Quiz Application (Quizzeria)

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ST4009CEM: Computing Activity Led Learning Project 2

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August 11, 2023

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Introduction

Welcome to Quizzeria, the innovative digital test platform designed to enhance learning. With subject-specific quizzes aligned with academic curricula, Quizzeria offers a versatile and customizable platform for students, teachers, and administrators. Its user-friendly interface ensures easy access and engagement with educational content, empowering users to adapt and modify quizzes to suit their school's unique requirements.

By utilizing Quizzeria's modern online testing capabilities, teachers effortlessly create quizzes that reflect their teaching materials, reinforcing students' understanding of class topics. Seamlessly integrating technology into the educational journey, Quizzeria revolutionizes testing, bringing convenience and effectiveness to the learning environment. Experience interactive assessments and modern digital methods for tests and exams with Quizzeria, making learning engaging and efficient.

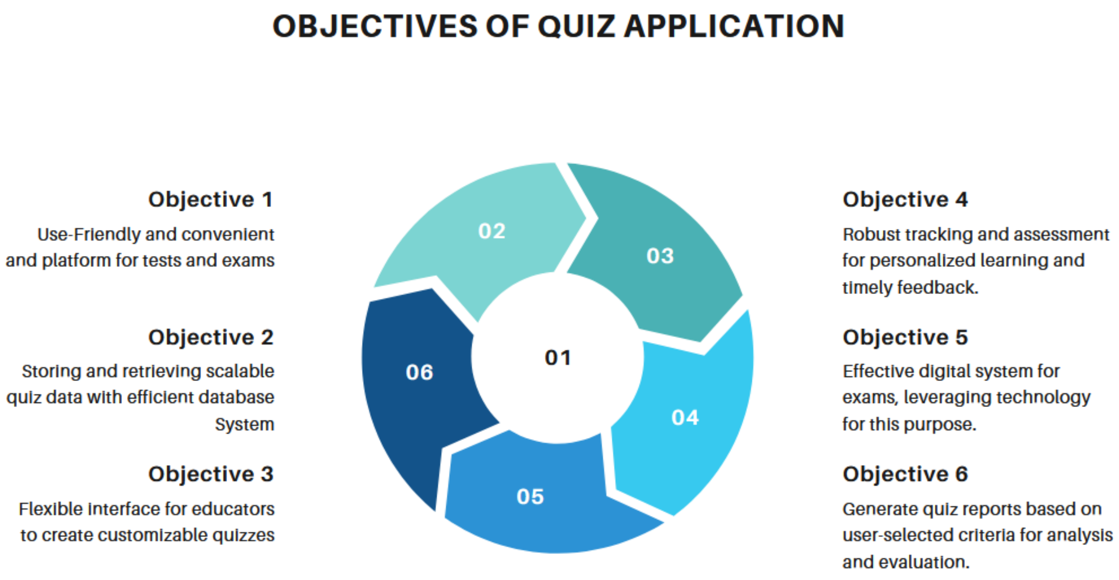
Figure 1: Concept of Quiz Application (Quizzeria)

Aims

The quiz application aims to provide a customizable online testing solution that enhances the learning experience, promotes interactive assessments, revolutionizes online testing by integrating technology seamlessly into education, evaluates student knowledge, tracks progress, and increases teacher efficiency.

Objectives

Figure 2: Objectives



OBJECTIVES OF QUIZ APPLICATION

Objective 1

Use-Friendly and convenient and platform for tests and exams

Objective 2

Storing and retrieving scalable quiz data with efficient database System

Objective 3

Flexible interface for educators to create customizable quizzes

Objective 4

Robust tracking and assessment for personalized learning and timely feedback.

Objective 5

Effective digital system for exams, leveraging technology for this purpose.

Objective 6

Generate quiz reports based on user-selected criteria for analysis and evaluation.

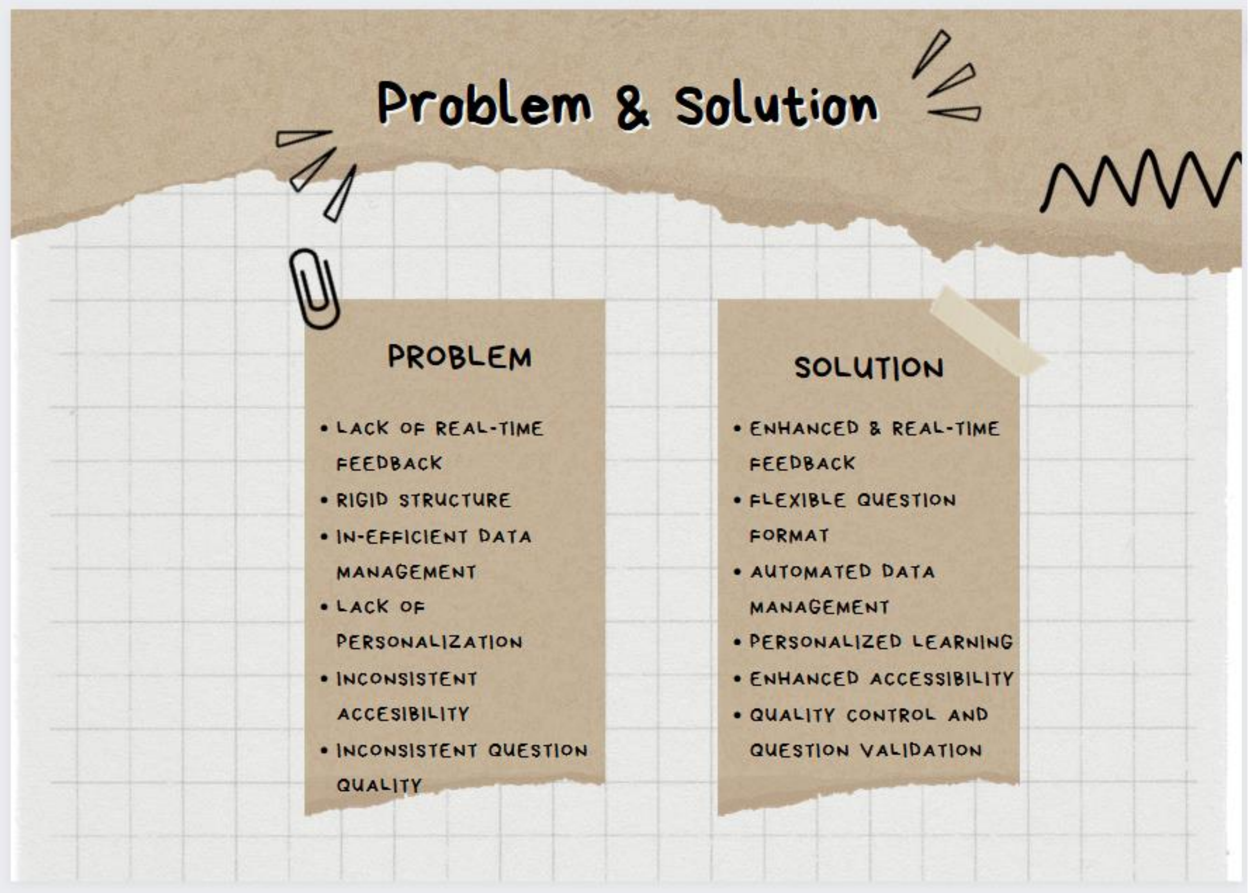
- Develop a user-friendly quiz application for convenient testing and examination.
- Implement an efficient database system for seamless storage and retrieval of quiz data.
- Provide customizable quiz creation and modification options for educators.
- Incorporate robust tracking and assessment features for personalized learning experiences.
- Replace traditional test taking methods with an effective digitalized system.
- Generate reports for analysis and evaluation based on user-selected criteria.

The academic objective is to create a practical quiz application using Java and database systems, with an intuitive user interface and robust database structure. It focuses on teamwork, object-oriented programming proficiency with Java, and Agile Methodology.

Problem Statement

Traditional quiz methods present challenges such as limited feedback, rigid structures, and inefficient data management, hindering personalized learning and progress tracking. A modern quiz application is needed to address these limitations and enhance the learning experience (Nguyen, 2022).

Figure 3: Problem Statement and Solutions



Problem & Solution

PROBLEM

- LACK OF REAL-TIME FEEDBACK
- RIGID STRUCTURE
- IN-EFFICIENT DATA MANAGEMENT
- LACK OF PERSONALIZATION
- INCONSISTENT ACCESIBILITY
- INCONSISTENT QUESTION QUALITY

SOLUTION

- ENHANCED & REAL-TIME FEEDBACK
- FLEXIBLE QUESTION FORMAT
- AUTOMATED DATA MANAGEMENT
- PERSONALIZED LEARNING
- ENHANCED ACCESSIBILITY
- QUALITY CONTROL AND QUESTION VALIDATION

Quizzeria is a modern quiz app that addresses the limitations of traditional methods. It offers customizable quizzes, intuitive interface, and efficient data management. Educators create tailored quizzes for personalized learning. The integrated database enables progress tracking and performance analysis. Quizzeria optimizes assessments and promotes interactive learning.

Features

The main features of Quizzeria are:

- Implement secure login and registration for user data protection.
- Provide a platform for quizzes, tests, and exams with features like progress tracking, randomized questions, and time limits.
- Enable smooth navigation through questions during assessments.
- Facilitate easy creation, deletion, and updating of questions by teachers.
- Store user scores in a database for convenient tracking.
- Scale the system efficiently.
- Allow users to view and edit personal information.
- Provide grades in both softcopy and hardcopy formats.

These are the main features, but additional features may/may not be added in the future according to stakeholder and product owners’ needs.

Functional Requirements

Functional requirements are the features and functions that the Quiz Application must have, they are as follows:

1. User Registration

Allows users to create an account by providing their first name, last name, role, username, email, and password, enabling them to access the Quiz Application.

Use Case Name	**User Registration**
Precondition	**None**
Basic Path	1. User visits registration page. 2. User enters their credentials. 3. Application validates information. 4. If valid, account is created and details stored securely. 5. User receives confirmation and is redirected to login.

2. User Login

Enables users to securely log in to their registered accounts using their credentials, granting them access to the Quiz Application.

Use Case Name	**User Login**
Precondition	**The user must have a registered account in the Application and should be on login page.**
Basic Path	1. User enters username/email and password.

	2. Application verifies credentials against stored data. 3. If valid, user gains access based on role. 4. If incorrect, user is prompted to re-enter correct information.

3. User Profile Management

Allows users to view and update their profile information, such as email, and password, and other information to personalize their experience.

Use Case Name	**User Profile Management**
Precondition	**The user must be logged in to the Quiz Application.**
Basic Path	1. The user navigates to their profile page. 2. The user can view and edit their profile information such as name, email, and other relevant details. 3. The user makes the necessary changes and saves the updated profile information.

4. Quiz Creation and Management

Provides teachers with the ability to create quizzes by specifying quiz details, adding questions, and managing existing quizzes.

Use Case Name	**Quiz Creation and Management**

Precondition	**The user must be logged in to the Quiz Application with appropriate permissions.**
Basic Path	1. User accesses quiz creation page. 2. User adds details for quiz (title, questions, options). 3. User saves quiz, adding it to available quizzes. 4. User can edit existing quizzes from the list. 5. User can delete quizzes from the list.

5. **Quiz Taking**

Enables users to participate in quizzes, answering questions and progressing through the quiz, test or examination until completion.

Use Case Name	**Quiz Taking**
Precondition	**The user must be logged in to the Quiz Application.**
Basic Path	1. User selects quiz from available quizzes. 2. User starts quiz, presented with first question. 3. User submits answers for current question, proceeds to next question. 4. User submits answers for current question, proceeds to next question. 5. Process continues until all quiz questions are completed or time limit is reached.

6. Randomized Questions

Randomizes the order of questions presented to users during a quiz, ensuring a unique and varied experience for each participant.

7. Grading

Automatically evaluates user responses to questions, calculates scores or percentages, and determines the correctness of answers.

Use Case Name	**Grading**
Precondition	**The user must complete a quiz.**
Basic Path	1. Application compares user's quiz answers to correct answers. 2. Application calculates score or percentage based on answer correctness.

8. Result and Analytics

Displays the results to users, including scores, performance data and if they passed or failed.

Use Case Name	**Result and Analytics**
Precondition	**The user must have completed a quiz.**
Basic Path	1. After the user completes a quiz, the application displays the result, including the score or percentage achieved.

	2. The user can view their performance statistics, such as the number of correct/incorrect answers and if the user passed or not.

9. **Account retrieval**

Allows users who have forgotten their login credentials to recover their account by providing the necessary information and following the account retrieval process.

Use Case Name	**Account Retrieval**
Precondition	**The user must have previously registered an account in the Quiz application.**
Basic Path	1. User accesses account retrieval page or selects "Forgot Password". 2. User provides username and new password. 3. Application verifies information and checks for matching accounts. 4. Account is reset with new password if information is valid.

10. **Printing Results**

Provides users with the option to generate a printable version of their quiz results.

Use Case Name	**Printing Results**
Precondition	**The user must have completed a quiz.**

Basic Path	1. User completes a quiz and navigates to the score page. 2. User selects desired score and clicks on the print option. 3. Application generates a printable version of the quiz results, including score, percentage, and user details. 4. Printable results are displayed or downloaded as a PDF or other printable format.

11. Delete Account

Enables users to permanently remove their account and associated data from the application's database, discontinuing their access and usage.

Use Case Name	**Deleting Account**
Precondition	**The user must be logged in to the Quiz Application.**
Basic Path	1. User goes to account profile page. 2. User selects the delete account option. 3. Application prompts user to confirm the account deletion. 4. If confirmed, the application initiates the account deletion process. 5. User's account and associated data are permanently removed from the Quiz Application's database.

12. Error Handling

The error handling functionality enables the application to handle errors gracefully, such as invalid login credentials or lost database connection. An error message with relevant information or instruction is displayed to the user in these cases.

Non-Functional Requirements

Non-functional requirements specify constraints and expectations for a quiz applications' performance, security, usability, and reliability, ensuring an effective and user-friendly experience (Editor, 2020).

- **Performance:**

  The application should have fast response times and handle large userbase, allowing users to navigate and interact with quizzes without significant delays or performance issues. This could include specifications for powerful servers, effective database architecture, and performance-enhancing system modifications.

- **Scalability:**

  The application should be able to handle increasing numbers of users and quizzes without compromising performance or functionality.

- **Usability:**

  The application should have a user-friendly interface, making it easy for the users to navigate, create quizzes, and take quizzes without encountering confusion or difficulties.

- **Reliability:**

  Users should always be able to access the system, and downtime should be kept at a minimum. This could entail specifications for redundant servers and backup systems, along with safeguards against data loss or system malfunctions.

- **Compatibility:**

  The application should be compatible with various devices and operating systems, allowing users to access and use the application on their preferred platforms.

- **Maintainability:**

The application should be easy to maintain and update with a well-organized codebase and documentation.

- **Security:**

  The application should ensure the confidentiality and integrity of user data, implementing appropriate measures to protect against unauthorized access or data breaches (CrowdStrike, 2023).

- **Data Persistence:**

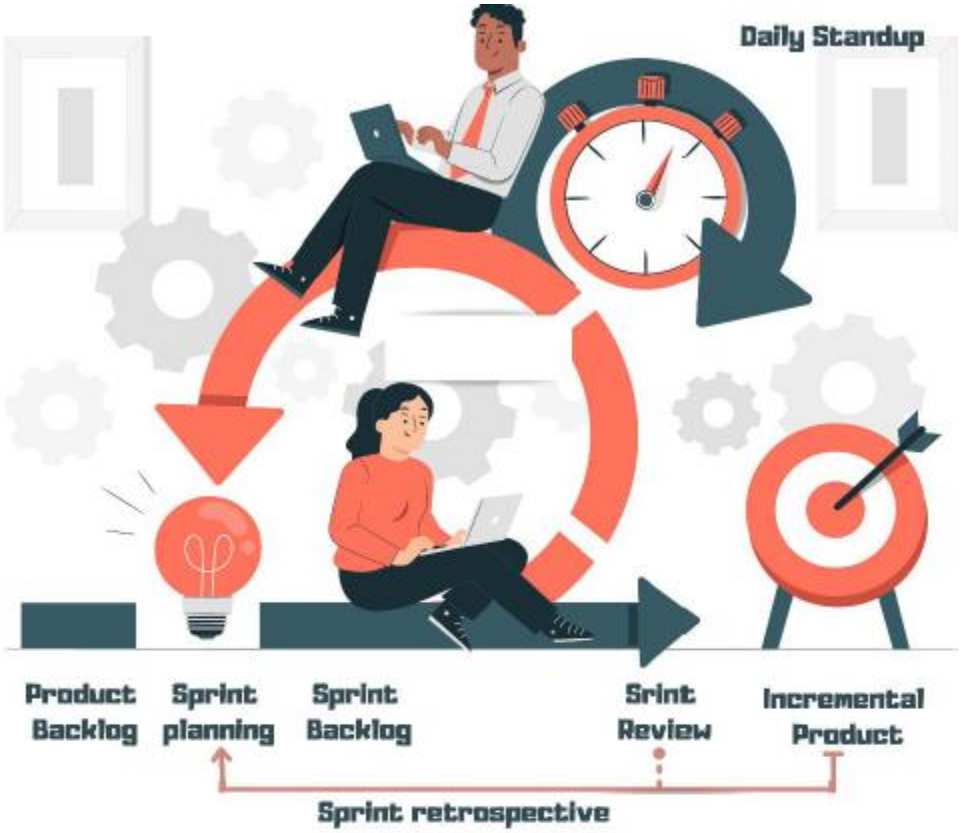
  The data persistence functionality ensures that the information entered by the users, quiz questions and scores, would be stored in a database so that it can be accessed and used by the application even after the application has been closed (Pfeil, 2010).

Scope of Project

The scope of the quiz application project encompasses the development of a comprehensive and user-friendly platform with the use of Java's GUI library Swing, that enables students and educators to engage in a digitalized way of taking tests and examination. The application will include features such as quiz creation, customization, and management, allowing educators to tailor quizzes according to specific subject requirements. Students will have the ability to participate in quizzes, track their progress, and receive timely feedback and results. The application will also incorporate a secure login and registration system, ensuring the privacy and confidentiality of user information. Additionally, the project will involve the implementation of a robust database system for efficient storage and retrieval of quiz data.

Development Methodology

Figure 4: Agile Methodology



Agile is an adaptable software development approach that emphasizes collaboration, customer satisfaction, and the ability to adapt to changes in an uncertain environment (Agile Alliance, 2023). It involves repeatedly developing specific functionalities of a system over a defined period of time before moving on to the next set of functionalities. This iterative development process allows for flexibility and continuous improvement (*Iteration*, 2022). It is important to note that this project followed the principles of Agile methodology, which guided the development process and ensured a dynamic and responsive approach to meet the project goals.

Iterative development is a very important aspect of Agile, and was utilized during the development of the quiz application. And it was used for the following reasons:

- **Increased Adaptability**

  Agile methodology allows teams to respond to changing requirements and market conditions quickly. By prioritizing flexibility and iterative development, Agile enables teams to adjust their plans and deliver valuable features efficiently.

- **Superior Product Quality**

  Through continuous testing, collaboration, and frequent feedback, Agile ensures that the product meets high-quality standards. By emphasizing early and regular testing, teams can identify and resolve issues promptly, resulting in a superior end product.

- **Continuous Feedback for Improvement**

  Agile promotes regular feedback loops between stakeholders, customers, and the development team. This constant feedback allows for continuous improvement and ensures that the product aligns with the stakeholders' needs and expectations.

- **Risk Mitigation**

  Agile methodologies, such as Scrum, employ short development cycles called sprints, which mitigate risks by delivering incremental value. By breaking down the project into manageable iterations, teams can identify and address risks early, minimizing their impact on the project's overall success.

- **Customer Satisfaction**

  Agile methodologies prioritize customer collaboration and involvement throughout the development process. By incorporating customer feedback and adjusting requirements based on their needs, Agile ensures that the final product delivers value and meets customer expectations, ultimately leading to higher customer satisfaction.

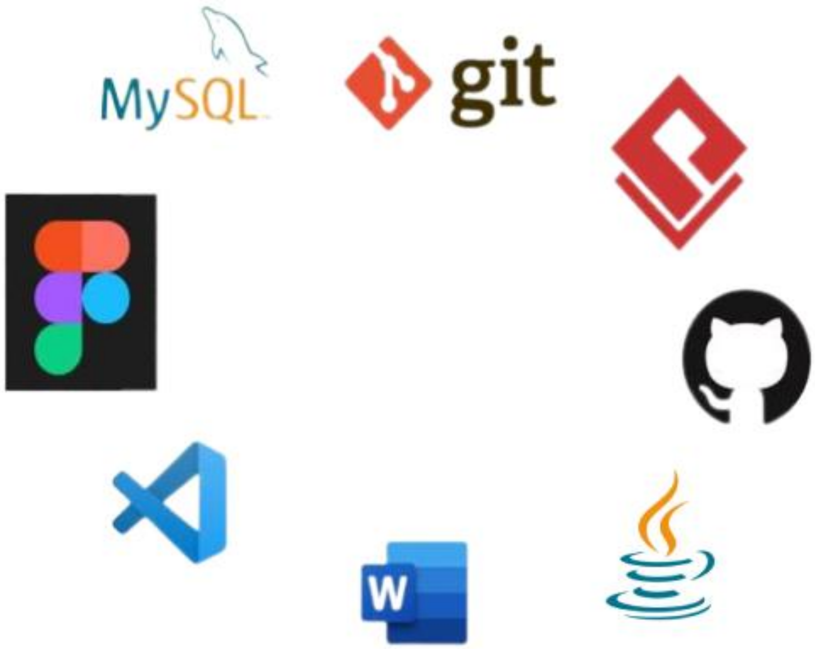
- **Enhanced Team Collaboration**

  Agile methodologies foster a collaborative work environment, promoting effective communication and teamwork. Through regular meetings, such as daily stand-ups and sprint reviews, team members can share progress, discuss challenges, and align their efforts, resulting in improved collaboration and productivity.

Overall, Agile methodology provides a framework that enables teams to be more adaptive, customer-focused, collaborative, and continuously improving, leading to successful project outcomes (Piyali, 2022).

