

ONLINE EXAMINATION SYSTEM

23CSJ303: ADVANCED PROGRAMMING - PROJECT REPORT

Submitted By

A V KIRAN (TKM23CS056)

AADITHYA P K (TKM23CS002)

ABHINAV R (TKM23CS007)

ARAVIND KUMAR V (LTKM23CS149)

SIDHARTH HARIHARAN (TKM23CS132)

to

TKM College of Engineering (Govt. Aided and Autonomous)

in partial fulfillment of the requirements for the award of Bachelor of Technology

in Computer Science and Engineering



Department of Computer Science and Engineering

T.K.M College of Engineering, Kollam

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

TKM COLLEGE OF ENGINEERING, KOLLAM



CERTIFICATE

This is to certify that the report entitled '**ONLINE EXAMINATION SYSTEM**' submitted by **A V Kiran (TKM23CS056), Aadithya P K (TKM23CS002), Abhinav R (TKM23CS007), Aravind Kumar V (LTKM23CS149), Sidharth Hariharan (TKM23CS132)** to TKM College of Engineering (Govt. Aided and Autonomous affiliated to the APJ Abdul Kalam Technological University) in partial fulfillment of the B.Tech. degree in Computer Science and Engineering is a bonafide record of the project work carried out by them under our guidance and supervision. This report in any form has not been submitted to any other University or purpose.

Project Coordinator

Head of the Department

DECLARATION

We hereby declare that the project report '**ONLINE EXAMINATION SYSTEM**', submitted for partial fulfillment of the requirements for the award of degree of Bachelor of Technology of the APJ Abdul Kalam Technological University, Kerala is a bonafide work done by us under supervision of **Dr. Shyna A.** This submission represents our ideas in our own words and where ideas or words of others have been included, we have adequately and accurately cited and referenced. We also declare that we have adhered to the ethics of academic honesty and integrity and have not misrepresented or fabricated any data or idea or fact or source in my submission. We understand that any violation of the above will be a cause for disciplinary action by the institute and/or the University and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been obtained. This report has not previously formed the basis for the award of any degree, diploma, or similar title of any other University.

A V Kiran

Place: Kollam

Aadithya P K

Date: 12/11/24

Abhinav R

Aravind Kumar V

Sidharth Hariharan

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A V Kiran

Aadithya P K

Abhinav R

Aravind Kumar V

Sidharth Hariharan

ABSTRACT

The **Online Examination System** is a web-based application developed to streamline the examination process for educational institutions. Utilizing Java for the user interface, Twilio API for OTP management, and MySQL for database operations, this system provides a structured, efficient, and scalable solution for online exam administration. It supports three distinct user roles: Advisors, Teachers, and Students, each with tailored functionalities to meet their needs. Advisors can manage records and registrations for students and teachers, while Teachers have tools to create, modify, and evaluate multiple-choice question (MCQ) exams. Students can register, attend exams, and receive instant feedback on their performance, allowing them to track their progress over time.

The system is designed for secure multi-user access, ensuring that each user role has the appropriate permissions and data access control. The application facilitates real-time interactions, enabling functionalities such as live exam submissions and immediate result processing. MySQL database management ensures data integrity and efficient storage of user information, exam content, and performance results.

This project offers a reliable, user-friendly interface and robust backend, designed to enhance the examination experience for institutions, educators, and students. It addresses the demands of online education by providing real-time, scalable, and secure exam management, fostering an environment where students can receive immediate feedback and educators can efficiently manage and assess their students.

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LIST OF ABBREVIATIONS

1. UML : Unified Modeling language
2. MCQ : Multiple Choice Questions
3. OES : Online Examination System
4. API - Application Programming Interface
5. UI - User Interface
6. UX - User Experience
7. HTTP - Hypertext Transfer Protocol
8. OTP : One Time Password
9. HTTPS - Hypertext Transfer Protocol Secure
10. SDK - Software Development Kit
11. TCP/IP - Transmission Control Protocol/Internet Protocol
12. IDE - Integrated Development Environment
13. JSON - JavaScript Object Notation
14. GUI - Graphical User Interface
15. SQL : Structured Query Language

CHAPTER 1 : INTRODUCTION

1.1 INTRODUCTION

In today's rapidly evolving educational landscape, the integration of technology into learning processes has become not just beneficial but essential. Educational institutions are increasingly recognizing the need for innovative solutions that enhance the examination experience. Traditional paper-based examination systems, while historically effective, present a myriad of challenges that hinder efficient assessment and timely feedback. The Online Examination System has been developed as a comprehensive solution to address these challenges and revolutionize the way examinations are conducted.

The Online Examination System is a sophisticated web-based application designed to streamline and enhance the examination process for educational institutions. By leveraging modern technologies, this system facilitates a smooth, automated, and user-friendly examination procedure that benefits students, educators, and administrative staff alike. This project aims not only to modernize traditional assessment methods but also to improve data management, security, and real-time feedback mechanisms.

The need for digital solutions in education has grown significantly due to various factors, including increasing student populations, the ongoing curriculum demands, and the desire for greater accessibility. Traditional examination methods often require substantial resources, including time, paper, and physical space. Furthermore, the administration of such examinations can lead to logistical nightmares, including scheduling conflicts, resource allocation, and an increased risk of errors during grading and assessment. These challenges make it imperative to develop a system that enhances efficiency while maintaining the integrity of the examination process.

The Online Examination System addresses these challenges through a carefully designed framework that incorporates features tailored to the needs of different stakeholders. The system encompasses three main user roles: Advisors, Teachers, and Students. Each user role is equipped with tools and functionalities designed to optimize their experience. Advisors are responsible for managing registrations and overseeing records, ensuring that all administrative tasks are handled seamlessly. Teachers are provided with intuitive tools that enable them to create, modify, and grade multiple-choice question (MCQ) exams effectively.

Students benefit from an engaging platform that allows them to register for and attend exams, as well as receive instant feedback on their performance.

Security and data integrity are paramount in the Online Examination System. By utilizing the Twilio API for secure one-time password (OTP) management and MySQL for robust database operations, the system offers a secure and reliable environment for all users. With secure multi-user access controls in place, the system guarantees that sensitive information is protected, thereby fostering trust and confidence among users.

Real-time interaction is another cornerstone of this system. By enabling functionalities such as live exam submissions and immediate result processing, the Online Examination System empowers students to receive prompt feedback, enabling them to track their academic performance and make informed decisions about their learning paths. This immediate feedback loop not only enhances student engagement but also supports a culture of continuous improvement.

The implementation of this project is timely and aligns with the ongoing global shift toward online and hybrid learning environments. The COVID-19 pandemic has accelerated the adoption of online education solutions, highlighting the need for reliable and scalable examination systems that can withstand unforeseen challenges. By incorporating lessons learned from recent global events, the Online Examination System is designed to be adaptable and resilient, ensuring that institutions can continue to provide quality assessments regardless of external circumstances.

This project report will delve deeper into the various aspects of the Online Examination System, including its architecture, functionalities, user interface design, implementation process, and data management strategies. It will also explore the benefits provided to each user role while discussing potential areas for future development and enhancement. Ultimately, this project aims to contribute to the ongoing advancement of digital solutions in education, providing institutions with the tools necessary to meet the evolving needs of students and educators alike. With a focus on usability, security, and innovation, the Online Examination System represents a significant advancement in the realm of academic assessments, setting the stage for a more engaged and effective educational experience in the digital age.

CHAPTER 2 : BACKGROUND

2.1 A Digital solution for paper-based examination

In today's digital age, the traditional paper-based testing methods have become increasingly inefficient and environmentally unfriendly. The need for a reliable, secure, and efficient digital solution for conducting tests has become paramount. This project aims to address this need by developing a Java-based application that offers a comprehensive platform for online MCQ-based testing.

1. Inefficiency of Paper-Based Tests:

- Administering paper exams involves extensive planning, printing, distributing, and later collecting test papers, all of which require considerable logistical resources and time.
- Grading paper-based exams, especially for large groups, is labor-intensive and prone to human error, often leading to delays in results and feedback.

2. Environmental Impact:

- Paper-based testing contributes to deforestation, increased energy consumption, and waste generation. With millions of students taking exams annually, the cumulative environmental footprint of paper use in exams is substantial.
- Reducing paper consumption aligns with sustainable practices and environmental protection initiatives, which many institutions are increasingly prioritizing.

3. Security Concerns:

- Traditional exams can be vulnerable to various security issues, including unauthorized access to exam papers before test dates (leakage), unauthorized materials (cheating), and tampering with answer sheets.
- Ensuring secure examination practices is crucial to maintaining academic integrity and a fair assessment process.

4. Lack of Real-time Feedback:

- In a paper-based system, students typically receive feedback only after a considerable delay, hindering their ability to address knowledge gaps or improve on specific topics immediately.

- Digital solutions can address this issue by offering near-instantaneous feedback, enabling a continuous learning process and encouraging student engagement.

2.2 Project Objectives

The Online Examination System is designed with the following objectives to overcome the issues mentioned above:

1. Digitalize Testing:

- Transitioning to a digital platform allows institutions to administer, manage, and monitor exams electronically. This shift minimizes the dependency on physical materials and enables institutions to manage the entire exam lifecycle, from question paper generation to result analysis, within a single digital interface.

2. Enhance Efficiency:

- Automating grading processes saves time for instructors, reduces administrative tasks, and expedites the examination process. This efficiency is especially valuable in large-scale testing environments, where manually grading hundreds or thousands of exams can be prohibitively time-consuming.
- The system's ability to automatically compile results and generate analytical reports further enhances productivity, enabling educators to focus on student learning rather than logistics.

3. Provide Real-time Feedback:

- Real-time scoring of MCQ-based assessments allows students to view their results and understand their performance immediately upon test completion. Such instant feedback encourages continuous learning and allows students to address weak areas promptly, improving the overall educational experience.

4. Customize for Specific Needs:

- The platform can be customized to meet various institutional requirements, including exam durations, result formats, and privacy or security needs. This adaptability makes the system versatile and suitable for a range of settings, from schools and colleges to corporate training programs.

CHAPTER 3 : DESIGN METHODOLOGY

3.1 CLASS DIAGRAM^[10]

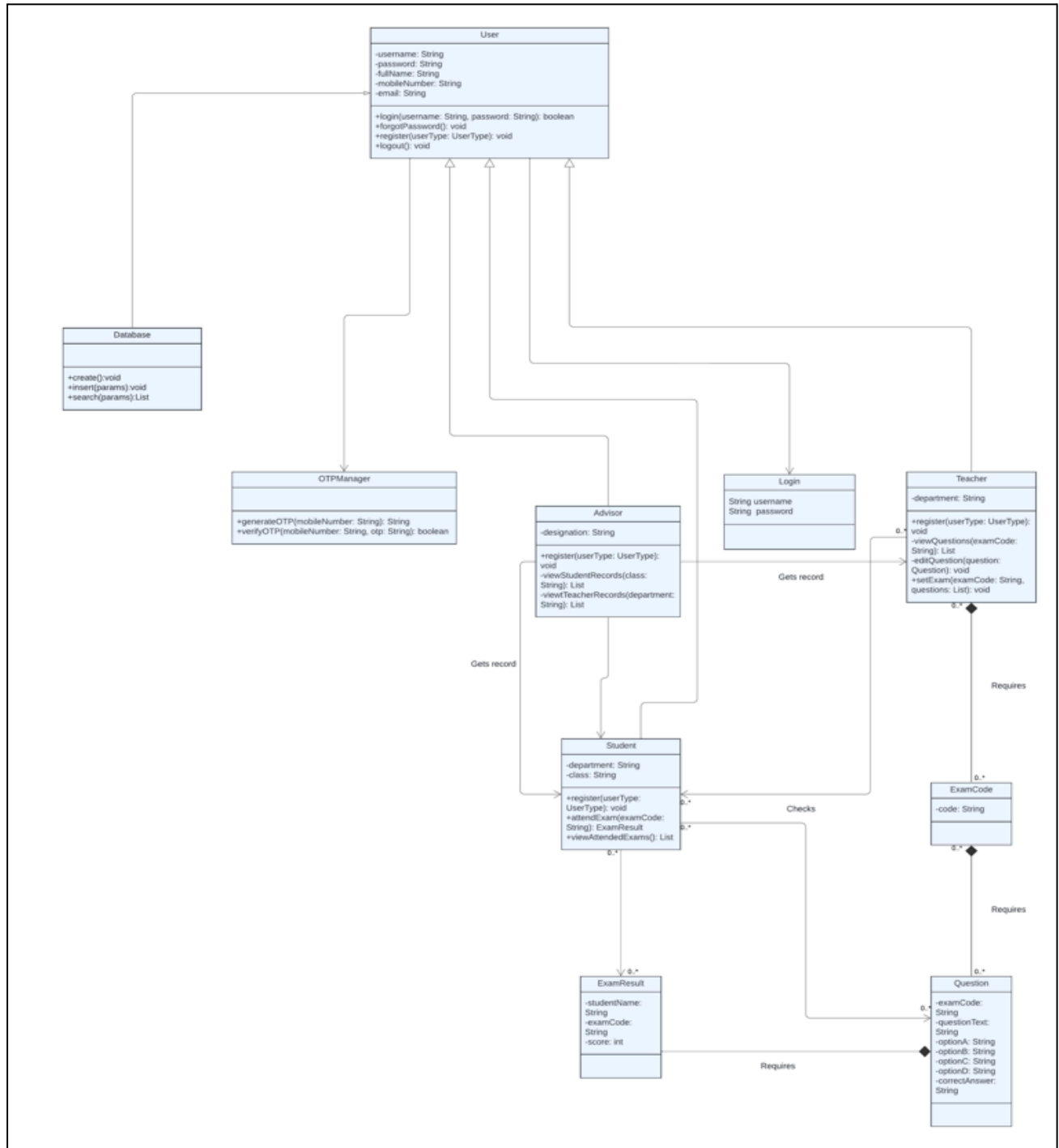


Fig 3.1 Class diagram

The diagram represents an **online examination system**. The class diagram starts with the User class has attributes like username, password, phoneNumber, and email. It includes methods such as login, register, logout, updateUser, and forgot.

1. **Database**: This class handles basic database operations with methods like create, update, and read. It serves as a backend storage system for user information and other data.
2. **OTPManager**: Responsible for generating and verifying one-time passwords (OTP). It has methods generateOTP and verifyOTP.
3. **Advisor**: This class represents advisors in the system with attributes like designation. It contains methods for registering users and viewing student and teacher records.
4. **Student**: Represents students, characterized by attributes such as department and class. It includes methods for registering, viewing exam codes, attending exams and viewing exam results.
5. **ExamResult**: Contains attributes like studentName, examCode, and score. This class keeps track of students' exam results.
6. **Login**: Holds username and password attributes. It is likely used for managing user login sessions.
7. **Teacher**: Represents teachers, with an attribute department. It includes methods for registering users, viewing exam codes, and setting exam questions.
8. **ExamCode**: Stores the exam code information with a single attribute code.
9. **Question**: Manages exam questions with attributes like examCode, questionText, multiple choice options (option1, option2, option3, option4), and the correct option.

The relationships between these classes are as follows:

1. User is central and interacts with multiple classes like Advisor, Student, and Teacher through methods that manage user registration and updates.
2. OTPManager works with User to handle OTP generation and verification.
3. Advisor interacts with Student and Teacher to view records.
4. Students interact with ExamCode and ExamResult to view codes, attend exams and view results.
5. Teacher interacts with ExamCode and Question to manage exams and set questions.

