



**INSTITUTE FOR ADVANCED COMPUTING AND
SOFTWARE DEVELOPMENT AKURDI, PUNE**

Documentation On

**“CodeMaze” – Online Java Compiler,
PD-DAC SEPT 2022**

**Submitted By:
Group No: 22**

**Roll No.
229029
229034**

**Name
Eklavya Shivaji Ghodake
Akshay Ansaji Hambarde**

**Mrs. Megha Mane
Project Guide**

**Mrs. Rohit Puranik
Centre Co-ordinator**

ABSTRACT

CodeMaze Exam Portal is a web- based platform that allows educational institution and organization to conduct assessments and exams for students or candidates. The platform provides a variety of assessment options such as coding challenge. The CodeMaze Exam Portal project has been developed using web development technologies such as HTML, CSS, JavaScript, Spring Boot, Express and various frameworks.

ACKNOWLEDGEMENT

I take this occasion to thank God, almighty for blessing us with his grace and taking our endeavour to a successful culmination. I extend my sincere and heartfelt thanks to our esteemed guide, **Mrs. Megha Mane** for providing me with the right guidance and advice at the crucial juncture sand for showing me the right way. I extend my sincere thanks to our respected Centre Co-Ordinator **Mr.Rohit Puranik**, for allowing us to use the facilities available. I would like to thank the other faculty members also, at this occasion. Last but not the least, I would like to thank my friends and family for the support and encouragement they have given me during the course of our work.

Eklavya Ghodake (229029)

Akshay Hambarde (229095)

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Introduction

CodeMaze Exam Portal is a platform that allows educational institutions and organization to Conduct online assessments and exam for students or candidates. The platform provides coding challenge. The CodeMaze exam Portal project aims to develop a software tool that can help educational institutions and organization conduct online assessments and exams easily and efficiently. The platform should provide a user-friendly interface, support for multiple assessment options, and real-time evaluation and feedback.

Features

1. **User-Friendly Interface :-** The CodeMaze Exam Portal Offers a user-friendly for educational institutions and organizations to create and manage online assessments and exams . The Interface is easy to navigate and allows administrators to create assessments, manage questions, and monitor the progress of the exam.
2. **Customizable assessments:** The platform allows the creation of customizable assessments that can be tailored to specific job roles, experience levels, and technical skills.
3. **Real-world problem-solving:** The assessments are designed to test candidates' ability to solve real-world problems using their technical and programming skills.
4. **Remote proctoring:** The platform supports remote proctoring to ensure that the exams are taken in a secure and fair manner.
5. **Automated grading and evaluation:** The platform uses automated grading and evaluation to ensure fast and accurate scoring of exams.
6. **Insights and analytics:** The platform provides detailed insights and analytics into candidate performance, allowing recruiters and hiring managers to make informed decisions.
7. **Integration with Applicant Tracking Systems (ATS):** The platform integrates with ATS to streamline the recruitment process and make it easier for recruiters to manage candidate data.

Project Objective

The aim of this document is to explain the functionality of the project developed for providing complete solution for Institution, Students as well as internal users (Examiners) through a single Gateway using internet/intranet. It will enable Institute to set up online Coding Exam, Students to give exam through virtual medium. It is the outcome of rigorous consideration of the requirements of the institute. This document will provide a baseline for design of the database, user interfaces, coding & evaluation of test plans. It will be used as a solid foundation for continued product evaluation if needed in future.

Project Overview

The online exam portal on CodeMaze is a web-based platform that enables educational institutions and organizations to create, manage and conduct online exams and assessments. It is designed to provide a comprehensive solution for educational institutions and organizations to evaluate the knowledge and skills of candidates or students through assessments that include multiple choice questions, coding challenges, and subjective questions. The online exam portal on CodeMaze allows administrators to create customized assessments based on their specific requirements. They can create assessments with different difficulty levels, time limits, and scoring systems. The portal also provides real-time evaluation and feedback to candidates and administrators, allowing them to monitor progress, evaluate performance and get insights into candidates' knowledge and skills. The portal ensures the security and privacy of candidates' data and assessments by using encryption, access control, and other security measures to protect data and prevent unauthorized access. It also provides reporting and analytics features that allow administrators to generate reports, analyze data, and get insights into candidates' performance. The portal can integrate with other educational tools and systems such as Learning Management Systems (LMS), Student Information Systems (SIS), and other assessment platforms, allowing educational institutions and organizations to streamline their assessment processes and improve their efficiency. Overall, the online exam portal on CodeMaze is a powerful and flexible tool that can help educational institutions and organizations to conduct online assessments and exams with ease, efficiency, and security.

Scope

This System allows Examiner to maintain a list of questions, add or remove questions before the test begins. Students can write the code once their session starts and can change their code multiple times in the given time slot. Examiner can see the response of all the students after the test ends for better evaluation.

Modules

1. Administration Module :- The administration module is used by administrators to create, manage and monitor exams and assessments. They can create assessments with different types of questions, set time limits and scoring systems, and customize exam settings based on their specific requirements. They can also manage candidate registration, scheduling, and access control.
2. Question Bank Module: The question bank module is used to create and manage question banks containing multiple choice questions, coding challenges, and subjective questions. Administrators can create and edit questions, organize them into categories and subcategories, and import questions from external sources.
3. Candidate Module: The candidate module is used by candidates to register for exams, view exam schedules, and take exams. Candidates can also review their performance
4. Performance and get feedback on their strengths and weaknesses.
5. Evaluation Module: The evaluation module is used by administrators to evaluate candidate responses, score exams, and provide feedback to candidates. The module also provides analytics and reporting features that allow administrators to analyze candidate performance, generate reports, and get insights into assessment

SYSTEM ANALYSIS

System analysis is the process of gathering and interpreting facts, diagnosing problems, and using the information to recommend improvements on the system. System analysis is a problem-solving activity that requires intensive communication between the system users and system developers. System analysis or study is an important phase of any system development process. The system is viewed as a whole, the inputs are identified, and the system is subjected to close study to identify the problem areas. The solutions are given as a proposal. The proposal is reviewed on user request and suitable changes are made. This loop ends as soon as the user is satisfied with the proposal.