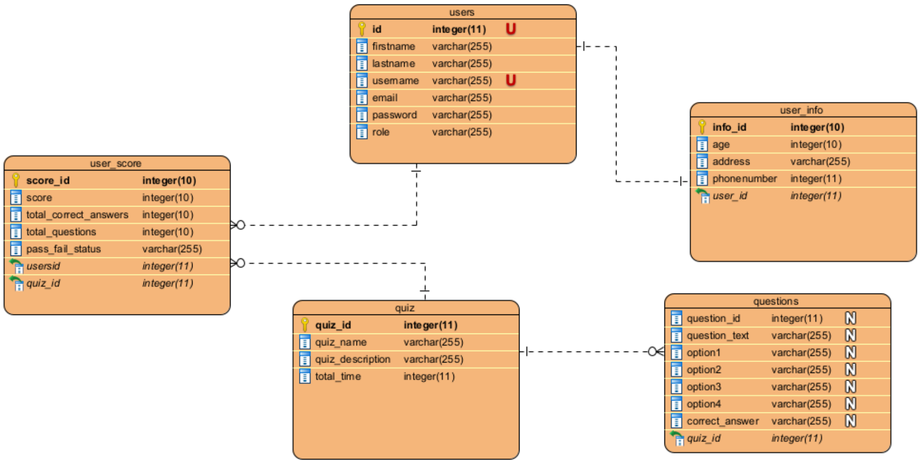
Tools and Technologies Used

Figure 5: Tools and Technologies Used



Conceptual Design

Figure 6: Entity Relation Diagram of Quiz Application

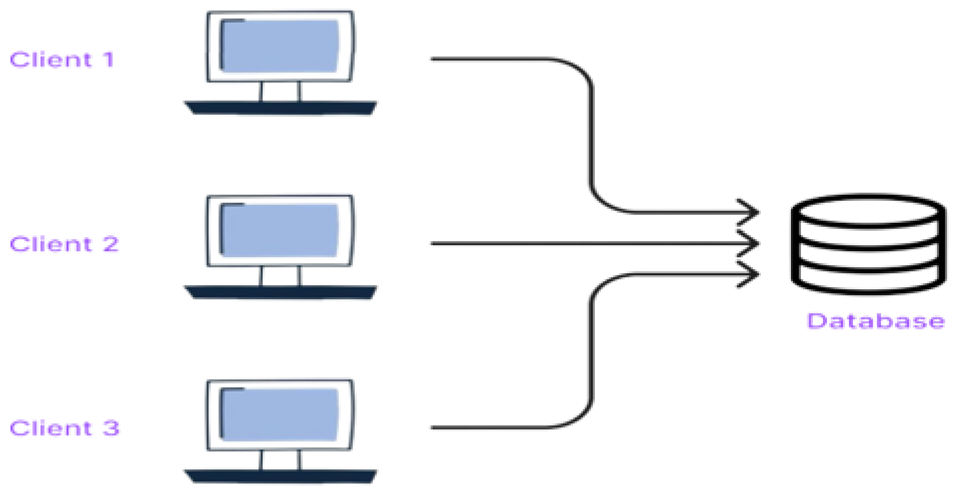


The provided ER diagram showcases the entities and their relationships in the quiz application, including User, Quiz, Questions, Score, and User Details. These entities are connected through strong relationships, defined by foreign keys that establish the associations *(How to Identify a Strong Vs Weak Relationship on ERD?,* 2013b). The diagram accurately captures the expected connections between entities, such as the one-to-one relationship between User Table and User Details Table based on a shared user_id. Overall, the ER diagram presents a clear and well-structured representation of the quiz application's entities and their relationships, ensuring efficient data management and retrieval.

System Architecture

The quiz application follows a two-tier system architecture, consisting of a client tier (presentation) and a server tier (application and data management) (Techopedia, 2013). The client tier handles the user interface, displaying quizzes, user information, and facilitating interactions such as answering questions and viewing results. The server tier manages the processing and storage of quiz data, including retrieving quizzes from databases, updating quiz information, and managing user accounts.

Figure 7: Two Tier System Architecture



This architecture enables direct communication between the client and server, ensuring efficient access to quiz information and seamless interaction for users.

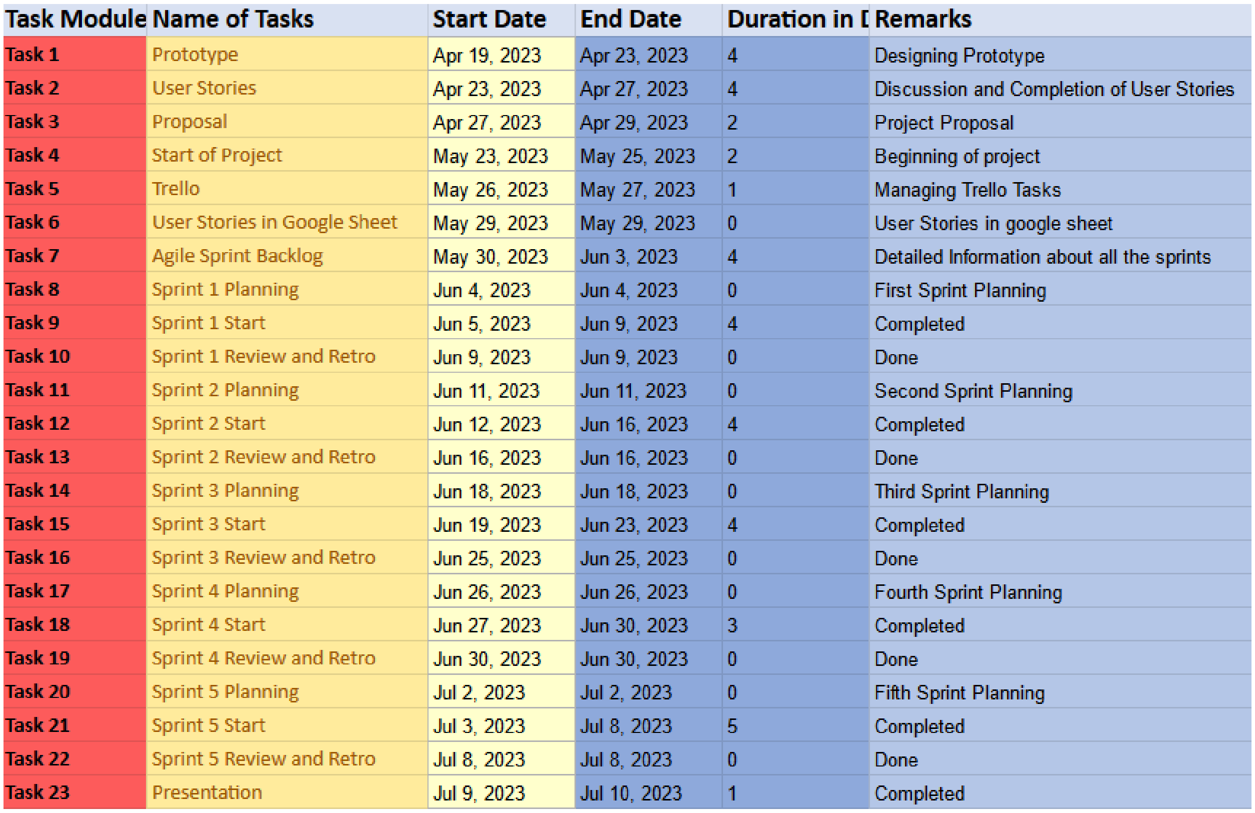
Similarly, the quiz application follows a Model-View-Controller (MVC) design pattern, which complements its two-tier system architecture (GeeksforGeeks, 2023). With the MVC pattern in place, the application achieves a clear separation of concerns and responsibilities, optimizing its performance and maintainability.

In this design pattern, the Model layer takes charge of managing the quiz data, user accounts, and scoring information. It interacts with the server tier, effectively handling data storage and retrieval operations. The View layer is responsible for presenting quizzes, user interfaces, and feedback to the users. It collaborates with the Model layer to display relevant quiz content and captures user responses. Lastly, the Controller layer acts as the intermediary, orchestrating user requests, facilitating communication between the Model and View layers, and updating the Model based on user inputs.

By adopting the MVC design pattern, the quiz application exhibits several benefits. It enhances code modularity, enabling developers to work on different components independently, simplifying maintenance and future enhancements. The clear separation of concerns also promotes scalability, allowing the application to accommodate additional features and functionalities seamlessly. Moreover, rigorous testing can be performed on each layer individually, ensuring high-quality and bug-free code. Overall, the integration of the MVC pattern within the quiz application ensures a robust, user-centric, and adaptable solution that aligns with industry best practices.

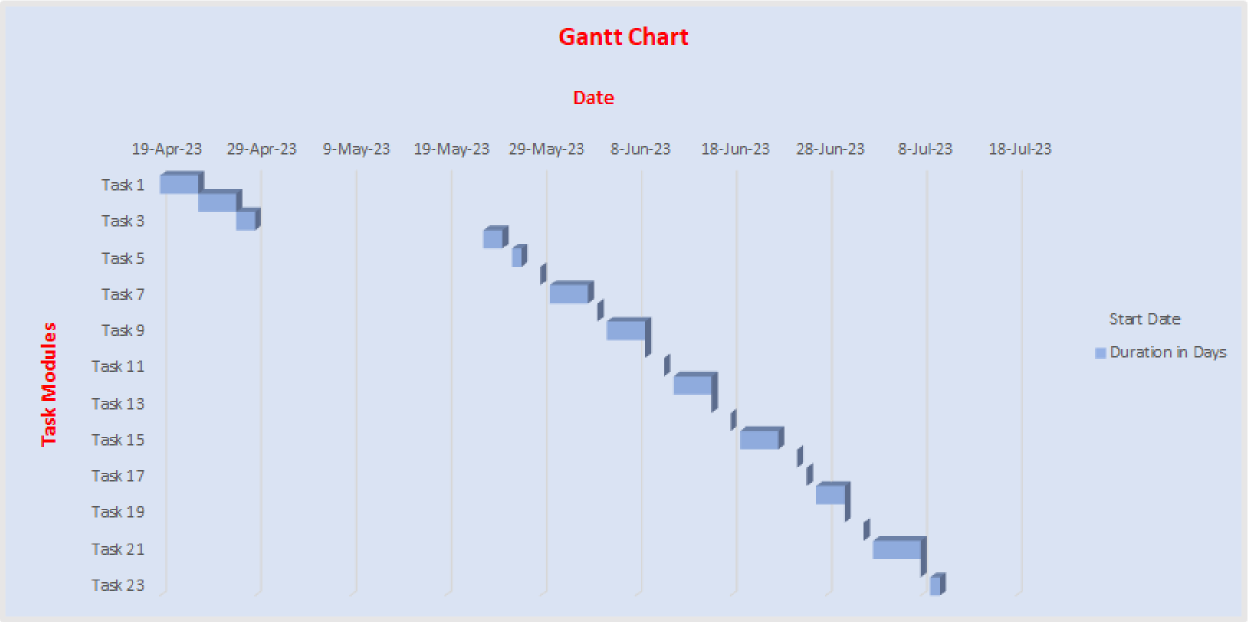
Project Plan

Figure 8: Milestones of the project



Task Module	Name of Tasks	Start Date	End Date	Duration in D	Remarks
Task 1	Prototype	Apr 19, 2023	Apr 23, 2023	4	Designing Prototype
Task 2	User Stories	Apr 23, 2023	Apr 27, 2023	4	Discussion and Completion of User Stories
Task 3	Proposal	Apr 27, 2023	Apr 29, 2023	2	Project Proposal
Task 4	Start of Project	May 23, 2023	May 25, 2023	2	Beginning of project
Task 5	Trello	May 26, 2023	May 27, 2023	1	Managing Trello Tasks
Task 6	User Stories in Google Sheet	May 29, 2023	May 29, 2023	0	User Stories in google sheet
Task 7	Agile Sprint Backlog	May 30, 2023	Jun 3, 2023	4	Detailed Information about all the sprints
Task 8	Sprint 1 Planning	Jun 4, 2023	Jun 4, 2023	0	First Sprint Planning
Task 9	Sprint 1 Start	Jun 5, 2023	Jun 9, 2023	4	Completed
Task 10	Sprint 1 Review and Retro	Jun 9, 2023	Jun 9, 2023	0	Done
Task 11	Sprint 2 Planning	Jun 11, 2023	Jun 11, 2023	0	Second Sprint Planning
Task 12	Sprint 2 Start	Jun 12, 2023	Jun 16, 2023	4	Completed
Task 13	Sprint 2 Review and Retro	Jun 16, 2023	Jun 16, 2023	0	Done
Task 14	Sprint 3 Planning	Jun 18, 2023	Jun 18, 2023	0	Third Sprint Planning
Task 15	Sprint 3 Start	Jun 19, 2023	Jun 23, 2023	4	Completed
Task 16	Sprint 3 Review and Retro	Jun 25, 2023	Jun 25, 2023	0	Done
Task 17	Sprint 4 Planning	Jun 26, 2023	Jun 26, 2023	0	Fourth Sprint Planning
Task 18	Sprint 4 Start	Jun 27, 2023	Jun 30, 2023	3	Completed
Task 19	Sprint 4 Review and Retro	Jun 30, 2023	Jun 30, 2023	0	Done
Task 20	Sprint 5 Planning	Jul 2, 2023	Jul 2, 2023	0	Fifth Sprint Planning
Task 21	Sprint 5 Start	Jul 3, 2023	Jul 8, 2023	5	Completed
Task 22	Sprint 5 Review and Retro	Jul 8, 2023	Jul 8, 2023	0	Done
Task 23	Presentation	Jul 9, 2023	Jul 10, 2023	1	Completed

Figure 9: Gantt Chart for quiz application



The project plan for the quiz application is a detailed roadmap that outlines the tasks and timelines for developing the application. The plan includes the following phases:

- Prototyping
- User Stories
- Agile Sprints 1 to 5
- Testing each product Deliverables
- Releasing Deliverables
- Final Product

The plan was further broken down into smaller chunks that align with each other and spans from 19th April 2023 to 9th July 2023, and a progress chart was implemented to ensure the team would stay organized and on track to ensure the completion of the project.