3.2 USE CASE DIAGRAMS^[10]

→ STUDENT

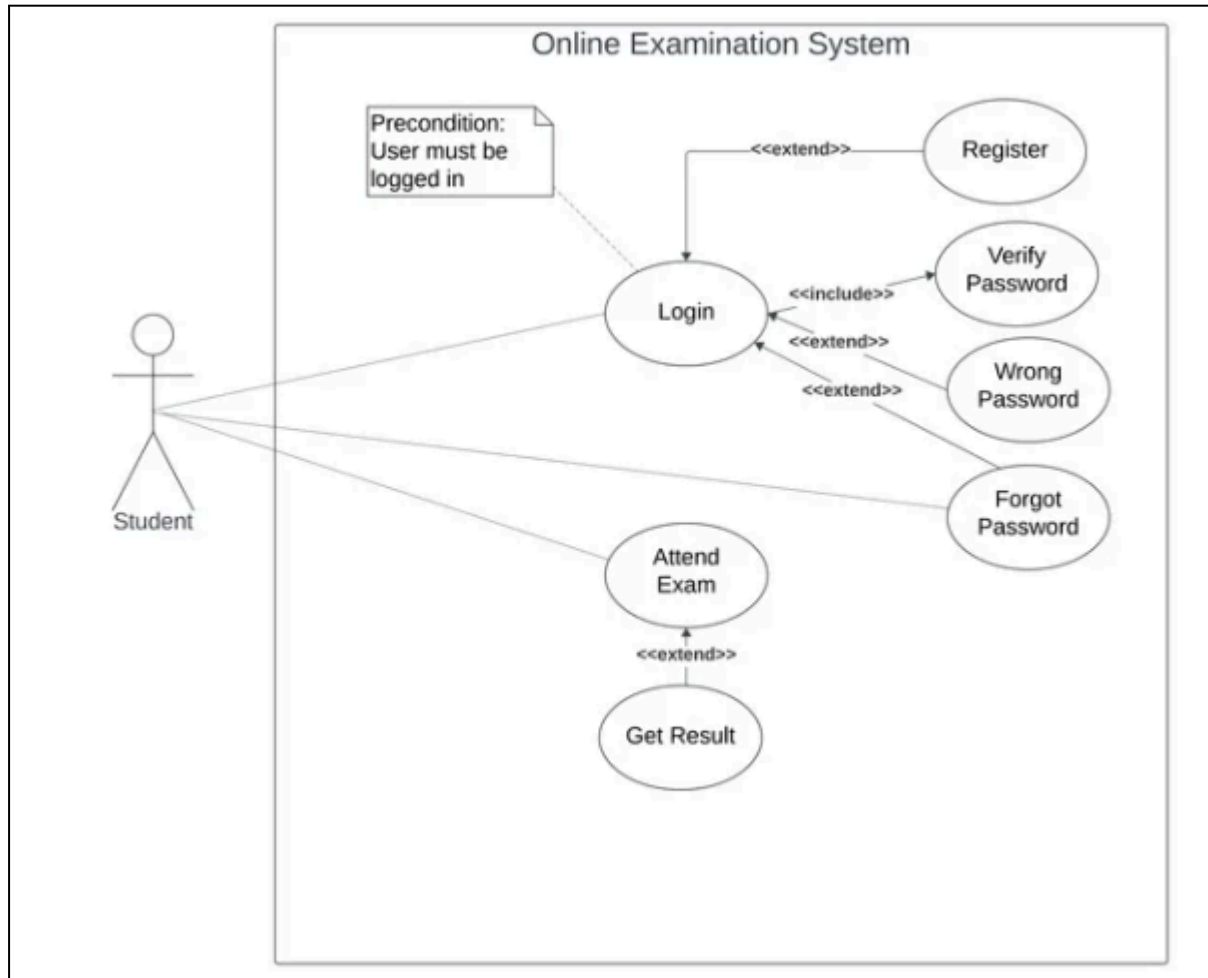


Fig 3.2.1 Use Case Diagram-I

The use case diagram shows the user student as a actor who connects to the system. The working of the different use cases are:

1. Login:
 - The student logs into the system.
 - Includes an include relationship with the Verify Password use case to ensure the password is checked during login.
 - If the password is incorrect, it extends to Wrong Password to handle the error.
 - Forgot Password is also an extend relationship, allowing students to reset their password if they cannot remember it.

2. Register:
 - The student registers with the system to create an account.
 - This is an extend relationship with the Login, as registration is a prerequisite for logging in.
3. Attend Exam:
 - The student participates in an online exam.
 - Precondition: The student must be logged in before they can attend an exam.
4. Get Result:
 - After completing the exam, the student retrieves their results.

→ TEACHER

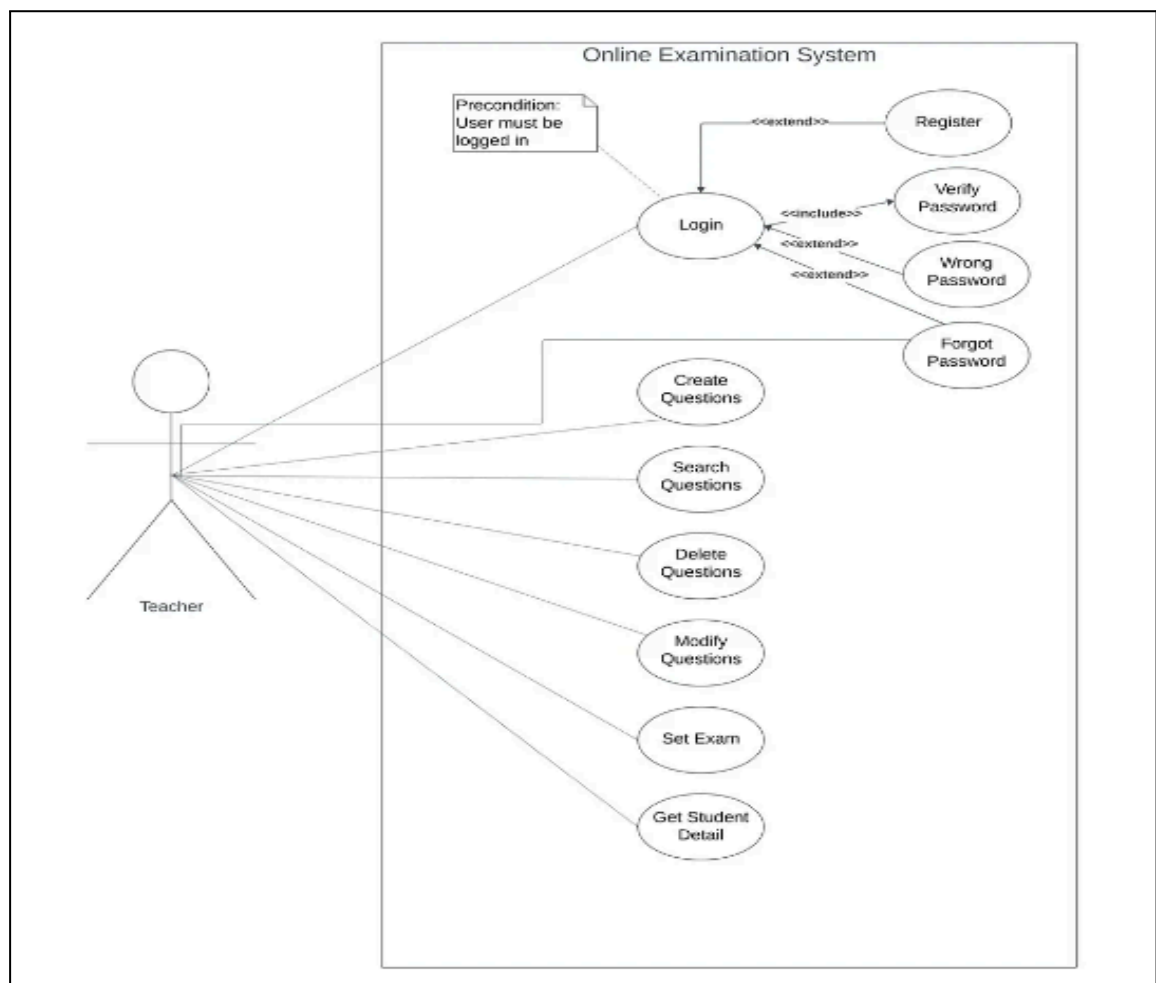


Fig 3.2.2 Use Case Diagram-II

1. Login:
 - The teacher logs into the system.
 - This includes an include relationship with Verify Password to ensure the password is verified during login.

- If the password is incorrect, it extends to Wrong Password to handle the issue.
 - Forgot Password is an extend relationship, allowing the teacher to reset their password if needed.
2. Register:
- The teacher can register with the system to create an account.
 - This has an extend relationship with the Login, as registration is necessary before logging in.
3. Create Questions:
- The teacher can create questions that will be used in exams.
4. Search Questions:
- The teacher searches for specific questions within the system, likely to review or manage them.
5. Delete Questions:
- The teacher can delete questions from the database if they are no longer relevant.
6. Modify Questions:
- The teacher has the ability to edit existing questions as needed.
7. Set Exam:
- The teacher sets up the exam by selecting questions and configuring exam parameters.
8. Get Student Detail:
- The teacher can retrieve details about students, likely for monitoring exam progress or managing records.

→ ADVISOR

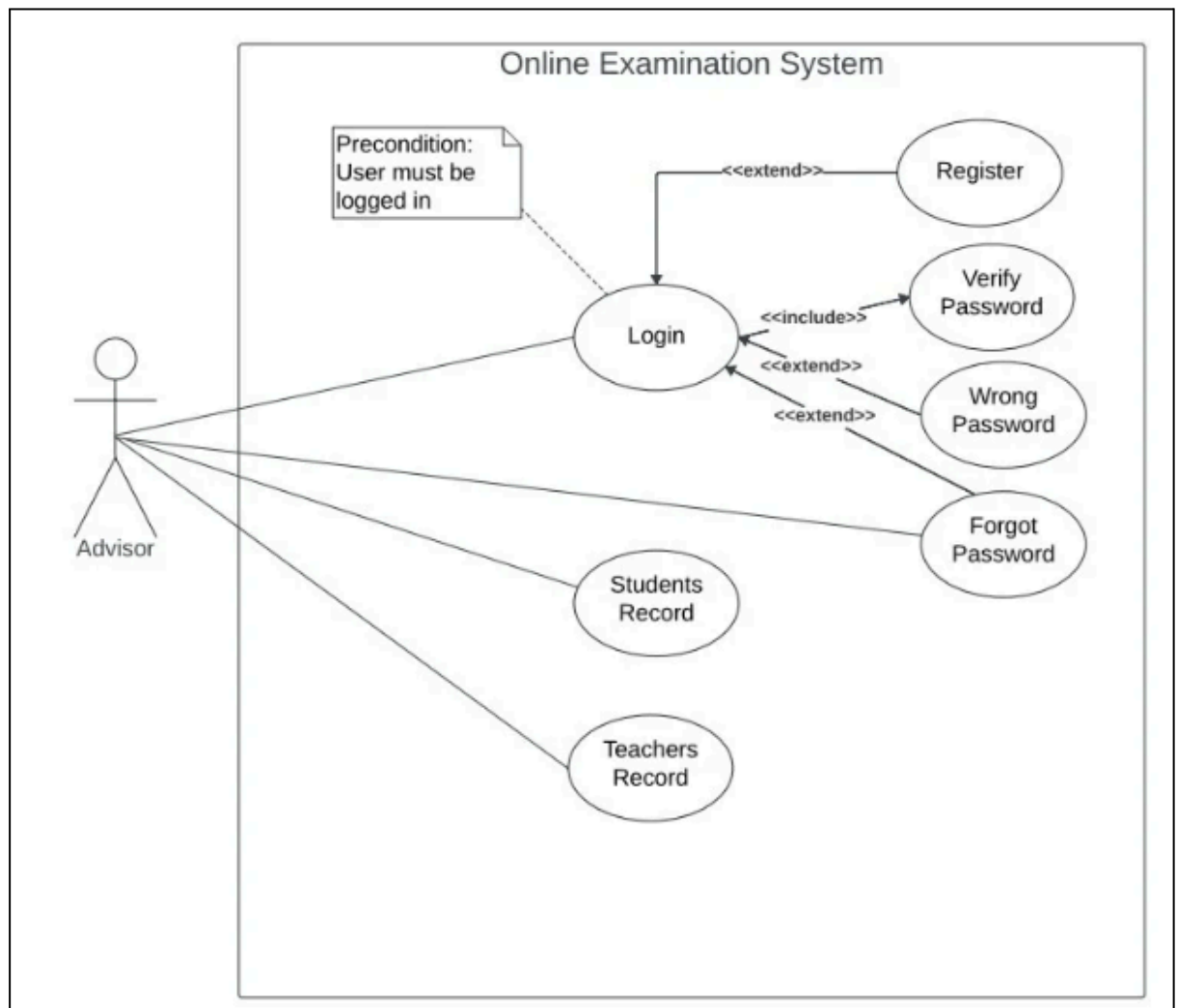


Fig 3.2.3 Use Case Diagram-III

1. Login:
 - The advisor logs into the system.
 - This includes an include relationship with Verify Password to confirm the password upon login.
 - If the password is incorrect, it extends to Wrong Password to handle errors.
 - Forgot Password is an extend relationship, allowing the advisor to reset their password if they forget it.
2. Register:
 - The advisor can register an account in the system.
 - This has an extend relationship with Login, as registration is necessary to access the system.

3. Students Record:

- The advisor accesses and manages records related to students, likely for tracking academic or exam-related information.

4. Teachers Record:

- The advisor can view and manage records of teachers, possibly for oversight or administrative purposes.

3.3 FLOWCHART^[10]

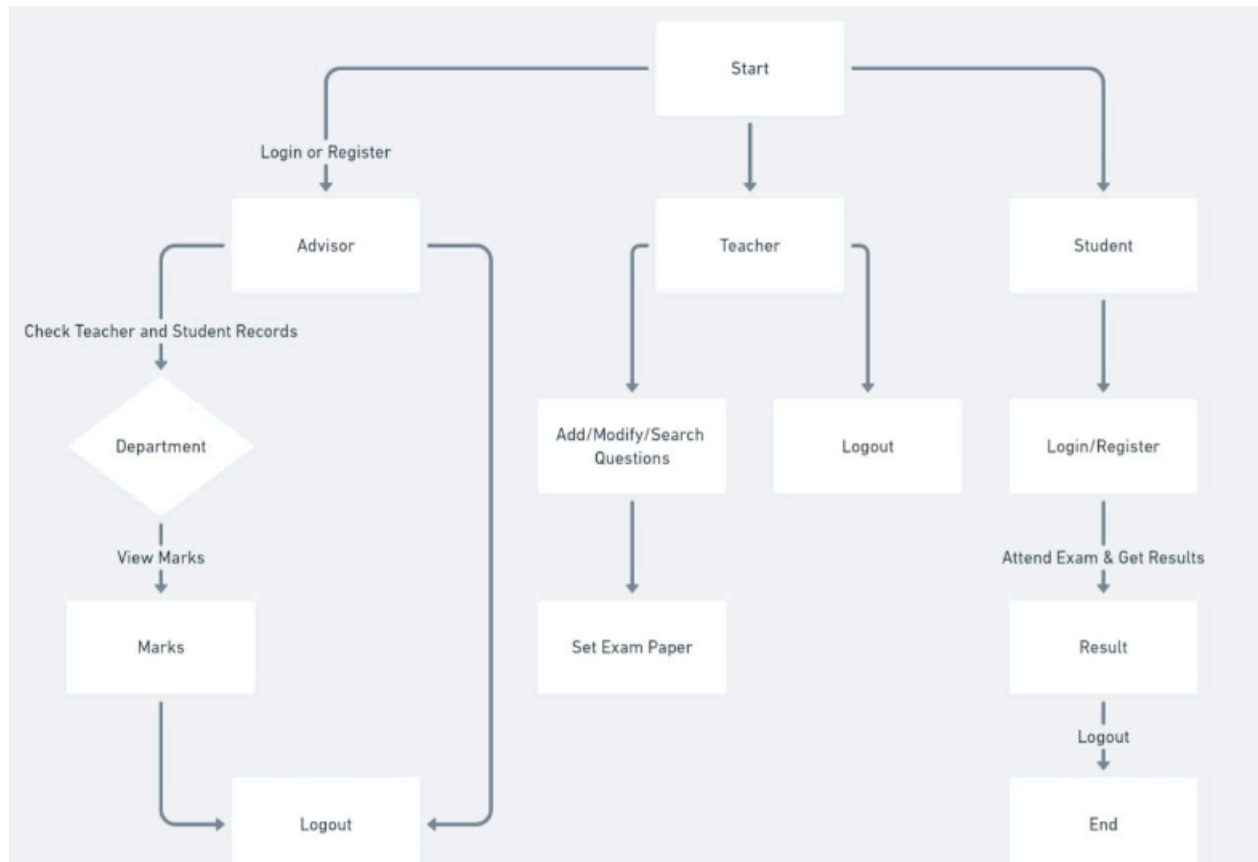


Fig 3.3 Flowchart

The flowchart illustrates a system designed for managing educational interactions among advisors, teachers, and students. The process begins with the user selecting whether to log in or register, signifying the entry point into the system.

Key Components:

1. User Roles:
 - The system accommodates three primary roles: Advisor, Teacher, and Student.
2. Advisor Functions:
 - After logging in or registering, the user may enter as an Advisor. The advisor can check teacher and student records, which involves navigating to the department section to view marks.
3. Teacher Functions:
 - If the user selects the Teacher role, they can add, modify, or search examination questions. Subsequently, the teacher is able to set the exam paper.

Once these tasks are completed, the teacher can choose to log out of the system.

4. Student Functions:

- Students, upon logging in or registering, have the option to attend exams and subsequently retrieve their results. After viewing their results, students also have the option to log out.

5. Flow Direction:

- The flowchart clearly indicates the paths taken based on user roles, with arrows guiding from one action to another, ultimately leading to the logout processes for both teachers and students.

