application, so we have tried to keep our user interface simple.

2.5 Challenges

There are many challenges we must overcome in order to develop this online quiz system. Some of the challenges are:

- Designing the user interface of the application so that it becomes user-friendly.
- Make it responsive for all devices.
- We had to learn many new things while working such as ReactJs, Redux, ExpressJs, NodeJs, etc.
- We were stuck in backend API security issues for a long time because the JWT concept was totally new for us.
- Designing the database for the whole system and making it a one-to-one/many-to-many connection.
- Ensuring that only authenticated users can access the specific features.
- Ensuring that the assigning task for the specific course would show only for that course

CHAPTER 3

REQUIREMENTS SPECIFICATION

3.1 Business Process Model

Business Process Model, also known as BPM [4], represents the front-end interface and the working process. It shows how the entire process of the application behaves.

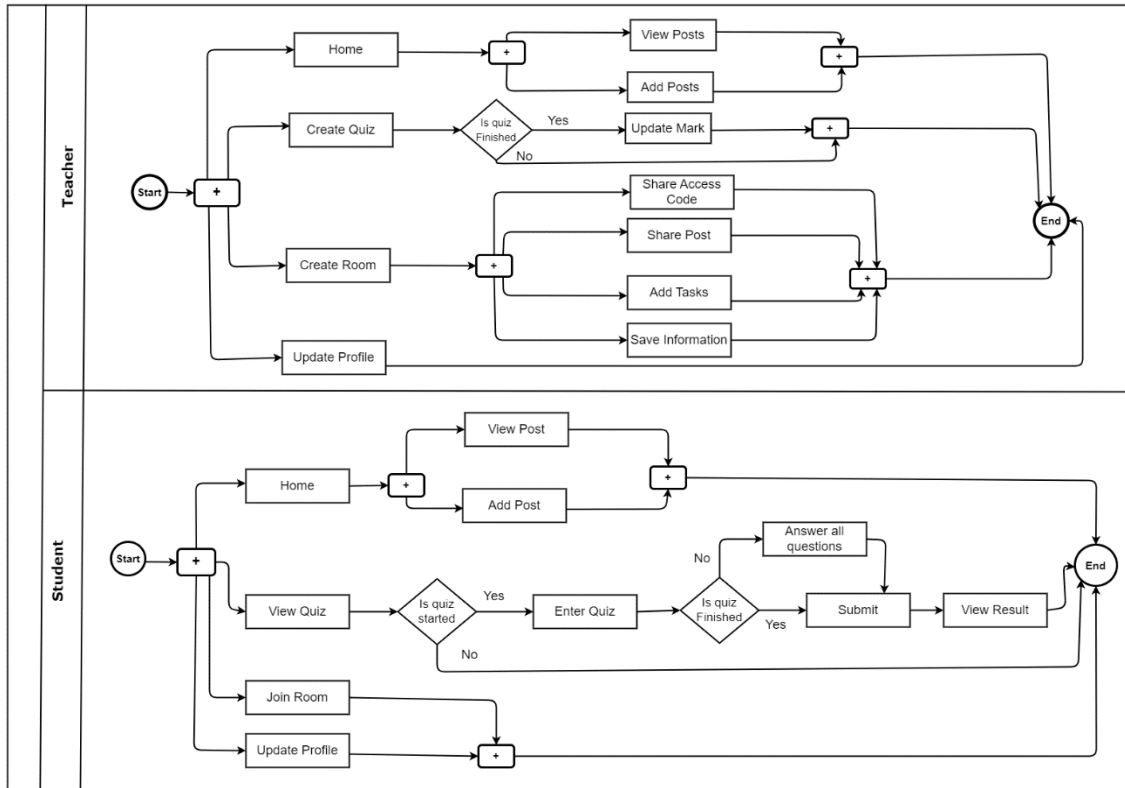


Figure 3.1.1: BPM or Business Process Model of QSpace

BPM increases the speed and total clear thought of the project. In Figure 3.1.1, we can see that there are two types of users Teacher and Student. Based on these two role the feature will be changed. In the above diagram, we can see the start and end nodes and rectangle shape which indicates the action of the system, and the diamond symbol represents a conditional process.

From the diagram, it can be seen that teachers have the extra feature of creating rooms and creating quizzes. And the common feature will be home, view quiz, and updating the

profile. And there will also be a feature that filters quizzes, and it will also be a standard feature which means it will be available for all types of users.

3.2 Requirements Collection and Analysis

Here we will summarize and analyze our work. Now I will describe those below:

- We have to implement the authentication so that only authenticated users can get access to the system.
- When a user logs in to the system we have to ensure the specific feature for that particular role.
- A teacher can create quizzes and rooms and by sharing the room's access code, other students can join that room. Teachers have also access to posting in a particular room.
- A student can participate in any public quiz but for participating in a course quiz he/she has to join that course.
- All the posts will appear on the home page.
- After logging out to the system, the system will take the user to the login page. To access the features they have to log in again.
- Also there is a dashboard for teachers from here they can control the quizzes and the status of the quizzes.

3.3 Use Case Model

Use Case diagram describes the user's possible interaction with the system. It shows the functionality and the requirements to access those functionalities. In the above diagram, we can see that students and teachers both have some features but to access those features they have to be authenticated users. Following the use-case-diagram of QSpace.

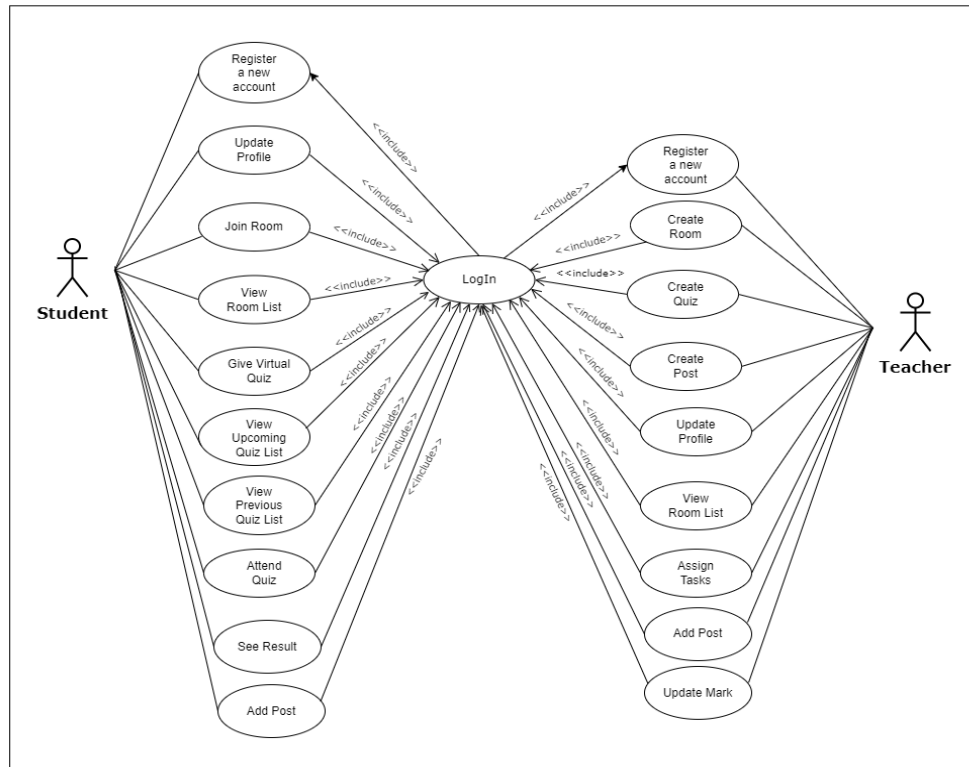


Figure 3.3.1: Use case diagram of QSpace

3.4 Use Case Description

Description for the following use case diagram:

Table 3.4.1: Use case description of Register a new account

Use case-1	Register a new account
Pre requisite	None
Actor	All User
Primary Path	User Name, Email, Password, Role, University/College Name, Profile Picture
Exceptional Path	User name must be filled, Email must be filled, Email must be valid, Password must be provided, Password must contain 6 characters

Upper Table 3.4.1 describes registering a new user to our system and its required information.