Prototype

Figure 10: Low Fidelity Login Page

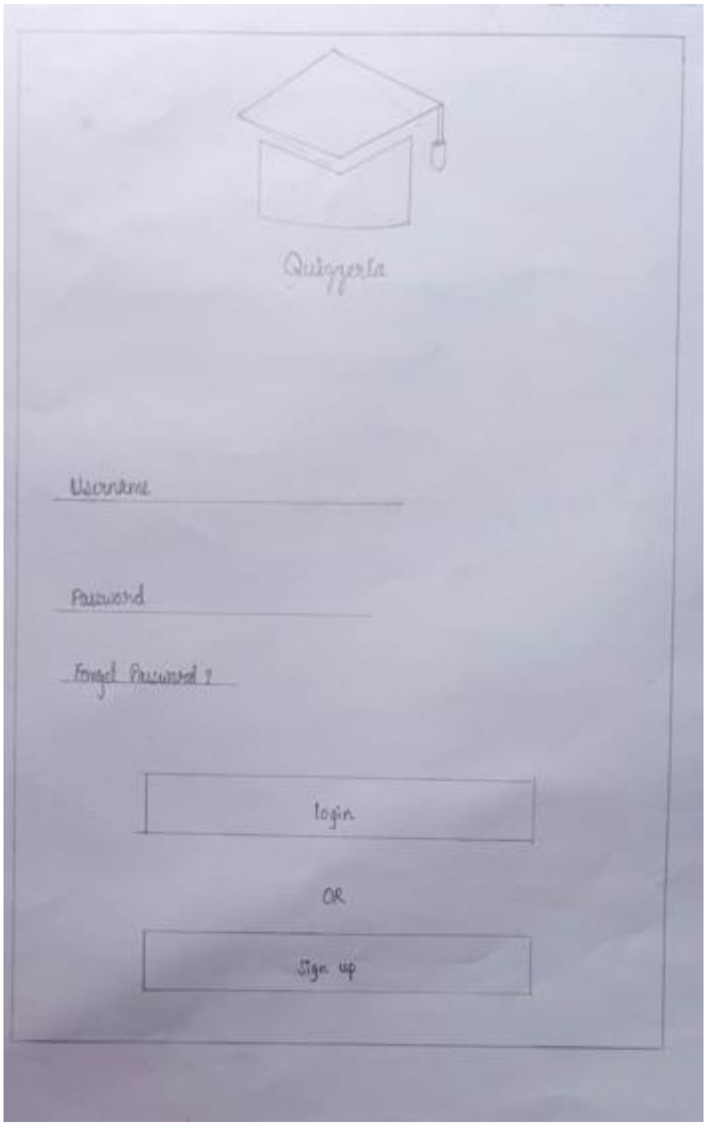


Figure 11: Low Fidelity Registration Page

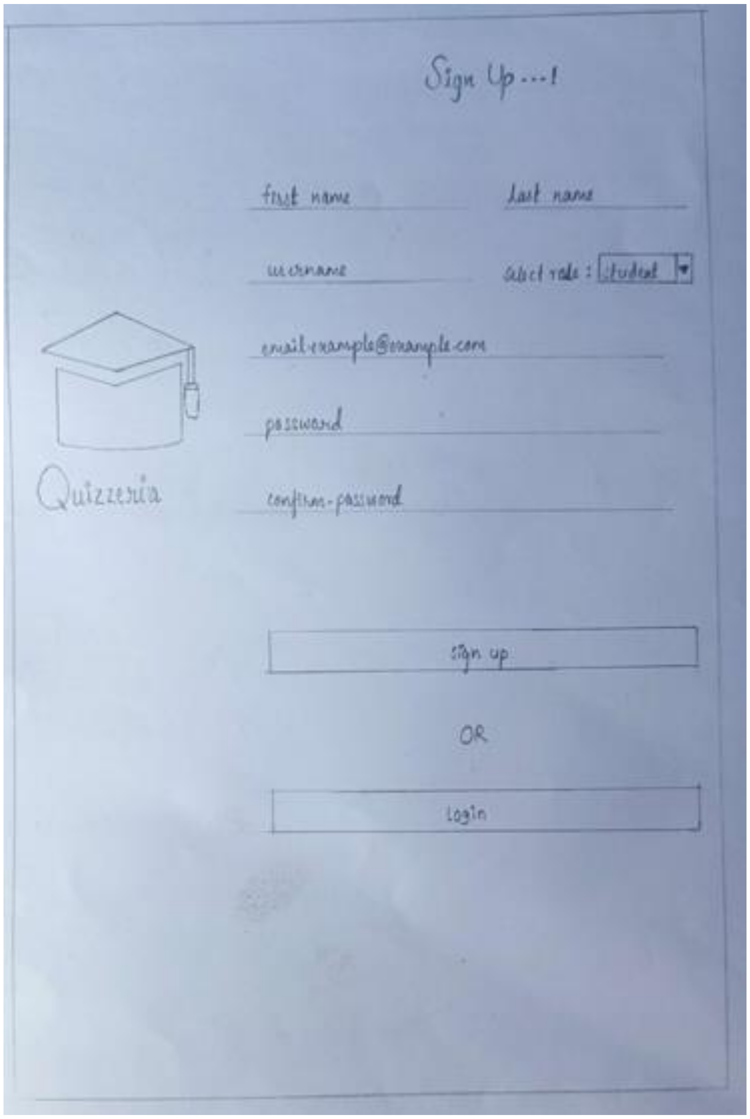


Figure 12: Low Fidelity Profile Page

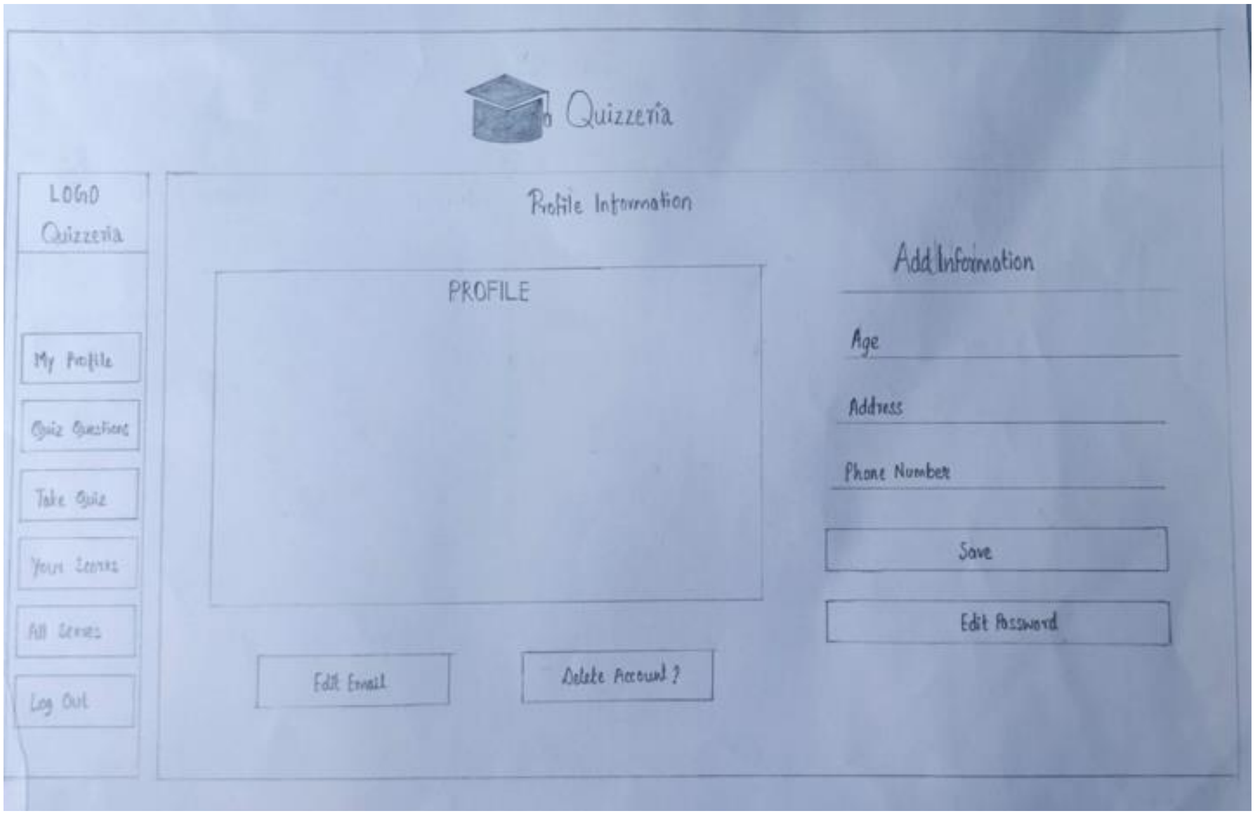


Figure 13: Low Fidelity Quiz Selection Page

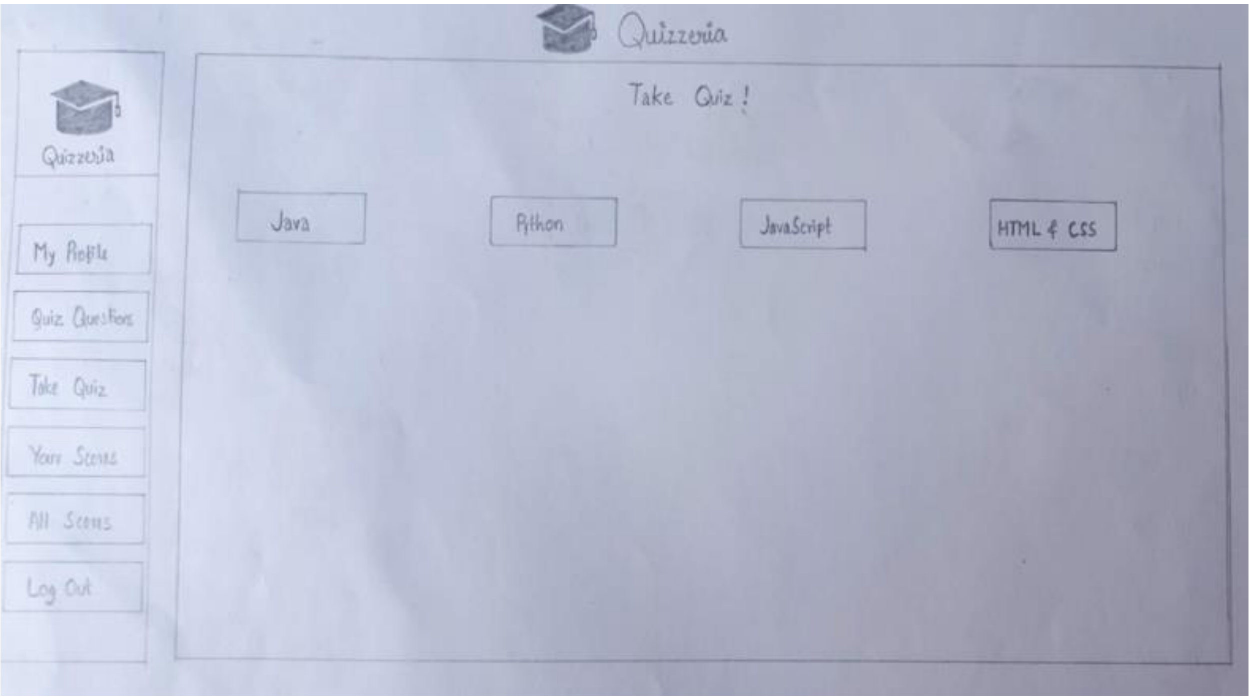
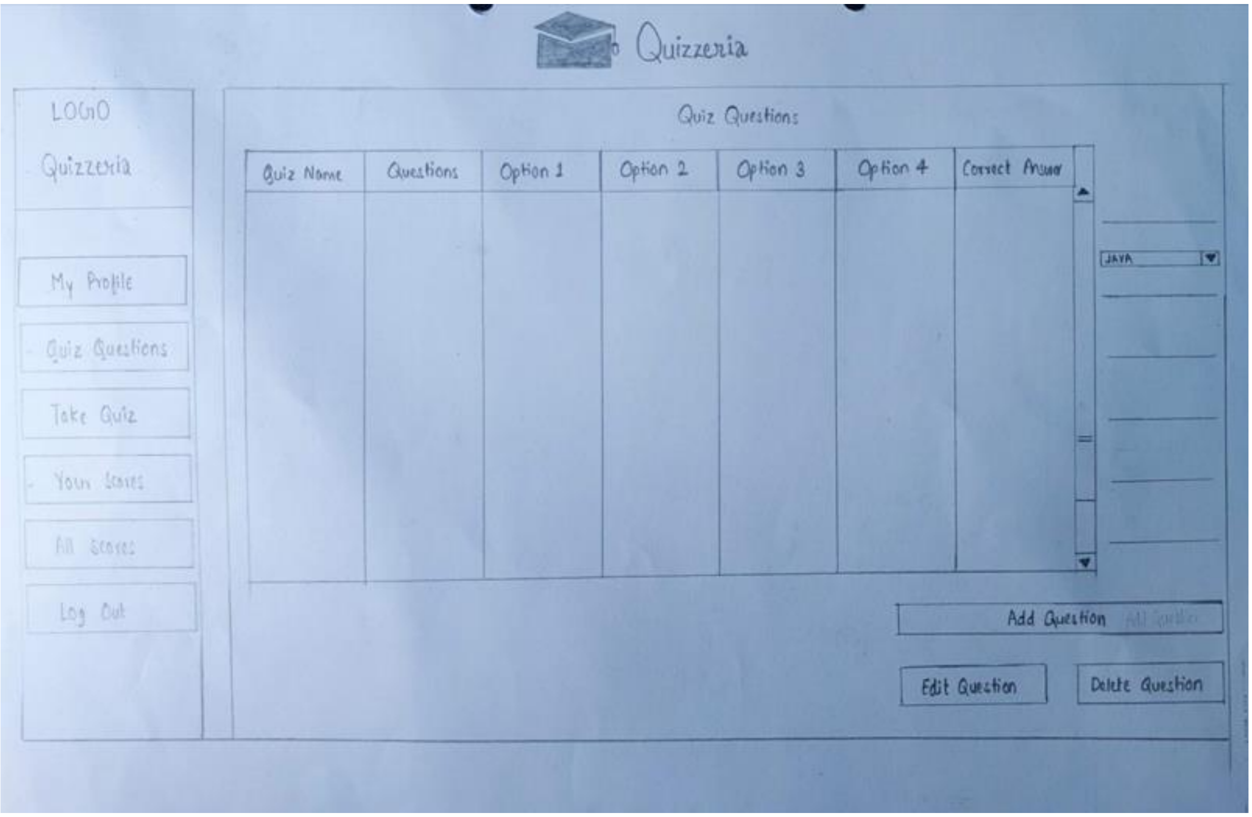
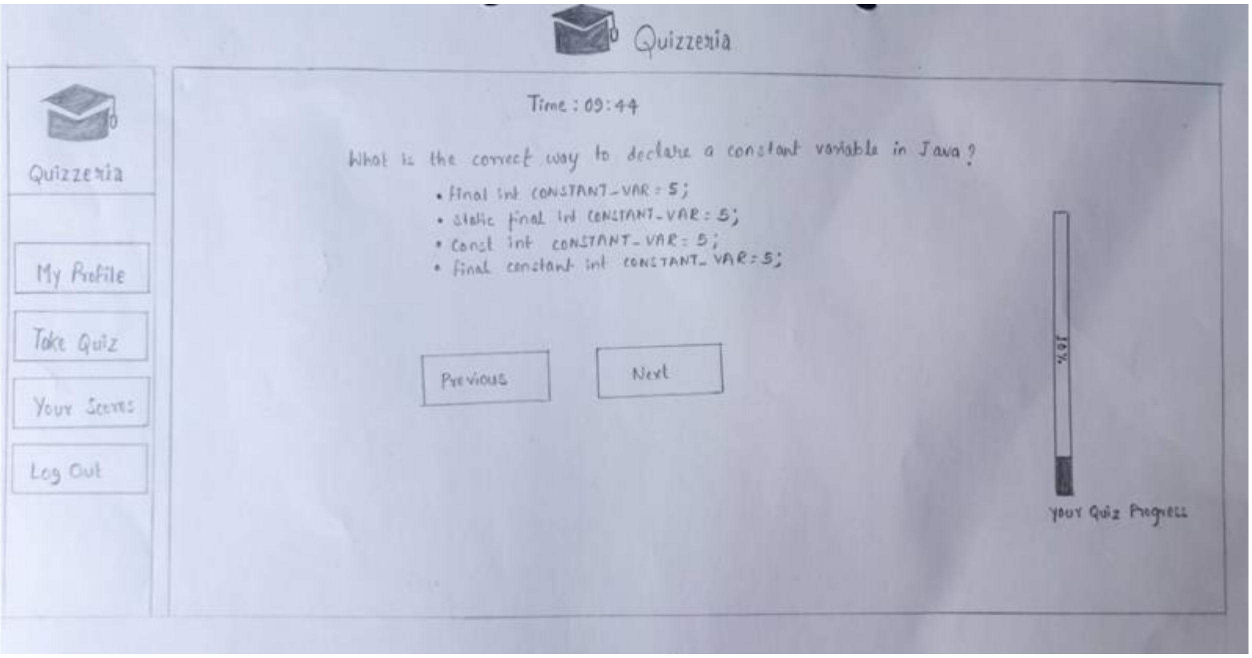


Figure 14: Low Fidelity Quiz Question Page



Quiz Name	Questions	Option 1	Option 2	Option 3	Option 4	Correct Answer

Figure 15: Low Fidelity Quiz Page

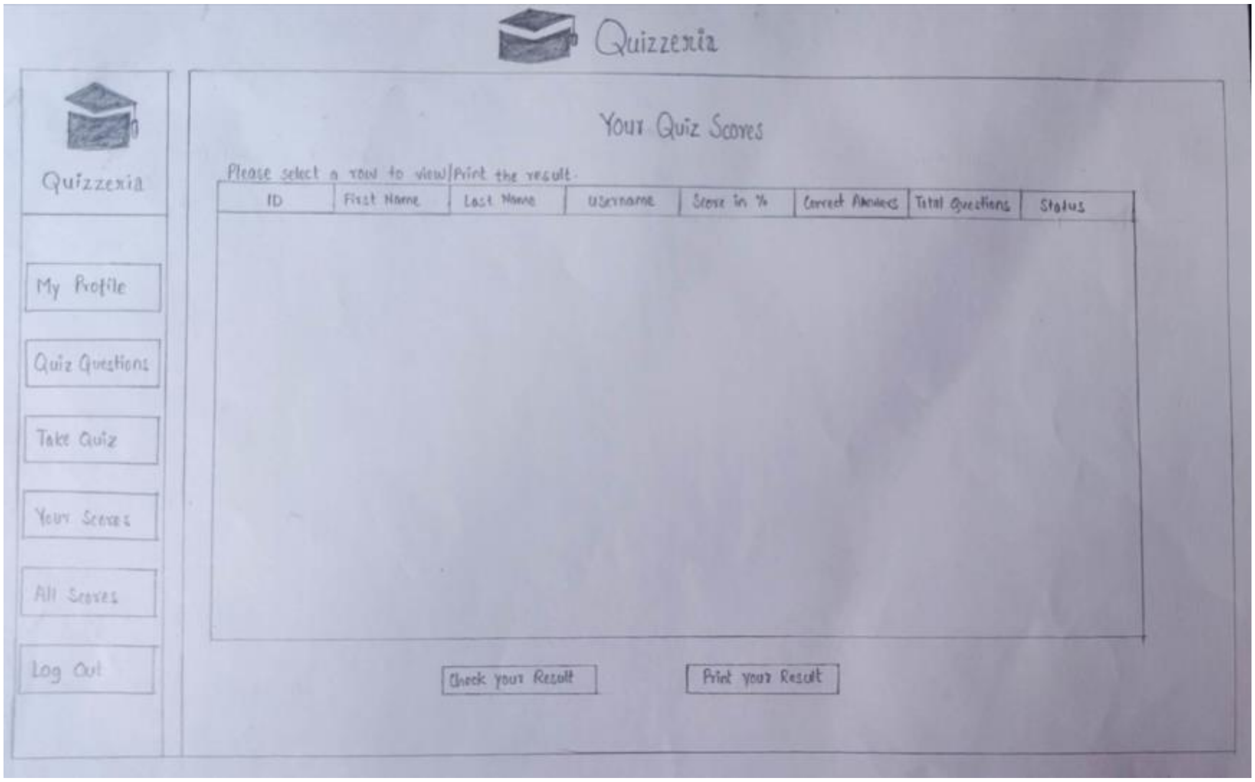


Time : 09:44

What is the correct way to declare a constant variable in Java?

- final int CONSTANT_VAR = 5;
- static final int CONSTANT_VAR = 5;
- const int CONSTANT_VAR = 5;
- final constant int CONSTANT_VAR = 5;

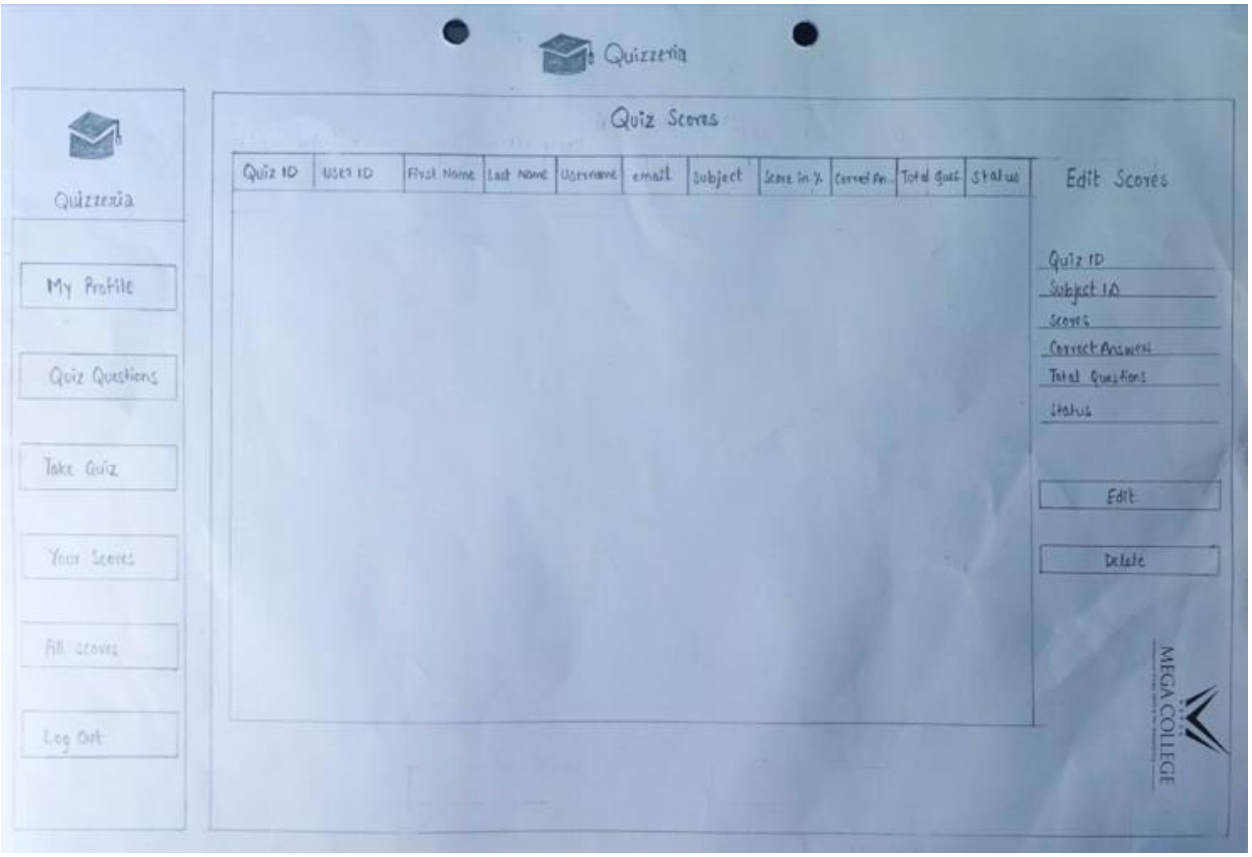
Figure 16: Low Fidelity Personal Quiz Score Page



Please select a row to view/Print the result.

ID	First Name	Last Name	Username	Score in %	Correct Answers	Total Questions	Status

Figure 17: Low Fidelity Quiz Score Page



Quiz ID	User ID	First Name	Last Name	Username	email	Subject	Score in %	Correct An..	Total Ques	Status

Figure 18: Mid Fidelity Login Page

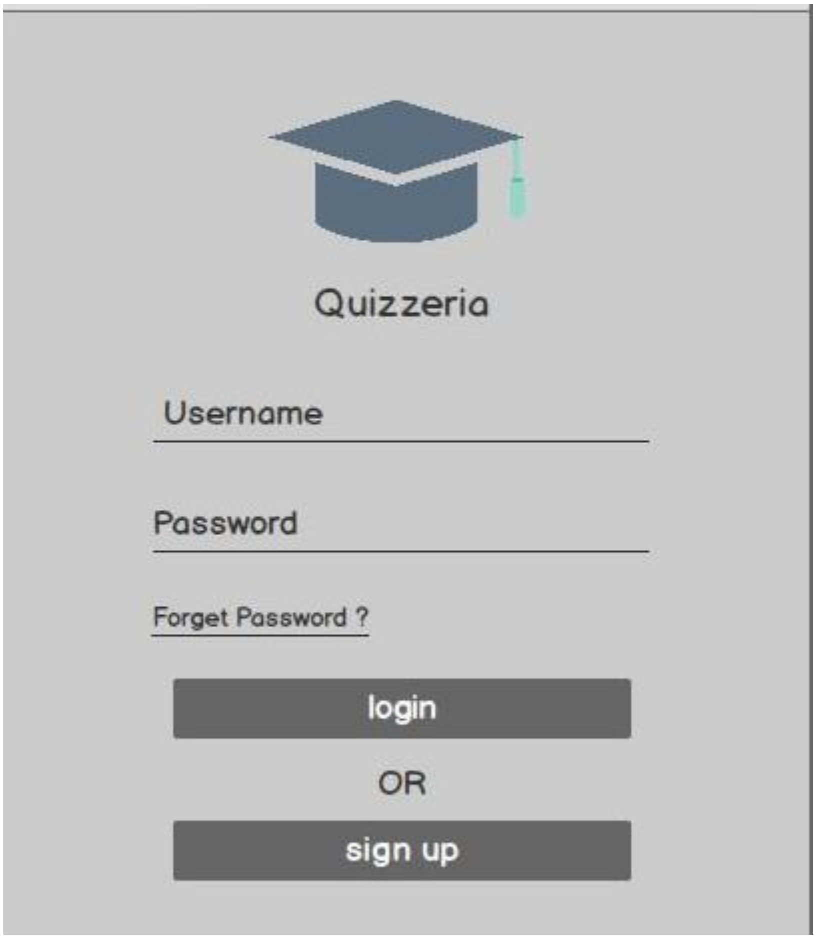
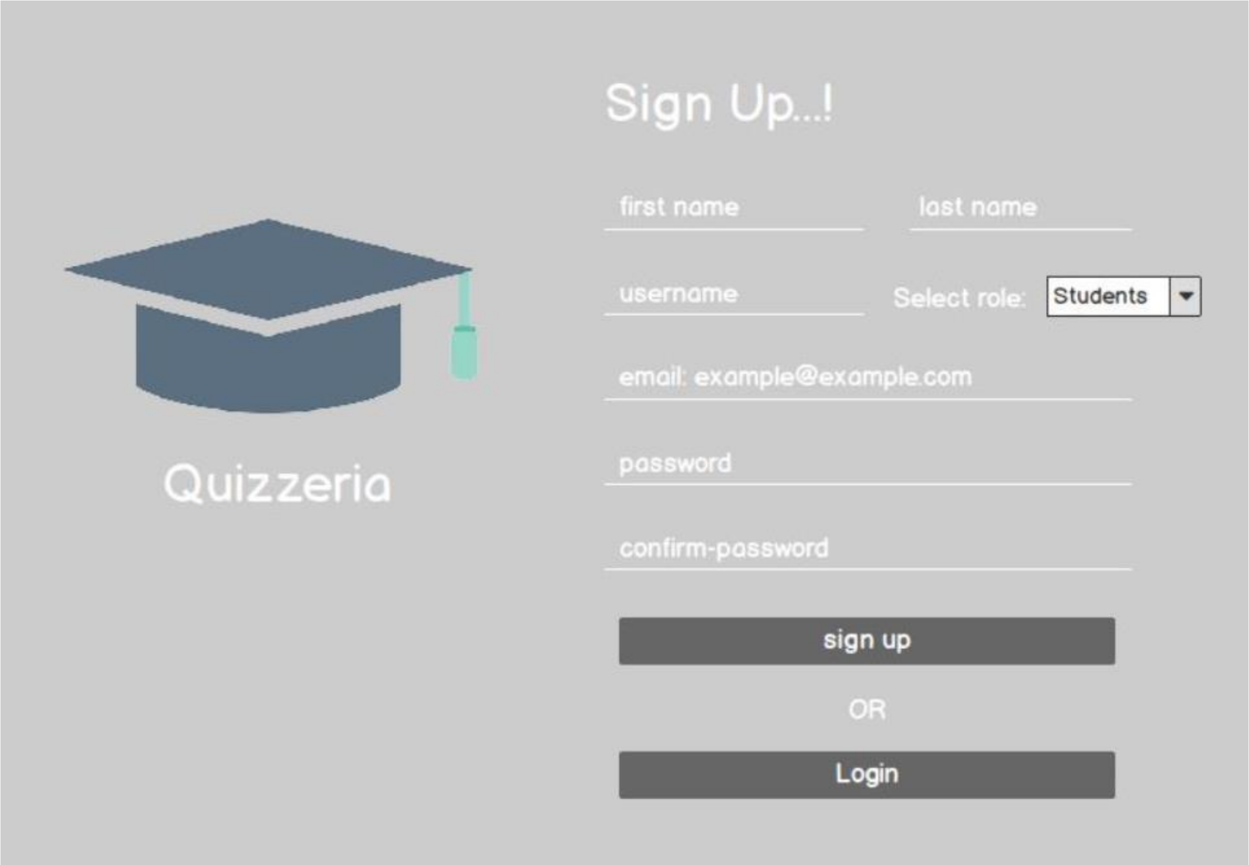