3.4 WIREFRAME MODEL^[1]

→ START



Fig 3.4.1 Start

→ LOGIN

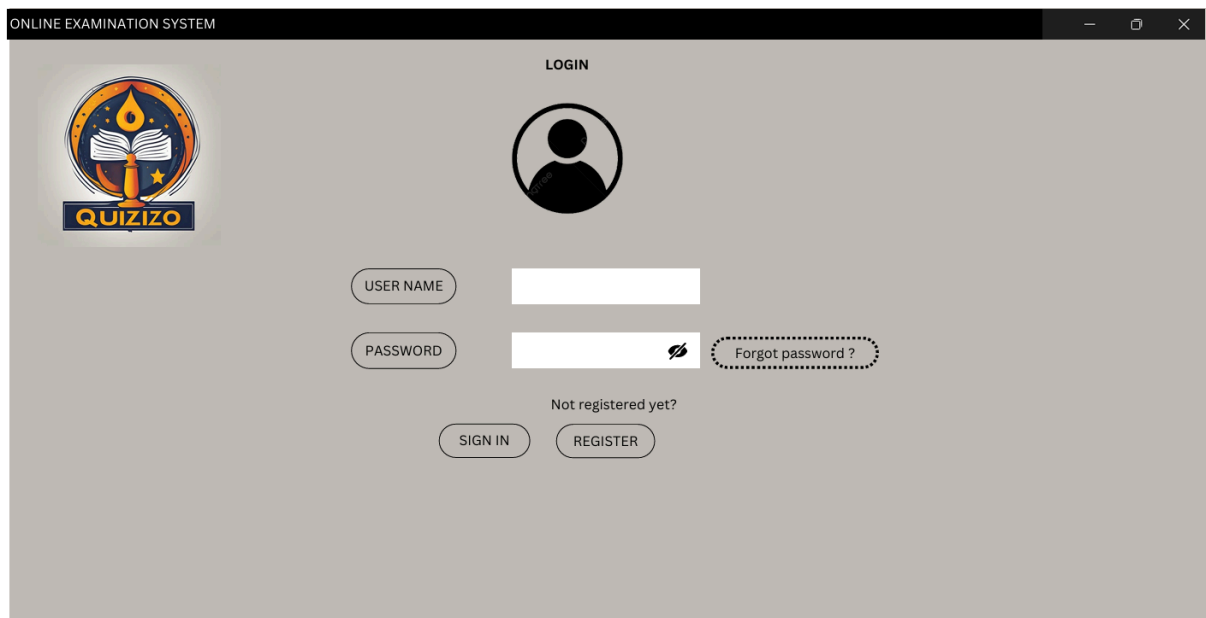
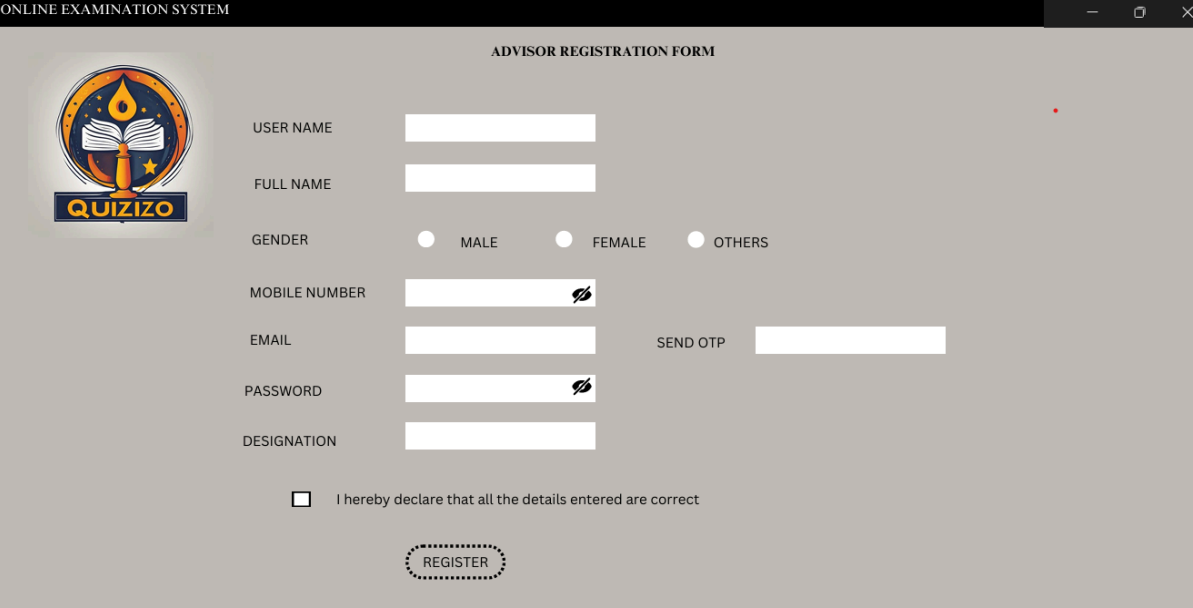