Table 3.4.2: Use case description of Log In

Use case-2	Log In
Pre requisite	Register a new account
Actor	All User
Primary Path	Email, Password
Exceptional Path	User not found, Invalid Password

Table 3.4.2 shows the login method and the required information to enter the website.

Table 3.4.3: Use case description of Update Profile

Use case-3	Update Profile
Pre requisite	Log In
Actor	All User
Primary Path	Enter Name or Leave empty Enter College Name/University Name or Leave empty Enter Current password and New password or Leave empty
Exceptional Path	Invalid password

Table 3.4.3 is the description of updating the profile of a user of our website and the fields they can edit.

Table 3.4.4: Use case description of Join Room

Use case-4	Join Room
Pre requisite	Log In
Actor	Student
Primary Path	Enter Joining Code
Exceptional Path	Invalid Joining Code

Table 3.4.4 describes the process of joining a room for students and the required path for entering the room.

Table 3.4.5: Use case description of View Room List

Use case-5	View Room List
Pre requisite	LogIn
Actor	All User
Primary Path	Click Room, Enter Room
Exceptional Path	No room available

Table 3.4.5 shows the description of the feature and view room list. A user can view his room list in the room tab. And he has to be logged in to access this feature.

Table 3.4.6: Use case description of Give Virtual Quiz

Use case-6	Give Virtual Quiz
Pre requisite	Log In
Actor	Student
Primary Path	Enter Quiz, Answer Questions, Submit Answer, See Result
Exceptional Path	Quiz not started, Quiz not available

Table 3.4.6 is the overview of the 'give a virtual quiz' feature. Users must be logged in to access this feature.

Table 3.4.7: Use case description of View Upcoming Quiz List

Use case-7	View Upcoming Quiz List
Pre requisite	Log In
Actor	All User
Primary Path	Click Quiz menu, view all course and public quizzes
Exceptional Path	No quiz available

Table 3.4.7 is the overview of the ‘View Upcoming Quiz List’ feature. Users must be logged in to access this feature.

Table 3.4.8: Use case description of View Previous Quiz List

Use case-8	View Previous Quiz List
Pre requisite	Log In
Actor	All User
Primary Path	Click Quiz menu, view all previous quiz lists
Exceptional Path	No quiz available

Table 3.4.8 is the overview of the ‘View Previous Quiz List’ feature. Users must be logged in to access this feature.

Table 3.4.9: Use case description of Attend Quiz

Use case-9	Attend Quiz
Pre requisite	Log In
Actor	Student
Primary Path	Enter Quiz, Answer questions, Submit quiz, See results
Exceptional Path	Not permitted

Table 3.4.9 shows the description of ‘attend quiz’ feature. Users must be logged in to attend a quiz.

Table 3.4.10: Use case description of See Result

Use case-10	See Result
Pre requisite	Log In, Participate Quiz

Actor	Student
Primary Path	Click Result options
Exceptional Path	Not Permitted

Table 3.4.10 is the overview of the ‘see result’ feature. Users must be logged in to access this feature. After attending a quiz they can see their results.

Table 3.4.11: Use case description of Create Room

Use case-11	Create Room
Pre requisite	Log In
Actor	Teacher
Primary Path	Enter Subject Name, Enter Subject Code
Exceptional Path	Server Error, Not permitted

Table 3.4.11 describes creating a room feature. It is only accessible to teachers. After creating a room, they can share it through a room access code.

Table 3.4.12: Use case description of Create Quiz

Use case-12	Create Quiz
Pre requisite	Log In
Actor	Teacher
Primary Path	Title, Subject, Date, Time, Duration, Status, Questions, Options
Exceptional Path	Server Error

Table 3.4.12 describes creating a quiz feature. It is only accessible to teachers. After creating a quiz, it will be accessible to the students.

Table 3.4.13: Use case description of Create Post

Use case-13	Create Post
-------------	-------------

Pre requisite	Log In
Actor	All user
Primary Path	Enter Title, Enter description, Post
Exceptional Path	Server Error, Not permitted

Table 3.4.13 is the overview of the ‘Create Post’ feature. Users must be logged in to access this feature. After posting content, it will be available on the homepage.

Table 3.4.14: Use case description of Pin Resource

Use case-14	Pin Resource
Pre requisite	Log In
Actor	Teacher
Primary Path	Enter Title, Enter resource
Exceptional Path	Server Error, Not permitted

Table 3.4.14 describes ‘pin resource’ feature. It is only accessible to teachers. Teachers can pin any resources for all students enrolled in that class.

3.5 Entity Relationship Diagram

It represents the database collection and its relationship. We have five different collections for storing our project’s information. Some are connected, but every collection is connected to the user collection. Below is the figure for the ERD of this project.

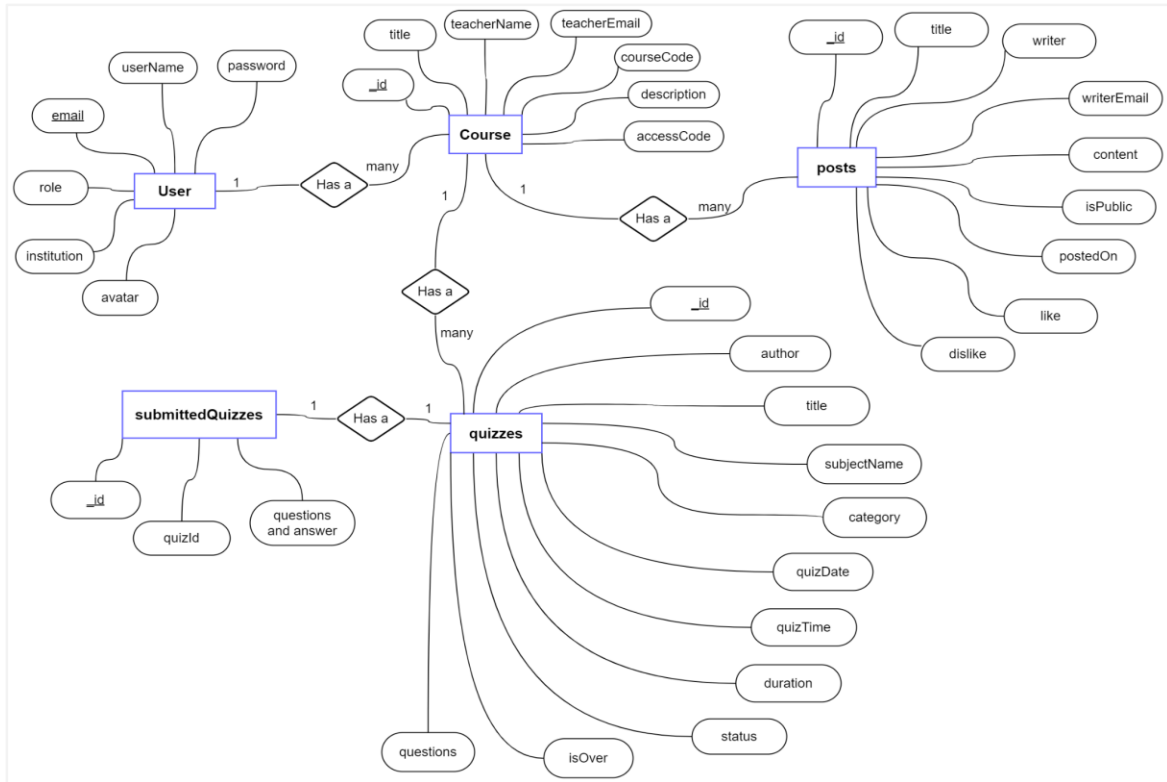


Figure 3.5.1: Entity Relationship Diagram for QSpace

3. 6 Design Requirements

We need certain gear and software in order to build the project.