Figure 19: Mid Fidelity Registration Page



Select role: Students

Figure 20: Mid Fidelity Profile Page

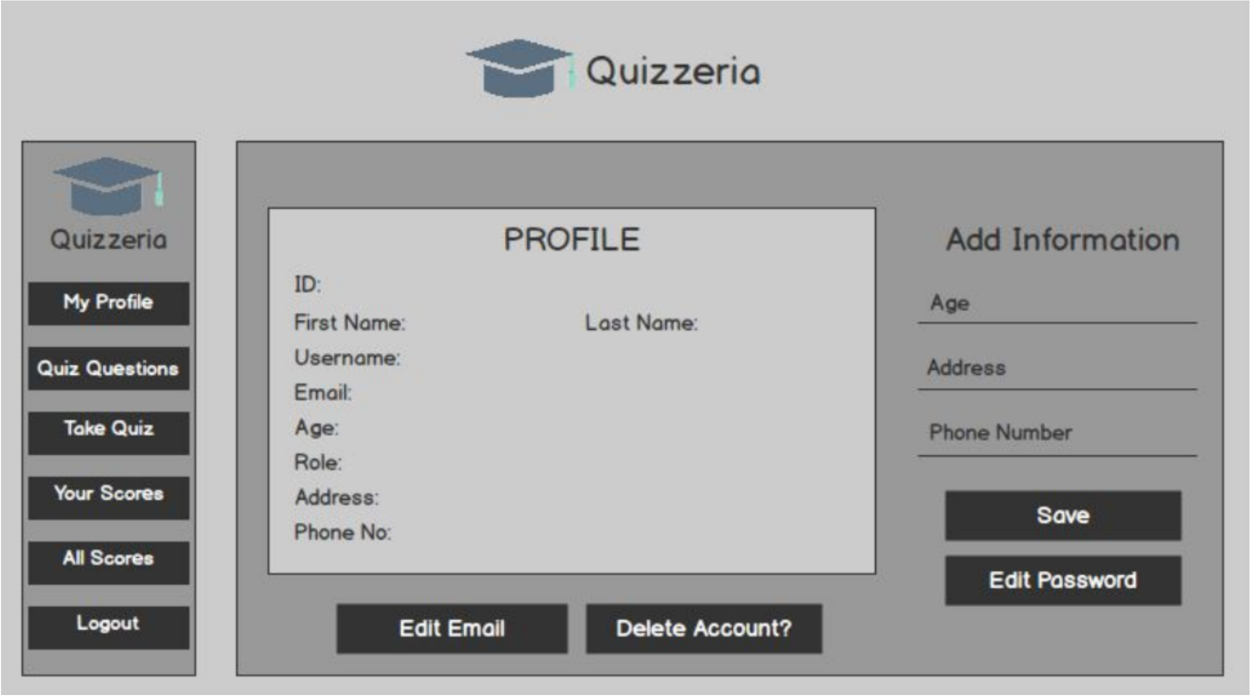


Figure 21: Mid Fidelity Quiz Selection Page

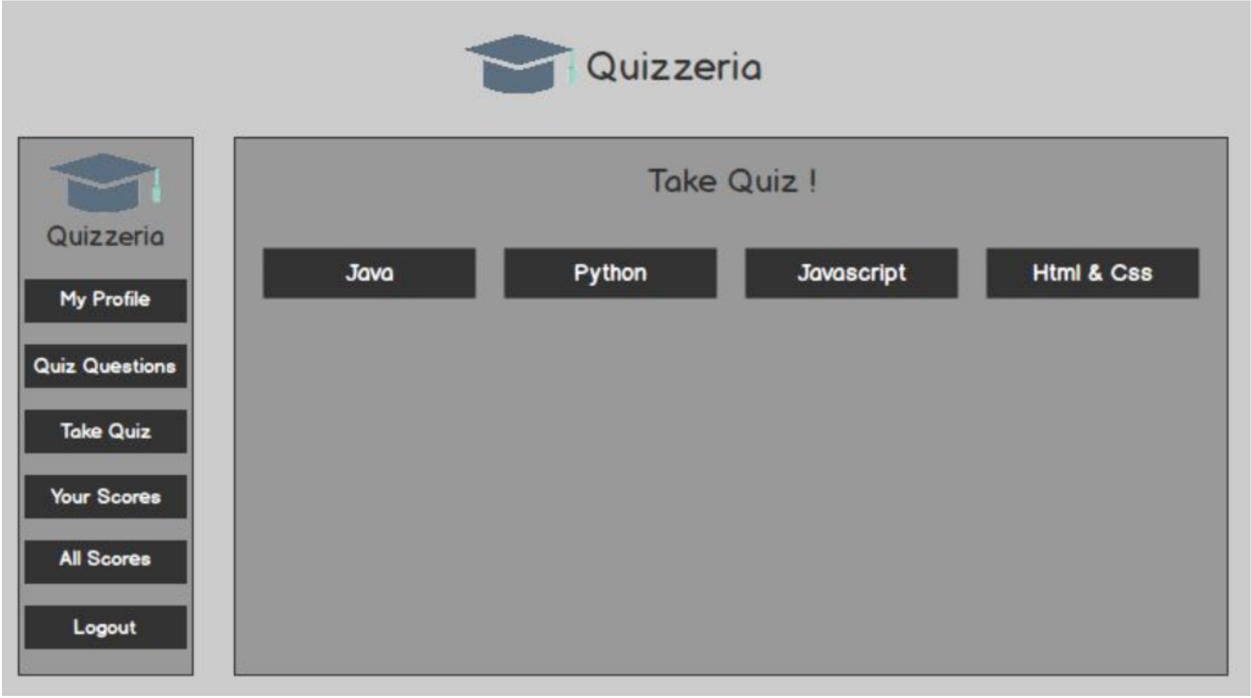


Figure 22: Mid Fidelity Quiz Page

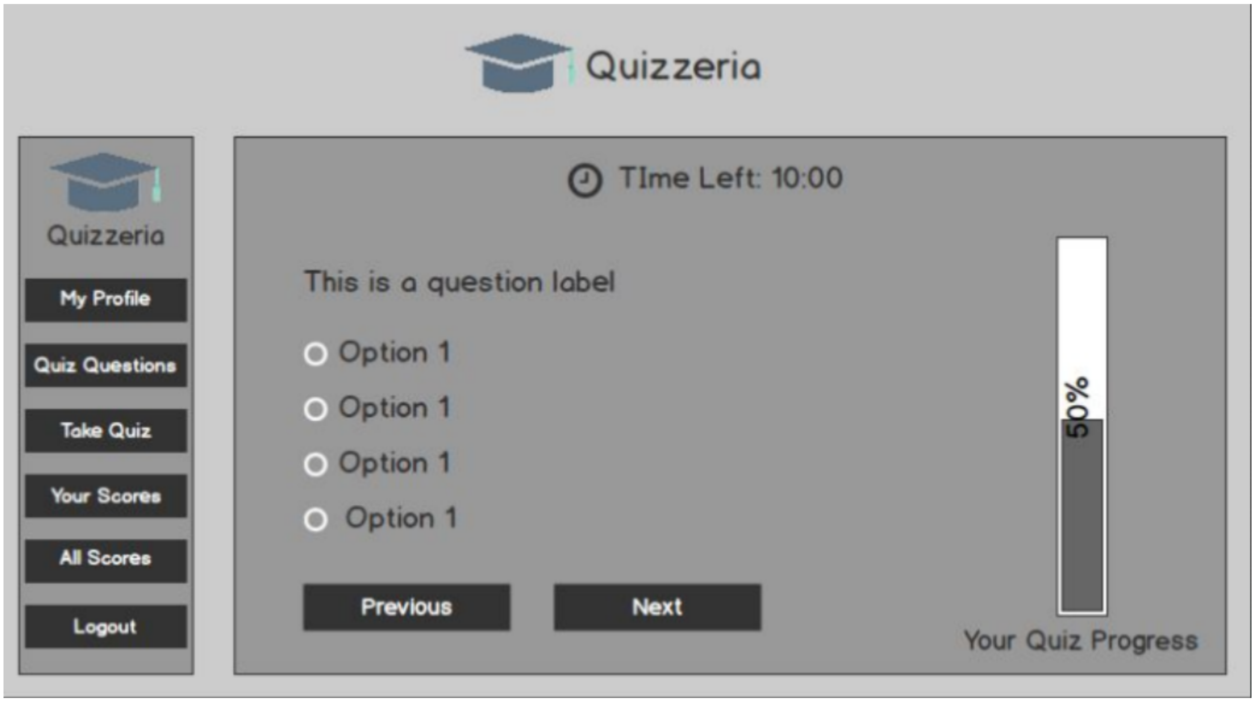
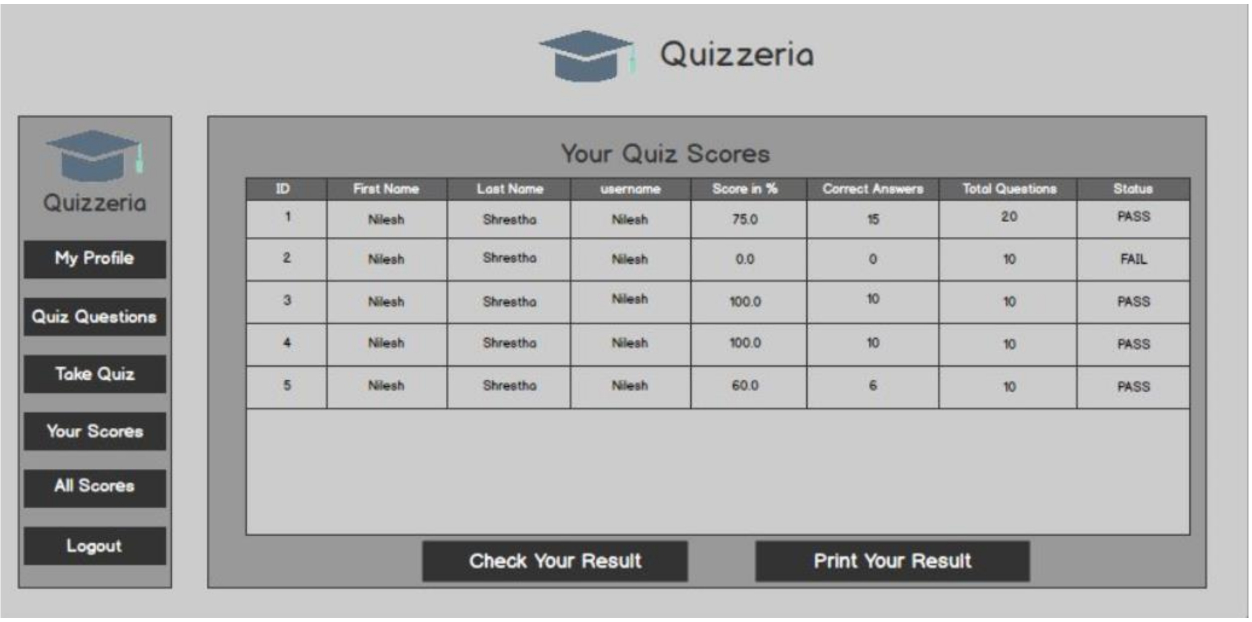


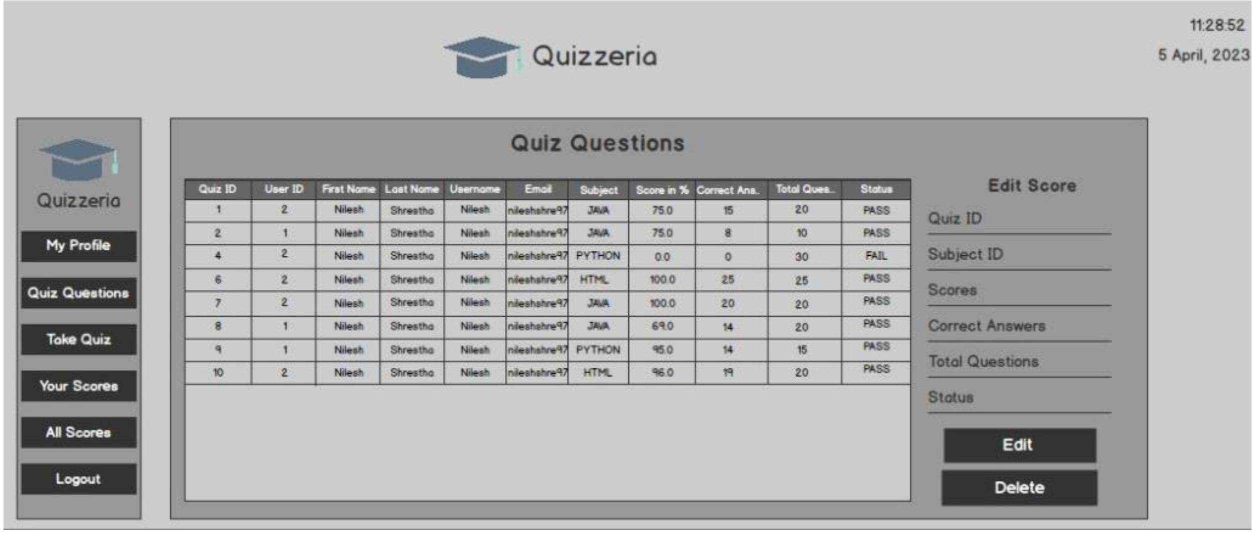
Figure 23: Mid Fidelity Personal Quiz Score Page



Your Quiz Scores

ID	First Name	Last Name	username	Score in %	Correct Answers	Total Questions	Status
1	Nilesh	Shrestha	Nilesh	75.0	15	20	PASS
2	Nilesh	Shrestha	Nilesh	0.0	0	10	FAIL
3	Nilesh	Shrestha	Nilesh	100.0	10	10	PASS
4	Nilesh	Shrestha	Nilesh	100.0	10	10	PASS
5	Nilesh	Shrestha	Nilesh	60.0	6	10	PASS

Figure 24: Mid Fidelity Quiz Score Page



Quiz ID	User ID	First Name	Last Name	Username	Email	Subject	Score in %	Correct Ans..	Total Ques..	Status
1	2	Nilesh	Shrestha	Nilesh	nileshshre97	JAVA	75.0	15	20	PASS
2	1	Nilesh	Shrestha	Nilesh	nileshshre97	JAVA	75.0	8	10	PASS
4	2	Nilesh	Shrestha	Nilesh	nileshshre97	PYTHON	0.0	0	30	FAIL
6	2	Nilesh	Shrestha	Nilesh	nileshshre97	HTML	100.0	25	25	PASS
7	2	Nilesh	Shrestha	Nilesh	nileshshre97	JAVA	100.0	20	20	PASS
8	1	Nilesh	Shrestha	Nilesh	nileshshre97	JAVA	69.0	14	20	PASS
9	1	Nilesh	Shrestha	Nilesh	nileshshre97	PYTHON	95.0	14	15	PASS
10	2	Nilesh	Shrestha	Nilesh	nileshshre97	HTML	96.0	19	20	PASS

Quiz ID

Subject ID

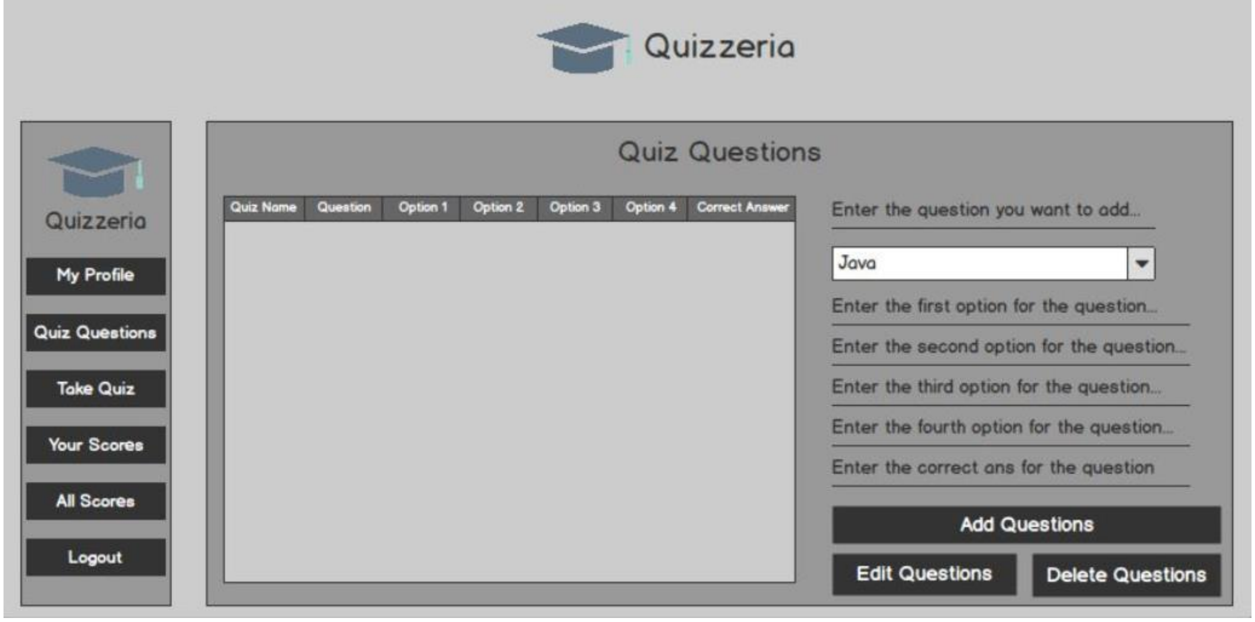
Scores

Correct Answers

Total Questions

Status

Figure 25: Mid Fidelity Quiz Questions Page



Quiz Name	Question	Option 1	Option 2	Option 3	Option 4	Correct Answer

Enter the question you want to add...

Java

Enter the first option for the question...

Enter the second option for the question...

Enter the third option for the question...

Enter the fourth option for the question...

Enter the correct ans for the question

Figure 26: High Fidelity Login Page

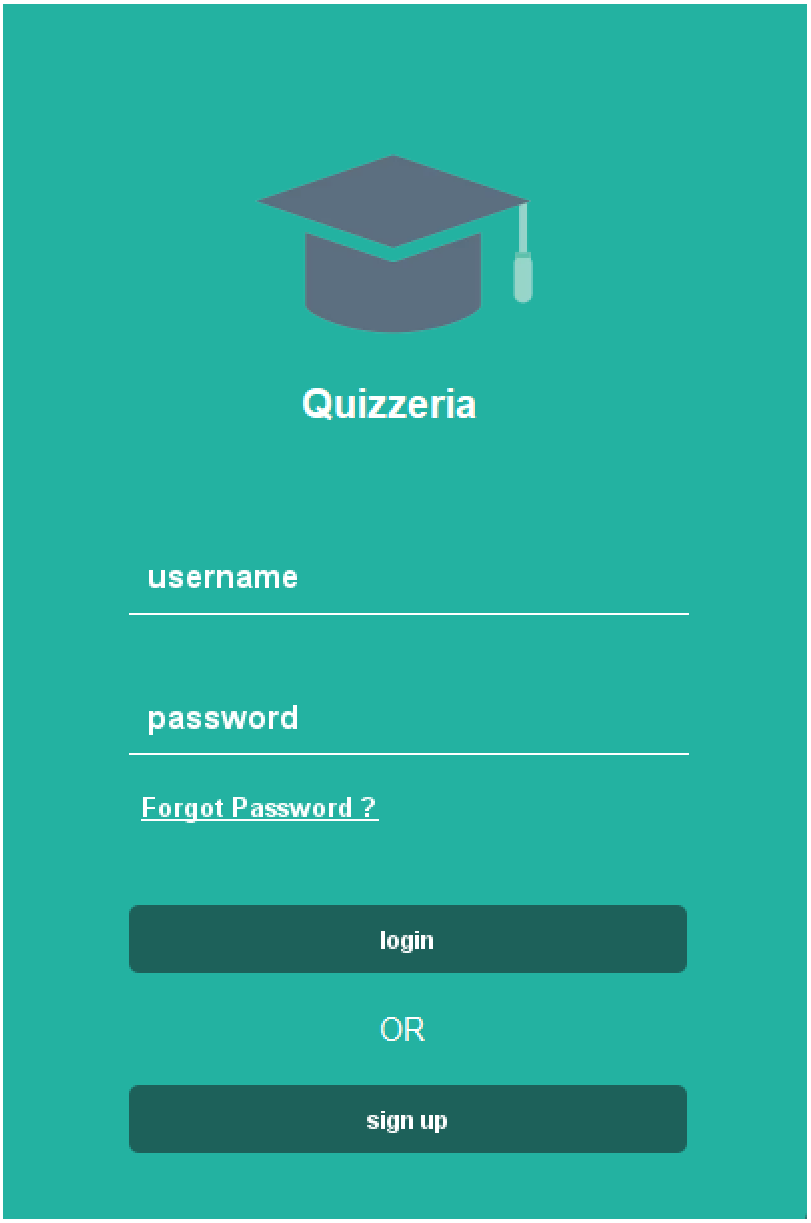
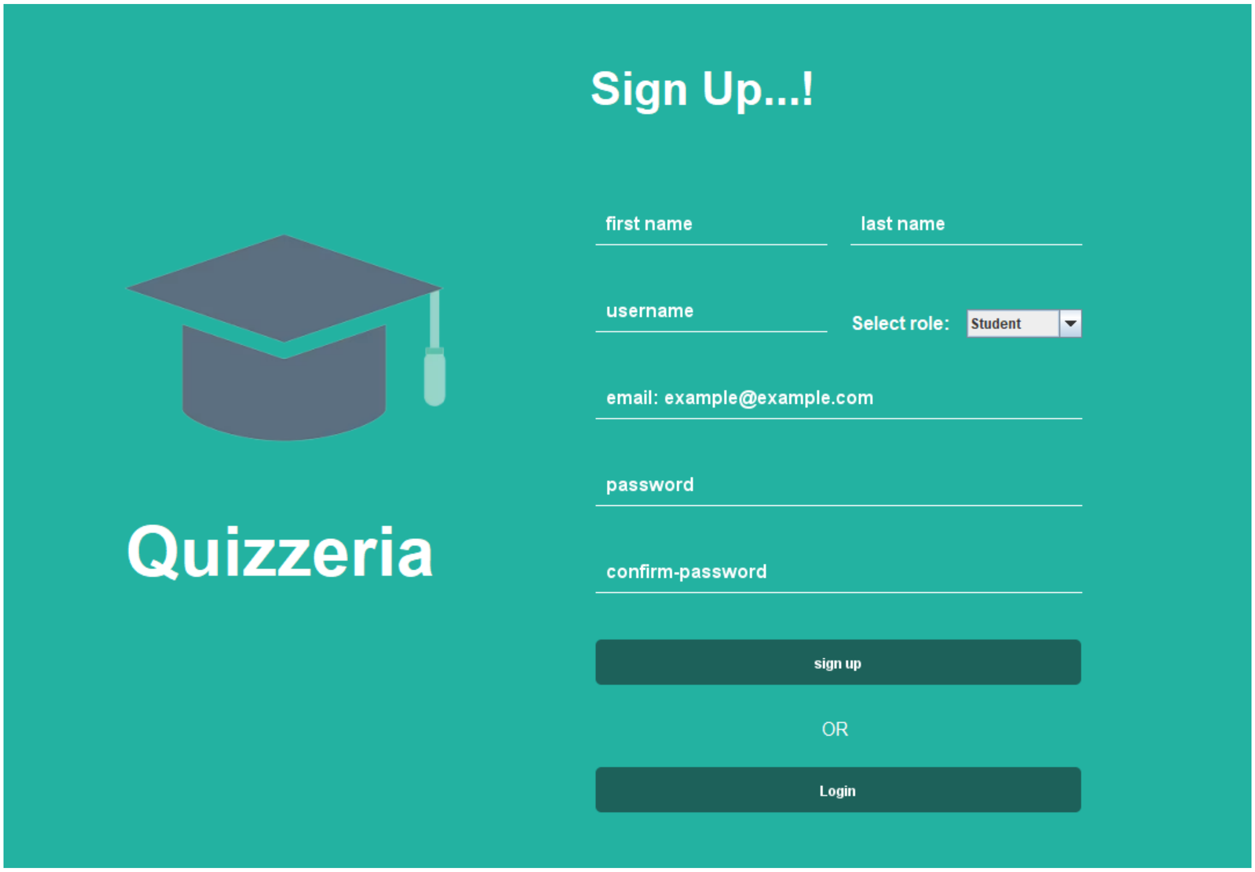