Fig 3.4.2 Login

→ REGISTRATION

ONLINE EXAMINATION SYSTEM

ADVISOR REGISTRATION FORM



USER NAME

FULL NAME

GENDER ☐ MALE ☐ FEMALE ☐ OTHERS

MOBILE NUMBER

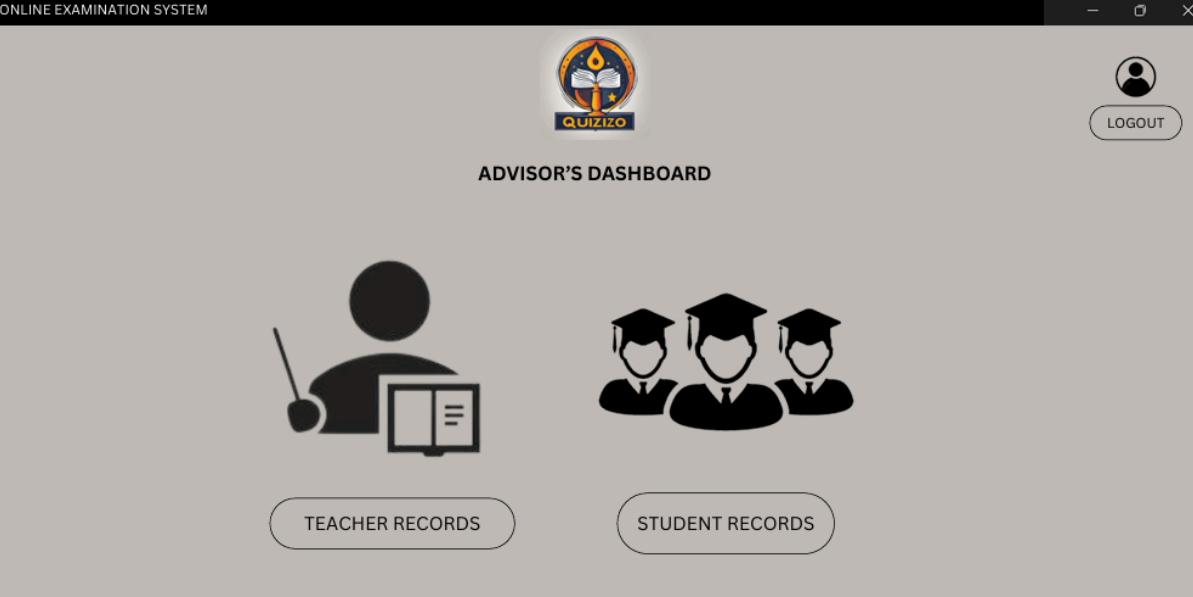
EMAIL SEND OTP

PASSWORD


DESIGNATION

☐ I hereby declare that all the details entered are correct

Fig 3.4.3 Registration


→ ADVISOR'S DASHBOARD

ONLINE EXAMINATION SYSTEM





ADVISOR'S DASHBOARD






Fig 3.4.4 Advisor Dashboard

→ **TEACHER'S DASHBOARD**

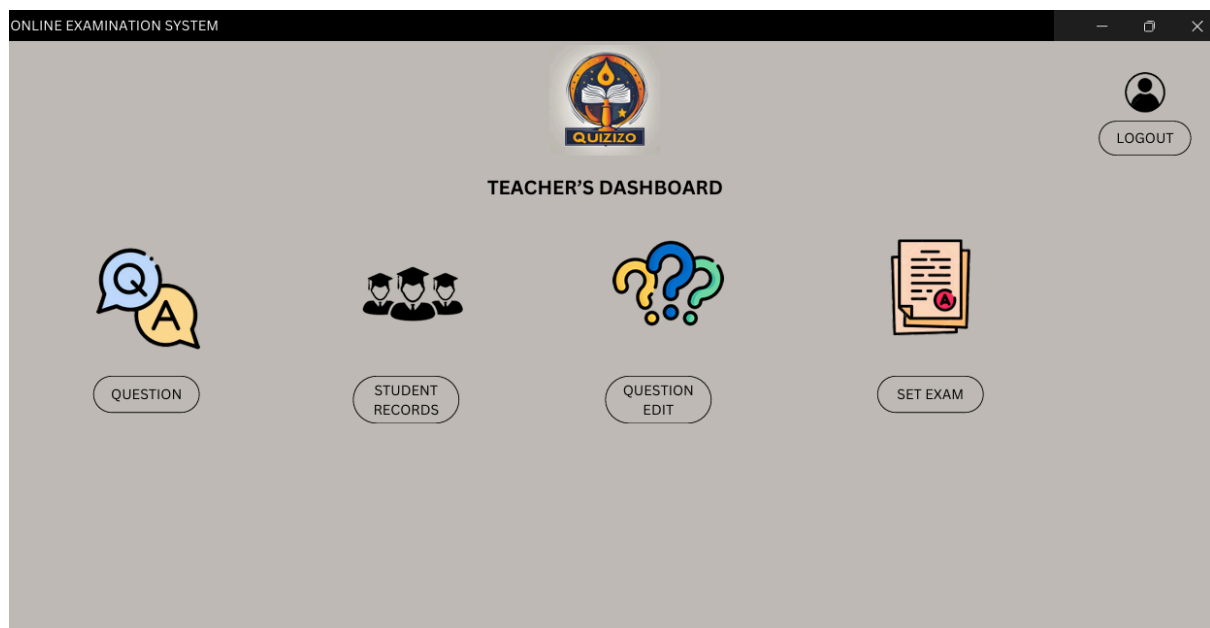


Fig 3.4.5 Teacher Dashboard

→ **STUDENT'S DASHBOARD**

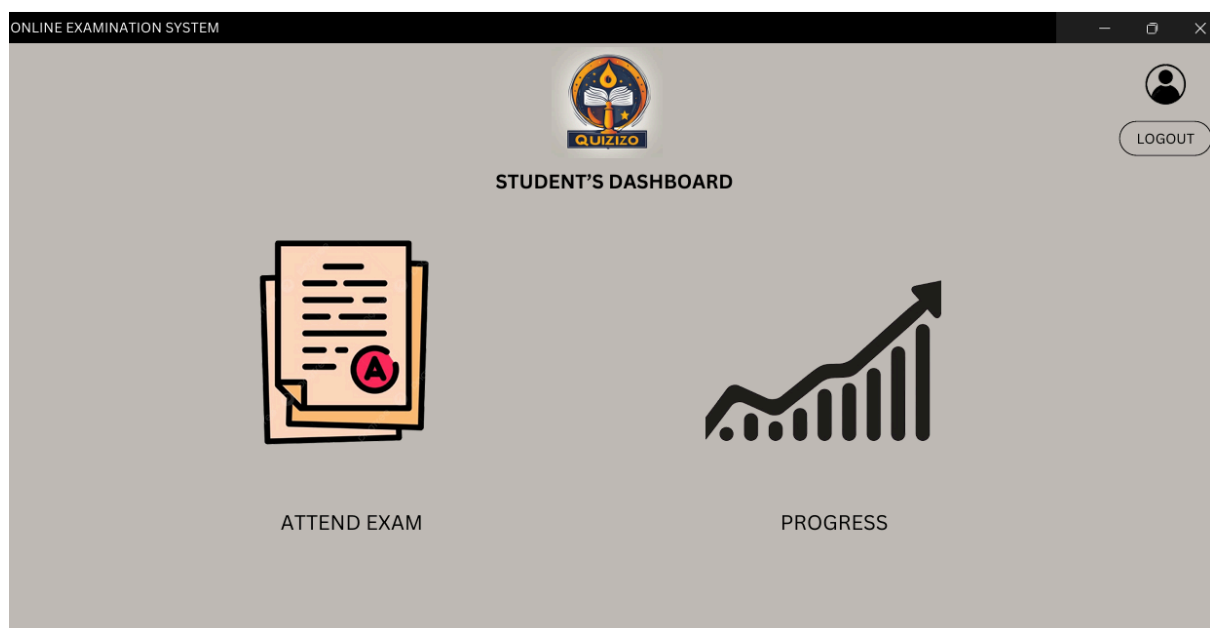


Fig 3.4.6 Student Dashboard

→ QUESTION EDIT

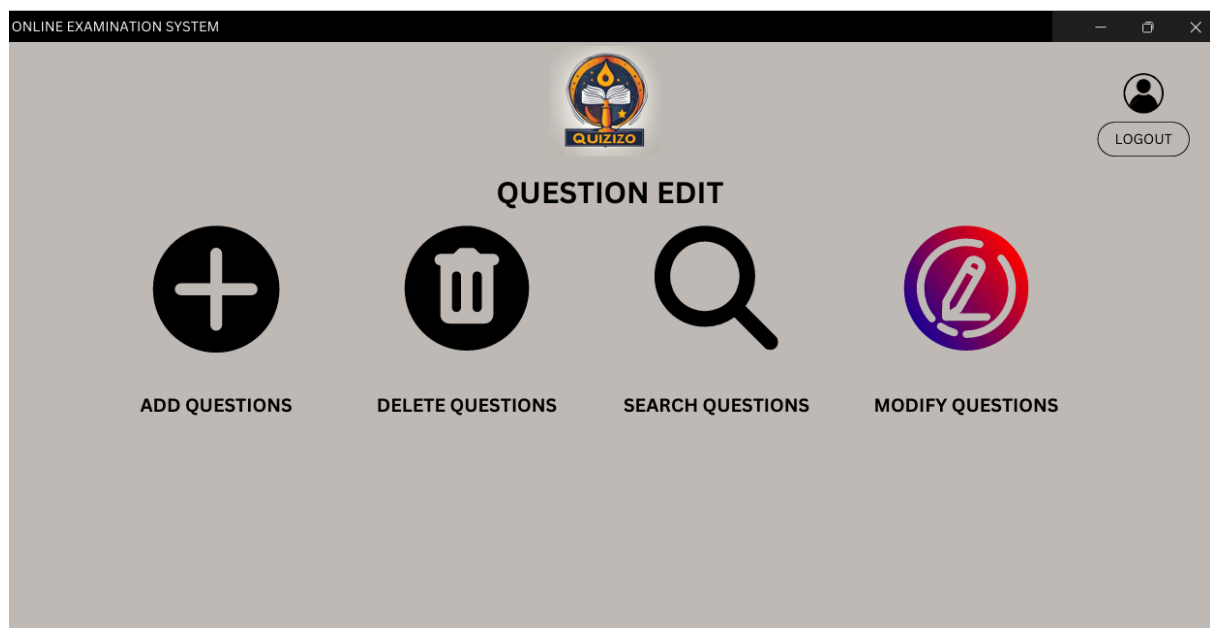


Fig 3.4.7 Question Edit

→ EXAM

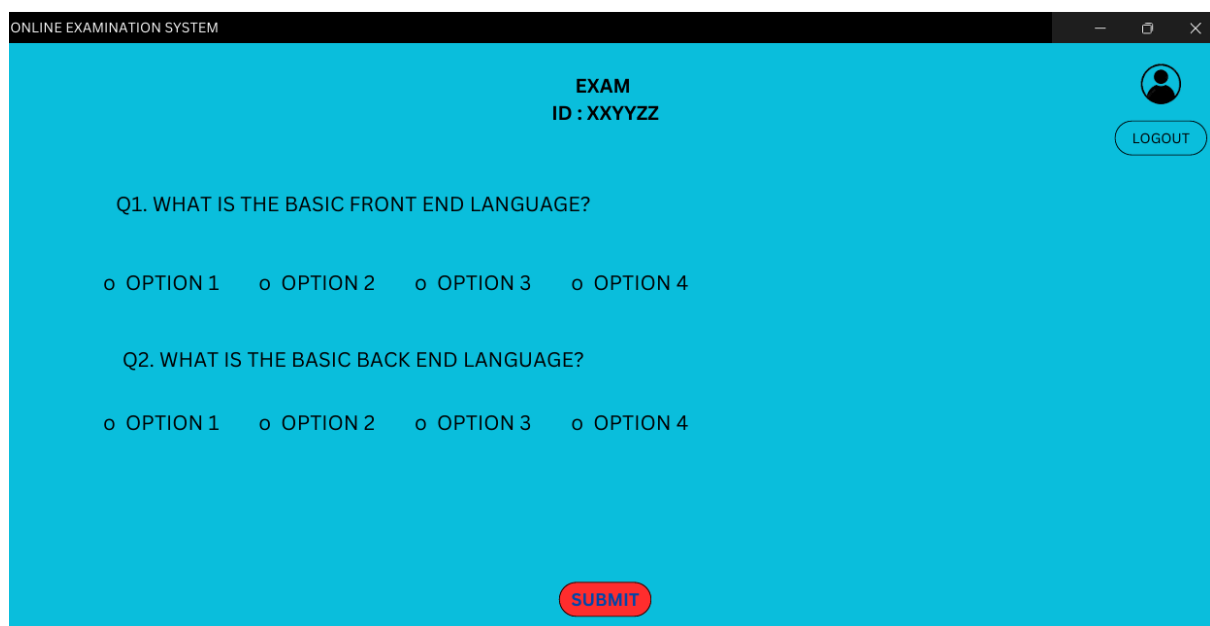


Fig 3.4.8 Exam

→ PROGRESS OF STUDENT

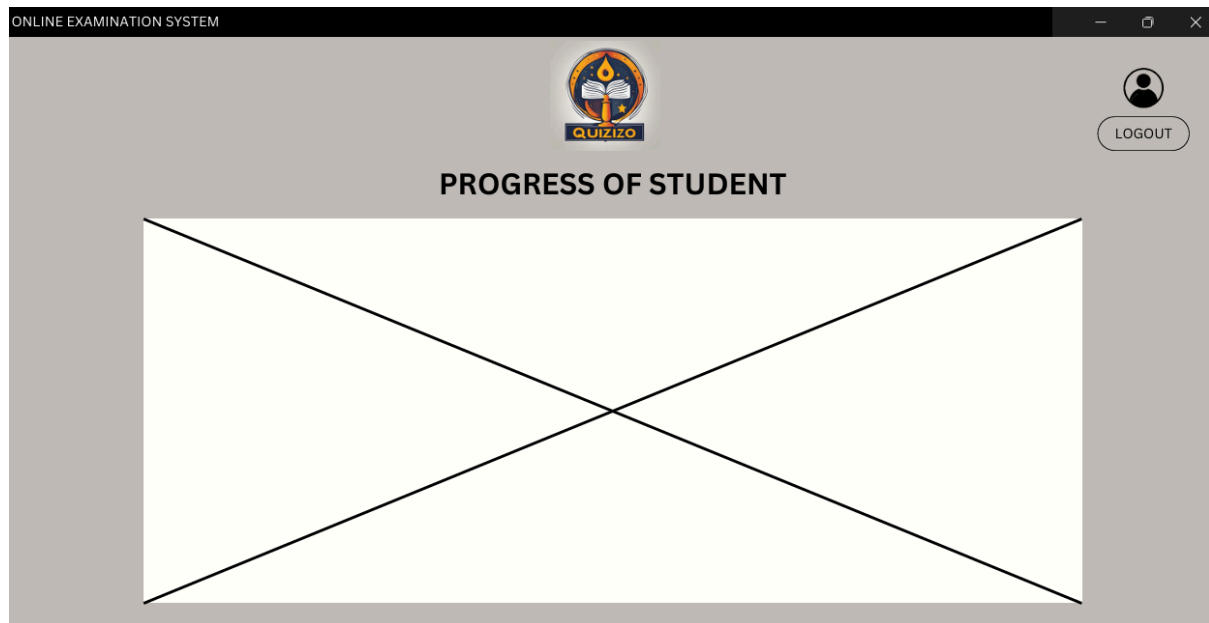


Fig 3.4.9 Progress of Student

3.5 LIST OF MySQL TABLES^[14]

```
mysql> select*from advisor_records;
```

| id | username | full_name | gender | mobile_number | email | password | designation |
|----|----------|-----------|--------|---------------|-----------------------|----------|-------------|
| 1 | kiran | kiran | Male | 8848974677 | kirancomtvm@gmail.com | kiran | adhoc |
| 3 | sid | sid | Male | 8848974677 | kiran@gmail.com | kiran | ADHOC |
| 4 | avkiran | avkiran | Male | 8848974677 | kiran@gmail.com | avkiran | ADHOC |

Fig 3.5.1 Table 1

```
mysql> select*from student_records;
```

| id | username | full_name | gender | mobile_number | email | password | course | class | department |
|----|----------|--------------|--------|---------------|----------------------|----------|--------|-------|------------|
| 1 | kiran | kiran | Male | 8848974677 | kiran@gmail.com | avkiran | CSE | R3B | Science |
| 2 | avkiran | A V KIRAN | Male | 8848974677 | kiran@gmail.com | kiran | CSE | R3B | Science |
| 3 | aadithya | AADITHYA P K | Male | 8848974677 | aadithyapk@gmail.com | aadithya | CSE | R3B | Science |
| 4 | abhinav | abhinav r | Male | 8848974677 | abhinavr@gmail.com | abhinav | CSE | R3B | Science |

Fig 3.5.2 Table 2

```
mysql> select*from advisor_records;
```

| id | username | full_name | gender | mobile_number | email | password | designation |
|----|----------|-----------|--------|---------------|-----------------------|----------|-------------|
| 1 | kiran | kiran | Male | 8848974677 | kirancomtvm@gmail.com | kiran | adhoc |
| 3 | sid | sid | Male | 8848974677 | kiran@gmail.com | kiran | ADHOC |
| 4 | avkiran | avkiran | Male | 8848974677 | kiran@gmail.com | avkiran | ADHOC |

Fig 3.5.3 Table 3

```
mysql> select*from student_records;
```

| id | username | full_name | gender | mobile_number | email | password | course | class | department |
|----|----------|--------------|--------|---------------|----------------------|----------|--------|-------|------------|
| 1 | kiran | kiran | Male | 8848974677 | kiran@gmail.com | avkiran | CSE | R3B | Science |
| 2 | avkiran | A V KIRAN | Male | 8848974677 | kiran@gmail.com | kiran | CSE | R3B | Science |
| 3 | aadithya | AADITHYA P K | Male | 8848974677 | aadithyapk@gmail.com | aadithya | CSE | R3B | Science |
| 4 | abhinav | abhinav r | Male | 8848974677 | abhinavr@gmail.com | abhinav | CSE | R3B | Science |

Fig 3.5.4 Table 4

```
mysql> select*from r3b_record;
```

| full_name | mobile_number | email | gender |
|--------------|---------------|----------------------|--------|
| AADITHYA P K | 8848974677 | aadithyapk@gmail.com | Male |
| abhinav r | 8848974677 | abhinavr@gmail.com | Male |
| A V KIRAN | 8848974677 | kiran@gmail.com | Male |

Fig 3.5.5 Table 5

```
mysql> select*from examcode;
```

| id | exam_code | question | option_a | option_b | option_c | option_d | correct_answer |
|----|-----------|--------------------------------------|---------------|-----------------|-------------------|-----------------------------|----------------|
| 1 | ABHI12 | what is true about java? | robust | that keyword | function oriented | compilation error not found | A |
| 2 | EXAM12 | WHAT IS THE EXAMPLE OF OOD LANGUAGE? | JAVA | C | C++ | NONE | A |
| 3 | EXAM12 | WHAT IS THE SPECIALITY OF JAVA? | ROBUST | OBJECT ORIENTED | THIS KEYWORD | ALL | D |
| 4 | ABHI12 | WHO IS FATHER OF JAVA? | james gosling | dennis ritche | charles babbage | guido von rossum | A |

Fig 3.5.6 Table 6

CHAPTER 4 :TOOLS AND TECHNOLOGIES

4.1 MySQL^[14]

1. **Functionality:** MySQL is an open-source relational database management system (RDBMS) used for managing structured data.
2. **Design:** Supports tables, views, indexes, and constraints to organize and maintain data integrity.
3. **Working:** Uses SQL (Structured Query Language) to create, read, update, and delete data. The database can store user data, exam results, and other related information in tables.
4. **Implementation:**
 - Install MySQL server.
 - Create schemas and tables using SQL commands.
 - Integrate with the Java application using connection strings and queries.
 - Use SQL scripts or GUI tools like MySQL Workbench for database design and management.

4.2 JDBC (Java Database Connectivity)^[12]

1. **Functionality:** Acts as an API for Java to connect and execute queries with a database (e.g., MySQL).
2. **Design:** Provides classes and interfaces like Connection, Statement, PreparedStatement, and ResultSet.
3. **Working:**
 - Load the JDBC driver
 - Establish a connection (DriverManager.getConnection()).
 - Execute SQL queries through Statement or PreparedStatement objects.
4. **Implementation:**
 - Add JDBC library (e.g., mysql-connector-java) to the project.
 - Create methods to handle connection setup, execute queries, and process results.

4.3 Twilio^[8]

1. **Functionality:** Provides communication APIs to send and receive SMS, handle OTP verification, and more.
2. **Design:** Consists of an API endpoint and SDKs that integrate with various programming languages for messaging.
3. **Working:**
 - Use Twilio's REST API to send an OTP to a user's phone.
 - Verify the OTP when entered by the user for authentication.
4. **Implementation:**
 - Sign up for a Twilio account and generate API keys.
 - Use Twilio's Java library to send SMS (using methods like `Message.creator()`).
 - Handle responses and verification logic in the backend.

4.4 Postman^[9]

1. **Functionality:** A platform for testing and developing APIs by sending requests and reviewing responses.
2. **Design:** Provides an easy-to-use interface with options for creating, saving, and organizing API calls.
3. **Working:**
 - Use Postman to send HTTP requests (GET, POST, PUT, DELETE) to the server.
 - View server responses, including status codes and payloads, to debug API endpoints.
4. **Implementation:**
 - Install Postman and create a new collection for organizing API requests.
 - Set up requests with required headers, parameters, and payloads.
 - Analyze response data for testing and integration purposes.

4.5 Git^[3]

1. **Functionality:** A distributed version control system for tracking code changes and collaborating with other developers.
2. **Design:** Uses repositories hosted locally or on platforms like GitHub/GitLab.

3. Working:

- Local repositories are created using git init, and changes are committed with git commit.
- Use git push to send changes to a remote repository and git pull to retrieve updates.

4. Implementation:

- Install Git on your system.
- Create a repository and link it to a remote URL using git remote add.
- Use Git commands for branching, merging, and managing code history.

4.6 Lucidchart^[10]

1. **Functionality:** A web-based diagramming tool for creating use case diagrams, flowcharts, and other visual representations.
2. **Design:** Provides drag-and-drop elements for designing interactive and clear diagrams.

3. Working:

- Choose a use case diagram template.
- Add actors, use cases, and relationships to map out system functionality.

4. Implementation:

- Sign up for Lucidchart and start a new diagram.
- Design and export diagrams as images or PDFs for inclusion in documentation.

4.7 draw.io (now known as Diagrams.net)^[2]

1. **Functionality:** An online tool for creating detailed diagrams such as class diagrams and flowcharts.
2. **Design:** Offers a variety of shapes and connectors for building UML diagrams.

3. Working:

- Use the editor to place classes, attributes, and methods.
- Connect classes with relationships like associations and inheritance.

4. Implementation:

- Open draw.io and start a new diagram.

- Design class structures, export as PNG/SVG for documentation or code reference.

4.8 Canva^[1]

1. **Functionality:** A graphic design platform for creating presentations, wireframes, and visual content.
2. **Design:** Includes customizable templates, design elements, and tools for layout and styling.
3. **Working:**
 - Create wireframes by using placeholders and design elements.
 - Build project presentations with slides containing images, text, and icons.
4. **Implementation:**
 - Log in to Canva and select a presentation or custom design template.
 - Design the app icon or wireframes and export them in suitable formats (PNG/PDF).

4.9 ChatGPT^[6]

1. **Functionality:** An AI tool that helps resolve coding issues, generate code snippets, and provide development guidance.
2. **Design:** Processes input queries and generates responses using natural language processing (NLP) and trained models.
3. **Working:**
 - Developers can input questions related to code errors or concepts.
 - The AI provides solutions, code examples, or troubleshooting steps.
4. **Implementation:**
 - Access ChatGPT through its web interface or API.
 - Use it to find quick solutions for database issues like managing MySQL connections or constructing complex SQL queries.

4.10 Google Docs^[4]

1. **Functionality:** An online word processing tool that allows users to create, edit, and collaborate on documents in real-time from any device.

- 2. Design:** Google Docs is designed to be intuitive and user-friendly, with a clean interface and robust tools for editing, formatting, and sharing. It integrates with Google Drive for storage and provides collaboration features with commenting and revision history.

3. Working:

- Document Creation and Editing: Users can create new documents or edit existing ones using a wide range of text formatting and styling options.
- Collaboration and Sharing: Multiple users can collaborate on the same document in real time, with permission settings for viewing, commenting, or editing.
- Cloud Storage Integration: All documents are saved automatically in Google Drive, allowing easy access and sharing.
- Add-ons and Extensions: Users can extend functionality by integrating third-party tools or using built-in features like Google Keep, Translate, and Explore.

4. Implementation:

- Access Google Docs via Browser or App: Users can use Google Docs through its web interface on docs.google.com or through mobile apps on Android and iOS.
- Templates and Formatting Options: Offers a range of templates for different document types and allows customization with fonts, images, tables, and charts.
- Real-time Collaboration Features: By inviting collaborators and assigning permissions, users can work together, leave comments, and track changes with version history.
- Export and Import Capabilities: Documents can be saved in multiple formats (PDF, DOCX, etc.) and imported from other word processing tools for compatibility.

CHAPTER 5 : IMPLEMENTATION AND RESULTS

5.1 IMPLEMENTATION AND RESULTS

→ START

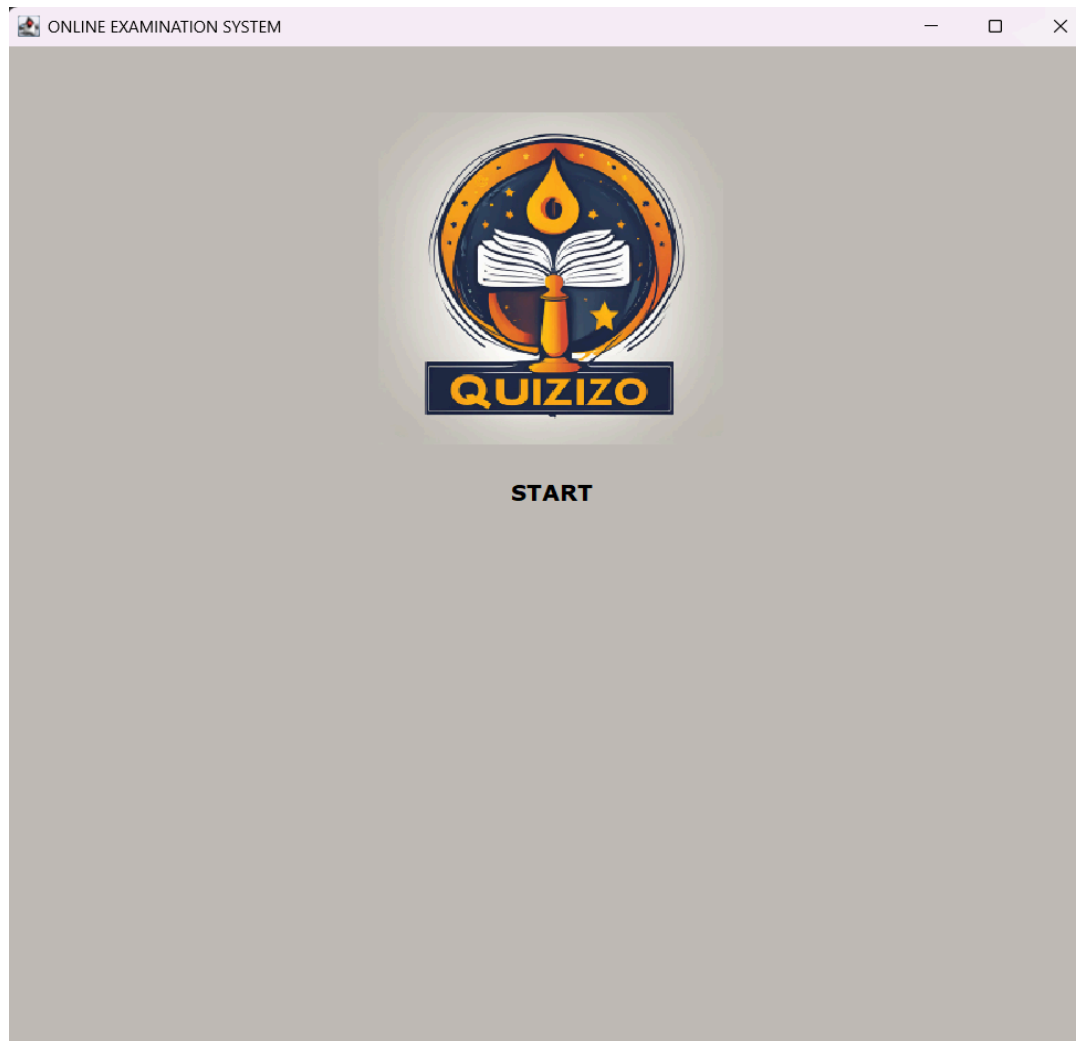


Fig 5.1.1 Start GUI

The first window opened when running the compiler is the START page which shows the logo of the online examination system along with the name “QUIZIZO”. When the user clicks on the START button the login panel opens up.