Hardware Requirements:

- Hard Disk: 500MB or more
- Processor: Core-I3 or more
- Ram: 512MB or more
- Internet Connection

Software Requirements:

- Windows/Linux Operating System
- Chrome browser for best experience
- MongoDB database
- VS code for developing
- Firebase Authentication

Library and Languages:

- HTML
- CSS
- JavaScript
- ReactJs
- Redux

Framework:

- NodeJs
- ExpressJs

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

The front end serves as the user interface via which a user can communicate with an application. We have kept the front end part of our website simple and user friendly. Our front end is divided into two parts, one is for teachers and another is for students. There are some features which is only available for the teachers and vice versa.

We have used HTML [5], CSS [6], and BootStrap [7] for designing the front end and we have also used ReactJs for interacting with the front end part with the backend. An open-source, free front-end JavaScript library called ReactJs is used to create user interfaces. By using this, we can easily connect between the front end and backend and also it makes the user interface smooth and user friendly.

As we told earlier that our web application is divided into two parts. When a user wants to register then they have to be a part of one of those roles. We have also keep login and registration process simple and user friendly.

4.2 Back-end Design

Since our product is a full-stack project, we also have a back-end or server-side component. The back end connects the front end with the database, which is used to save users' information and also the information of other functionalities.

We have used NodeJs runtime [8] and ExpressJs framework [9] for creating API. API is basically the connection which is used to connect the front end and database. By using API we can query the database. For the database, we have used MongoDB, a NoSQL database; [10] for querying into the database we have used mongoose, which makes it easy to query into the MongoDB database.

4.3 Interaction Design and User Experience (UX)

The most important factor that has to be considered while building an application is the user experience. The objective of interaction designers is to enhance the interactive

experience for users at the point where they interact with a feature. UX designers pay attention to the user's journey when engaging with a feature, not just the amount of time spent doing so.

We have always tried to improve the user experience, so we have kept our front-end design simple. We have also provided necessary notifications/messages to the user. Suppose an error occurs or an action is taken successfully, then we have to notify the user to know the state of their current activity.

4.4 Implementation Requirements

For implementing our project we have used the following components:

4.4.1 Figma

Figma is a web application which is used to design the interface of applications. We have chosen it because it is easy to use, and it can also be shared and worked together with other teammates. It helps us to design the prototype of our application.

4.4.2 VS Code

For building this project we have used VS Code IDE. Which was customizable and efficient for our work.

4.4.3 ReactJS Library

For the interaction of front end we have used ReactJs Library. It is a JavaScript Library which makes the front end more user friendly and customizable.

4.4.4 NodeJs, ExpressJs

We have used NodeJs and ExpressJs for our backend part. It connects the database with the frontend part

4.4.5 MongoDB

It is a NoSQL database which uses JSON-like documents with optional schemas. It offers 512mb initial free storage for storing the information of an application.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

We used two different types of databases for our project, Firebase and MongoDB. We have used Firebase for only Authentication because Firebase provides some built-in and secured authentication methods. By using those methods, we can quickly authenticate a user. And for storing the data of the application, we have used MongoDB. On our website, we have implemented email/password authentication. We have implemented this using the firebase method.

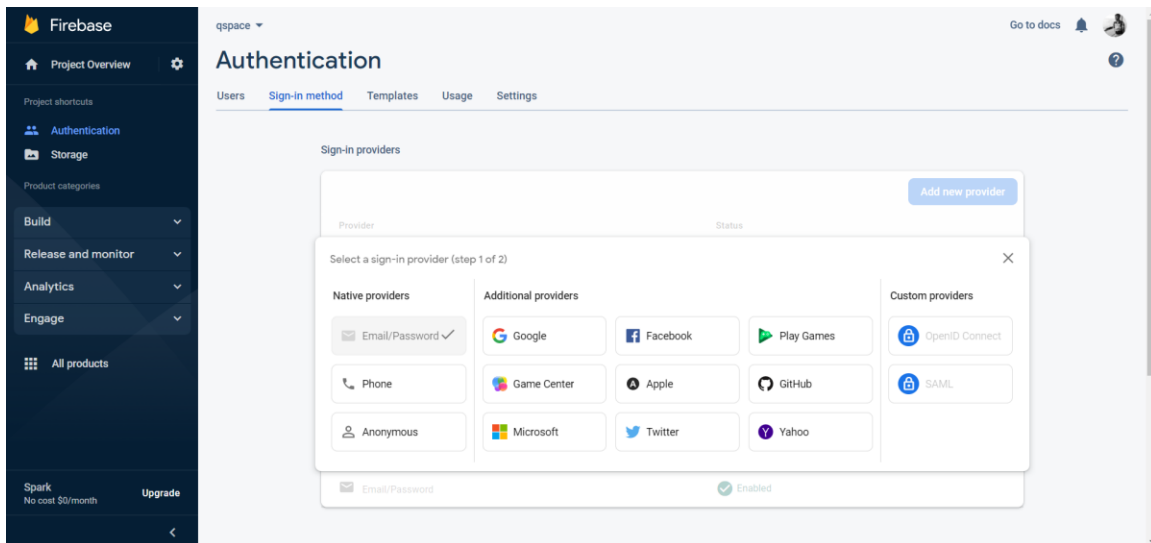


Figure 5.1.1: Firebase Authentication method for Qspace

After authenticated we have store the users' information in MongoDB. Below is the user table in Firebase.

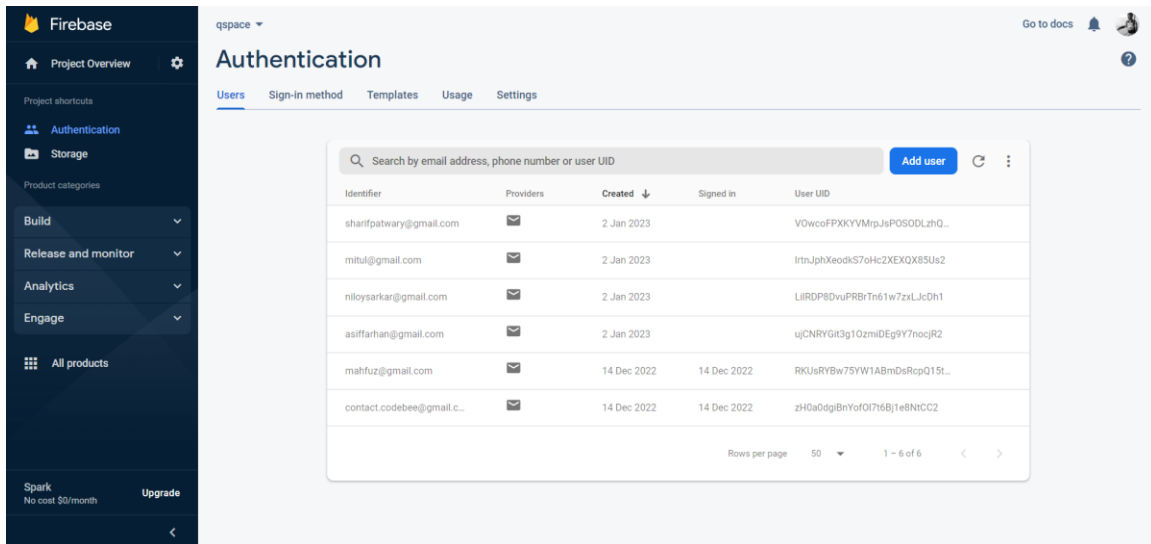


Figure 5.1.2: Registered User

In the above picture we can see the registered user list of our web application. For storing other information we have used MongoDB.