Figure 27: High Fidelity Registration Page



Sign Up...!

first name

last name

username

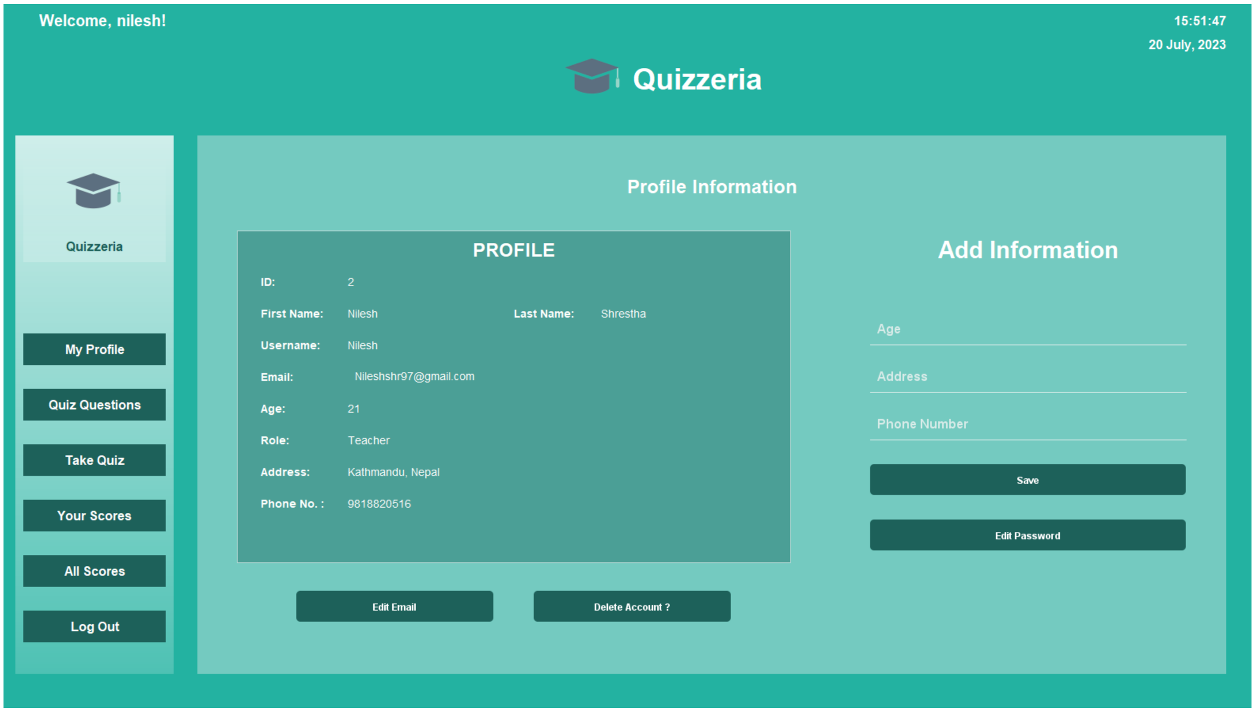
Select role: Student

email: example@example.com

password

confirm-password

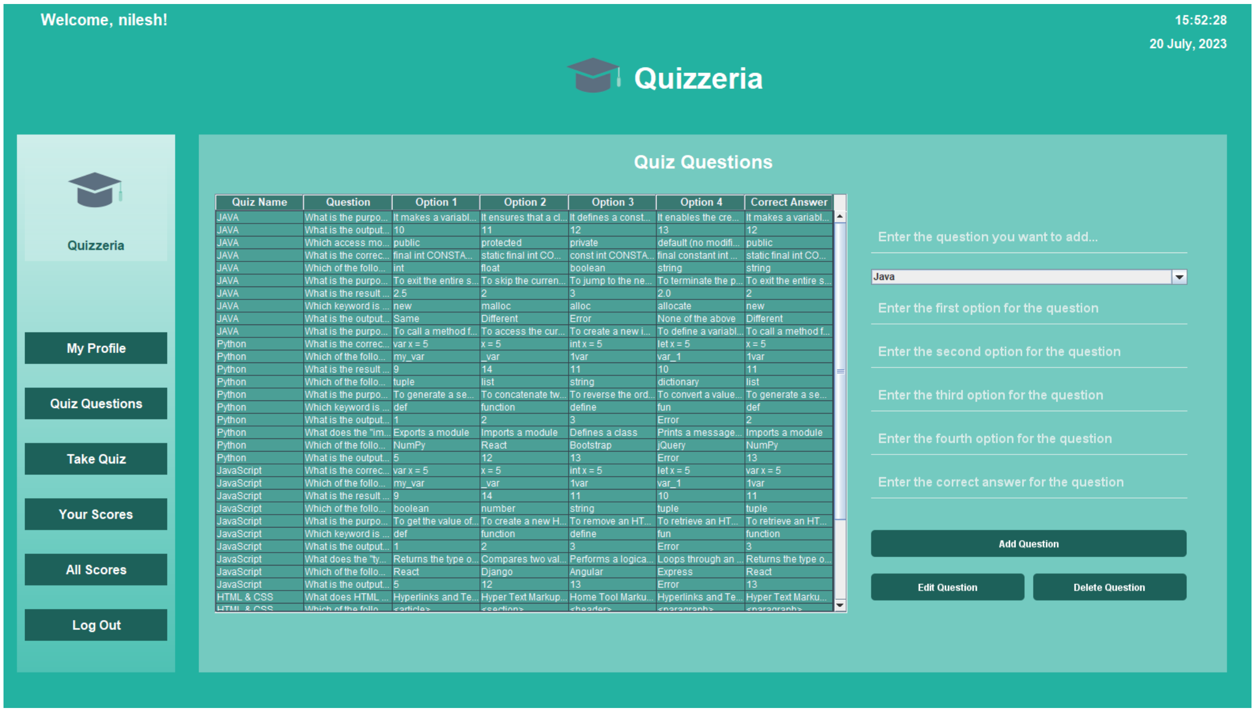
Figure 28: High Fidelity Profile Page



PROFILE

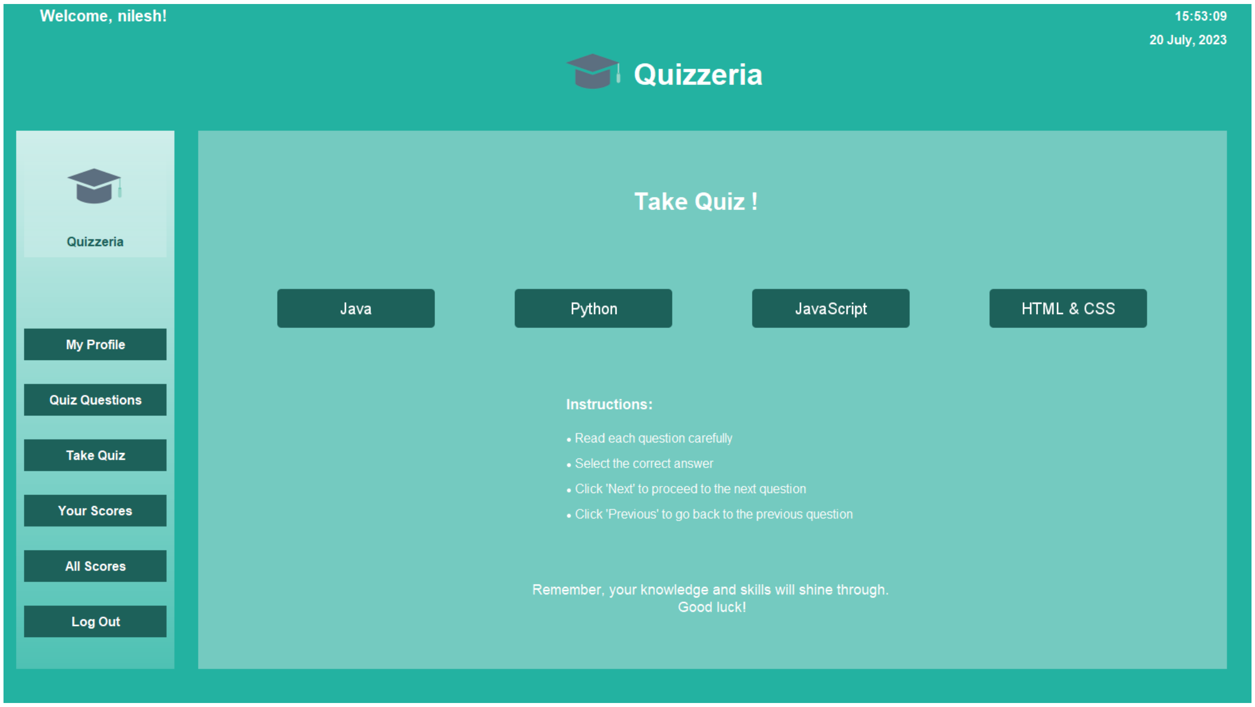
ID:	2		
First Name:	Nilesh	Last Name:	Shrestha
Username:	Nilesh		
Email:	Nileshshr97@gmail.com		
Age:	21		
Role:	Teacher		
Address:	Kathmandu, Nepal		
Phone No. :	9818820516		

Figure 29: High Fidelity Quiz Question Page


Welcome, nilesh!
15:52:28
20 July, 2023
Quizzeria
Quizzeria
My Profile
Quiz Questions
Take Quiz
Your Scores
All Scores
Log Out
Quiz Questions
Enter the question you want to add...
Java
Enter the first option for the question
Enter the second option for the question
Enter the third option for the question
Enter the fourth option for the question
Enter the correct answer for the question
Add Question
Edit Question
Delete Question

Quiz Name	Question	Option 1	Option 2	Option 3	Option 4	Correct Answer
JAVA	What is the purpo...	It makes a variabl...	It ensures that a cl...	It defines a const...	It enables the cre...	It makes a variabl...
JAVA	What is the output...	10	11	12	13	12
JAVA	Which access mo...	public	protected	private	default (no modifi...	public
JAVA	What is the correc...	final int CONSTA...	static final int CO...	const int CONSTA...	final constant int ...	static final int CO...
JAVA	Which of the follo...	int	float	boolean	string	string
JAVA	What is the purpo...	To exit the entire s...	To skip the curren...	To jump to the ne...	To terminate the p...	To exit the entire s...
JAVA	What is the result ...	2.5	2	3	2.0	2
JAVA	Which keyword is ...	new	malloc	alloc	allocate	new
JAVA	What is the output...	Same	Different	Error	None of the above	Different
JAVA	What is the purpo...	To call a method f...	To access the cur...	To create a new i...	To define a variabl...	To call a method f...
Python	What is the correc...	var x = 5	x = 5	int x = 5	let x = 5	x = 5
Python	Which of the follo...	my_var	_var	1var	var_1	1var
Python	What is the result ...	9	14	11	10	11
Python	Which of the follo...	tuple	list	string	dictionary	list
Python	What is the purpo...	To generate a se...	To concatenate tw...	To reverse the ord...	To convert a value...	To generate a se...
Python	Which keyword is ...	def	function	define	fun	def
Python	What is the output...	1	2	3	Error	2
Python	What does the "im...	Exports a module	Imports a module	Defines a class	Prints a message...	Imports a module
Python	Which of the follo...	NumPy	React	Bootstrap	jQuery	NumPy
Python	What is the output...	5	12	13	Error	13
JavaScript	What is the correc...	var x = 5	x = 5	int x = 5	let x = 5	var x = 5
JavaScript	Which of the follo...	my_var	_var	1var	var_1	1var
JavaScript	What is the result ...	9	14	11	10	11
JavaScript	Which of the follo...	boolean	number	string	tuple	tuple
JavaScript	What is the purpo...	To get the value of...	To create a new H...	To remove an HT...	To retrieve an HT...	To retrieve an HT...
JavaScript	Which keyword is ...	def	function	define	fun	function
JavaScript	What is the output...	1	2	3	Error	3
JavaScript	What does the "ty...	Returns the type o...	Compares two val...	Performs a logica...	Loops through an ...	Returns the type o...
JavaScript	Which of the follo...	React	Django	Angular	Express	React
JavaScript	What is the output...	5	12	13	Error	13
HTML & CSS	What does HTML ...	Hyperlinks and Te...	Hyper Text Markup...	Home Tool Marku...	Hyperlinks and Te...	Hyper Text Marku...
HTML & CSS	Which of the follo...	<article>	<section>	<header>	<paragraph>	<paragraph>

Figure 30: High Fidelity Quiz Selection Page



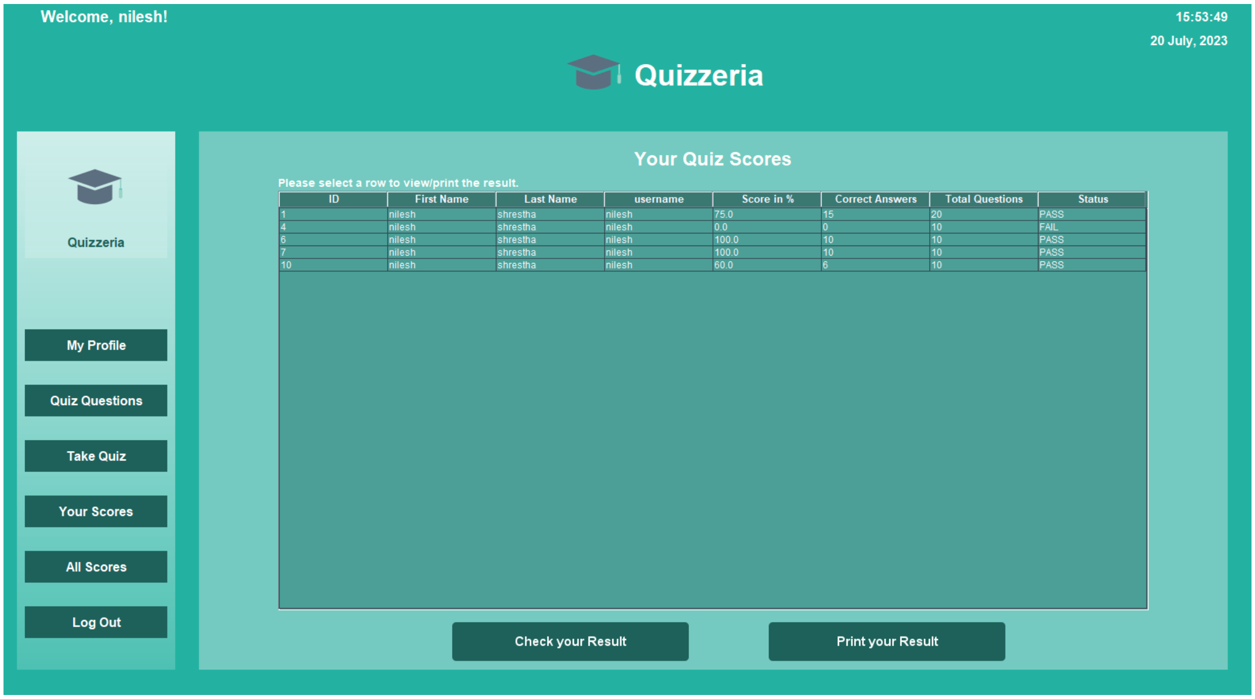
Take Quiz !

Instructions:

- Read each question carefully
- Select the correct answer
- Click 'Next' to proceed to the next question
- Click 'Previous' to go back to the previous question

Remember, your knowledge and skills will shine through.
Good luck!

Figure 31: High Fidelity Personal Quiz Score Page

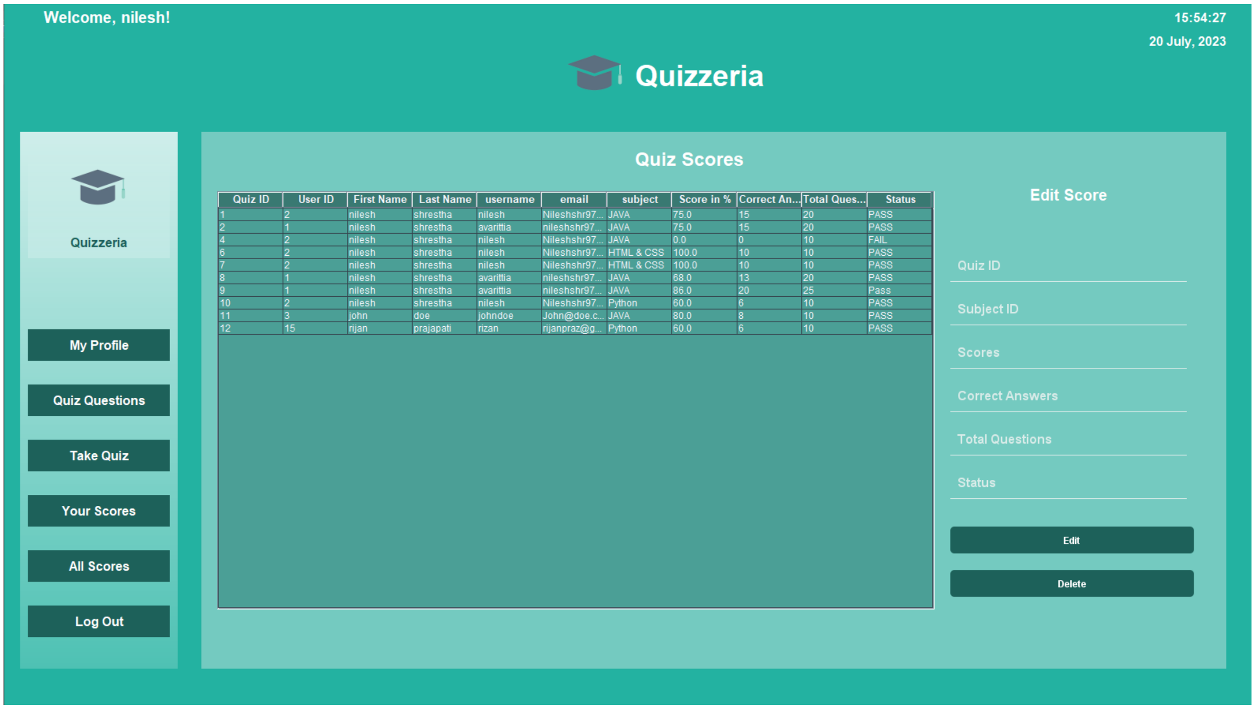


Your Quiz Scores

Please select a row to view/print the result.

ID	First Name	Last Name	username	Score in %	Correct Answers	Total Questions	Status
1	nilesh	shrestha	nilesh	75.0	15	20	PASS
4	nilesh	shrestha	nilesh	0.0	0	10	FAIL
6	nilesh	shrestha	nilesh	100.0	10	10	PASS
7	nilesh	shrestha	nilesh	100.0	10	10	PASS
10	nilesh	shrestha	nilesh	60.0	6	10	PASS

Figure 32: High Fidelity Quiz Score Page



Welcome, nilesh!