→ LOGIN

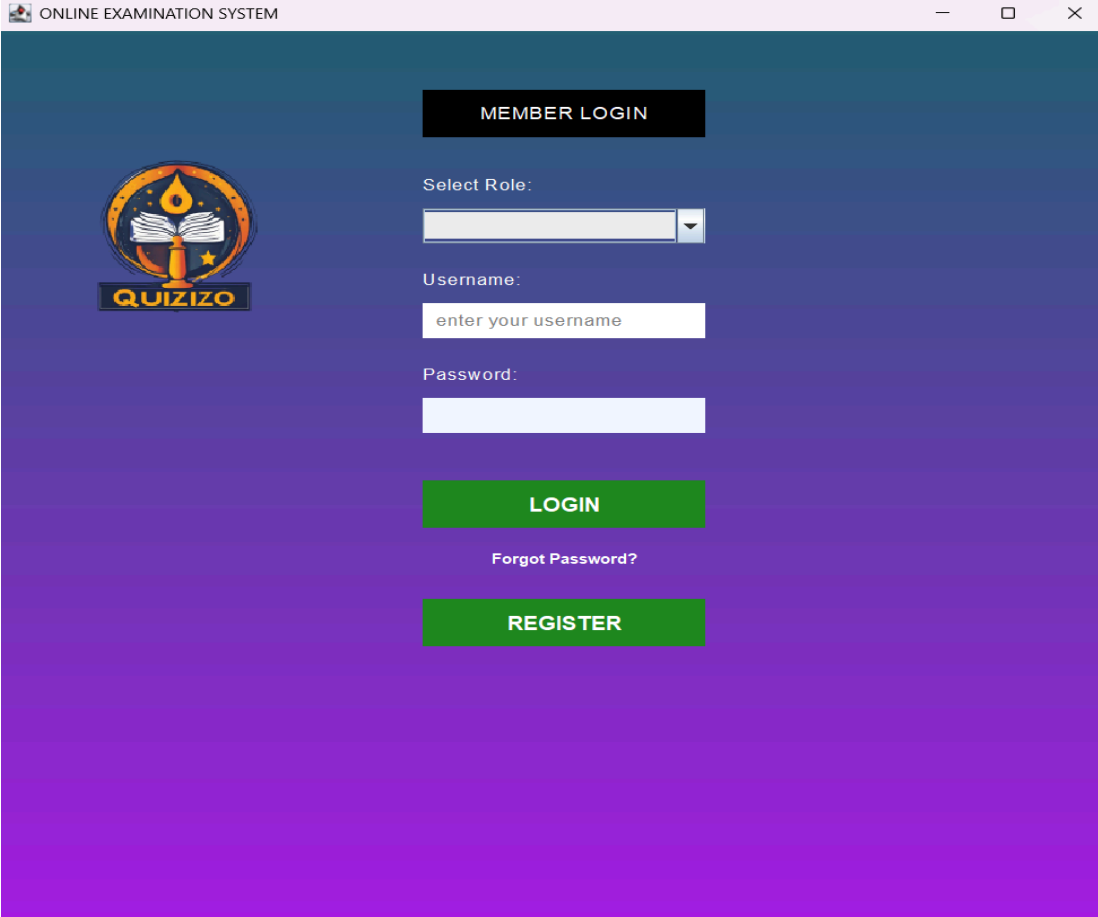


Fig 5.1.2 Login GUI

The user logs in to the account with the username and password created by selecting the role of student/teacher/advisor respectively. If the user forgets the password he/she clicks on forgot password which prompts the user to enter the username and submitting it takes to new password entry field where the new password is being set. If the user has not yet registered, they can click REGISTER button selecting the role for registration mandatorily.

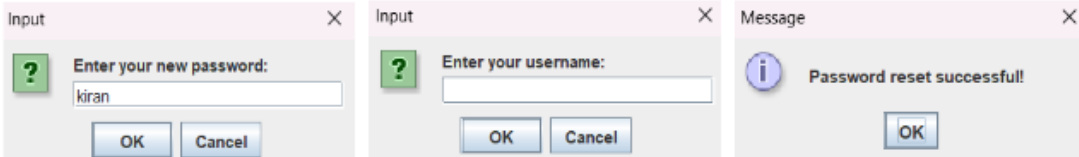


Fig 5.1.3 Forgot Password

→ REGISTER

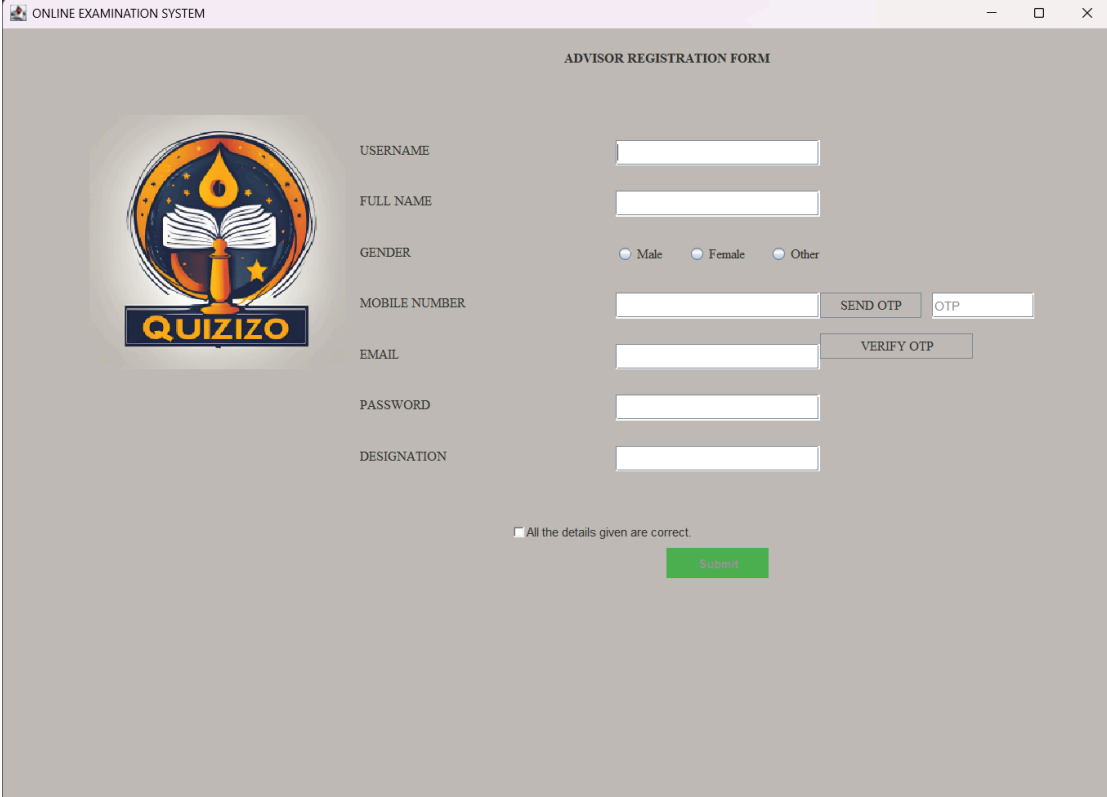
The image shows a web browser window titled "ONLINE EXAMINATION SYSTEM". Inside the window is a form titled "ADVISOR REGISTRATION FORM". On the left side of the form is a logo for "QUIZIZO" featuring a stylized lamp, an open book, and a star. The form contains several input fields: "USERNAME", "FULL NAME", "GENDER" (with radio buttons for "Male", "Female", and "Other"), "MOBILE NUMBER", "EMAIL", "PASSWORD", and "DESIGNATION". There are also two buttons: "SEND OTP" next to the mobile number field and "VERIFY OTP" next to the email field. At the bottom of the form, there is a checkbox labeled "All the details given are correct." and a green "Submit" button.


Fig 5.1.4 Advisor Registration GUI

This form is a registration page for advisors in an online examination system called **QUIZIZO**. It collects essential information from advisors, including their username, full name, gender, mobile number, email, password, department.

The form has options for gender selection and includes a process to verify the mobile number and email using an OTP (One-Time Password) for added security. Advisors must confirm their details by checking a box to enable the submit button, ensuring accuracy before submitting their registration.

ONLINE EXAMINATION SYSTEM - Teacher Registration

TEACHER REGISTRATION FORM



USERNAME

FULL NAME

GENDER ☐ Male ☐ Female ☐ Other

MOBILE NUMBER

EMAIL

PASSWORD

COURSE

DEPARTMENT

DESIGNATION

☐ All the details given are correct.


Fig 5.1.5 Teacher Registration GUI

This form is a registration page for teachers in an online examination system called **QUIZIZO**. It collects essential information from teachers, including their username, full name, gender, mobile number, email, password, course, department, and designation.

The form has options for gender selection and includes a process to verify the mobile number and email using an OTP (One-Time Password) for added security. Teachers must confirm their details by checking a box to enable the submit button, ensuring accuracy before submitting their registration.

ONLINE EXAMINATION SYSTEM

STUDENT REGISTRATION FORM



USERNAME

FULL NAME

GENDER ☐ Male ☐ Female ☐ Other

MOBILE NUMBER

EMAIL

PASSWORD

COURSE

CLASS

DEPARTMENT

☐ All the details given are correct.

Fig 5.1.6 Student Registration GUI

This form is a registration page for students in an online examination system called **QUIZIZO**. It gathers essential student information, including username, full name, gender, mobile number, email, password, course, class, and department.

The form also uses OTP verification for the mobile number, ensuring secure registration. Students can select their class and department from dropdowns specific to student options. The form requires students to confirm their details with a checkbox to activate the "Submit" button.

→ ADVISOR

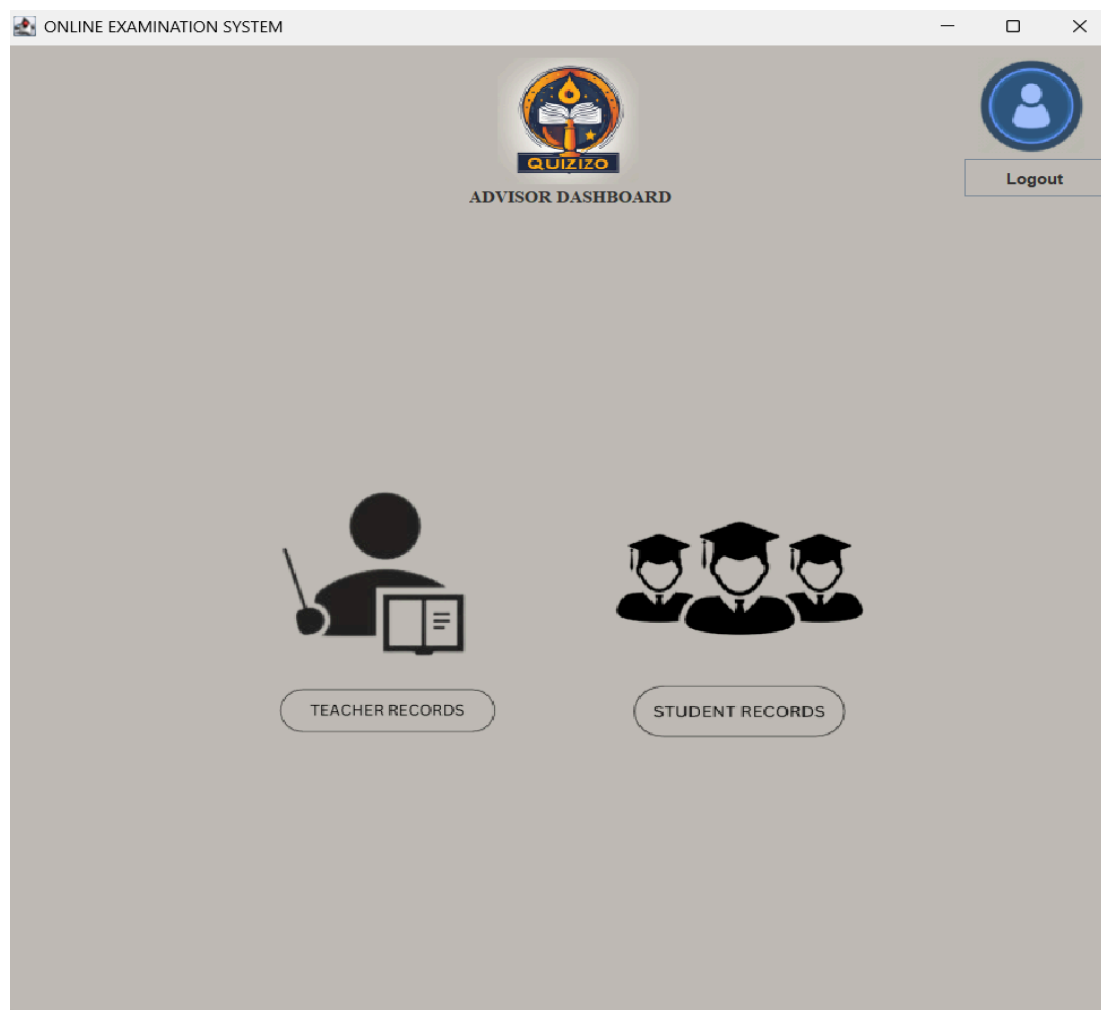



Fig 5.1.7 Advisor Dashboard GUI

This is the Advisors Dashboard where an advisor can try to access the student and teacher records efficiently and after completion of tasks logout button clicked redirects them to the login page.

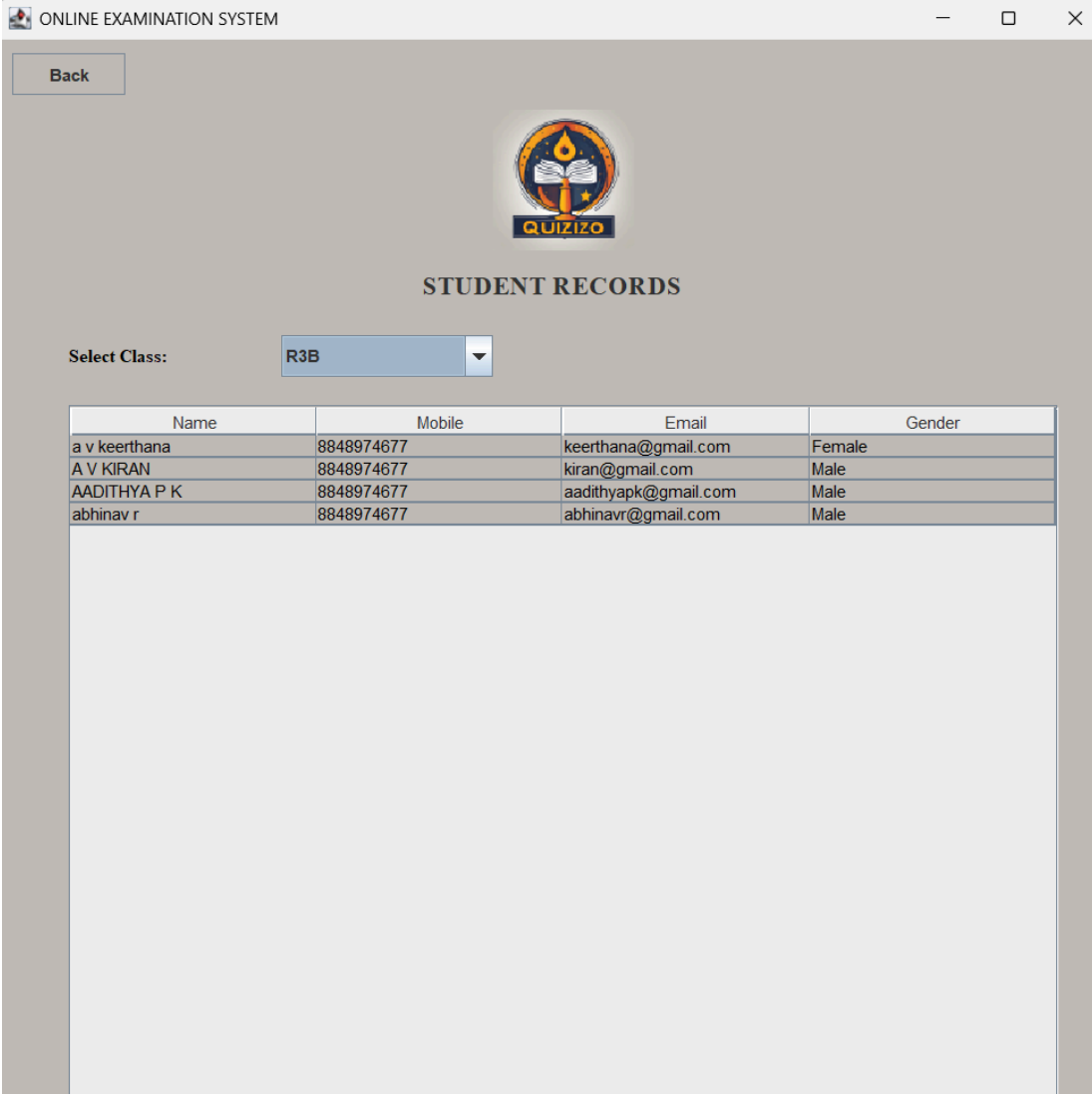


The screenshot displays a web application window titled "ONLINE EXAMINATION SYSTEM". In the top left corner, there is a "Back" button. The main content area features a logo with a book and a flame, labeled "QUIZIZO". Below the logo, the text "TEACHER RECORDS" is centered. A "Select Department:" label is followed by a dropdown menu currently showing "CSE". Below this, a table displays teacher records. The table has four columns: "Name", "Mobile Number", "Email", and "Gender". The first row contains the data: "kiran", "8848974677", "kirancomtvm@gmail.com", and "Male". The rest of the table area is empty.

| Name | Mobile Number | Email | Gender |
|-------|---------------|-----------------------|--------|
| kiran | 8848974677 | kirancomtvm@gmail.com | Male |

Fig 5.1.8 Teacher Records

This is showing the records of teachers in a department to the advisors and giving the mobile number, email id and gender of the teachers present in the selected department.



The screenshot displays a web application window titled "ONLINE EXAMINATION SYSTEM". In the top left corner, there is a "Back" button. The main content area features a logo with a lamp and the word "QUIZIZO" below it. Below the logo, the text "STUDENT RECORDS" is centered. Underneath, there is a "Select Class:" label followed by a dropdown menu currently showing "R3B". Below the dropdown is a table with four columns: "Name", "Mobile", "Email", and "Gender". The table contains four rows of student data. Below the table is a large, empty rectangular area.

| Name | Mobile | Email | Gender |
|---------------|------------|----------------------|--------|
| a v keerthana | 8848974677 | keerthana@gmail.com | Female |
| A V KIRAN | 8848974677 | kiran@gmail.com | Male |
| AADITHYA P K | 8848974677 | aadithyapk@gmail.com | Male |
| abhinav r | 8848974677 | abhinavr@gmail.com | Male |

Fig 5.1.9 Student Records

This shows the records of students in a particular class selected by the advisor which displays the name, mobile number, email id and the gender of each student in order of respective class.