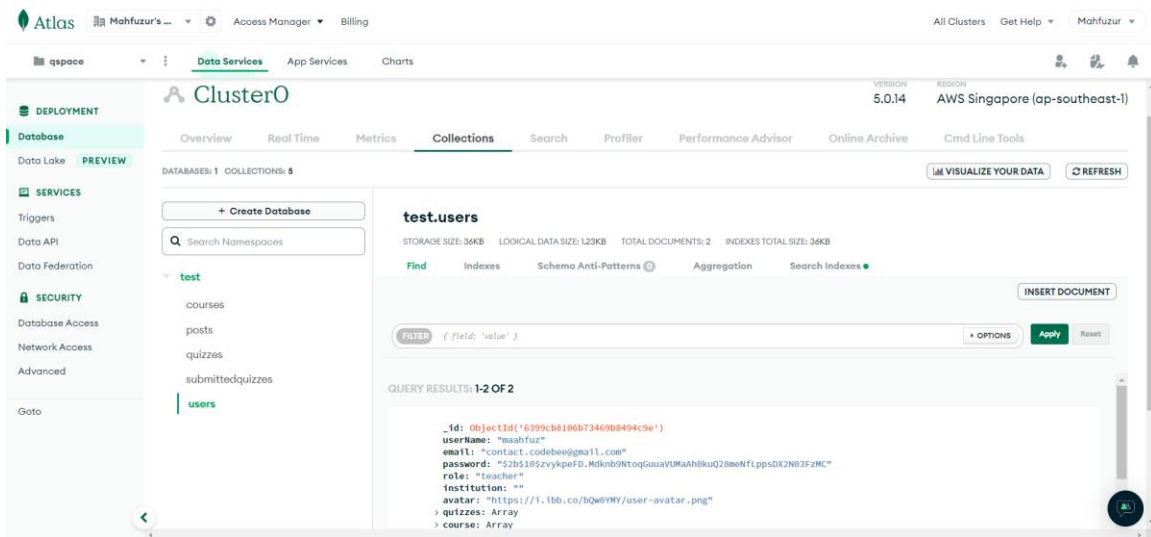


Figure 5.1.3: Database for storing the data of our web application

In the above picture, we can see five different tables for storing the necessary information. We have created a table for users, posts, courses, quizzes, and submitted-quizzes.

5.2 Implementation of Front-end design

The most crucial element of an application is the front end. We have used HTML, CSS, Bootstrap and ReactJs to design and make dynamic our project.

5.2.1 Register Page

The below Figure 5.2.1 shows the registration page of our website. A user must provide user-name, email, password, role for registering in the website, institution and profile picture is optional.

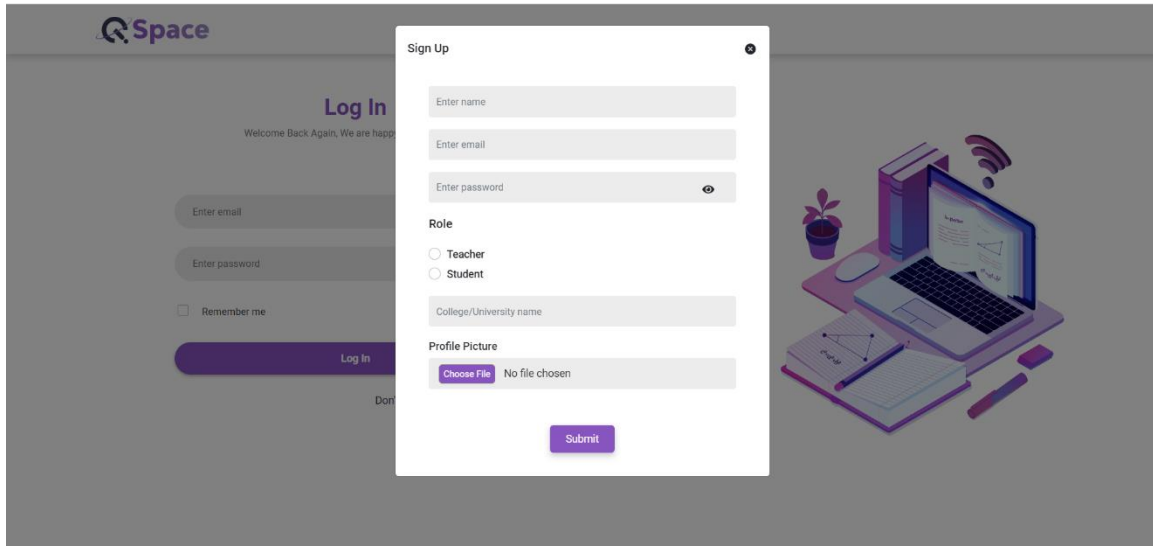


Figure 5.2.1: Register modal

5.2.2 LogIn Page

Below Figure 5.2.2 illustrates the login page of QSpace. A user can log in to our website using their registered email address and password after successfully registering.

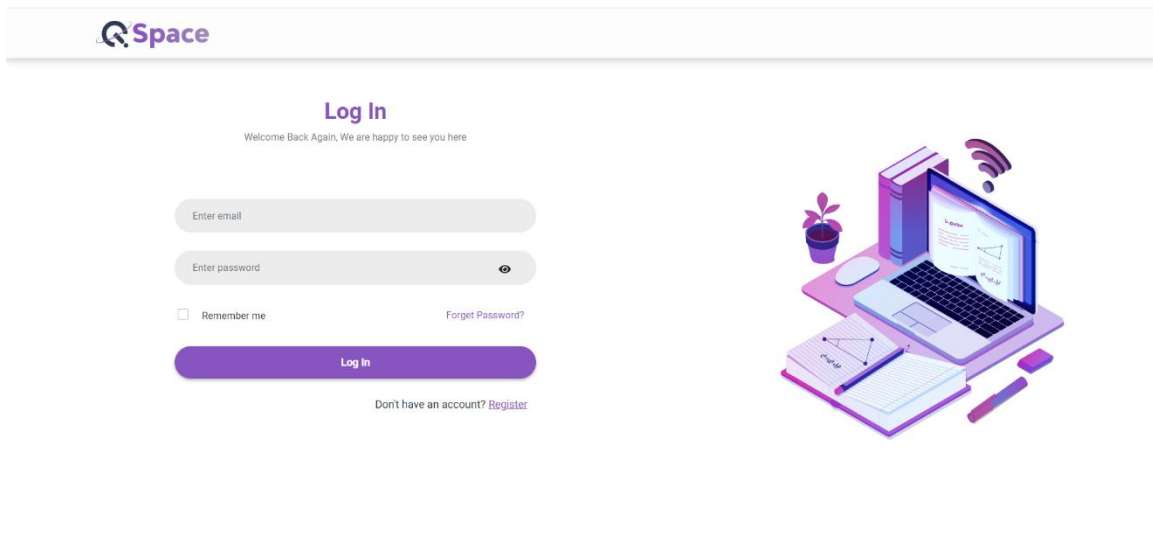


Figure 5.2.2: Log-In Page

5.2.3 Home Page

The Figure 5.2.3 is the interface of the home page of QSpace website. After successful login to the website, the user will be redirected to the home page. The home page will have

an option for a public post. A user can add a public post from home, and all the posts, including private, will appear on the home page. There will also be a sidebar that will show the next seven days' schedule of the current week. Users can filter date-wise to check if there is a quiz on that day or not.

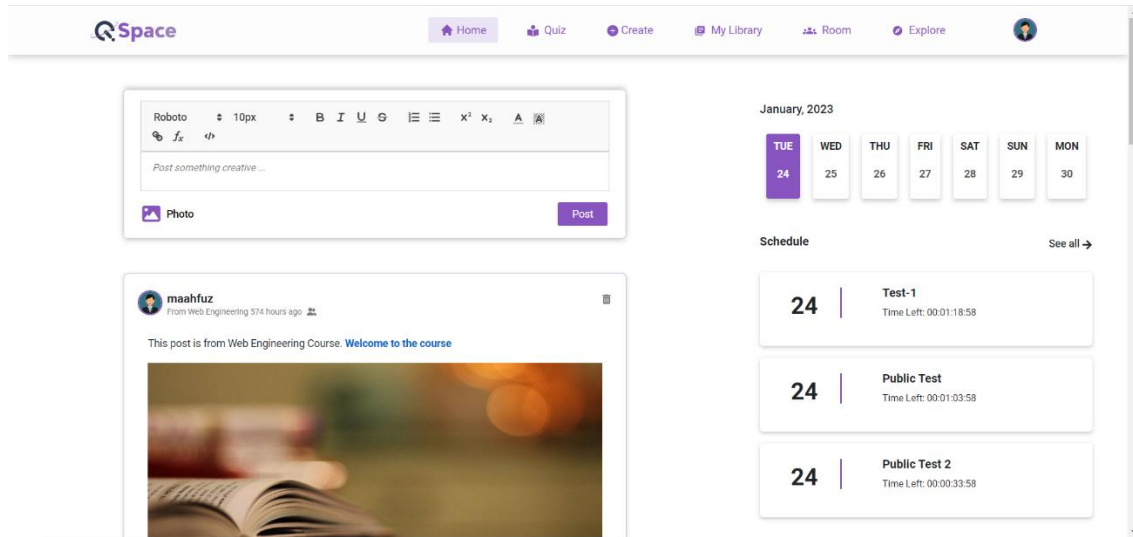


Figure 5.2.3: Home page

5.2.4 Quiz Page

Below, Figure 5.2.4 shows the page where a user can see their upcoming and previous quizzes. There will be two categories for quizzes, one is course, and another is public. A user can create a private quiz from a course/room.