EXISTING SYSTEM

CodeMaze is an online platform that offers a variety of programming challenges, coding competitions, and skill assessments for developers and other technical professionals. The online exam portal of CodeMaze provides a platform for organizations to create and administer coding assessments to evaluate the technical skills of candidates.

The existing system of the online exam portal of CodeMaze includes several features, such as:

1. **User Management:** The system allows administrators to manage users, including creating user accounts, assigning roles and permissions, and updating user information.
2. **Test Creation:** The system enables administrators to create coding tests, including defining the scope of the assessment, the type of questions, and the time limit for each question.
3. **Test Administration:** The system provides a platform for administrators to monitor and manage tests, including starting and stopping tests, monitoring the progress of test-takers, and reviewing test results.
4. **Candidate Assessment:** The system automatically evaluates candidates' performance based on their responses to coding questions and generates a report that summarizes their technical abilities.

5. Customization: The system provides customization options for organizations to tailor the assessment experience to their specific needs, such as adding their branding, creating custom questions, and setting test parameters.
 6. Analytics: The system provides analytics features that enable administrators to track candidate performance, monitor test trends, and generate reports that provide insights into the effectiveness of the assessment process.
- . Overall, the online exam portal of CodeMaze provides a comprehensive platform for organizations to evaluate the technical skills of candidates through coding assessments. The system's features allow for flexibility and customization, making it a popular choice for organizations of all sizes and industries.

PROPOSED SYSTEM

Based on the existing system of the online exam portal of CodeMaze, a proposed system can be designed with additional features to enhance the user experience and improve the assessment process.

E-R Diagram



Figure 1.

Proposed System

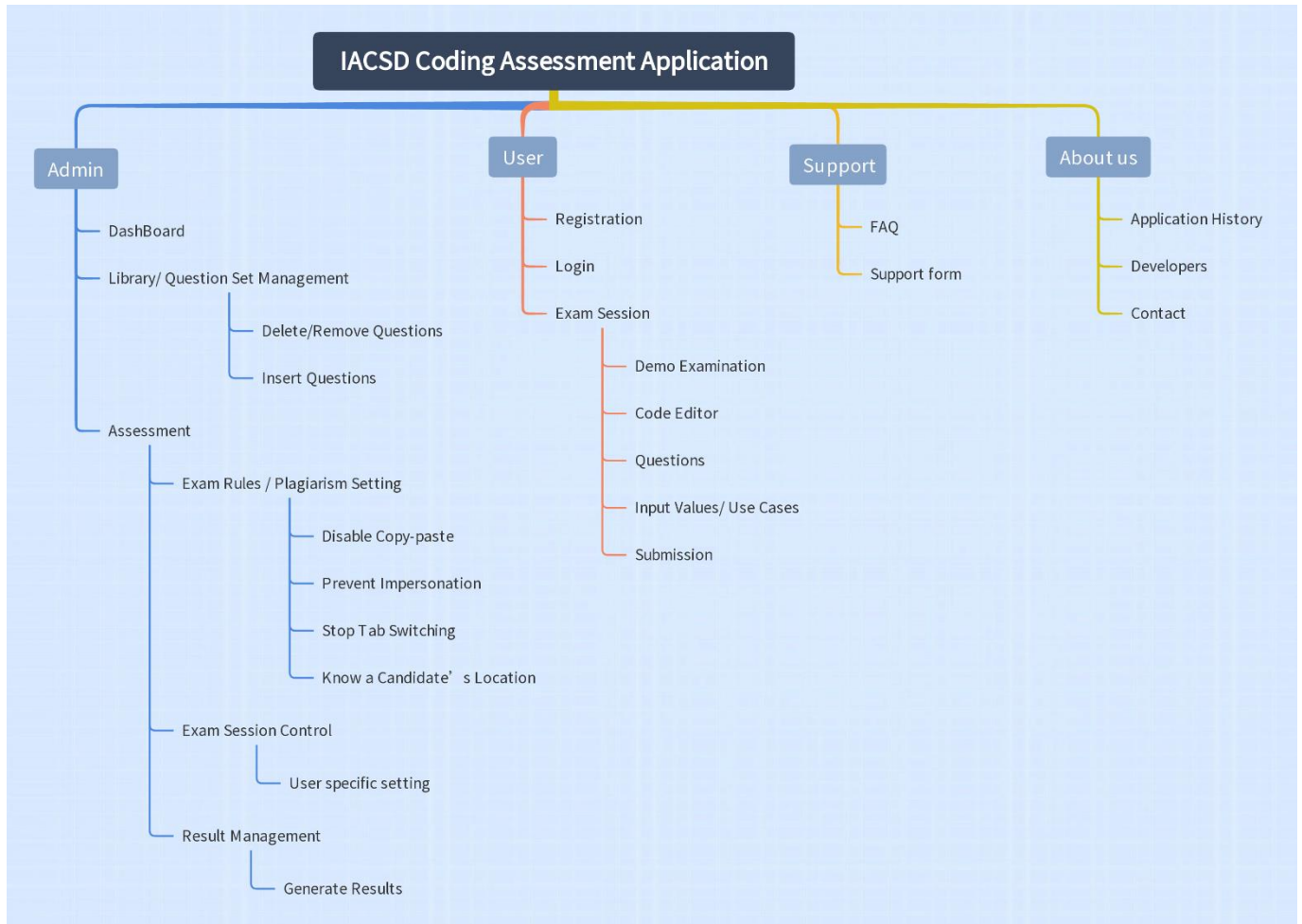
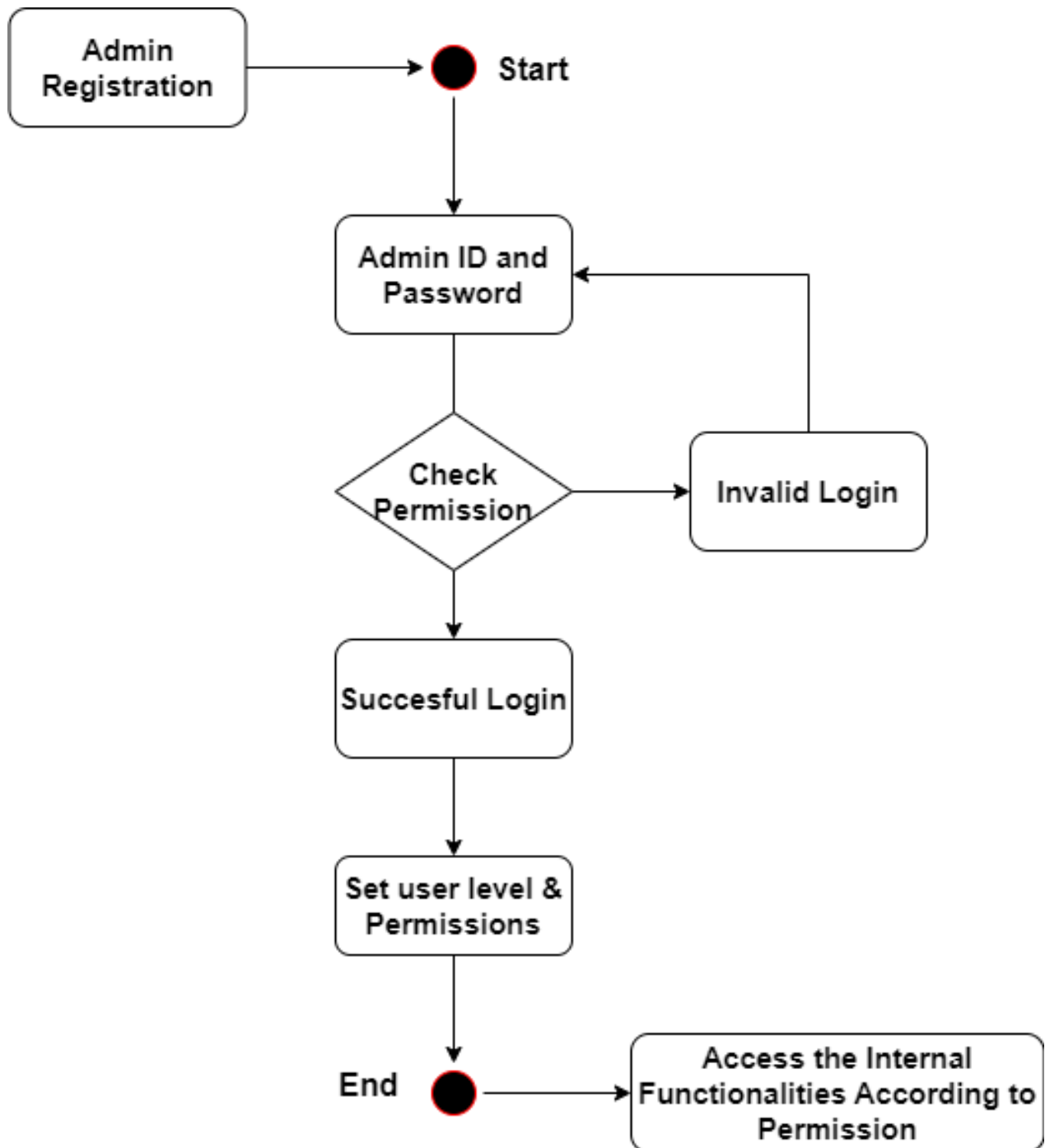