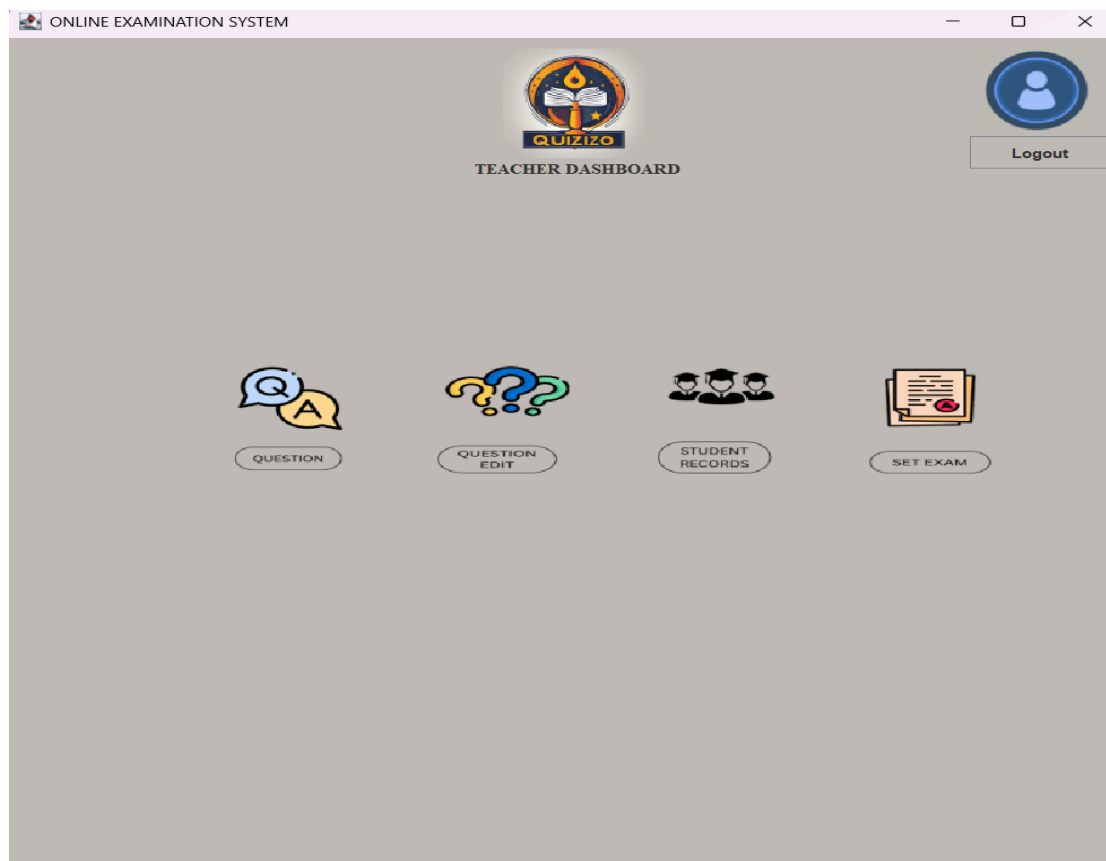
→ TEACHER

Fig 5.1.10 Teacher Dashboard GUI

This is a Teacher Dashboard where the teacher can access different options like Question which helps to view questions, Question edit option to edit, Student records to get marks of students, Set exam to set the exam for students. After the completion of tasks, the logout button lets you to logout from the account.

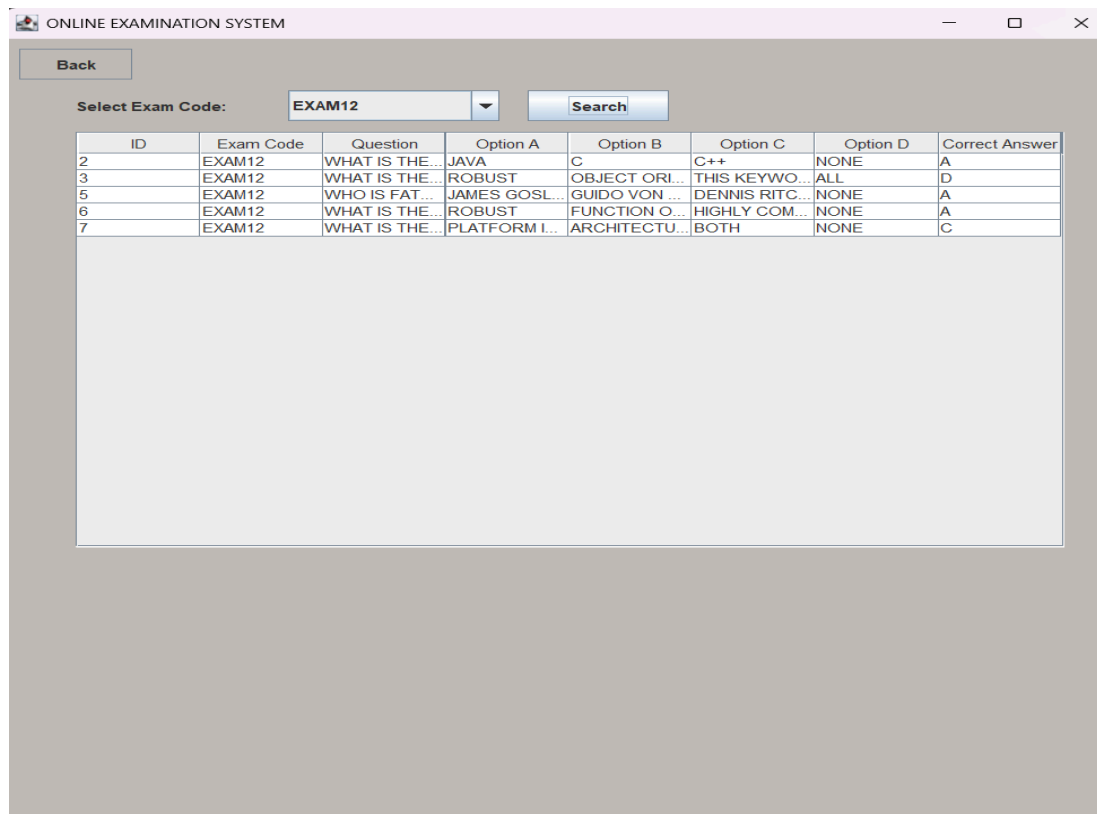


Fig 5.1.11 Question View GUI

This helps the teacher to view the questions and options entered when the respective question paper code is being selected and the search button is clicked . It shows the Question ID, question, options a,b,c,d and the correct answer.

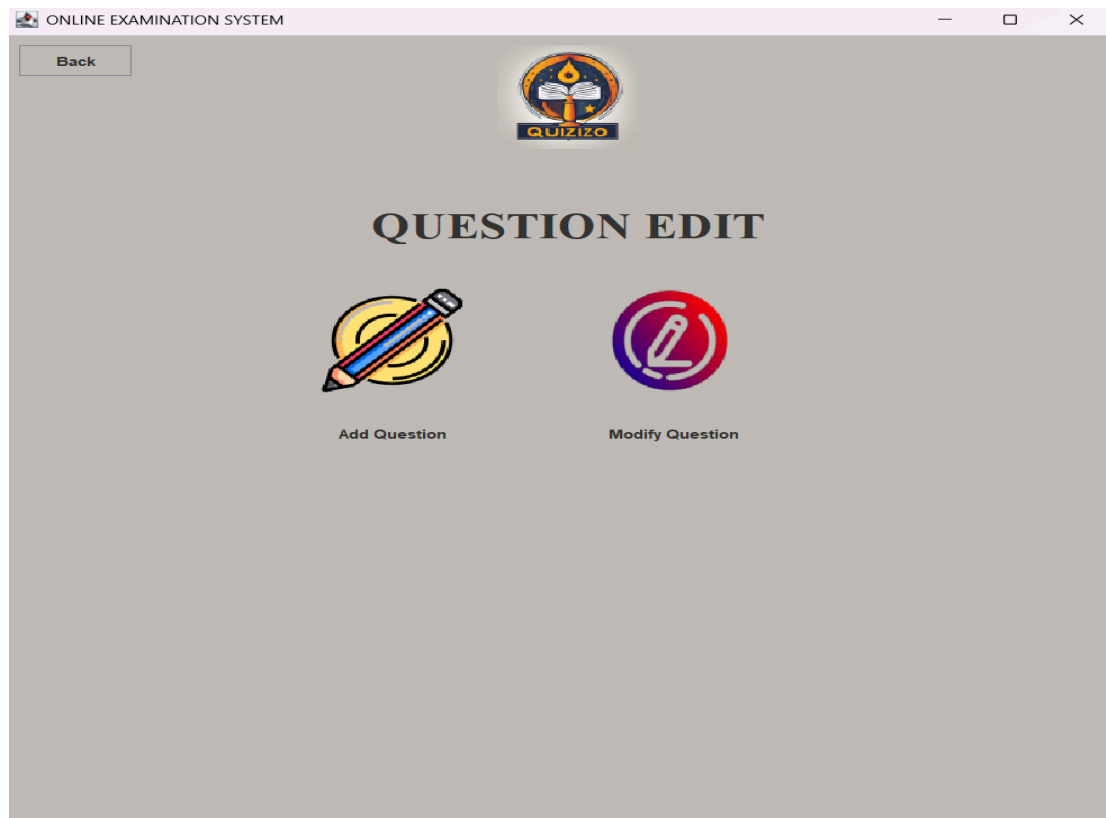
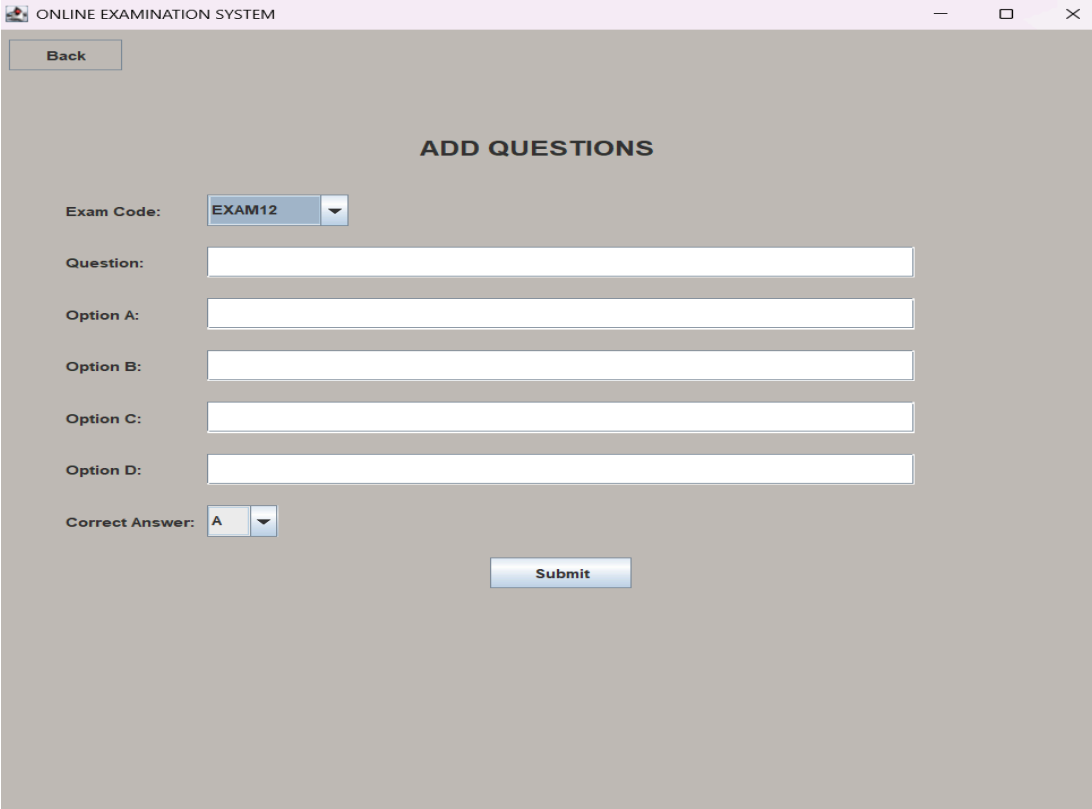


Fig 5.1.12 Question Edit GUI

This is used for controlling the changes in question papers set by the teachers, the add question and the modify questions proceed to the respective process to add or modify the questions already in the question paper.



The screenshot shows a web application window titled "ONLINE EXAMINATION SYSTEM". Inside the window, there is a "Back" button in the top left corner. The main heading is "ADD QUESTIONS". Below this, there is a form with the following fields:

- Exam Code:** A dropdown menu currently showing "EXAM12".
- Question:** A single-line text input field.
- Option A:** A single-line text input field.
- Option B:** A single-line text input field.
- Option C:** A single-line text input field.
- Option D:** A single-line text input field.
- Correct Answer:** A dropdown menu currently showing "A".

At the bottom center of the form is a "Submit" button.

Fig 5.1.13 Add Question GUI

The panel shows the option to select the exam code for the respective exam and add a question and its options as well as the correct answer to add it to the question paper set by the teacher by clicking the submit button after all the entries .

The screenshot shows a web application window titled "ONLINE EXAMINATION SYSTEM". At the top left is a "Back" button. Next to it is a dropdown menu currently showing "EXAM12". Below these is a "Select Exam Code:" label and a "Search" button. The main area contains a table with the following headers: ID, Exam Code, Question, Option A, Option B, Option C, Option D, and Correct Answer. The table body is empty. At the bottom left of the table area are two buttons: "Modify" and "Delete".

| ID | Exam Code | Question | Option A | Option B | Option C | Option D | Correct Answer |
|----|-----------|----------|----------|----------|----------|----------|----------------|
|----|-----------|----------|----------|----------|----------|----------|----------------|

Fig 5.1.14 Modify Question

This helps to modify the question paper by selecting the existing question code and searching for the questions found in it, then selecting the question from the table and clicking modify enables us to modify and submit the new modification to come in effect.

→ STUDENT

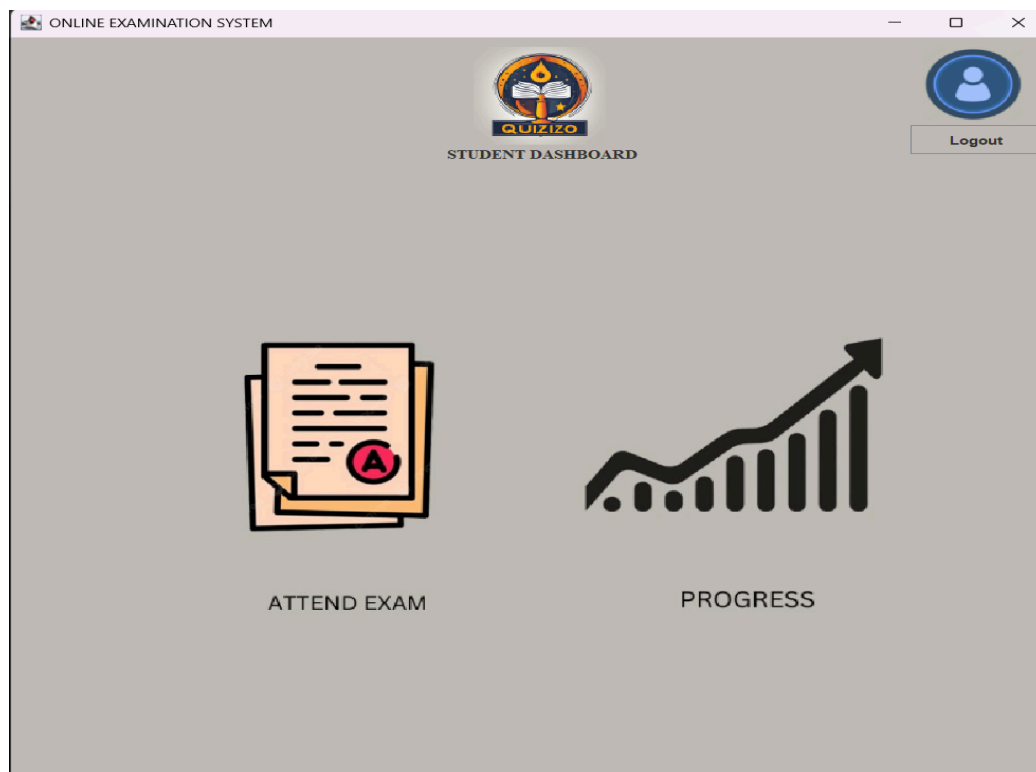


Fig 5.1.15 Student Dashboard GUI

The Student Dashboard lets the student attend exams and as well check the previous records of the examination and maintain the progress of studies. After the needs they can logout by clicking the logout button.