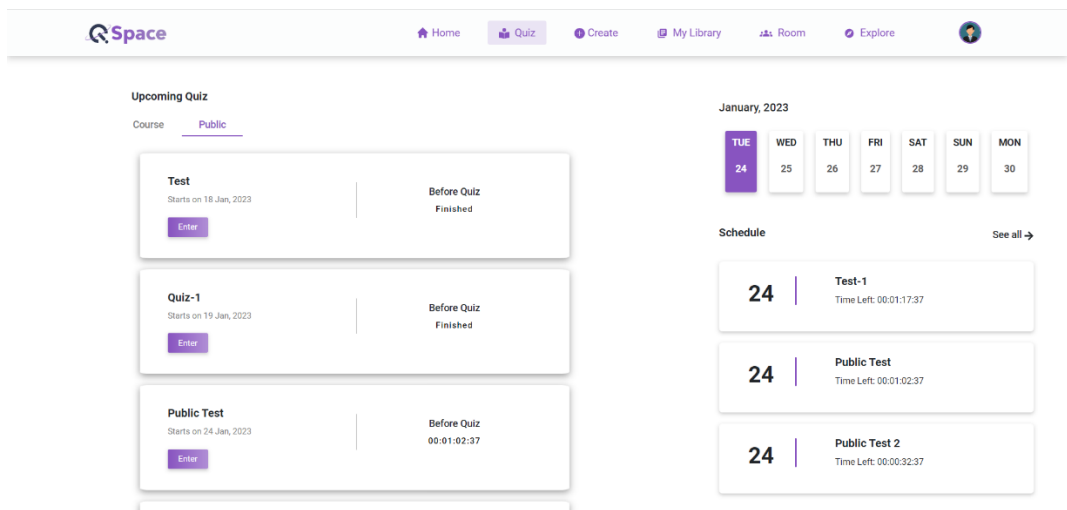


Figure 5.2.4: Quiz Page

5.2.5 Create Page

This feature will only be available for teachers. From here, they can create a quiz. Below, Figure 5.2.5 shows the create page. A teacher must have to provide a title, status, subject, date, start-time, end-time, and questions to create a quiz.

Space

Home Quiz Create My Library Room

Test-4 Public Active Save

01/03/2023 11:00 PM 11:15 PM

Question 1 Edit Delete

Test Question

choices

● first ● second

● third ● fourth

5 marks

New Question

Figure 5.2.5: Create Page

5.2.6 My Library Page

The Figure 5.2.6 shows the Library Page of our website. Here all the quizzes a user created or participated in will gradually appear for teachers and students. Teachers can update the status of the quiz and also delete a quiz from here. Student and teacher both can view their quiz from here.

Space

Home Quiz Create My Library Room Explore

Add Quiz Subject: Public Status: Active Add filter

Subject	Title	Status	Date	View	Controls
Algorithm	Quiz-2	Active	20-01-2023	View	
Algorithm	Test-1	Active	24-01-2023	View	
Public	Test	Active	18-01-2023	View	
Public	Quiz-1	Active	19-01-2023	View	
Public	Public Test	Active	24-01-2023	View	
Public	Public Test 2	Active	24-01-2023	View	

Figure 5.2.6: My Library Page

5.2.7 Room Page

Figure 5.2.7 shows the room page, where it will show all the room lists. Teachers can create a room (5.2.7.1), and students can join the room (5.2.7.2) from here.

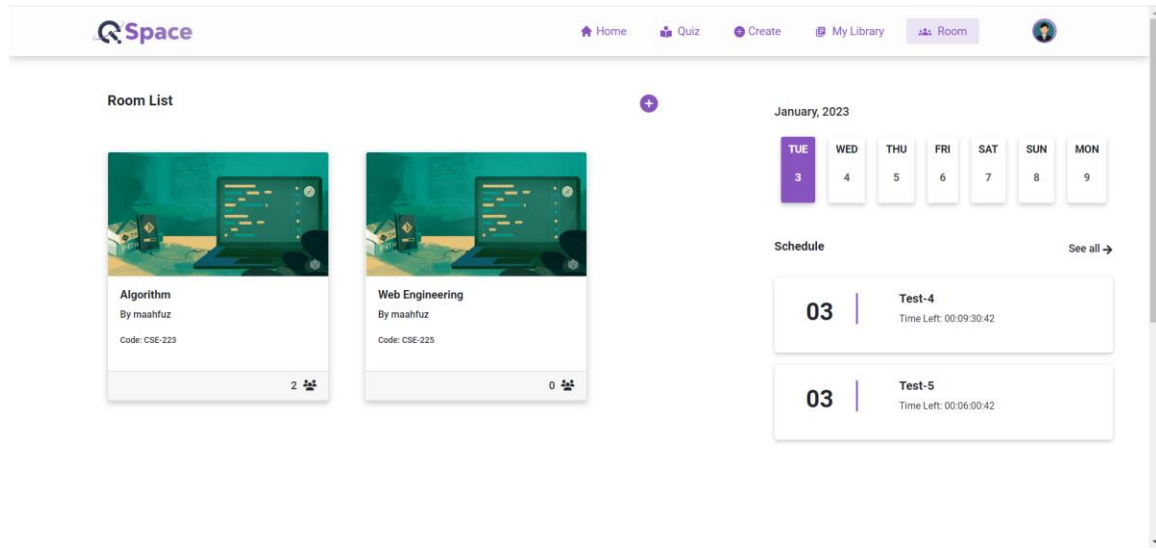


Figure 5.2.7: Room Page

Figure 5.2.7.1 shows the teacher's create room page.

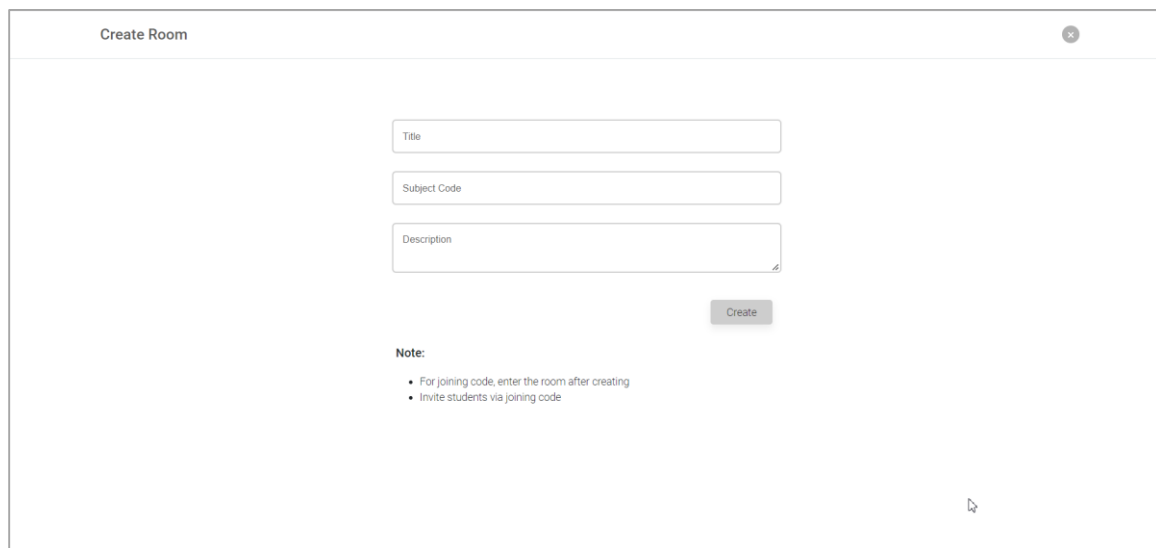


Figure 5.2.7.1: Create Room

Figure 5.2.7.2 shows the students' join room feature. Students can join the room by using an access code, which teachers share.