15:54:27
20 July, 2023

Quiz Scores

Quiz ID	User ID	First Name	Last Name	username	email	subject	Score in %	Correct An...	Total Ques...	Status
1	2	nilesh	shrestha	nilesh	Nileshshr97...	JAVA	75.0	15	20	PASS
2	1	nilesh	shrestha	avarittia	nileshshr97...	JAVA	75.0	15	20	PASS
4	2	nilesh	shrestha	nilesh	Nileshshr97...	JAVA	0.0	0	10	FAIL
6	2	nilesh	shrestha	nilesh	Nileshshr97...	HTML & CSS	100.0	10	10	PASS
7	2	nilesh	shrestha	nilesh	Nileshshr97...	HTML & CSS	100.0	10	10	PASS
8	1	nilesh	shrestha	avarittia	nileshshr97...	JAVA	68.0	13	20	PASS
9	1	nilesh	shrestha	avarittia	nileshshr97...	JAVA	86.0	20	25	Pass
10	2	nilesh	shrestha	nilesh	Nileshshr97...	Python	60.0	6	10	PASS
11	3	john	doe	johndoe	John@doe.c...	JAVA	80.0	8	10	PASS
12	15	rijan	prajapati	rizan	rijanpraz@g...	Python	60.0	6	10	PASS

Edit Score

Quiz ID

Subject ID

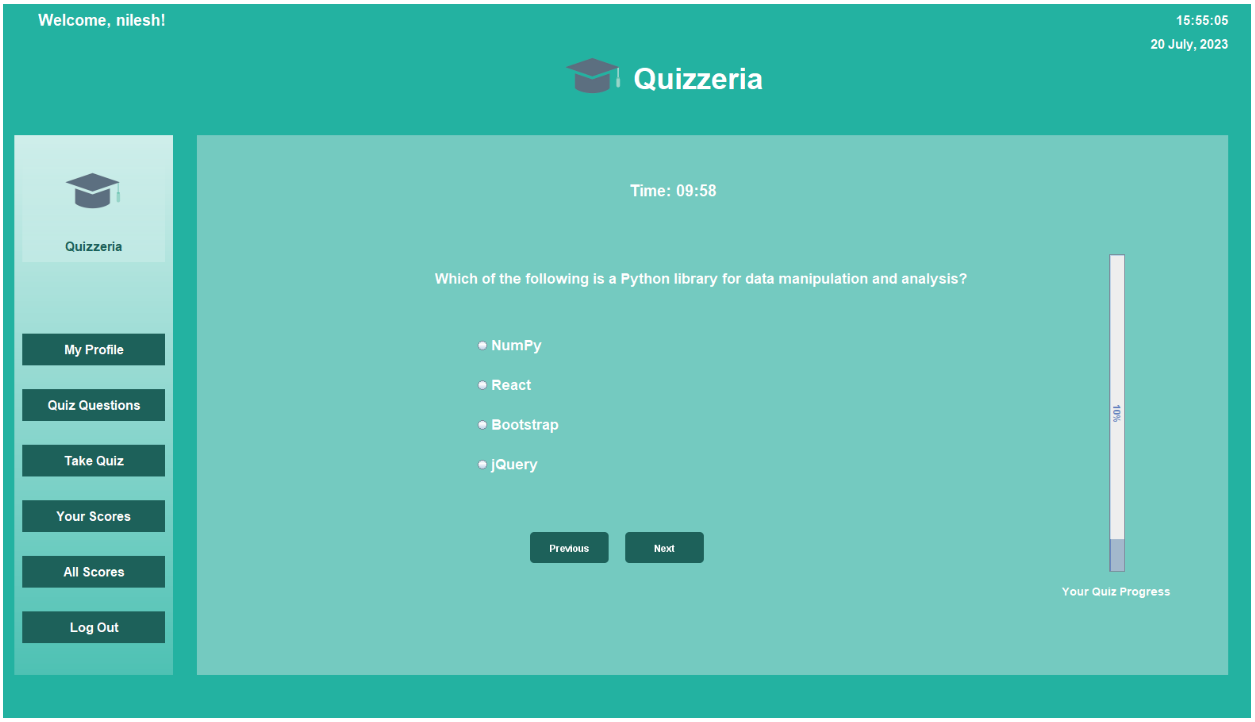
Scores

Correct Answers

Total Questions

Status

Figure 33: High Fidelity Quiz Page



Welcome, nilesh!

15:55:05
20 July, 2023

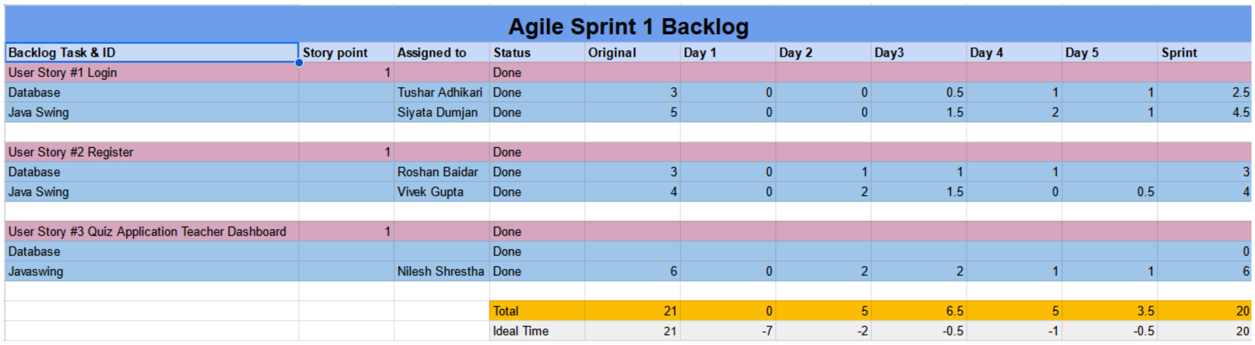
Time: 09:58

Which of the following is a Python library for data manipulation and analysis?

○ NumPy
○ React
○ Bootstrap
○ jQuery

Outcomes

Figure 34: Sprint 1 Backlog



Agile Sprint 1 Backlog

Backlog Task & ID	Story point	Assigned to	Status	Original	Day 1	Day 2	Day3	Day 4	Day 5	Sprint
User Story #1 Login	1		Done							
Database		Tushar Adhikari	Done	3	0	0	0.5	1	1	2.5
Java Swing		Siyata Dumjan	Done	5	0	0	1.5	2	1	4.5
User Story #2 Register	1		Done							
Database		Roshan Baidar	Done	3	0	1	1	1		3
Java Swing		Vivek Gupta	Done	4	0	2	1.5	0	0.5	4
User Story #3 Quiz Application Teacher Dashboard	1		Done							
Database			Done							0
Javaswing		Nilesh Shrestha	Done	6	0	2	2	1	1	6
			Total	21	0	5	6.5	5	3.5	20
			Ideal Time	21	-7	-2	-0.5	-1	-0.5	20

Figure 35: Sprint 1 Burndown Chart

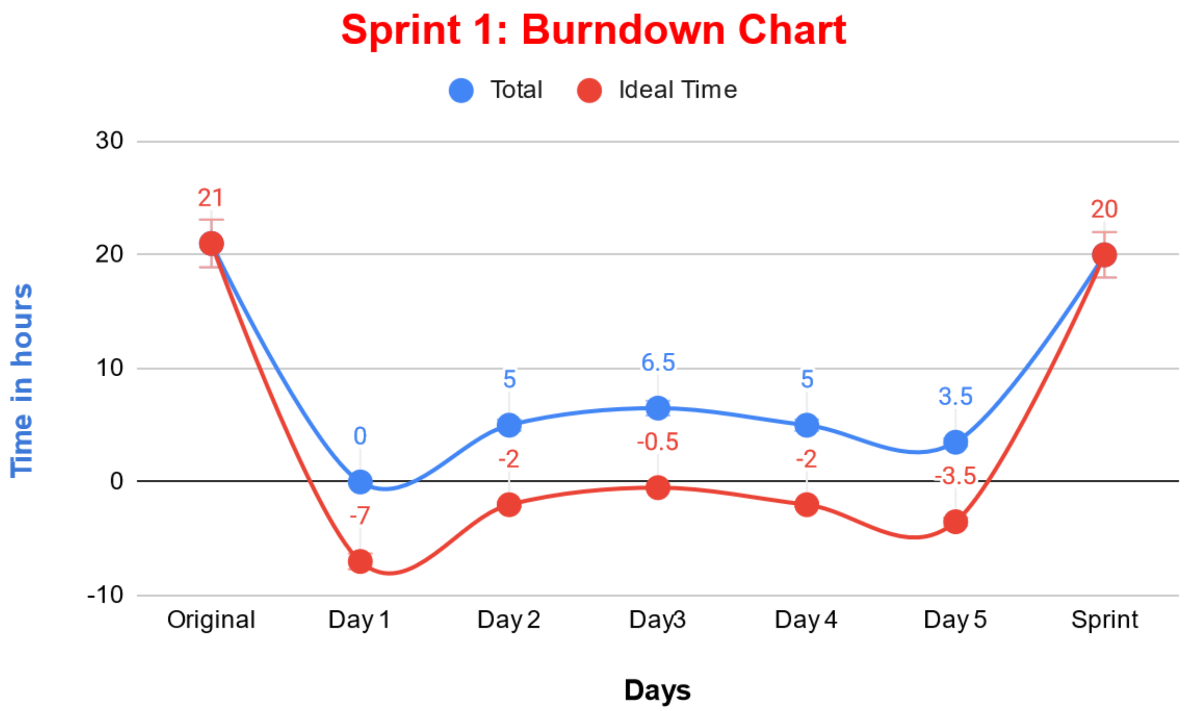
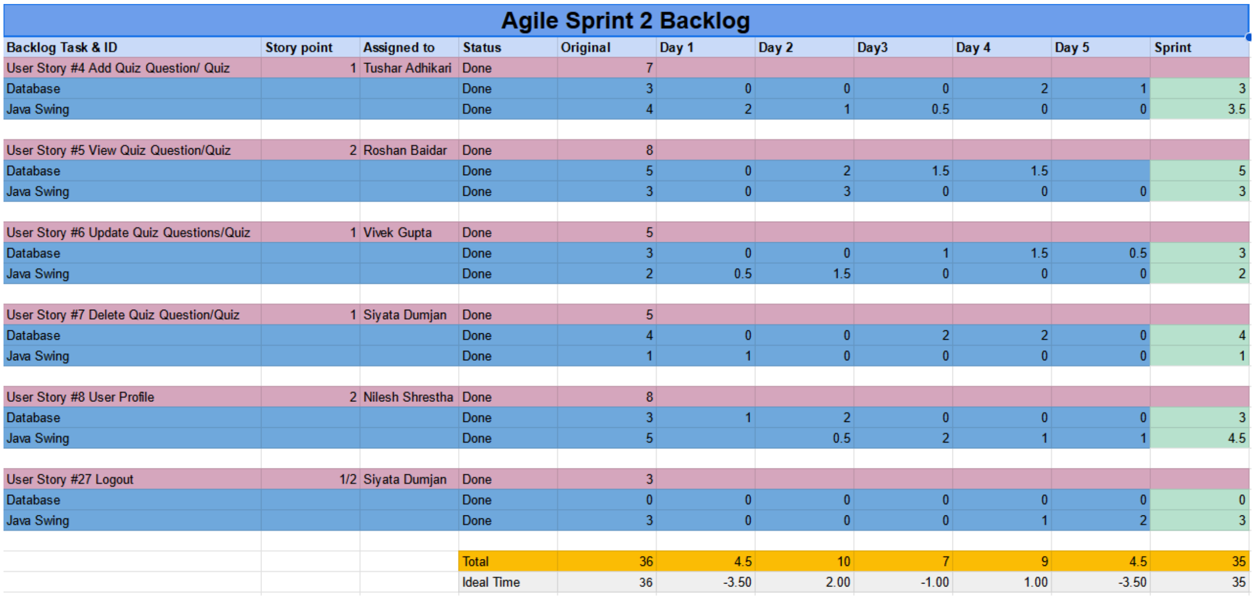


Figure 36: Sprint 2 Backlog



Agile Sprint 2 Backlog

Backlog Task & ID	Story point	Assigned to	Status	Original	Day 1	Day 2	Day3	Day 4	Day 5	Sprint
User Story #4 Add Quiz Question/ Quiz	1	Tushar Adhikari	Done	7						
Database			Done	3	0	0	0	2	1	3
Java Swing			Done	4	2	1	0.5	0	0	3.5
User Story #5 View Quiz Question/Quiz	2	Roshan Baidar	Done	8						
Database			Done	5	0	2	1.5	1.5		5
Java Swing			Done	3	0	3	0	0	0	3
User Story #6 Update Quiz Questions/Quiz	1	Vivek Gupta	Done	5						
Database			Done	3	0	0	1	1.5	0.5	3
Java Swing			Done	2	0.5	1.5	0	0	0	2
User Story #7 Delete Quiz Question/Quiz	1	Siyata Dumjan	Done	5						
Database			Done	4	0	0	2	2	0	4
Java Swing			Done	1	1	0	0	0	0	1
User Story #8 User Profile	2	Nilesh Shrestha	Done	8						
Database			Done	3	1	2	0	0	0	3
Java Swing			Done	5		0.5	2	1	1	4.5
User Story #27 Logout	1/2	Siyata Dumjan	Done	3						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	3	0	0	0	1	2	3
			Total	36	4.5	10	7	9	4.5	35
			Ideal Time	36	-3.50	2.00	-1.00	1.00	-3.50	35

Figure 37: Sprint 2 Burndown Chart

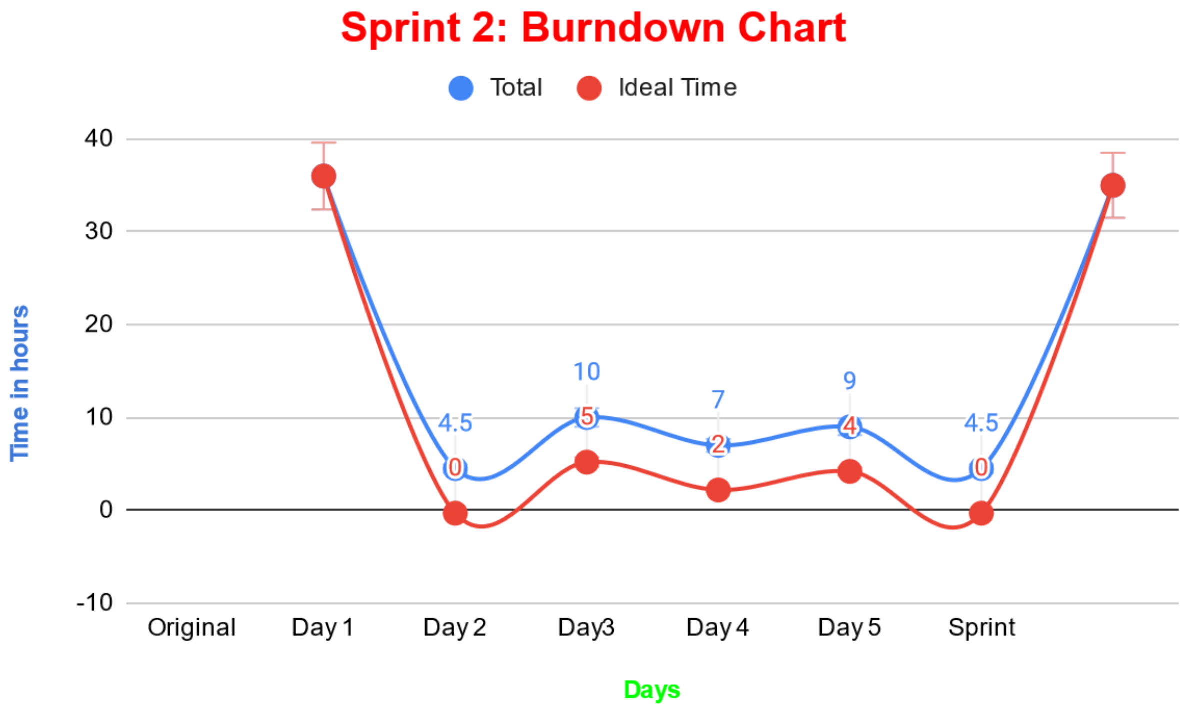
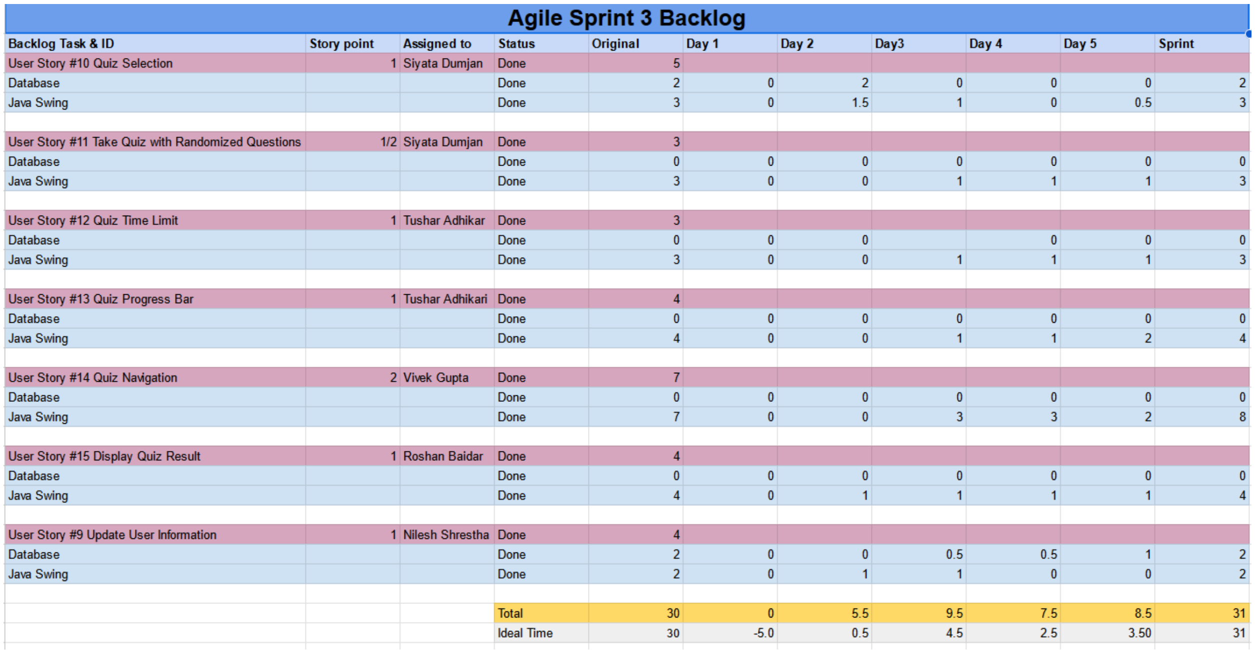


Figure 38: Sprint 3 Backlog



Agile Sprint 3 Backlog

Backlog Task & ID	Story point	Assigned to	Status	Original	Day 1	Day 2	Day3	Day 4	Day 5	Sprint
User Story #10 Quiz Selection	1	Siyata Dumjan	Done	5						
Database			Done	2	0	2	0	0	0	2
Java Swing			Done	3	0	1.5	1	0	0.5	3
User Story #11 Take Quiz with Randomized Questions	1/2	Siyata Dumjan	Done	3						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	3	0	0	1	1	1	3
User Story #12 Quiz Time Limit	1	Tushar Adhikar	Done	3						
Database			Done	0	0	0		0	0	0
Java Swing			Done	3	0	0	1	1	1	3
User Story #13 Quiz Progress Bar	1	Tushar Adhikari	Done	4						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	4	0	0	1	1	2	4
User Story #14 Quiz Navigation	2	Vivek Gupta	Done	7						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	7	0	0	3	3	2	8
User Story #15 Display Quiz Result	1	Roshan Baidar	Done	4						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	4	0	1	1	1	1	4
User Story #9 Update User Information	1	Nilesh Shrestha	Done	4						
Database			Done	2	0	0	0.5	0.5	1	2
Java Swing			Done	2	0	1	1	0	0	2
			Total	30	0	5.5	9.5	7.5	8.5	31
			Ideal Time	30	-5.0	0.5	4.5	2.5	3.50	31

Figure 39: Sprint 3 Burndown Chart

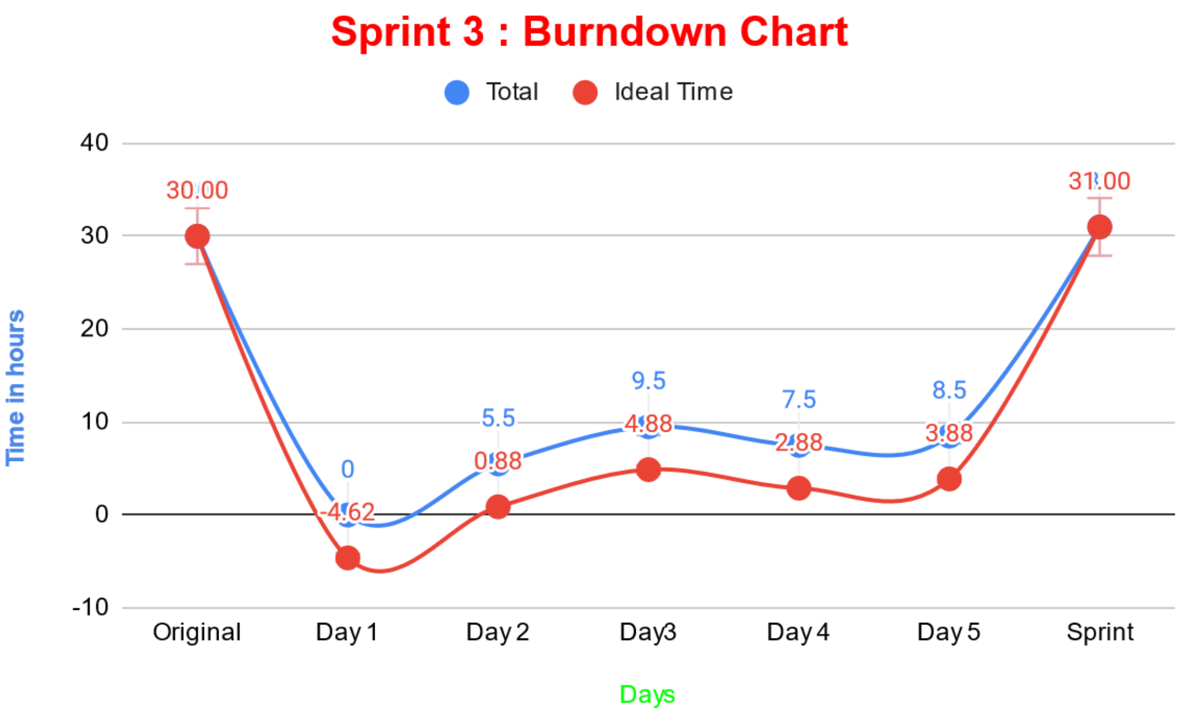
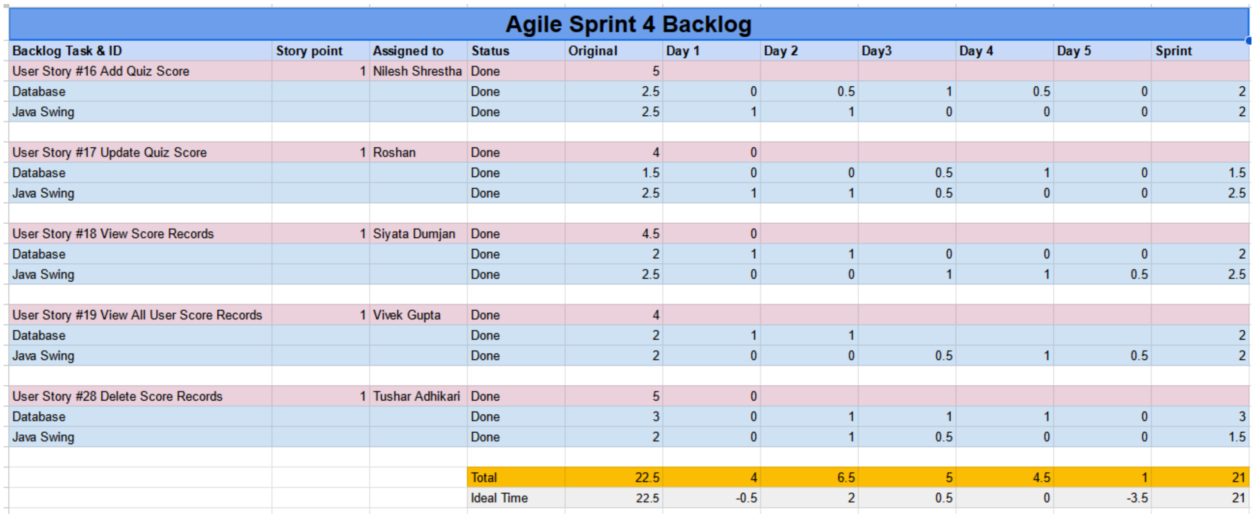