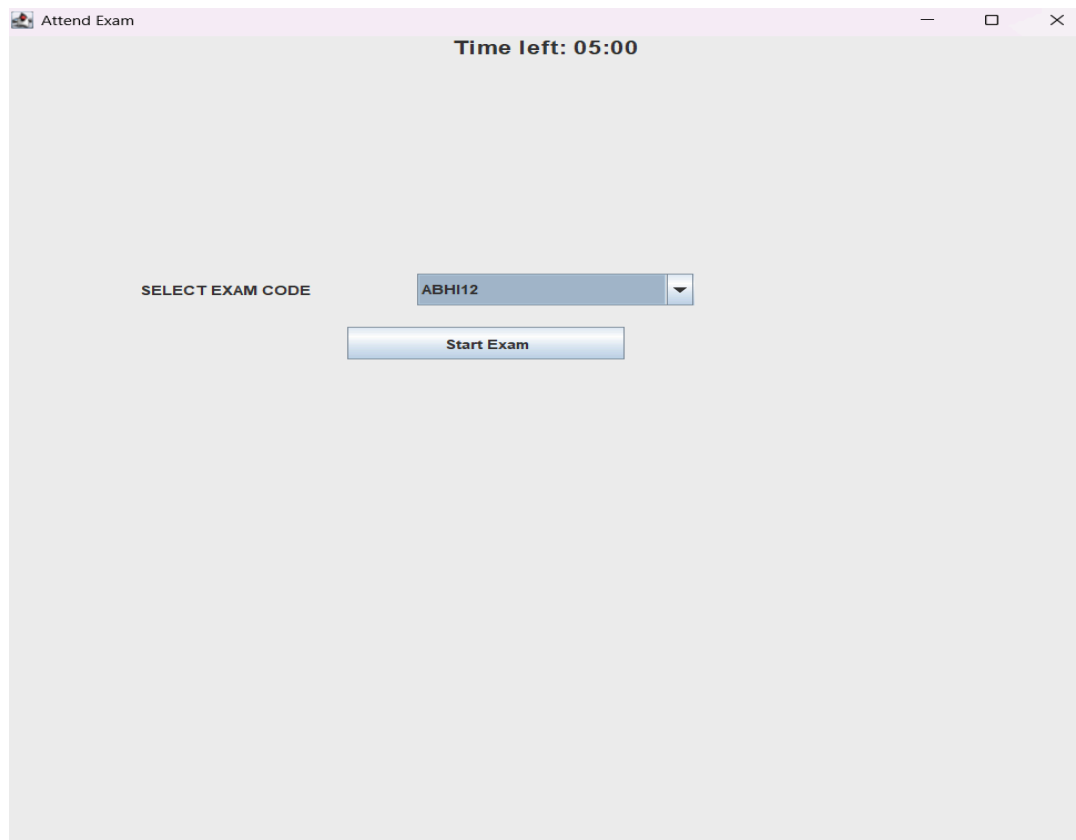
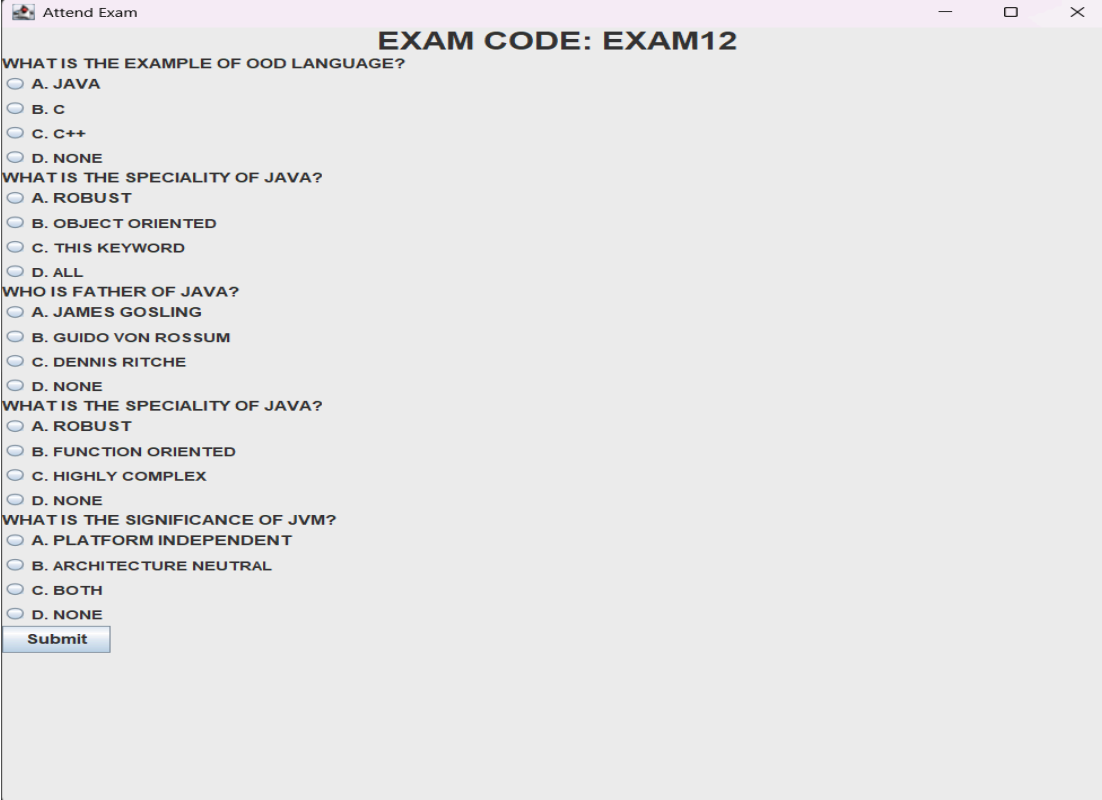


Fig 5.1.16 Start Exam

The examination page starts when the respective code of exam for the student to attend is being selected and the start button is clicked. When the start button is clicked the timer present in it controls the time of attending examination and redirects to result if time is over.



The screenshot shows a window titled "Attend Exam" with a light purple header. Below the header, the text "EXAM CODE: EXAM12" is displayed in bold. The main area contains five multiple-choice questions, each with four radio button options. The questions are about OOD languages, Java specialities, and the father of Java. At the bottom left, there is a "Submit" button.

Attend Exam

EXAM CODE: EXAM12

WHAT IS THE EXAMPLE OF OOD LANGUAGE?

- ☐ A. JAVA
- ☐ B. C
- ☐ C. C++
- ☐ D. NONE

WHAT IS THE SPECIALITY OF JAVA?

- ☐ A. ROBUST
- ☐ B. OBJECT ORIENTED
- ☐ C. THIS KEYWORD
- ☐ D. ALL

WHO IS FATHER OF JAVA?

- ☐ A. JAMES GOSLING
- ☐ B. GUIDO VON ROSSUM
- ☐ C. DENNIS RITCHE
- ☐ D. NONE

WHAT IS THE SPECIALITY OF JAVA?

- ☐ A. ROBUST
- ☐ B. FUNCTION ORIENTED
- ☐ C. HIGHLY COMPLEX
- ☐ D. NONE

WHAT IS THE SIGNIFICANCE OF JVM?

- ☐ A. PLATFORM INDEPENDENT
- ☐ B. ARCHITECTURE NEUTRAL
- ☐ C. BOTH
- ☐ D. NONE

Submit

Fig 5.1.17 Attend Exam GUI

The questions and the exam code for the exam is displayed , students choose the options below each question and proceed to next and finally the submit button is being clicked for the exam score display.

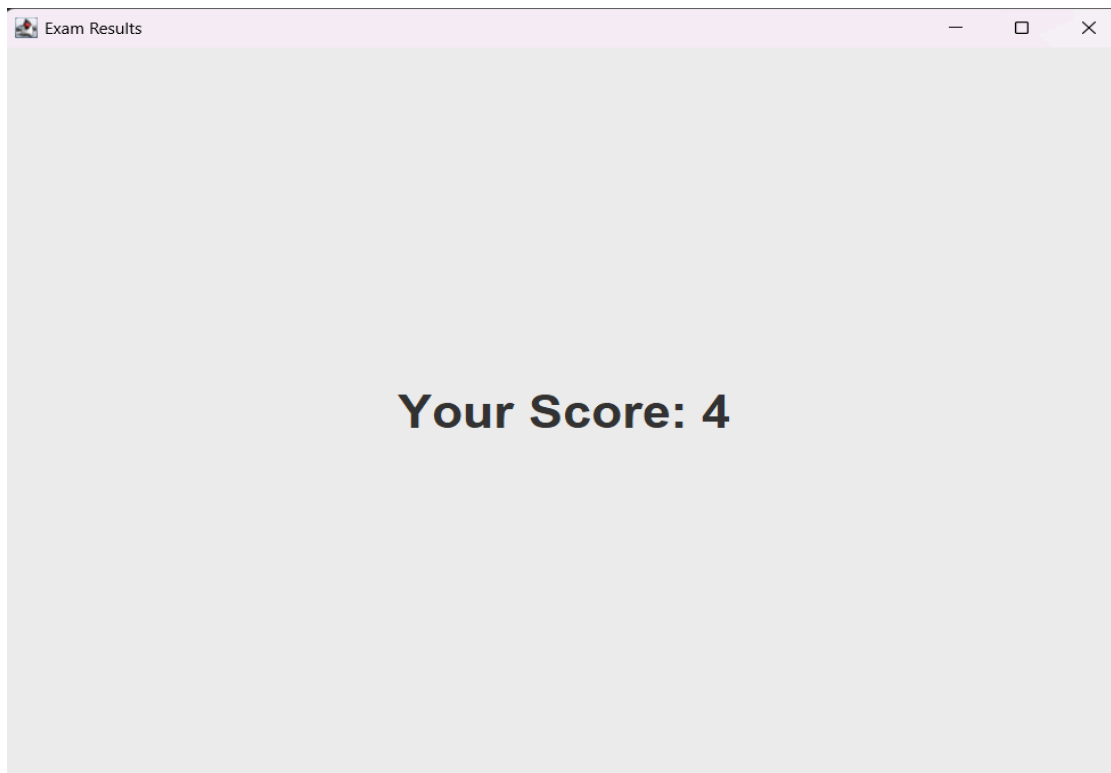


Fig 5.1.18 Score GUI

The final display of the marks at realtime after the exam ends is here, the score of the student is being displayed.

CHAPTER 6 : TIMELINE AND TASK DISTRIBUTION

6.1 TIMELINE OF THE PROJECT

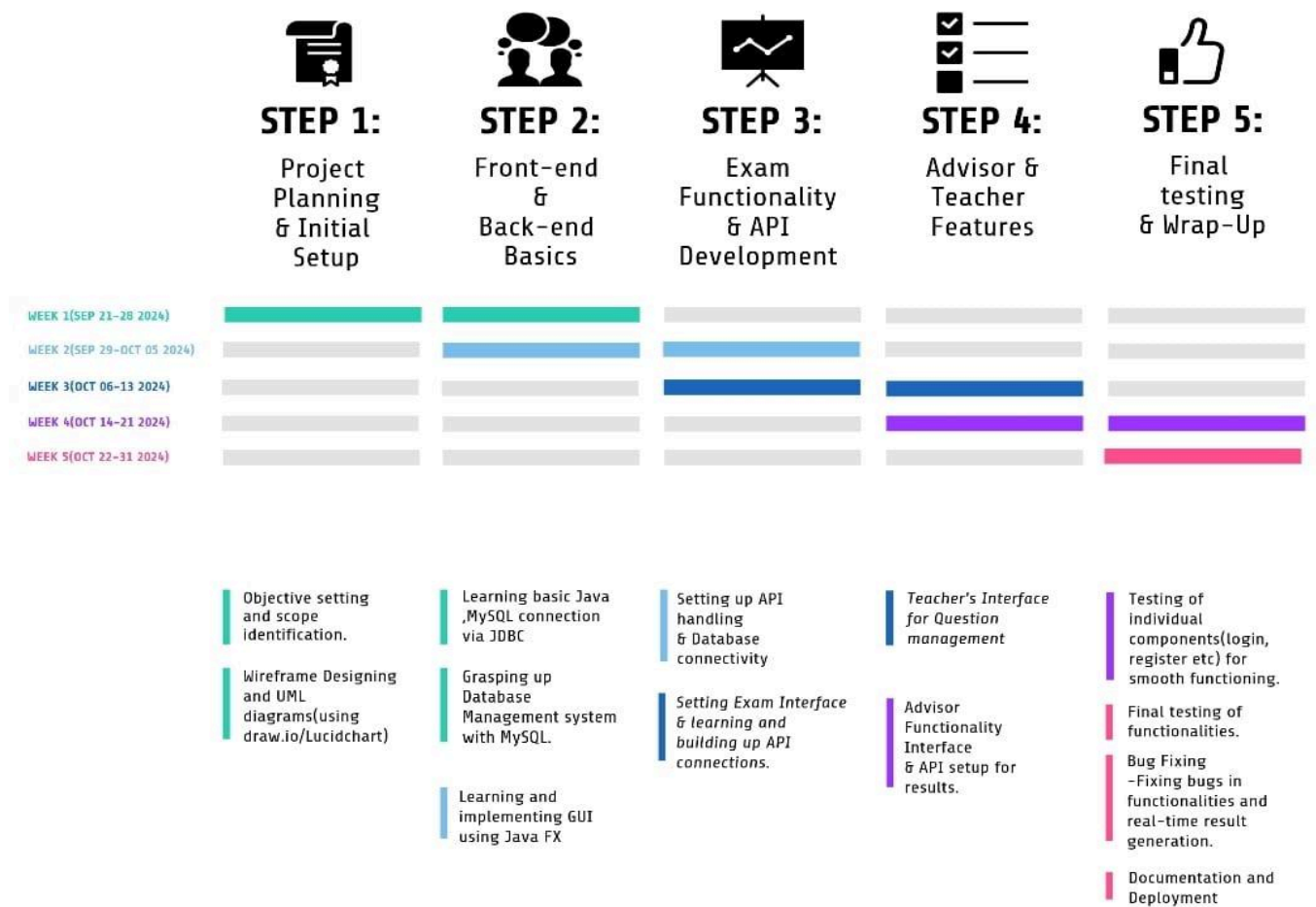


Fig 6.1 Timeline of Project

6.2 TASK DISTRIBUTION

1. Aravind Kumar V

- The Database management system of student , teacher modules using MySQL.
- GUI designing of overall website development.
- Monitor and help the team members in their task.

2. A V Kiran

- The Database management system of Login users and registered users, advisor modules.
- API integration in OTP generation and verification.
- GUI designing in overall development.
- Bug fixing and work monitoring of the team.

3. Aadithya P K

- GUI design of Teacher Module comprising Exam Question paper ,Add questions, modify questions using Java.

4. Abhinav R

- Implementation of student , advisor Modules using Java.

5. Sidharth Hariharan

- GUI design for login, registration and starting pages of website and implementation of remaining part of teacher module which includes getting students records and marks.