Figure 2.

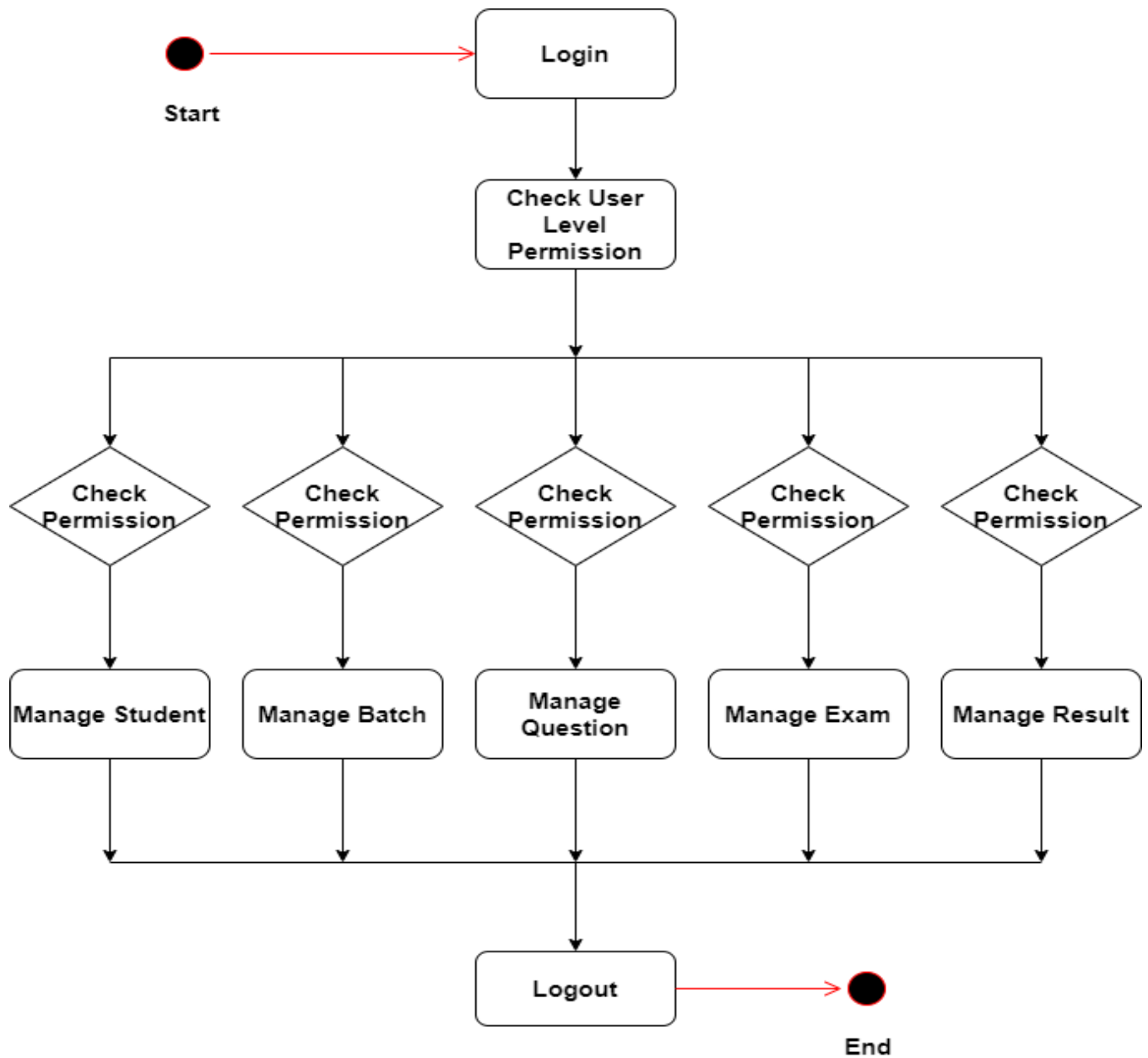
Login Activity Diagram



Login Activity Diagram

Figure 3.

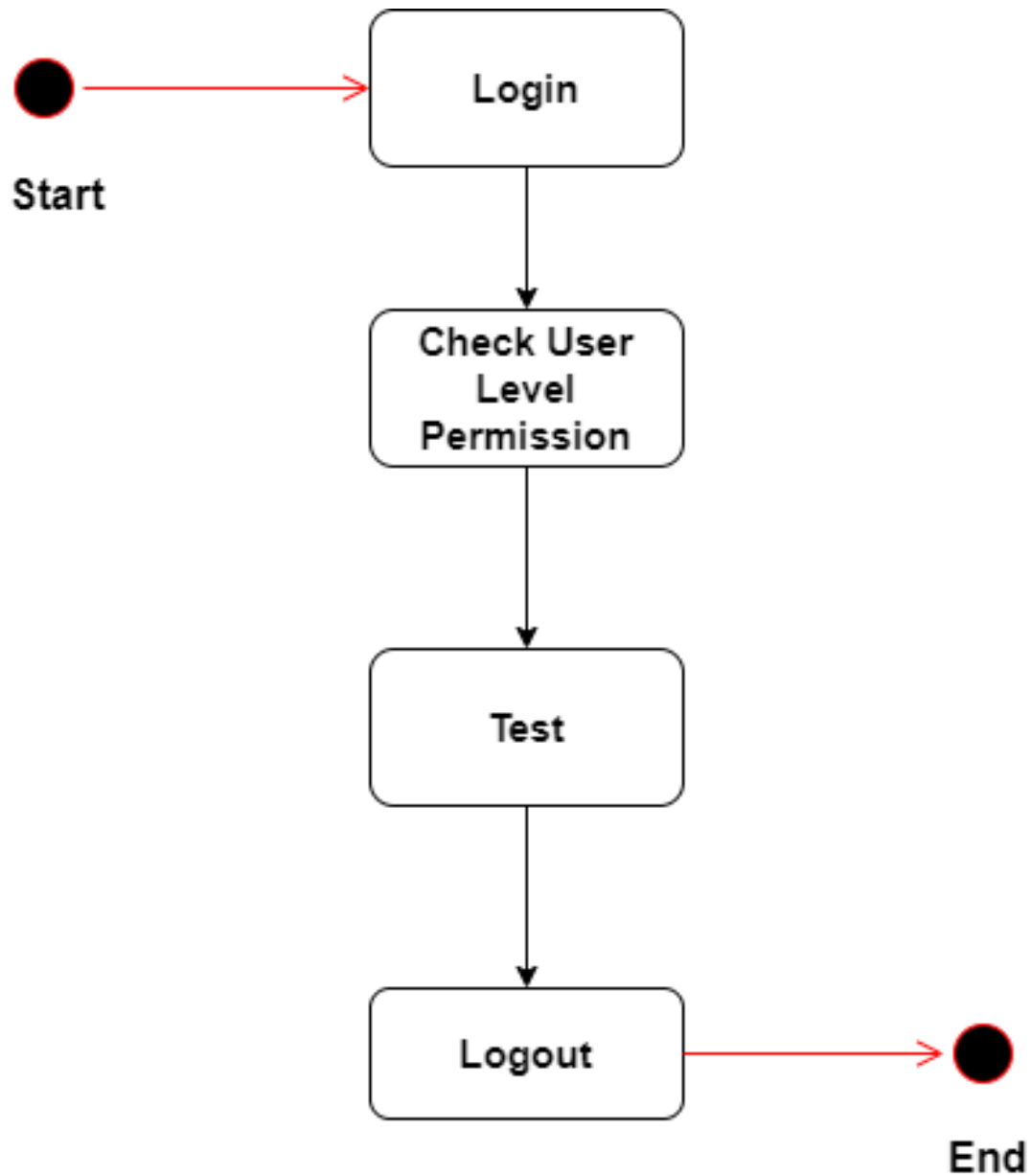
Admin Activity Diagram



Admin Activity Diagram

Figure 4.