Figure 40: Sprint 4 Backlog



Agile Sprint 4 Backlog

Backlog Task & ID	Story point	Assigned to	Status	Original	Day 1	Day 2	Day3	Day 4	Day 5	Sprint
User Story #16 Add Quiz Score	1	Nilesh Shrestha	Done	5						
Database			Done	2.5	0	0.5	1	0.5	0	2
Java Swing			Done	2.5	1	1	0	0	0	2
User Story #17 Update Quiz Score	1	Roshan	Done	4	0					
Database			Done	1.5	0	0	0.5	1	0	1.5
Java Swing			Done	2.5	1	1	0.5	0	0	2.5
User Story #18 View Score Records	1	Siyata Dumjan	Done	4.5	0					
Database			Done	2	1	1	0	0	0	2
Java Swing			Done	2.5	0	0	1	1	0.5	2.5
User Story #19 View All User Score Records	1	Vivek Gupta	Done	4						
Database			Done	2	1	1				2
Java Swing			Done	2	0	0	0.5	1	0.5	2
User Story #28 Delete Score Records	1	Tushar Adhikari	Done	5	0					
Database			Done	3	0	1	1	1	0	3
Java Swing			Done	2	0	1	0.5	0	0	1.5
			Total	22.5	4	6.5	5	4.5	1	21
			Ideal Time	22.5	-0.5	2	0.5	0	-3.5	21

Figure 41: Sprint 4 Burndown Chart

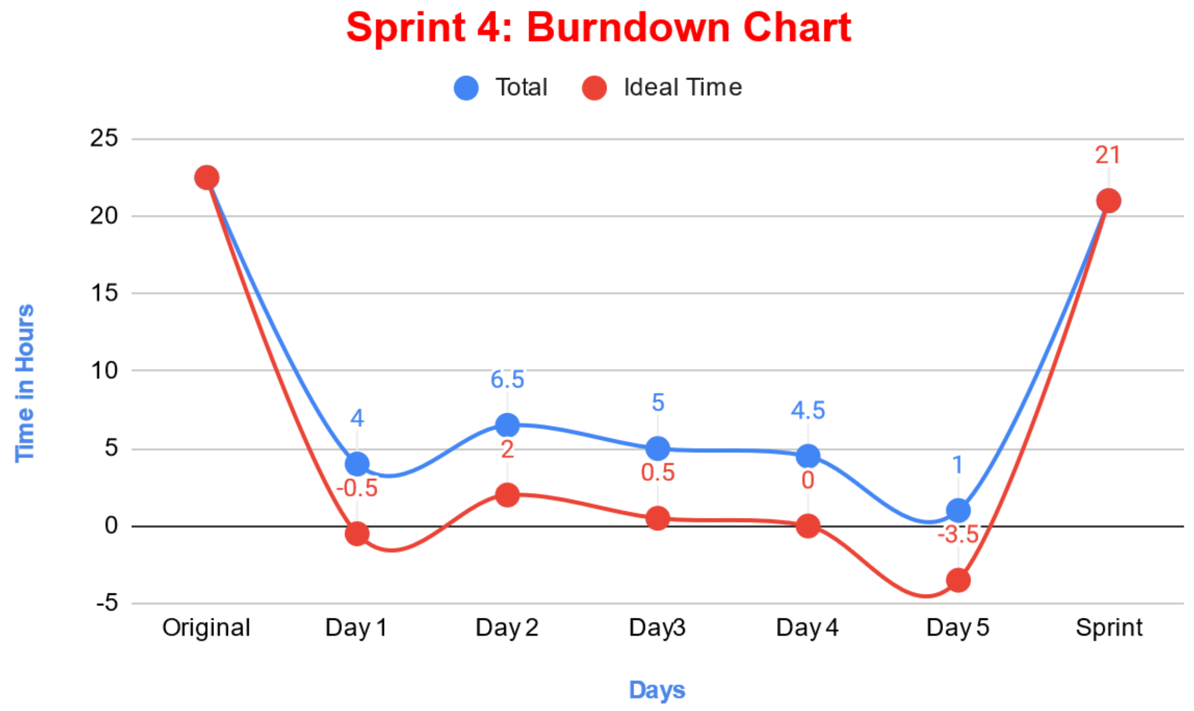
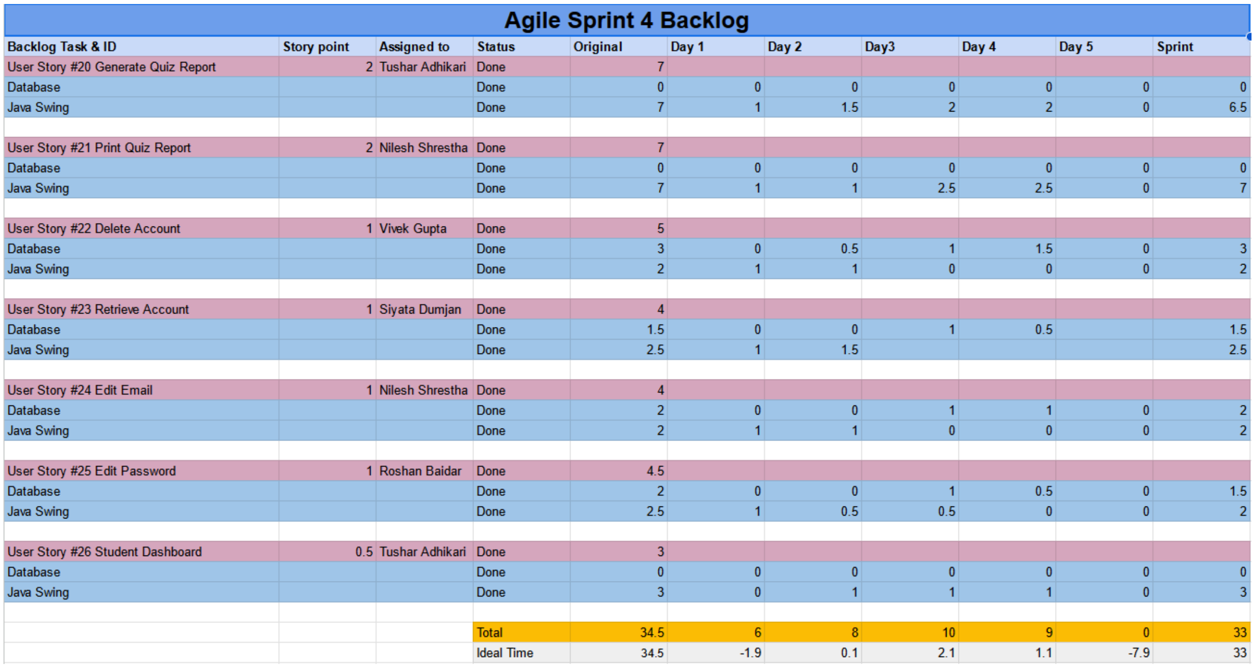


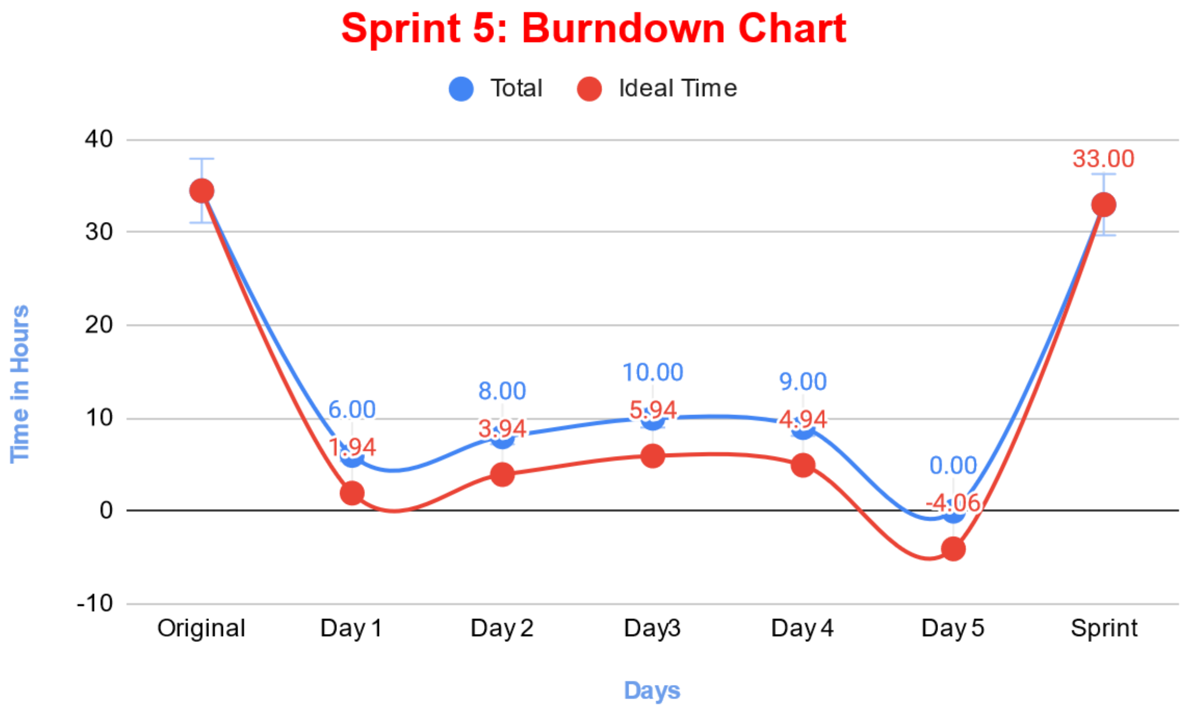
Figure 42: Sprint 5 Backlog



Agile Sprint 4 Backlog

Backlog Task & ID	Story point	Assigned to	Status	Original	Day 1	Day 2	Day3	Day 4	Day 5	Sprint
User Story #20 Generate Quiz Report	2	Tushar Adhikari	Done	7						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	7	1	1.5	2	2	0	6.5
User Story #21 Print Quiz Report	2	Nilesh Shrestha	Done	7						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	7	1	1	2.5	2.5	0	7
User Story #22 Delete Account	1	Vivek Gupta	Done	5						
Database			Done	3	0	0.5	1	1.5	0	3
Java Swing			Done	2	1	1	0	0	0	2
User Story #23 Retrieve Account	1	Siyata Dumjan	Done	4						
Database			Done	1.5	0	0	1	0.5		1.5
Java Swing			Done	2.5	1	1.5				2.5
User Story #24 Edit Email	1	Nilesh Shrestha	Done	4						
Database			Done	2	0	0	1	1	0	2
Java Swing			Done	2	1	1	0	0	0	2
User Story #25 Edit Password	1	Roshan Baidar	Done	4.5						
Database			Done	2	0	0	1	0.5	0	1.5
Java Swing			Done	2.5	1	0.5	0.5	0	0	2
User Story #26 Student Dashboard	0.5	Tushar Adhikari	Done	3						
Database			Done	0	0	0	0	0	0	0
Java Swing			Done	3	0	1	1	1	0	3
			Total	34.5	6	8	10	9	0	33
			Ideal Time	34.5	-1.9	0.1	2.1	1.1	-7.9	33

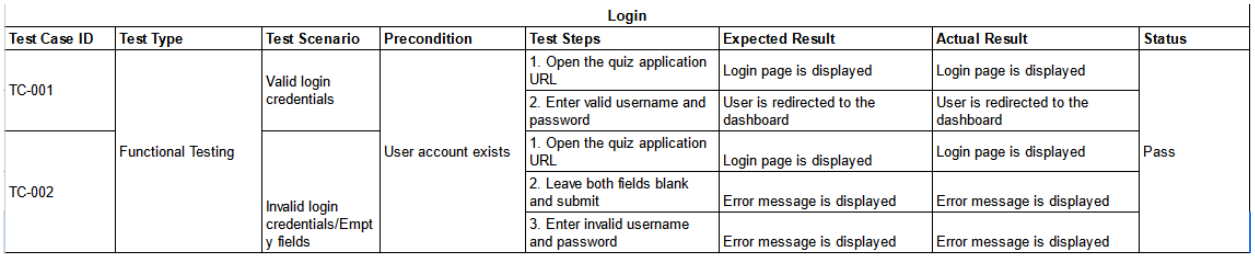
Figure 43: Sprint 5 Burndown Chart



System Testing

Before combining them into a fully working application, unit testing, a type of white box testing, was used to execute a system test for each and every functional component of the program (Richardson et al., 2020). As indicated in the figures below, it was tested once more after integration to make sure the parts were functioning appropriately and in accordance with expectations.

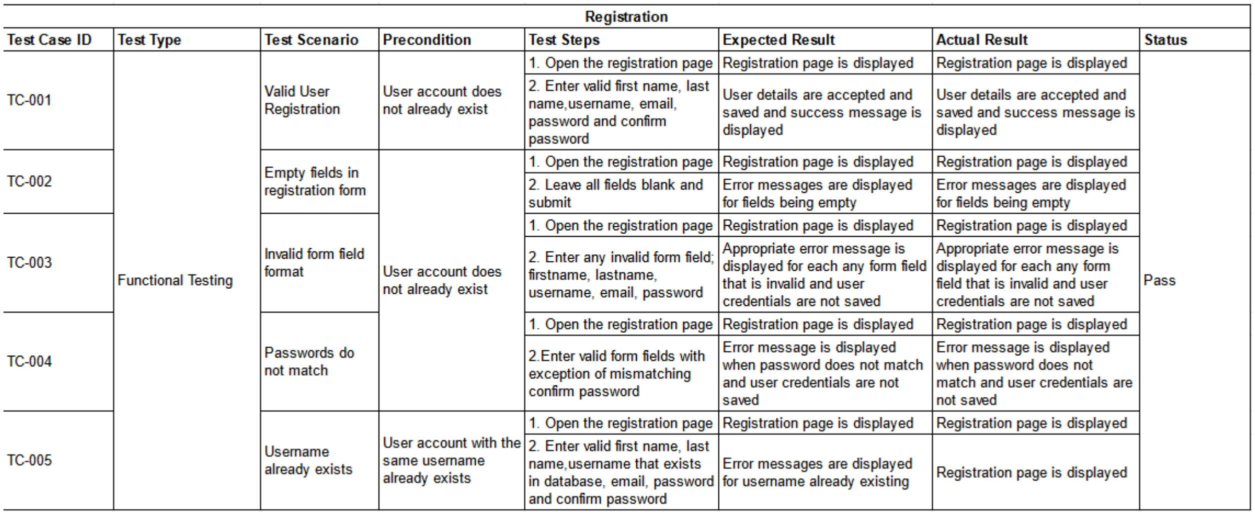
Figure 44: Test Case Scenario for Login



Login

Test Case ID	Test Type	Test Scenario	Precondition	Test Steps	Expected Result	Actual Result	Status
TC-001	Functional Testing	Valid login credentials	User account exists	1. Open the quiz application URL	Login page is displayed	Login page is displayed	Pass
				2. Enter valid username and password	User is redirected to the dashboard	User is redirected to the dashboard	
TC-002		Invalid login credentials/Empty fields		1. Open the quiz application URL	Login page is displayed	Login page is displayed	
				2. Leave both fields blank and submit	Error message is displayed	Error message is displayed	
				3. Enter invalid username and password	Error message is displayed	Error message is displayed	

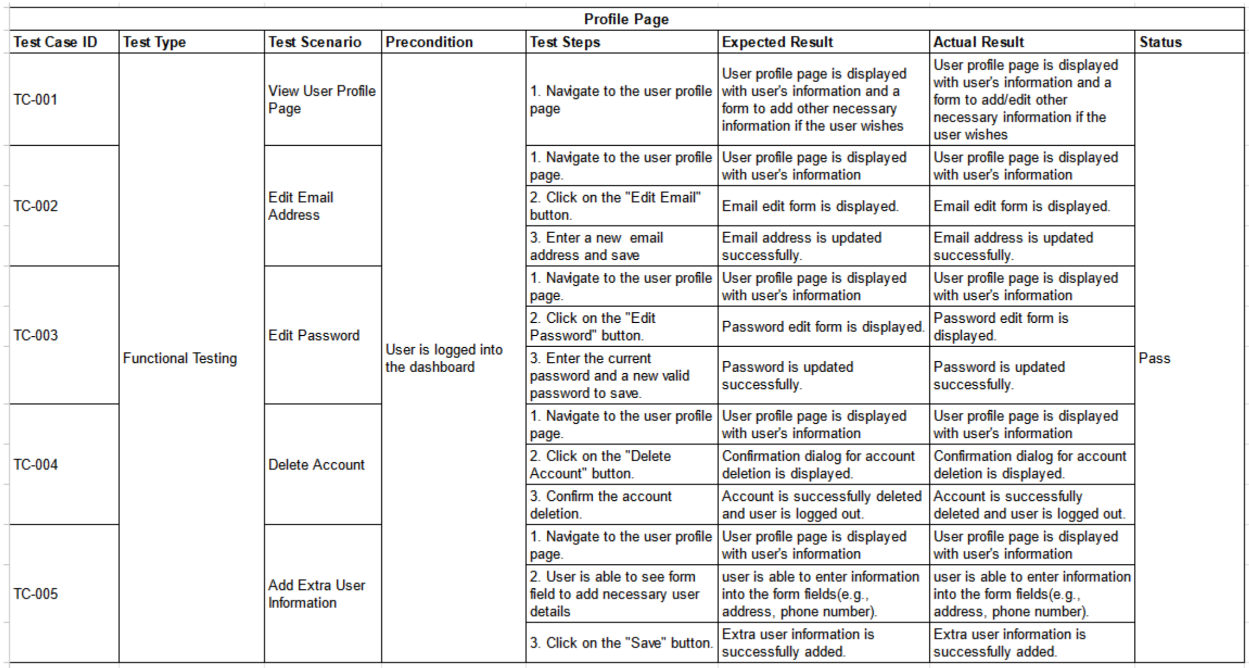
Figure 45: Test Case Scenario for Registration



Registration

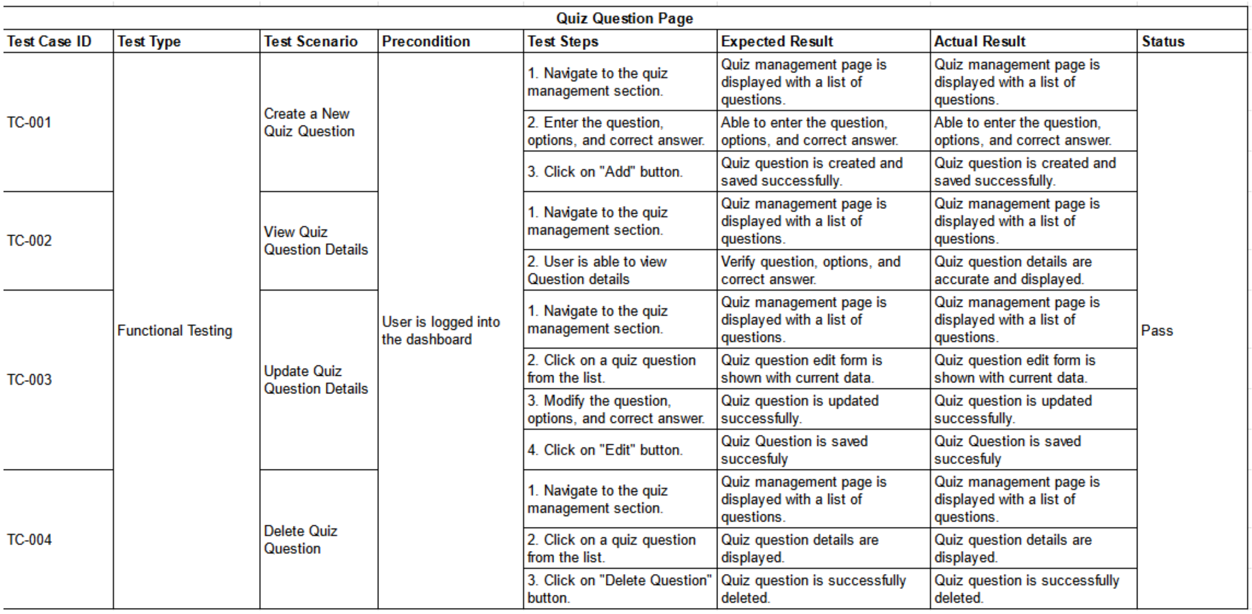
Test Case ID	Test Type	Test Scenario	Precondition	Test Steps	Expected Result	Actual Result	Status
TC-001	Functional Testing	Valid User Registration	User account does not already exist	1. Open the registration page	Registration page is displayed	Registration page is displayed	Pass
				2. Enter valid first name, last name,username, email, password and confirm password	User details are accepted and saved and success message is displayed	User details are accepted and saved and success message is displayed	
TC-002		Empty fields in registration form	User account does not already exist	1. Open the registration page	Registration page is displayed	Registration page is displayed	
				2. Leave all fields blank and submit	Error messages are displayed for fields being empty	Error messages are displayed for fields being empty	
TC-003		Invalid form field format		1. Open the registration page	Registration page is displayed	Registration page is displayed	
				2. Enter any invalid form field; firstname, lastname, username, email, password	Appropriate error message is displayed for each any form field that is invalid and user credentials are not saved	Appropriate error message is displayed for each any form field that is invalid and user credentials are not saved	
TC-004		Passwords do not match		1. Open the registration page	Registration page is displayed	Registration page is displayed	
				2.Enter valid form fields with exception of mismatching confirm password	Error message is displayed when password does not match and user credentials are not saved	Error message is displayed when password does not match and user credentials are not saved	
TC-005		Username already exists	User account with the same username already exists	1. Open the registration page	Registration page is displayed	Registration page is displayed	
				2. Enter valid first name, last name,username that exists in database, email, password and confirm password	Error messages are displayed for username already existing	Registration page is displayed	