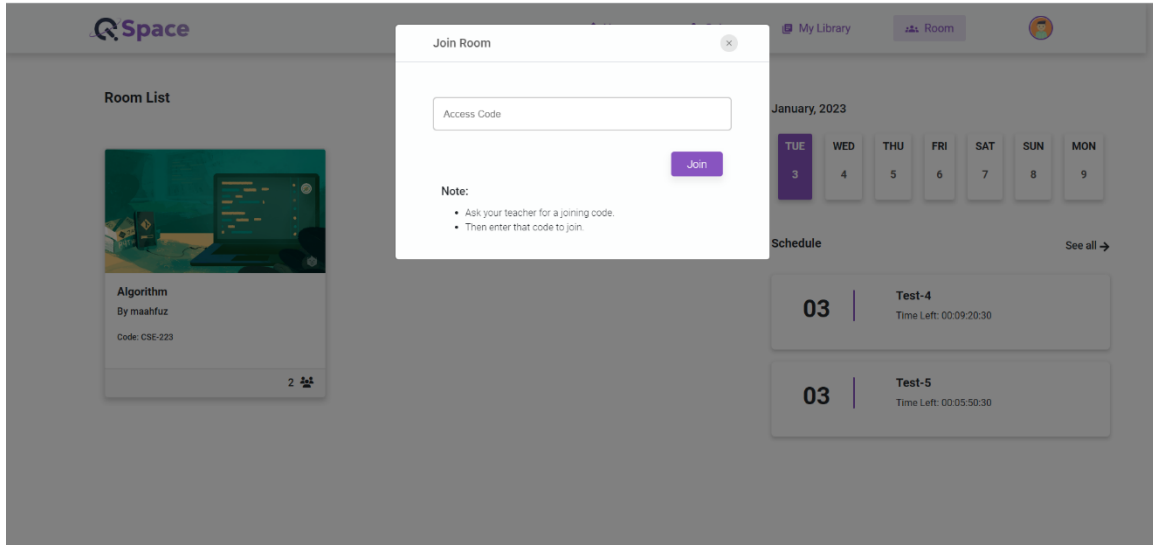


Figure 5.2.7.2: Join Room

5.2.8 Inside Room page

Figure 5.2.8 shows the interface of the inside of a room. Here teachers can share the private post, create a quiz for this subject, and pin any resources. Students can access those posts, quizzes, and pinned resources from here.

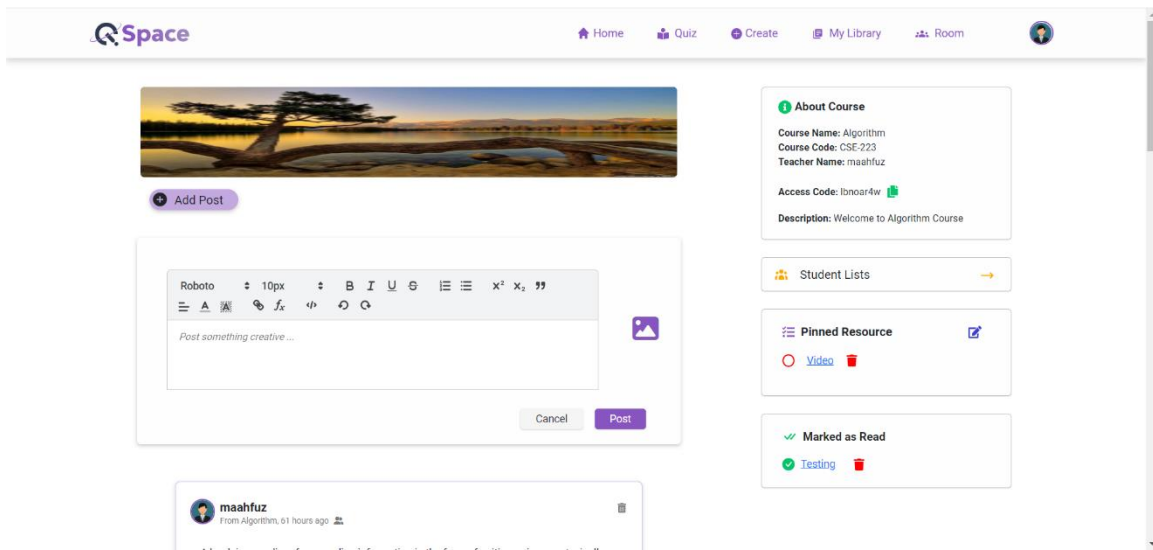


Figure 5.2.8: Inside Room

5.2.9 Student List

Figure 5.2.9 shows the student list of a room. From here users can see the student list of the room and teachers can remove a user from the room.

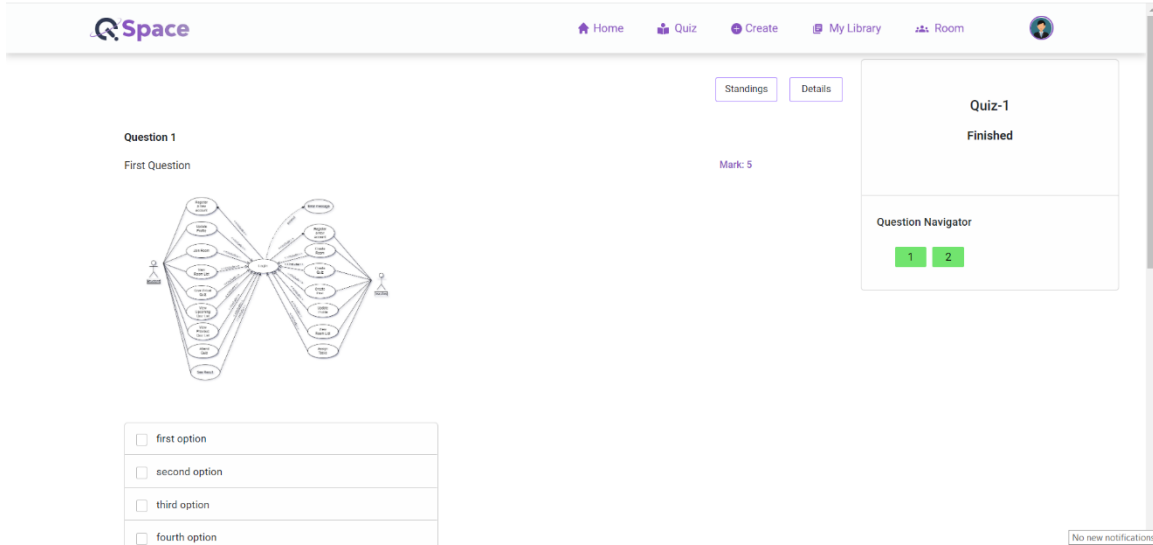


Figure 5.2.11: Questions inside a quiz

5.2.12 Teacher’s Dashboard for a quiz

Figure 5.2.12 shows the teacher’s dashboard for a quiz. From here, teachers can see the attachment and update the numbers of the students who participated in that quiz.