Student Activity Diagram : -

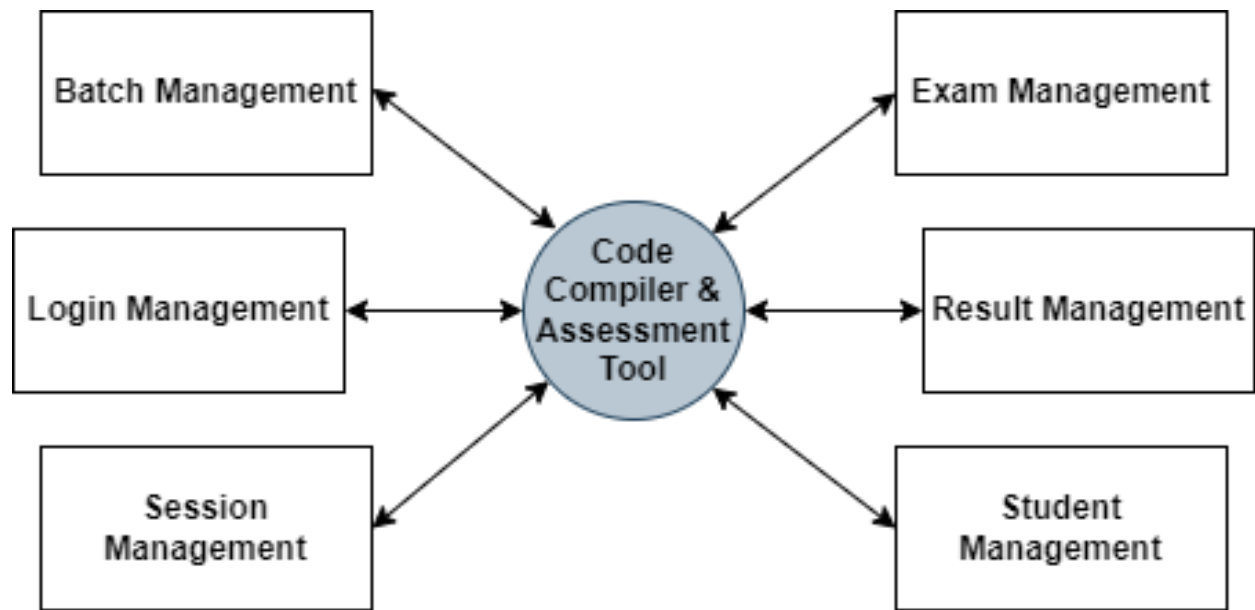


Student Activity Diagram

Figure 5.

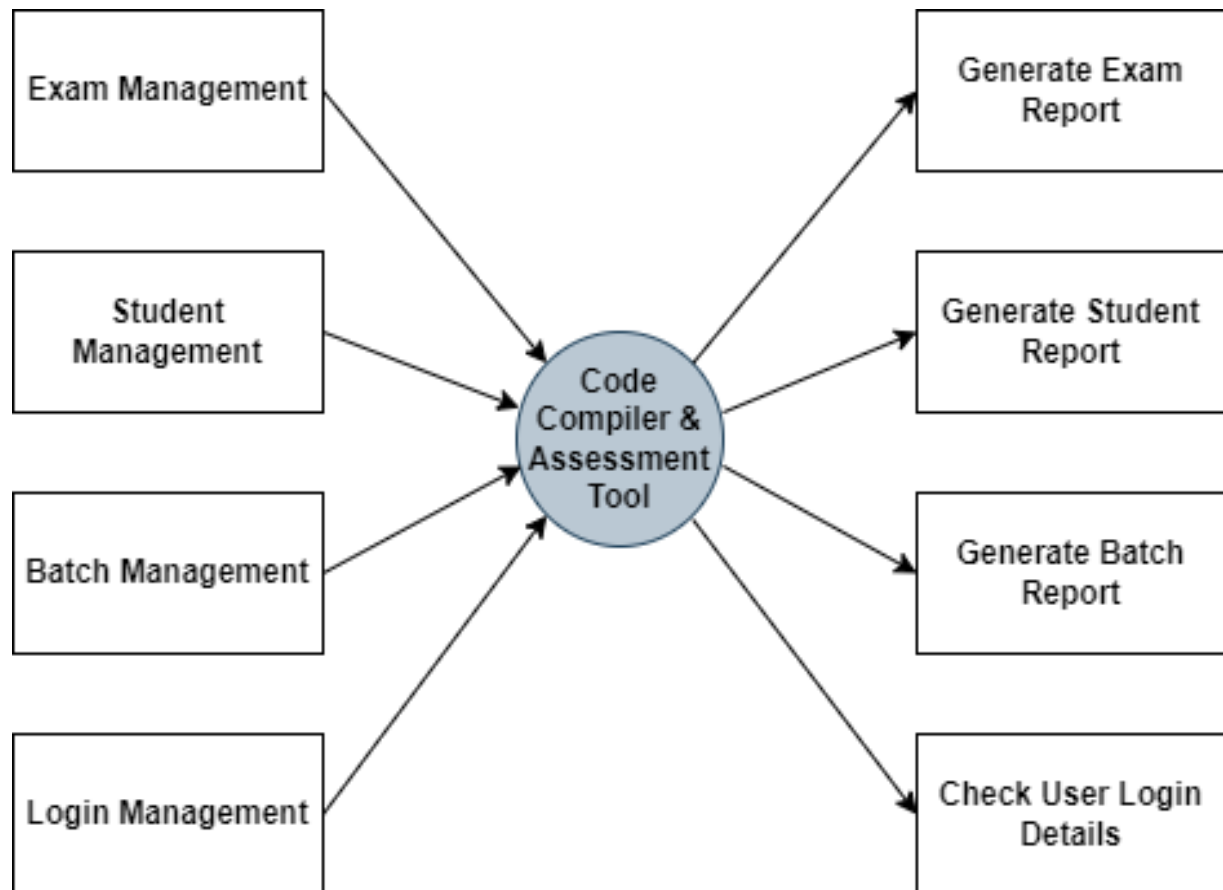
Level 0 Data Flow Diagram: -

Figure 6.