CHAPTER 7 : BIBLIOGRAPHY/REFERENCE

[1] Canva

Canva. (n.d.). *Canva: Online design and visual content creation tool*. Canva. Retrieved October 23, 2024, from <https://www.canva.com/>

[2] Draw.io

Draw.io. (n.d.). *Draw.io: Free online diagram software*. Draw.io. Retrieved September 14, 2024, from <https://www.draw.io/>

[3] GitHub

GitHub, Inc. (n.d.). *GitHub: Where the world builds software*. GitHub. Retrieved September 29, 2024, from <https://github.com/>

[4] Google Docs

Google. (n.d.). *Google Docs: Online Document Editor*. Google. Retrieved November 12, 2024, from <https://www.google.com/docs/about/>

[5] Geeks For Geeks

GeeksforGeeks. (n.d.). *GeeksforGeeks: A computer science portal for geeks*. GeeksforGeeks. Retrieved October 17, 2024, from <https://www.geeksforgeeks.org/>

[6] ChatGPT

OpenAI. (n.d.). *ChatGPT: An AI language model by OpenAI*. OpenAI. Retrieved November 12, 2024, from <https://openai.com/chatgpt>

[7] Google

Google. (n.d.). *Google Search Engine*. Google. Retrieved November 12, 2024, from <https://www.google.com/>

[8] Twilio

Twilio. (n.d.). *Twilio: Cloud communications platform for developers*. Twilio. Retrieved November 12, 2024, from <https://www.twilio.com/>

[9] Postman

Postman. (n.d.). *Postman API platform for building and using APIs*. Postman. Retrieved November 12, 2024, from <https://www.postman.com/>

[10] Lucidchart

Lucid Software Inc. (n.d.). *Lucidchart: Online diagramming application*. Lucidchart. Retrieved November 12, 2024, from <https://www.lucidchart.com/>

[11] Java

Oracle. (n.d.). *Java Platform, Standard Edition Documentation*. Oracle. Retrieved November 12, 2024, from <https://docs.oracle.com/javase/>

[12] MySQL Connector/J

Oracle. (n.d.). *MySQL Connector/J 8.0 Developer Guide*. Oracle. Retrieved November 12, 2024, from <https://dev.mysql.com/doc/connector-j/8.0/en/>

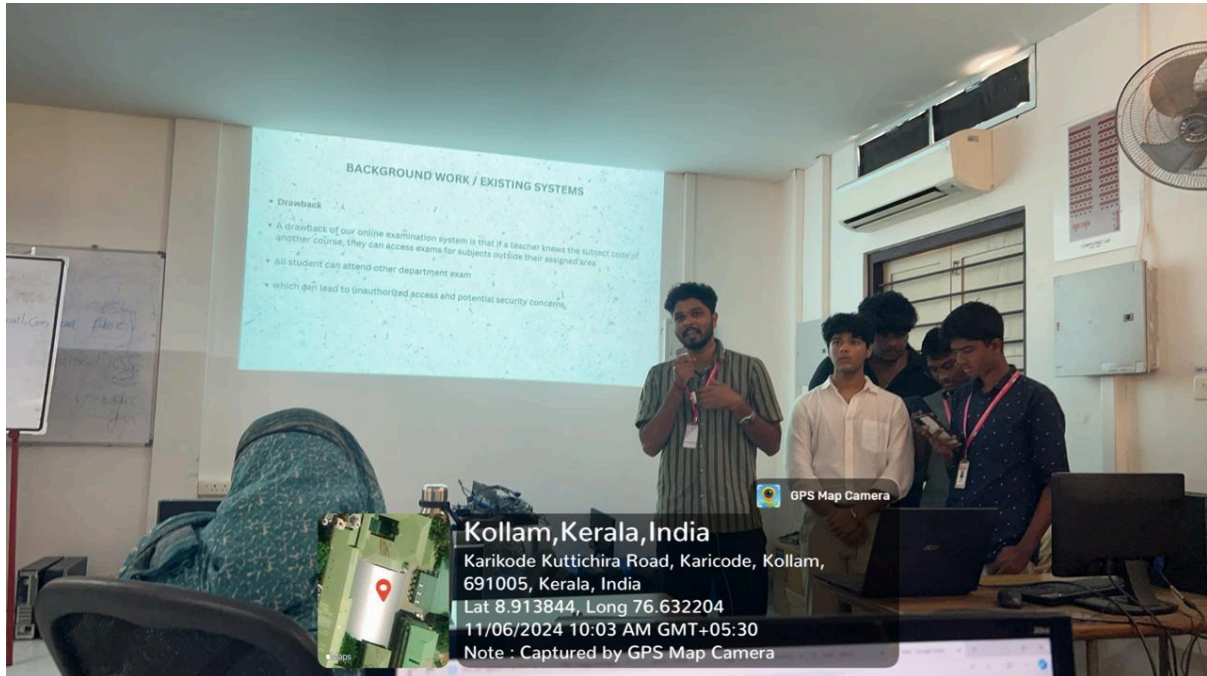
[13] IntelliJ IDEA

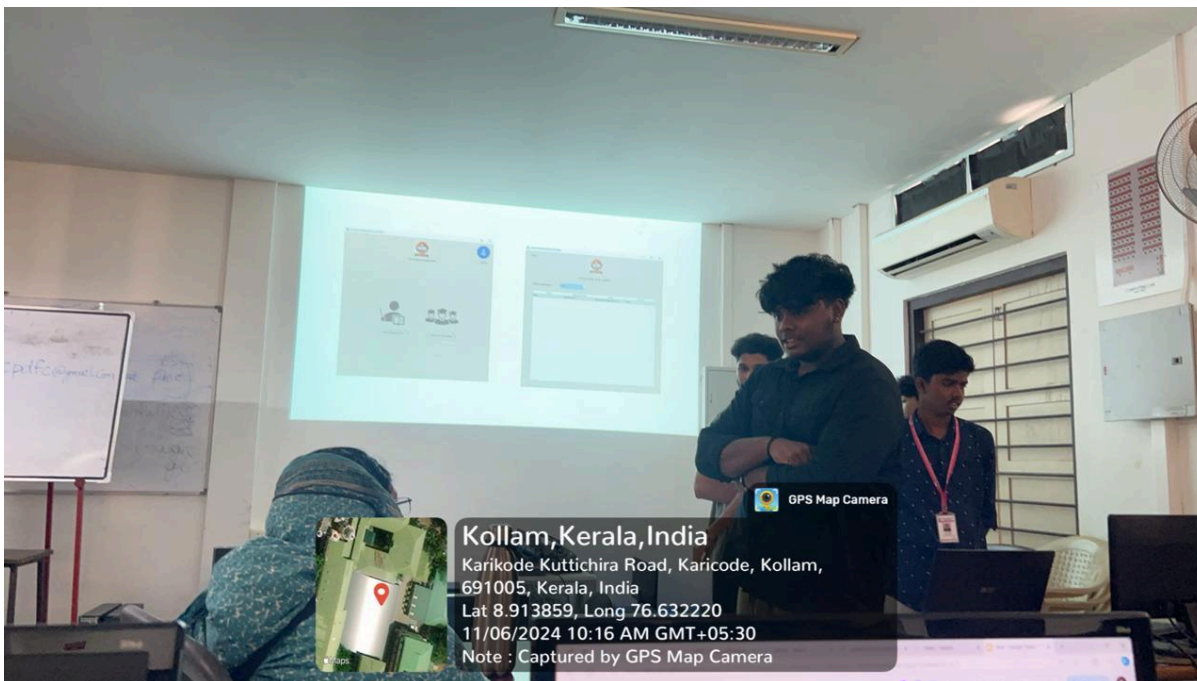
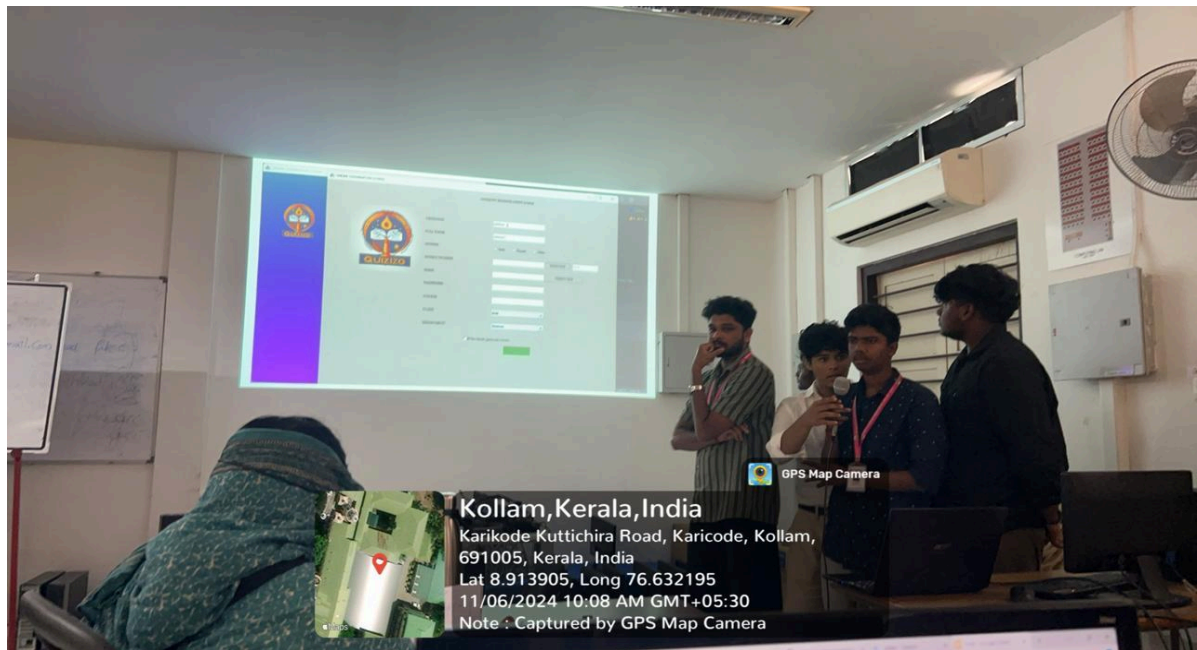
JetBrains. (n.d.). *IntelliJ IDEA: The Java IDE for Professional Developers*. JetBrains. Retrieved November 12, 2024, from <https://www.jetbrains.com/idea/>

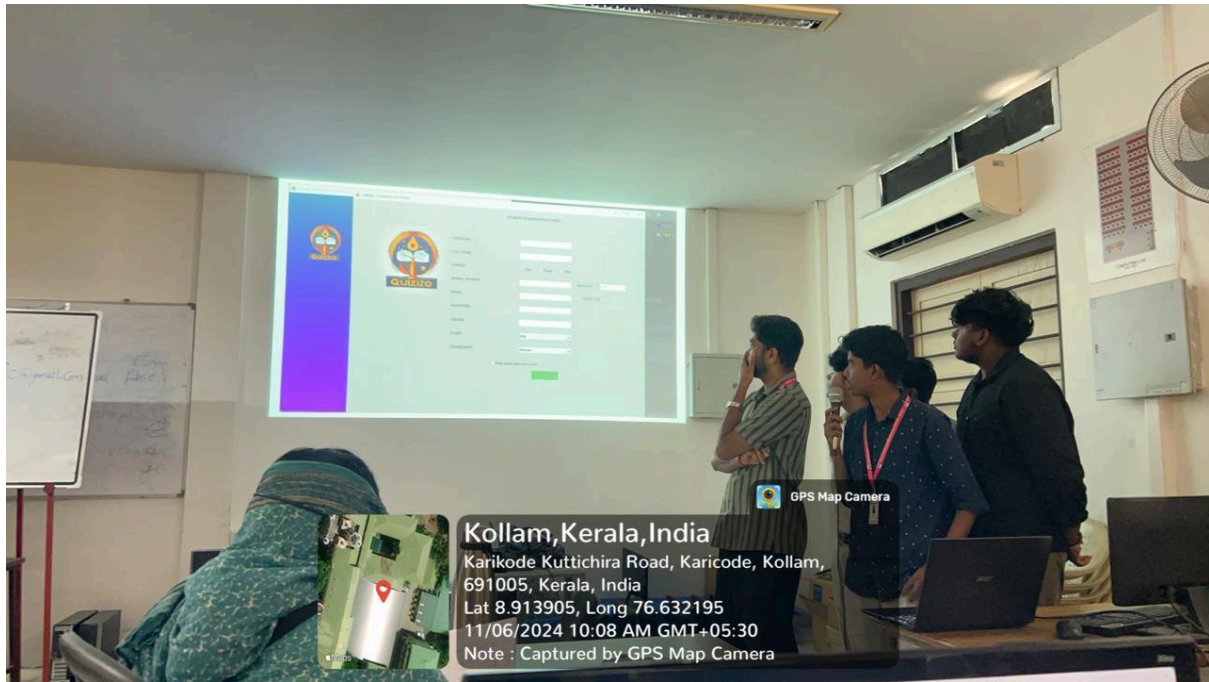
[14] MySQL

Oracle. (n.d.). *MySQL Database Management System*. Oracle. Retrieved November 12, 2024, from <https://www.mysql.com/>

CHAPTER 8 : GEOTAGGED PHOTOGRAPHS







CHAPTER 9 : APPENDICES

8.1 Appendix I: Vision, Mission and Program Educational Objectives (PEOs)

VISION

To be a center of excellence imparting quality education in Computer Science and Engineering and transforming students to critical thinkers and lifelong teams capable of developing environment friendly and economically feasible solutions to real world problems

MISSION

- To provide a strong foundation in Computer Science and Engineering, prepare students for professional career and higher education, and inculcate research interest.
- To be abreast of the technological advances in a rapidly changing world.
- To impart skills to come up with socially acceptable solutions to real world problems, upholding ethical values.

PROGRAMME EDUCATIONAL OBJECTIVES(POEs)

PEO 1: Excel in professional career by acquiring knowledge in mathematics, science and engineering and apply the knowledge in the design of hardware and software solution for challenging problems of the society

PEO 2: Pursue higher studies and research thereby engages in lifelong learning by adapting to the current trends in the area of Computer Science and Engineering

PEO 3: Ability to Provide socially acceptable and economically feasible computer oriented solutions to real world problems with teamwork, while maintaining environmental balance, quality and cognizance of the underlying principles of ethics.

8.2 Appendix I : Program Outcomes

1. **PO1 Engineering knowledge** : Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **PO2 Problem analysis** : Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first Principles of mathematics, natural sciences, and engineering sciences.
3. **PO3 Design/development of solutions** : Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **PO4 Conduct investigations of complex problems** : Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **PO5 Modern tool usage** : Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **PO6 The engineer and society** : Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **PO7 Environment and sustainability** : Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **PO8 Ethics** : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **PO9 Individual and team work** : Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **PO10 Communication** : Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- 11.PO11 Project management and finance :** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12.PO12 Life-long learning :** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

8.3 Appendix II : Course Outcomes (COs)

1. **CO1-** Design a UML structural and behavioral model for solving real world problems (Analyze Level).
2. **CO2-** Develop programs to solve problems using object-oriented design techniques through Java (Apply Level)
3. **CO3-** Illustrate the creation and usages of packages and interfaces in Java. (Understand Level)
4. **CO4-** Demonstrate the exception handling mechanism to handle run time errors (Apply Level)
5. **CO5-** Make use of collection interfaces and classes to store and manipulate data effectively. (Apply Level)
6. **CO6-** Develop Java application to solve a real-world problem by using graphical user interfaces and Event handling techniques (Create Level)

8.4 Appendix III : Fulfillment of Programme Outcomes

1. **PO1 - Engineering Knowledge:**

The OES applies engineering principles in software development, utilizing programming (Java) and database management (MySQL) knowledge to create a system that addresses the complex requirements of educational assessment. Mathematical and logical skills are used to design secure and efficient algorithms for user verification, question randomization, and results processing, creating a robust foundation for the examination system.

2. **PO2 - Problem Analysis:**

The OES development involved identifying key challenges in traditional exams, such as logistical complexities, resource inefficiency, and grading errors. Research into best practices for online exams and secure data management enabled the team to analyze these problems using principles of software engineering and database management, creating substantiated solutions.

3. **PO3 - Design/Development of Solutions:**

The OES is designed to meet the unique needs of students, teachers, and advisors, considering public health (remote accessibility), safety (secure login), and societal benefits (reduced resource usage). Its architecture ensures a reliable, efficient, and user-friendly system that aligns with security, accessibility, and educational inclusivity.

4. **PO4 - Conduct Investigations of Complex Problems:**

Through rigorous testing, the OES team validated the functionality of the system's core features, such as secure login with OTP, database integrity, and real-time grading. This research-driven approach included analyzing data from user tests and identifying areas of improvement, ensuring a system with reliable and accurate functionality.

5. **PO5 - Modern Tool Usage:**

The OES integrates modern tools such as Twilio for secure OTP handling and MySQL for database management. These tools support secure, efficient operations in real-time, while consideration of their limitations (e.g., security risks or scalability) ensures an effective and adaptable system.

6. **PO6 - The Engineer and Society:**

The OES addresses societal needs by making examinations more accessible and efficient, supporting remote and hybrid learning environments. Contextual

understanding of educational requirements, security concerns, and privacy considerations shaped design decisions, ensuring a system that respects user privacy and promotes educational inclusivity.

7. PO7 - Environment and Sustainability:

As a digital, paperless solution, the OES promotes sustainable development by reducing the environmental impact associated with paper-based exams. This approach demonstrates an understanding of the need for sustainable educational practices that minimize resource usage and reduce waste.

8. PO8 - Ethics:

The OES adheres to ethical principles by implementing secure data handling practices, using OTP verification to protect user identities, and enforcing role-based access controls. These ethical safeguards ensure that user privacy is respected and sensitive data is handled responsibly.

9. PO9 - Individual and Team Work:

The OES development required collaborative teamwork, with team members contributing in areas like database configuration, user interface design, and security implementation. Effective teamwork in a multidisciplinary environment allowed each member to contribute their expertise, resulting in a well-rounded system.

10. PO10 - Communication:

Clear communication was essential for the OES, both in terms of internal team interactions and user-facing documentation. The project includes well-documented code, user manuals, and interface guides to ensure users and future developers can effectively use and maintain the system.

11. PO11 - Project Management and Finance:

The OES team managed the project within budget and timeline constraints, prioritizing essential features and adhering to Agile project management principles. Budget allocation for third-party services, such as Twilio, was balanced to ensure efficient resource management and feature delivery.

12. PO12 - Life-long Learning:

The development of the OES fostered a commitment to continuous learning, with the team researching and implementing emerging tools in educational technology and data security. This adaptability to technological advances ensures the system can evolve with new educational trends and technological advancements.

CHAPTER 10 : CONCLUSION

1. In conclusion, this project has successfully addressed the primary goals and objectives outlined in its inception. Through the implementation of a sophisticated Online Examination System, we have created a platform that enhances the efficiency, security, and accessibility of examinations in educational institutions. The system's integration with tools such as Twilio for secure OTP management and MySQL for data storage has ensured a reliable and user-friendly experience for Advisors, Teachers, and Students alike.
2. The project demonstrates the potential of digital solutions to overcome the limitations of traditional examination processes by providing real-time feedback, minimizing logistical constraints, and ensuring a secure environment. Additionally, this project has underscored the importance of ethical considerations and data integrity in educational tools, fostering trust among users.
3. The Online Examination System aligns well with the shift towards online and hybrid learning models, proving adaptable to evolving educational needs. By leveraging modern technologies, the system has laid a foundation for future improvements, such as enhanced analytics for student performance and expanded functionalities for adaptive assessments.
4. Ultimately, this project has not only provided a robust solution for examination management but has also contributed to advancing digital education. The work completed here highlights the ongoing necessity for innovative educational tools that can adapt to a rapidly changing academic landscape, setting the stage for continued improvements and future developments.