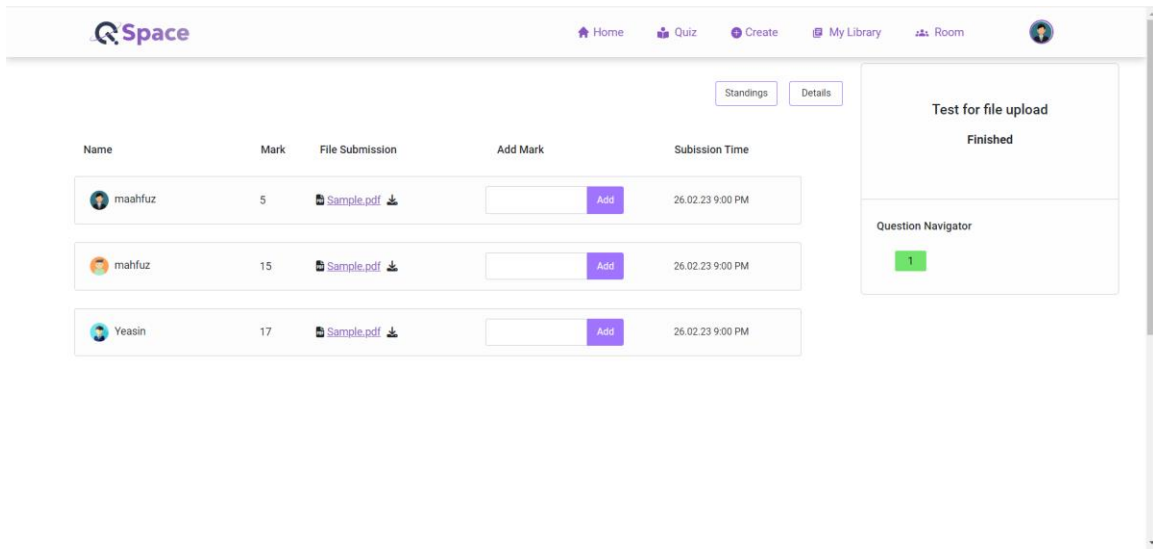


Figure 5.2.12: Teacher’s dashboard for a quiz

5.2.13 Result page for students

Figure 5.2.13 shows the result page for the students. It shows the total marks and the number of wrong, correct and un-answer questions through a pie chart.

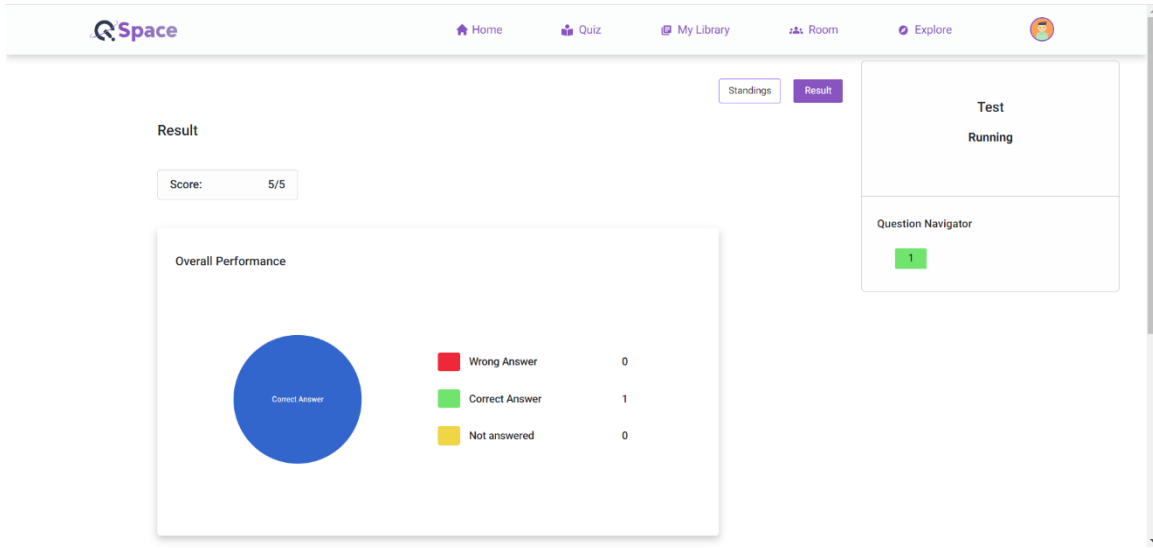


Figure 5.2.13: Result page for students

5.2.14 Standings page

Figure 5.2.14 shows the standings page of a quiz. Here we have sorted the user by their marks, and if two users have the same mark, they will sort by their submission time.

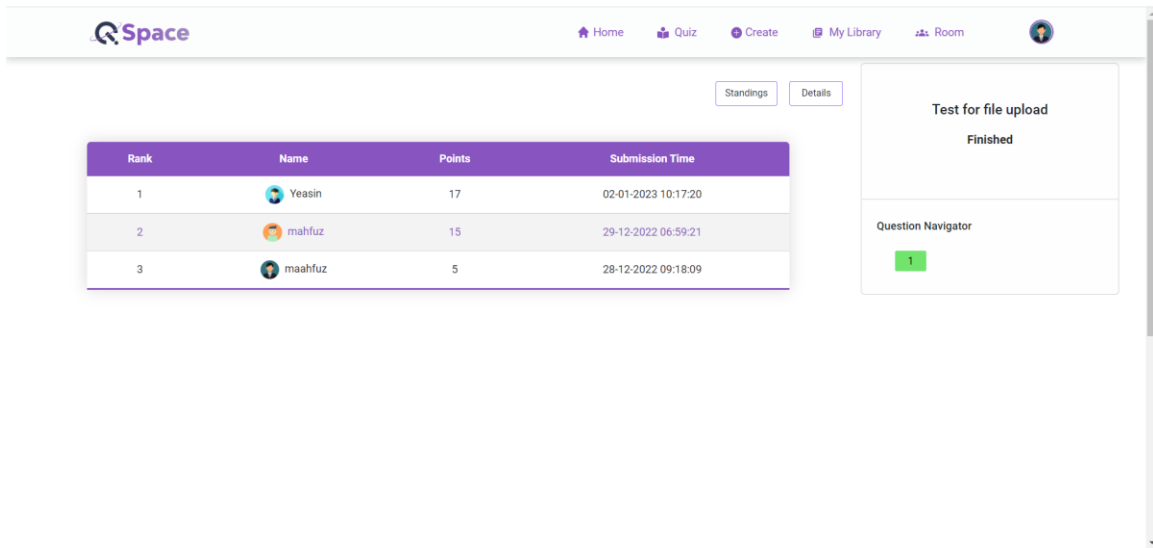


Figure 5.2.14: Standings Page

5.2.15 Profile Page

Figure 5.2.15 is the interface of the profile page of a QSpace user. From here they can update their information except their email, they can also change their password from here (Figure 5.2.15.1).