Zero Level Data Flow Diagram

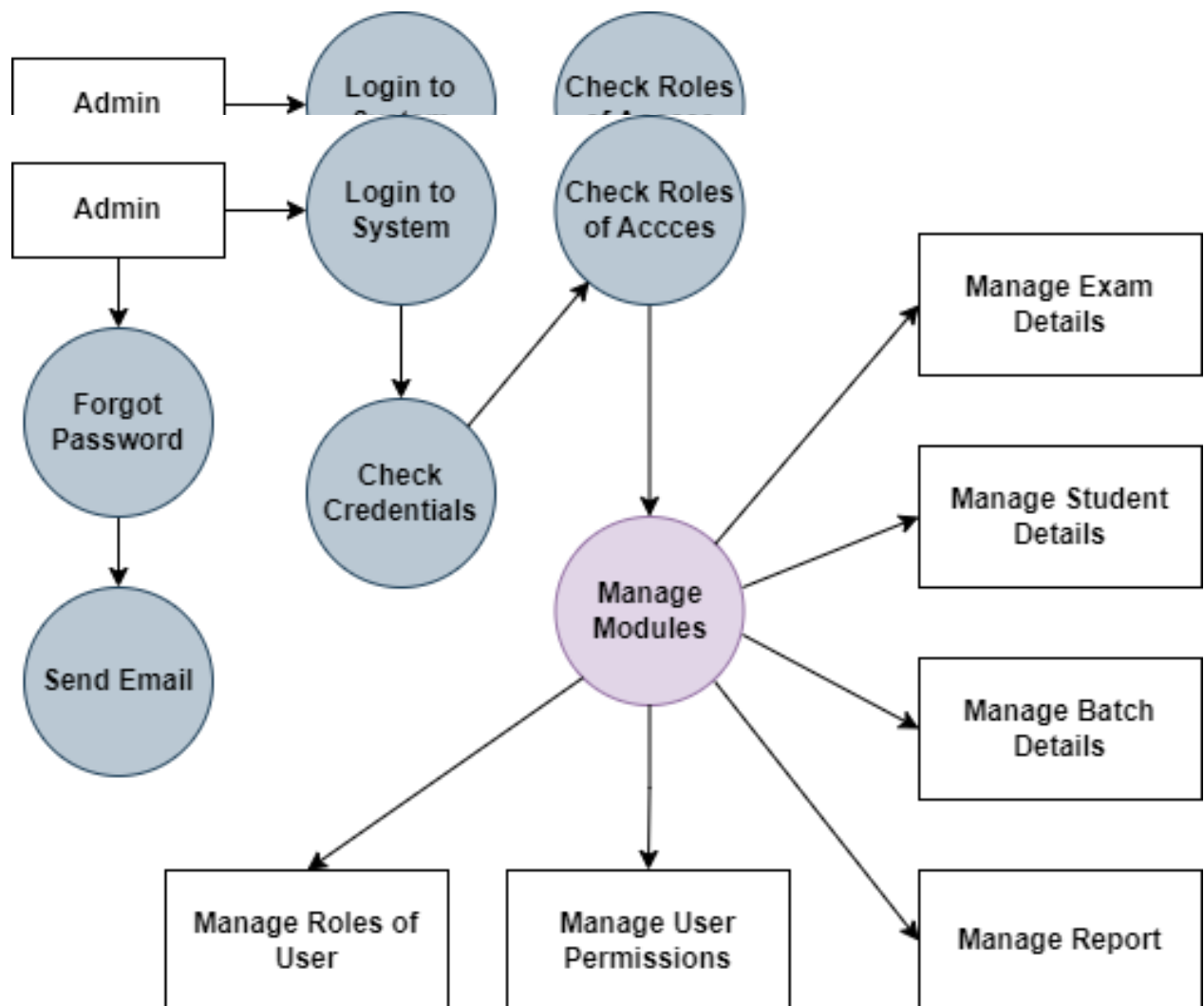
Level 1 | Flow Diagram: -



First Level Data Flow Diagram

Figure 7.