Figure 46: Test Case Scenario for Profile Page



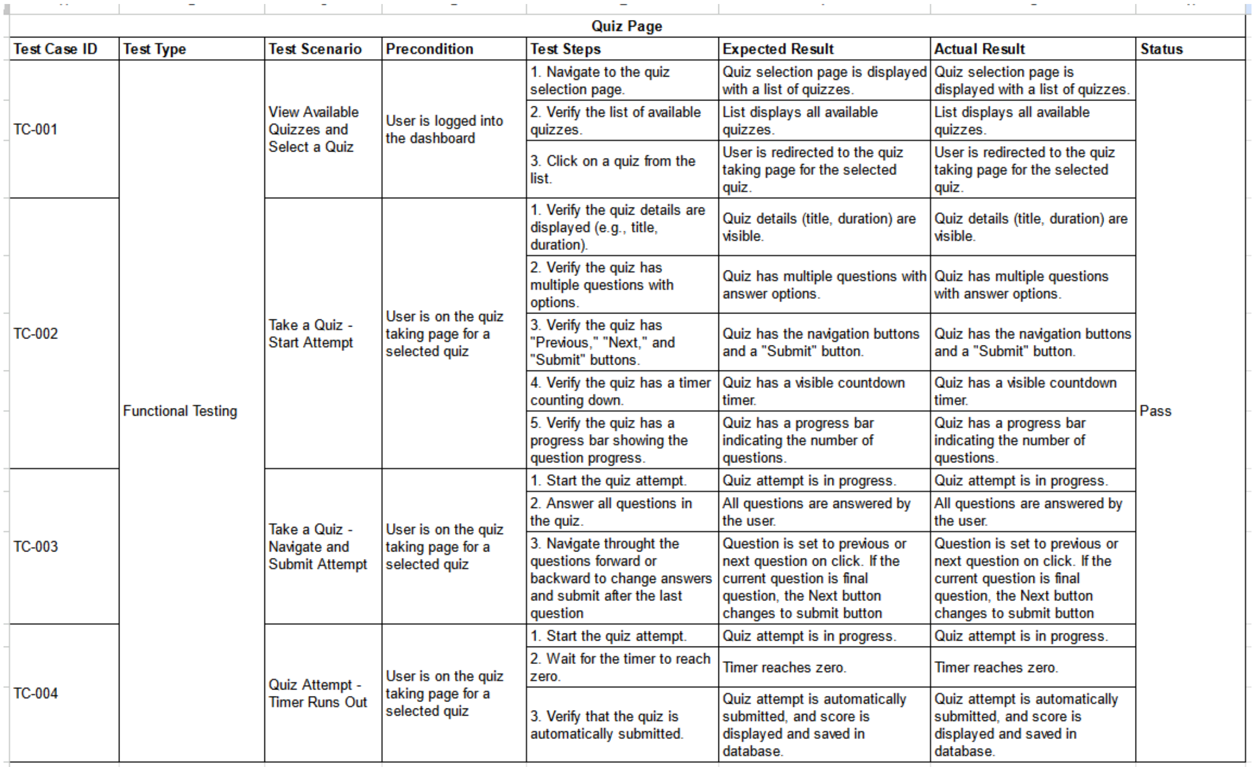
Profile Page							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	View User Profile Page	User is logged into the dashboard	1. Navigate to the user profile page	User profile page is displayed with user's information and a form to add other necessary information if the user wishes	User profile page is displayed with user's information and a form to add/edit other necessary information if the user wishes	Pass
TC-002		Edit Email Address		1. Navigate to the user profile page.	User profile page is displayed with user's information	User profile page is displayed with user's information	
				2. Click on the "Edit Email" button.	Email edit form is displayed.	Email edit form is displayed.	
				3. Enter a new email address and save	Email address is updated successfully.	Email address is updated successfully.	
TC-003		Edit Password		1. Navigate to the user profile page.	User profile page is displayed with user's information	User profile page is displayed with user's information	
				2. Click on the "Edit Password" button.	Password edit form is displayed.	Password edit form is displayed.	
				3. Enter the current password and a new valid password to save.	Password is updated successfully.	Password is updated successfully.	
TC-004		Delete Account		1. Navigate to the user profile page.	User profile page is displayed with user's information	User profile page is displayed with user's information	
				2. Click on the "Delete Account" button.	Confirmation dialog for account deletion is displayed.	Confirmation dialog for account deletion is displayed.	
				3. Confirm the account deletion.	Account is successfully deleted and user is logged out.	Account is successfully deleted and user is logged out.	
TC-005		Add Extra User Information		1. Navigate to the user profile page.	User profile page is displayed with user's information	User profile page is displayed with user's information	
				2. User is able to see form field to add necessary user details	user is able to enter information into the form fields(e.g., address, phone number).	user is able to enter information into the form fields(e.g., address, phone number).	
				3. Click on the "Save" button.	Extra user information is successfully added.	Extra user information is successfully added.	

Figure 47: Test Case Scenario for Quiz Question Page



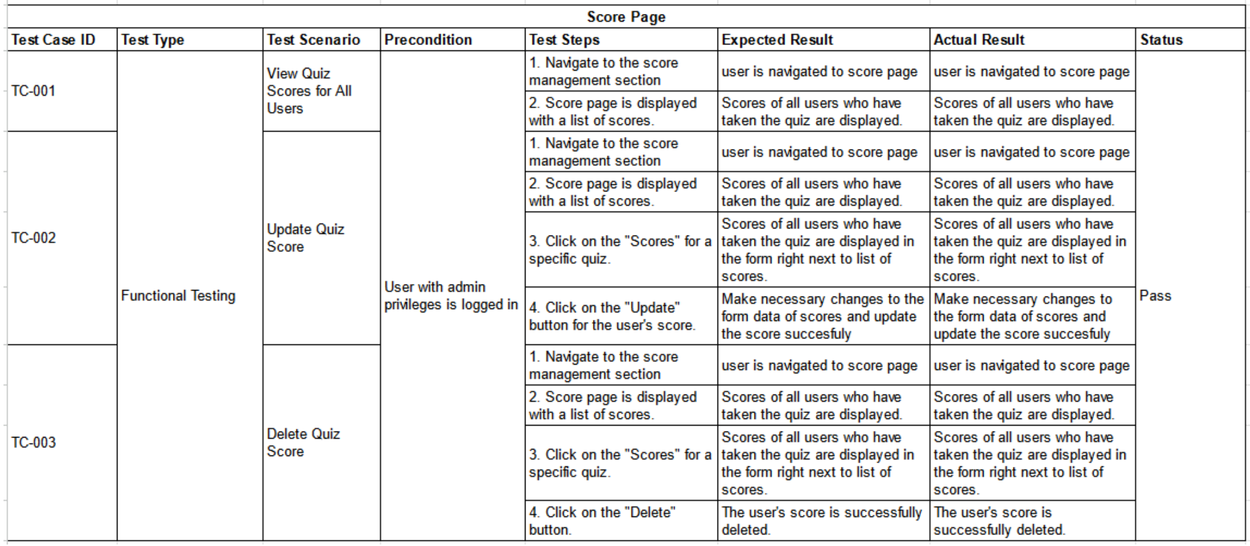
Quiz Question Page							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	Create a New Quiz Question	User is logged into the dashboard	1. Navigate to the quiz management section.	Quiz management page is displayed with a list of questions.	Quiz management page is displayed with a list of questions.	Pass
				2. Enter the question, options, and correct answer.	Able to enter the question, options, and correct answer.	Able to enter the question, options, and correct answer.	
				3. Click on "Add" button.	Quiz question is created and saved successfully.	Quiz question is created and saved successfully.	
TC-002		View Quiz Question Details		1. Navigate to the quiz management section.	Quiz management page is displayed with a list of questions.	Quiz management page is displayed with a list of questions.	
				2. User is able to view Question details	Verify question, options, and correct answer.	Quiz question details are accurate and displayed.	
TC-003		Update Quiz Question Details		1. Navigate to the quiz management section.	Quiz management page is displayed with a list of questions.	Quiz management page is displayed with a list of questions.	
				2. Click on a quiz question from the list.	Quiz question edit form is shown with current data.	Quiz question edit form is shown with current data.	
				3. Modify the question, options, and correct answer.	Quiz question is updated successfully.	Quiz question is updated successfully.	
				4. Click on "Edit" button.	Quiz Question is saved succesfuly	Quiz Question is saved succesfuly	
TC-004		Delete Quiz Question		1. Navigate to the quiz management section.	Quiz management page is displayed with a list of questions.	Quiz management page is displayed with a list of questions.	
				2. Click on a quiz question from the list.	Quiz question details are displayed.	Quiz question details are displayed.	
				3. Click on "Delete Question" button.	Quiz question is successfully deleted.	Quiz question is successfully deleted.	

Figure 48: Test Case Scenario for Quiz Page



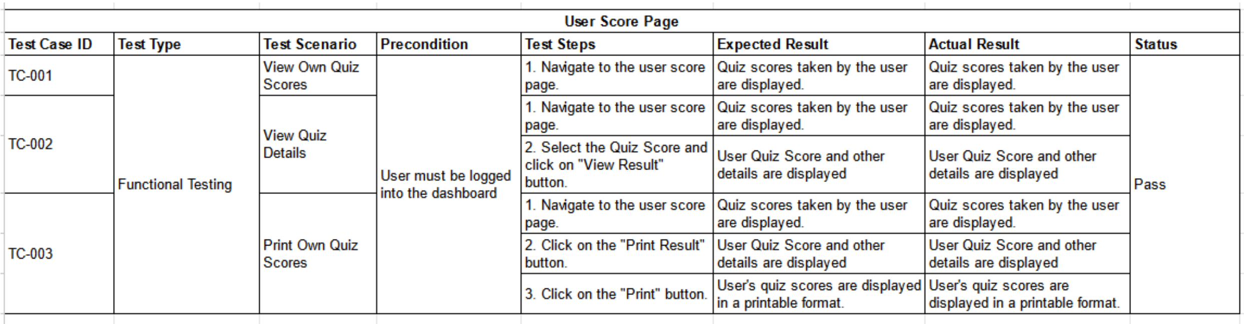
Quiz Page							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	View Available Quizzes and Select a Quiz	User is logged into the dashboard	1. Navigate to the quiz selection page.	Quiz selection page is displayed with a list of quizzes.	Quiz selection page is displayed with a list of quizzes.	Pass
				2. Verify the list of available quizzes.	List displays all available quizzes.	List displays all available quizzes.	
				3. Click on a quiz from the list.	User is redirected to the quiz taking page for the selected quiz.	User is redirected to the quiz taking page for the selected quiz.	
TC-002		Take a Quiz - Start Attempt	User is on the quiz taking page for a selected quiz	1. Verify the quiz details are displayed (e.g., title, duration).	Quiz details (title, duration) are visible.	Quiz details (title, duration) are visible.	
				2. Verify the quiz has multiple questions with options.	Quiz has multiple questions with answer options.	Quiz has multiple questions with answer options.	
				3. Verify the quiz has "Previous," "Next," and "Submit" buttons.	Quiz has the navigation buttons and a "Submit" button.	Quiz has the navigation buttons and a "Submit" button.	
				4. Verify the quiz has a timer counting down.	Quiz has a visible countdown timer.	Quiz has a visible countdown timer.	
				5. Verify the quiz has a progress bar showing the question progress.	Quiz has a progress bar indicating the number of questions.	Quiz has a progress bar indicating the number of questions.	
TC-003		Take a Quiz - Navigate and Submit Attempt	User is on the quiz taking page for a selected quiz	1. Start the quiz attempt.	Quiz attempt is in progress.	Quiz attempt is in progress.	
				2. Answer all questions in the quiz.	All questions are answered by the user.	All questions are answered by the user.	
				3. Navigate throught the questions forward or backward to change answers and submit after the last question	Question is set to previous or next question on click. If the current question is final question, the Next button changes to submit button	Question is set to previous or next question on click. If the current question is final question, the Next button changes to submit button	
TC-004		Quiz Attempt - Timer Runs Out	User is on the quiz taking page for a selected quiz	1. Start the quiz attempt.	Quiz attempt is in progress.	Quiz attempt is in progress.	
				2. Wait for the timer to reach zero.	Timer reaches zero.	Timer reaches zero.	
				3. Verify that the quiz is automatically submitted.	Quiz attempt is automatically submitted, and score is displayed and saved in database.	Quiz attempt is automatically submitted, and score is displayed and saved in database.	

Figure 49: Test Case Scenario for Score Page



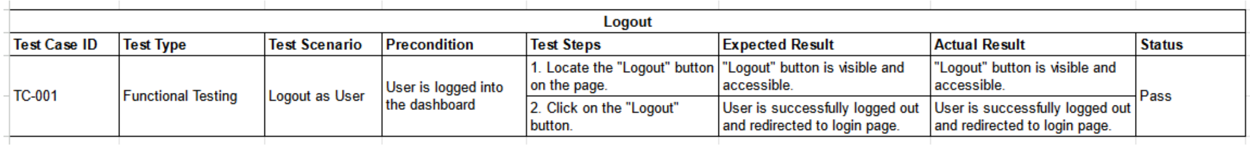
Score Page							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	View Quiz Scores for All Users	User with admin privileges is logged in	1. Navigate to the score management section	user is navigated to score page	user is navigated to score page	Pass
				2. Score page is displayed with a list of scores.	Scores of all users who have taken the quiz are displayed.	Scores of all users who have taken the quiz are displayed.	
TC-002		Update Quiz Score		1. Navigate to the score management section	user is navigated to score page	user is navigated to score page	
				2. Score page is displayed with a list of scores.	Scores of all users who have taken the quiz are displayed.	Scores of all users who have taken the quiz are displayed.	
				3. Click on the "Scores" for a specific quiz.	Scores of all users who have taken the quiz are displayed in the form right next to list of scores.	Scores of all users who have taken the quiz are displayed in the form right next to list of scores.	
				4. Click on the "Update" button for the user's score.	Make necessary changes to the form data of scores and update the score succesfuly	Make necessary changes to the form data of scores and update the score succesfuly	
TC-003		Delete Quiz Score		1. Navigate to the score management section	user is navigated to score page	user is navigated to score page	
				2. Score page is displayed with a list of scores.	Scores of all users who have taken the quiz are displayed.	Scores of all users who have taken the quiz are displayed.	
				3. Click on the "Scores" for a specific quiz.	Scores of all users who have taken the quiz are displayed in the form right next to list of scores.	Scores of all users who have taken the quiz are displayed in the form right next to list of scores.	
				4. Click on the "Delete" button.	The user's score is successfully deleted.	The user's score is successfully deleted.	

Figure 50: Test Case Scenario for User Score Page



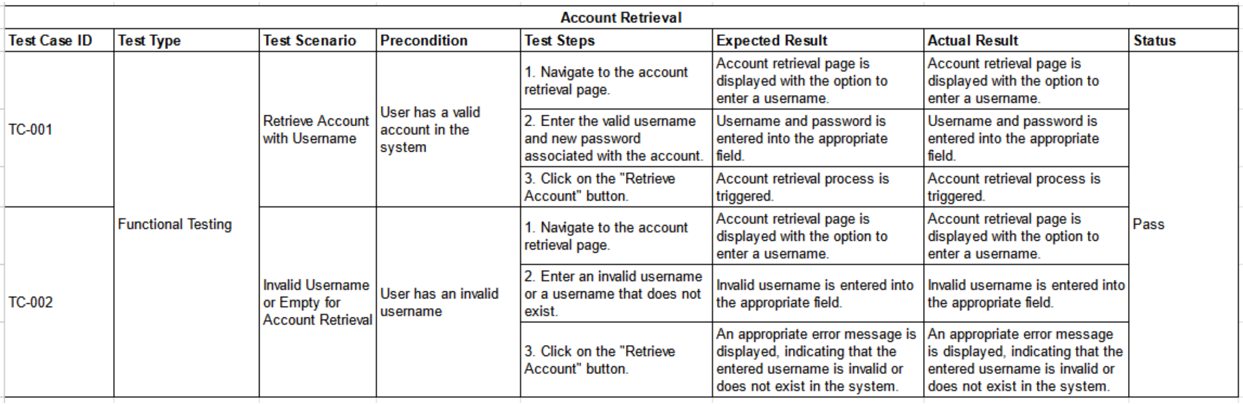
User Score Page							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	View Own Quiz Scores	User must be logged into the dashboard	1. Navigate to the user score page.	Quiz scores taken by the user are displayed.	Quiz scores taken by the user are displayed.	Pass
TC-002		View Quiz Details		1. Navigate to the user score page.	Quiz scores taken by the user are displayed.	Quiz scores taken by the user are displayed.	
				2. Select the Quiz Score and click on "View Result" button.	User Quiz Score and other details are displayed	User Quiz Score and other details are displayed	
TC-003		Print Own Quiz Scores		1. Navigate to the user score page.	Quiz scores taken by the user are displayed.	Quiz scores taken by the user are displayed.	
				2. Click on the "Print Result" button.	User Quiz Score and other details are displayed	User Quiz Score and other details are displayed	
				3. Click on the "Print" button.	User's quiz scores are displayed in a printable format.	User's quiz scores are displayed in a printable format.	

Figure 51: Test Case Scenario for Logout



Logout							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	Logout as User	User is logged into the dashboard	1. Locate the "Logout" button on the page.	"Logout" button is visible and accessible.	"Logout" button is visible and accessible.	Pass
				2. Click on the "Logout" button.	User is successfully logged out and redirected to login page.	User is successfully logged out and redirected to login page.	

Figure 52: Test Case Scenario for Account Retrieval



Account Retrieval							
Test Case ID	**Test Type**	**Test Scenario**	**Precondition**	**Test Steps**	**Expected Result**	**Actual Result**	**Status**
TC-001	Functional Testing	Retrieve Account with Username	User has a valid account in the system	1. Navigate to the account retrieval page.	Account retrieval page is displayed with the option to enter a username.	Account retrieval page is displayed with the option to enter a username.	Pass
				2. Enter the valid username and new password associated with the account.	Username and password is entered into the appropriate field.	Username and password is entered into the appropriate field.	
				3. Click on the "Retrieve Account" button.	Account retrieval process is triggered.	Account retrieval process is triggered.	
TC-002		Invalid Username or Empty for Account Retrieval	User has an invalid username	1. Navigate to the account retrieval page.	Account retrieval page is displayed with the option to enter a username.	Account retrieval page is displayed with the option to enter a username.	
				2. Enter an invalid username or a username that does not exist.	Invalid username is entered into the appropriate field.	Invalid username is entered into the appropriate field.	
				3. Click on the "Retrieve Account" button.	An appropriate error message is displayed, indicating that the entered username is invalid or does not exist in the system.	An appropriate error message is displayed, indicating that the entered username is invalid or does not exist in the system.	

Conclusion

In conclusion, developing a quiz application using Java Swing and MySQL was a great experience for us students. Through this project, we followed Agile methodology, allowing us to work in small increments and make continuous improvements. This approach helped us stay focused on meeting the project requirements and delivering a user-friendly and efficient application.

The system architecture we designed ensured that the application is scalable and easy to maintain. With a well-organized frontend, we created a user-friendly GUI that offered a positive experience for our users. Meanwhile, the backend efficiently handled user inputs, validated them, and executed CRUD operations on the MySQL database.

We prioritized user stories, which served as a guideline to fulfill the needs of our target audience effectively. User stories helped shape the application's features and ensured that it fulfilled its purpose. The user-centric approach allowed us to stay on track and consistently consider the end-users' needs throughout the development process.

As students, this project provided us with invaluable hands-on experience in software development, database management, and GUI design. We expanded our knowledge and skills while working collaboratively as a team. Overall, creating the quiz application was both challenging and rewarding, and it strengthened our problem-solving and programming skills. We are proud of our accomplishment and look forward to applying our newfound skills to future projects.

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Appendix

Version Control (GitHub Link)

College repository - https://github.com/SoftwaricaCollege/batch-33c-nileshshrs

Original repository - https://github.com/nileshshrs/quiz_app

YouTube Link

https://youtu.be/et_uXLGWNV0

Project Artifact Link

https://docs.google.com/spreadsheets/d/1w3fnWsVLi5WIhvAyckvi-CLcbAR7UZ4umzLYEdgRGco/edit?usp=sharing

Trello

https://trello.com/invite/b/bTd59e2F/ATTI71cb7dceba10640e549c114762e20a9555F17446/group-a-quiz-application