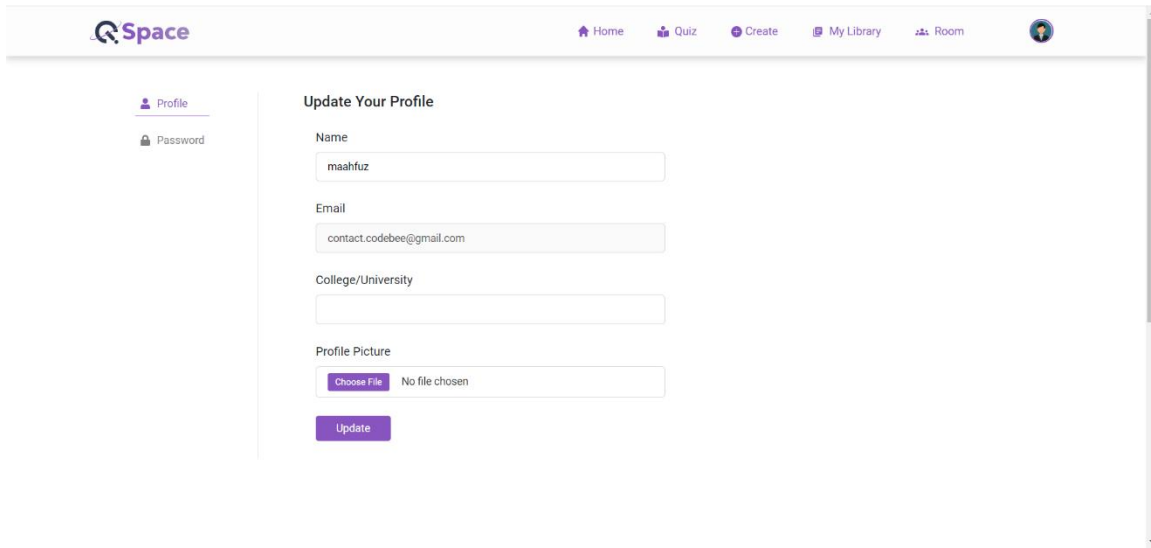


Figure 5.2.15: Profile Page

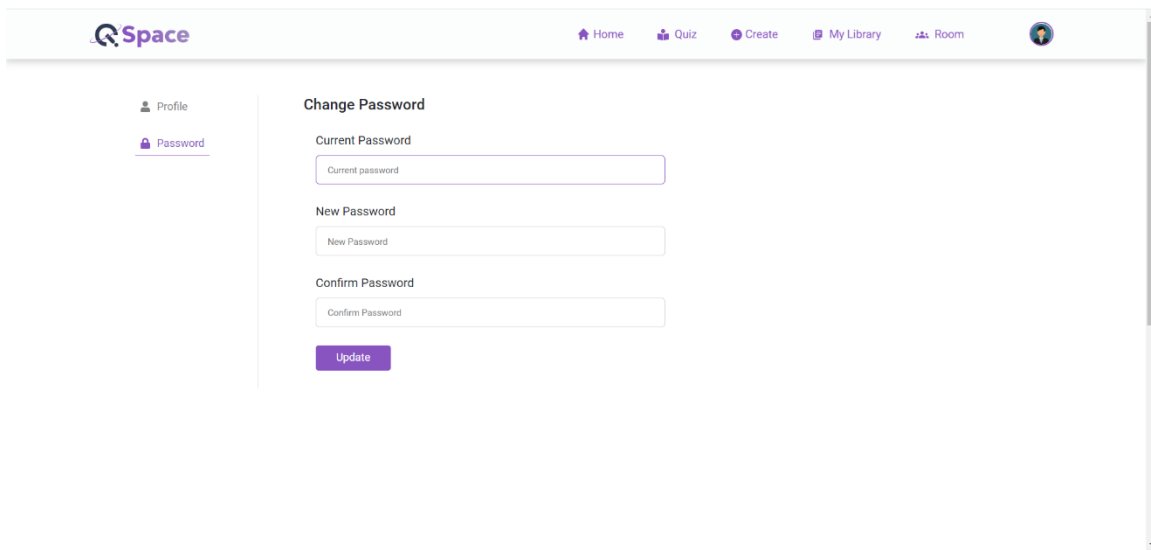


Figure 5.2.15.1: Password change

5.3 Implementation Interaction

We have maintained a user-friendly and straightforward interface for our website. To interact, we used many icons and notifications while the action was being done. We have made it responsive for the users.

5.4 Testing Implementation

It is important to test all the functionalities before deploying it. We have tested our project to determine whether or not the systems meets all the requirements. Below is the Table 5.4.1 of test evaluation which we have used to test the system.

Table 5.4.1: Testing implementation

Test Case		Test Input	Expected Outcome	Obtained Outcome	Pass/Fail
1. User Registration		Fill up the required field	Registered successfully	Registered successfully	Pass
2. User Login		User email and password	Logged-In successfully	Logged-In successfully	Pass
3. Add public posts		Images and other contents	Posted successfully	Posted successfully	Pass
4. Create Quiz		Teachers can create quiz by entering title, subject, status, date, start-time, end-time and the questions	Created successfully	Created successfully	Pass
5. Submit Quiz		Users can submit quiz after answering questions	Submitted successfully	Submitted successfully	Pass
6. Update marks		Teachers can update the marks for attachment files	Updated successfully	Updated successfully	Pass

7. View Result		Users can view their result after submitting quiz	Result loaded successfully	Result loaded successfully	Pass
8. View Standings		Users can view standings after finishing a quiz	Standings loaded successfully	Standings loaded successfully	Pass
9. Create Room		Teachers can create room by entering all the required info	Created successfully	Created successfully	Pass
10. Join Room		Students can join room by access code	Joined successfully	Joined successfully	Pass
11. Add private post		Teachers can add private post by entering contents and image	Posted successfully	Posted successfully	Pass
12. Add pin resource		Teachers can add pinned resource	Added successfully	Added successfully	Pass
13. View Student list		Users can view the joined student list of a room	Loaded successfully	Loaded successfully	Pass
14. View My Library		Users can view my	Loaded successfully	Loaded successfully	Pass

		library feature after loading this page			
15. View upcoming quiz		Users can view upcoming quiz after loading the page	Loaded successfully	Loaded successfully	Pass
16. Update quiz status		Teachers can update the status of a quiz.	Updated successfully	Updated successfully	Pass
17. Delete Quiz		Teachers can delete a quiz	Deleted successfully	Deleted successfully	Pass
18. Remove a student from the room		Teachers can remove a student from a room	Removed successfully	Removed successfully	Pass
19. Edit questions before publish		Teachers can edit a question while adding question for a quiz	Edited successfully	Edited successfully	Pass
20. Update profile info		Users can update their profile info such as, user-name, profile picture, institution name	Updated successfully	Updated successfully	Pass

21. Update password		Users can update their password by giving current password and new password	Updated successfully	Updated successfully	Pass
22. Delete Posts		Users can delete only their post	Deleted successfully	Deleted successfully	Pass
23. Comment below a post		User can comment on a post	Commented successfully	Commented successfully	Pass

Table 5.4.1: Testing Implementation

5.5 Test Results and Reports

After completing our project, we tested it on different devices and different aspects of users. Our project performs well in every test. Test result and report is the description of tests and the results of those tests. We have performed several tests on our project. Below are some of the tests which we have done successfully, and our project performed well against those tests:

- Successfully Registering users.
- Users logged-in successfully.
- Quiz system works fine.
- Users can add and delete post successfully.
- Users can comment successfully.
- Quiz create, delete, update status, performs as expected
- Profile and password updates also perform as expected.
- All other updates and system perform as expected.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

We have created the web application QSpace, which is based on quizzes. Our main aim is to make the online examination system easy and familiar. We have seen during the Corona pandemic that many educational institutions have fallen back from the current year due to the non-continuation of online classes. That's why we have developed this project for online-based class tests. Here we have provided public and private post-share options, which will help the students learn new things from others' posts. Every system has some limitations. Our system also has some limitations. And we will fix those issues in the future.

6.2 Possibilities for Future Developments

Qspace has a lot of improvements to make it more acceptable and user-friendly. Below are the few future developments of our project:

- We will add more questions options here in future.
- We will add assignment submission and evaluation in future.
- The interface will be updated to make it more user friendly.
- We will implement online attendance system.
- Virtual quiz system will be improved

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APPENDIX

Appendix A: Project Reflection

Front-end:

HTML: Hyper Text Markup Language is referred to as HTML. The structure of a website is built using this markup language.

CSS: It is a style sheet language that gives markup languages like HTML or XML-based applications some style.

Bootstrap: With a focus on mobile responsiveness, Bootstrap is a free and open-source CSS framework created for front-end web development. It offers design templates based on HTML, CSS, and JavaScript for typography, forms, buttons, navigation, and other interface components.

JavaScript: JavaScript is a scripting language for creating dynamic web page contents. It produces components that enhance how website users interact with online sites.

ReactJs: React is a free and open-source front-end JavaScript library for creating user interfaces based on UI components. It is maintained by Meta and a community of independent developers and other companies.

Redux: Redux is an open-source JavaScript package which is used to manage and centralize application state. It can be used with any JavaScript library. Redux is widely used with ReactJs and AngularJs.

Back-end:

NodeJs: It is an open-source, cross-platform JavaScript runtime environment for running web applications outside the client's browser. Developers use Node.js to build server-side web applications, and since it employs an asynchronous, event-driven approach, it is ideal for data-intensive applications.

ExpressJs: Express is a flexible application framework for Node.js that offers a robust set of functionality for both web and mobile applications. By using ExpressJs, we can use API to connect the front-end and back-end.

MongoDB: MongoDB is a document-oriented NoSQL database. Instead of the tables and rows seen in traditional relational databases, it employs collections and documents. The fundamental type of data in MongoDB is a key-value pair, which is the building block of documents.

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