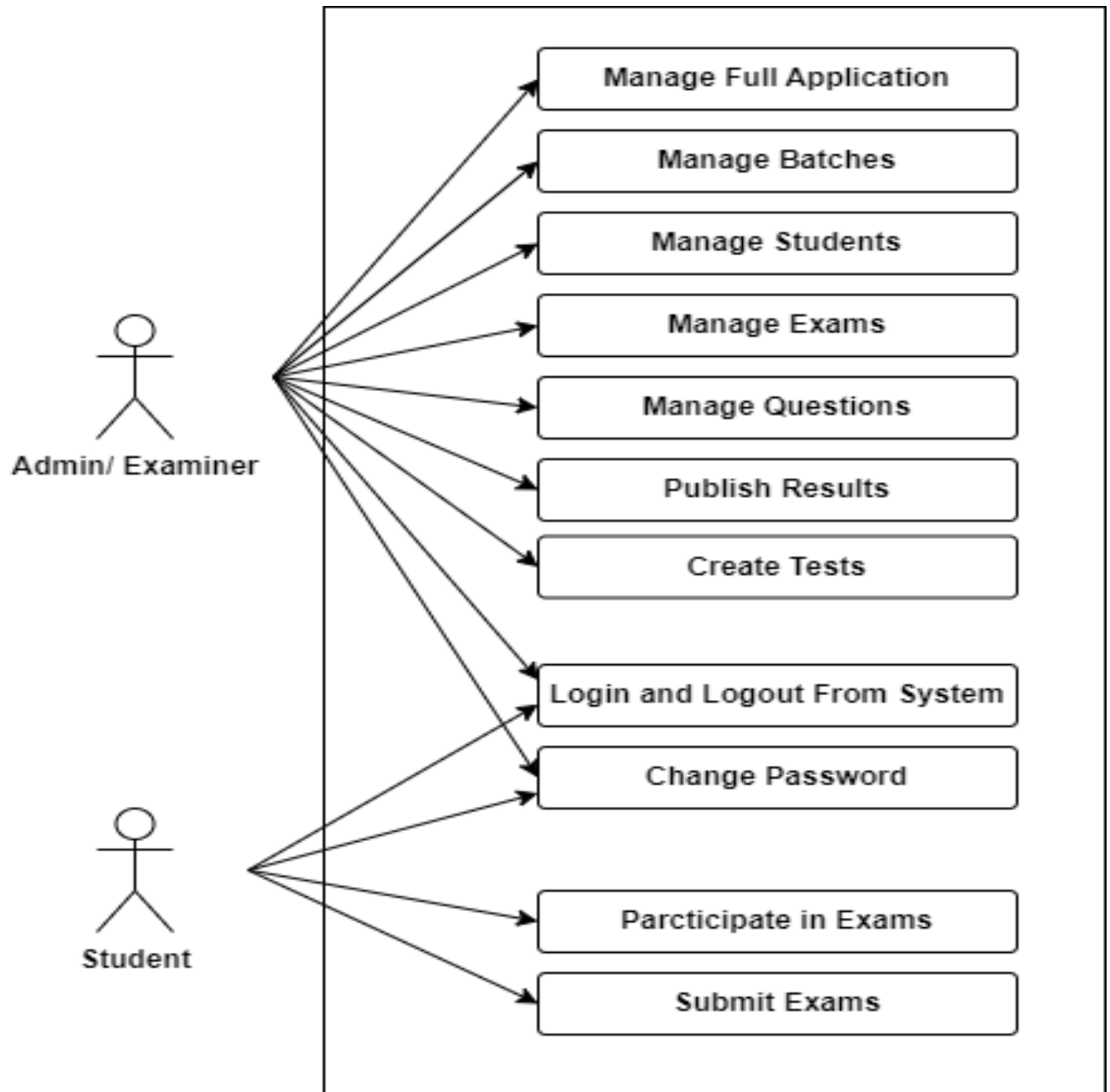
Level 2 Flow Diagram: -



Second Level Data Flow Diagram

Figure 8.

Use-case Diagram



Usecase Diagram

Figure 9

E-R Diagram

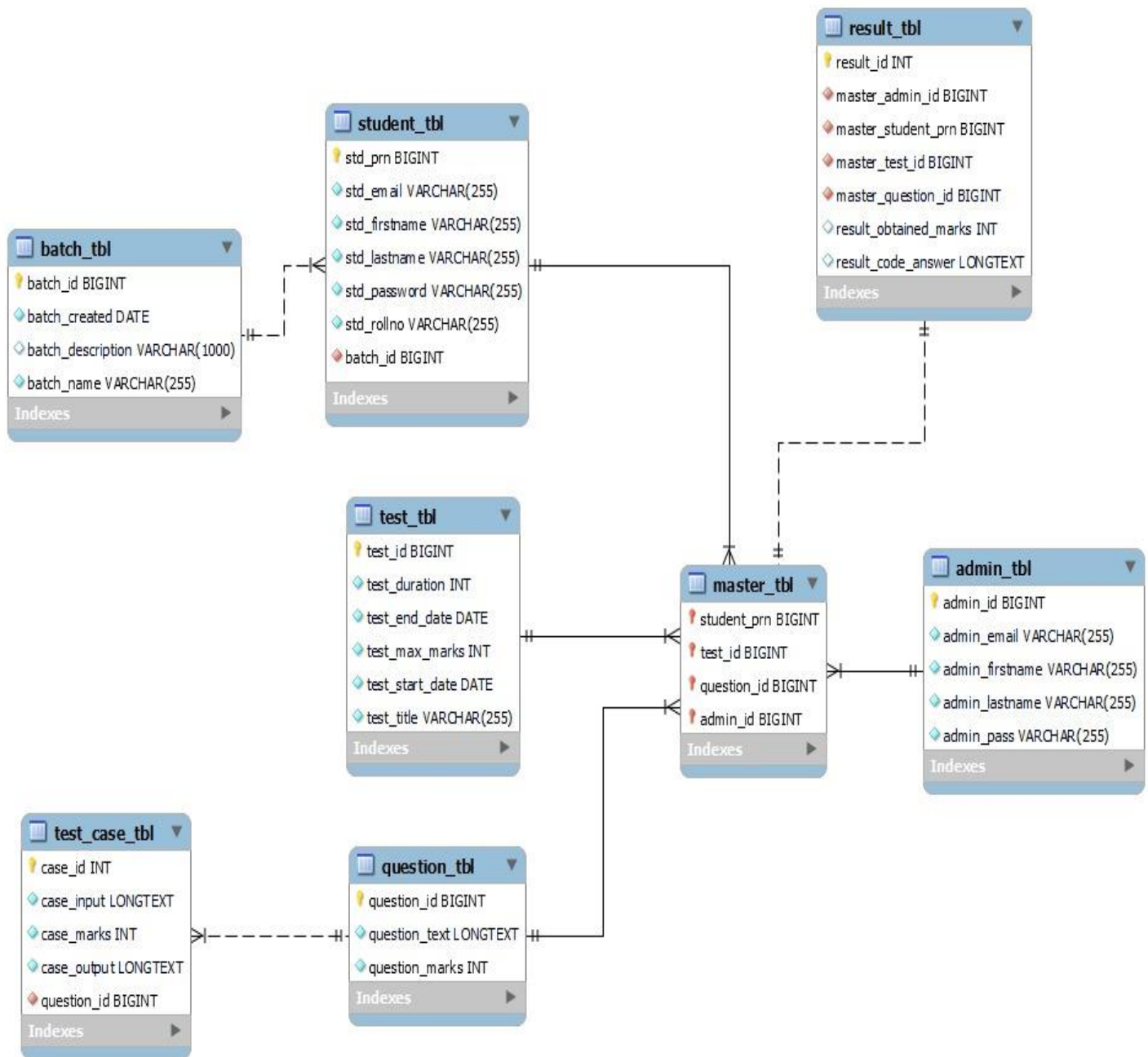


Figure 10

Class Diagram

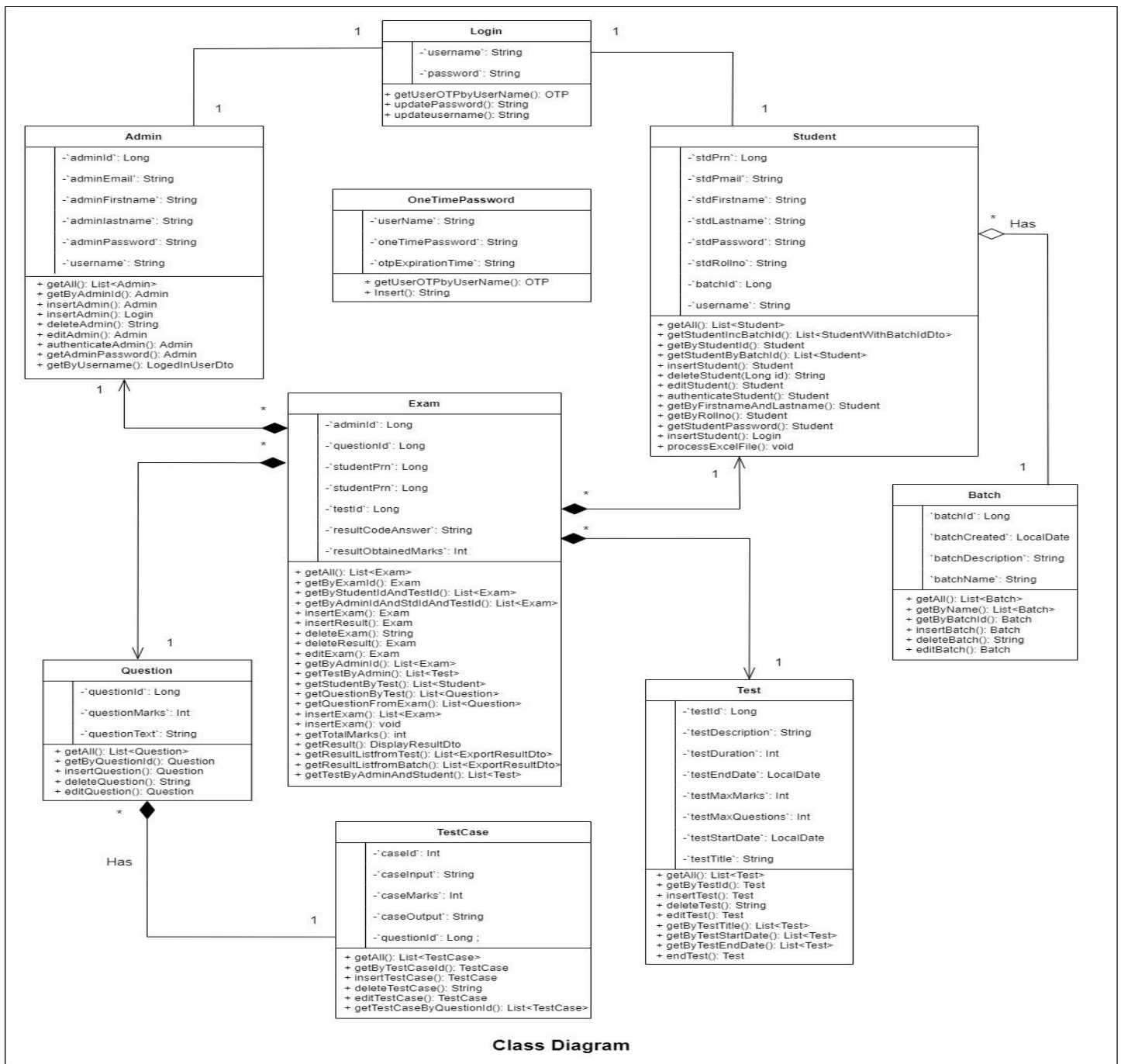


Figure 12.

SYSTEM REQUIREMENT SPECIFICATION

General Description

Product Description:

- An Online Exam Portal on CodeMaze is a web-Based. Platform designed to enable organization and educational institutions to conduct online exams and assessments. The portal provides tools for exam creation question bank managements, automated grading and feedback, and reporting and analytic.

- The platform allows exam creators to create different types of questions such as multiple choice, programming questions. It allows them to customize the exam setting, such as time limits, number of attempts, and difficulty level.

Problem Statement

- Organizations and educational institutions face various challenges when conducting traditional pen-and-paper-based exams. These challenges include the manual handling of exam papers, the need for physical exam centre, and the high costs associated with conducting and grading exams. These challenges often result in long lead times for exam results and the potential for errors or bias in grading.
- Additionally, with the increasing need for remote learning and work, there is a growing demand for online exam platforms that are secure, reliable, and user-friendly. However, developing and implementing such platforms can be challenging, requiring a high level of technical expertise and resources.
- The problem statement, therefore, is to create an online exam portal on CodeMaze that provides a secure, reliable, and user-friendly platform for organizations and educational institutions to conduct online exams and assessments. The portal should be easy to use for both exam creators and takers,

Functional Requirements

Create Exams

Examiner will have the ability to create coding exams and upload exam questions. They can also add multiple test cases for the codes, customize the mark distribution for a question and pick from a bunch of questions that are already designed by us.

Administer Exams

Examiner can administer exams to students, view the responses of all students for better evaluation, change questions any number of times before the start.

Grade Exams

Examiner can grade exams and view exam results. They can also view the number of students absent for the test Examiner

View Exam Results: -Examiner can view exam results and see how students performed.

Student Dashboard

Students will be given the information of their exam through an email with their id and password. They can change their password for security purpose, start the exam once their session starts, check their code by clicking on the submit button to see if it matches all the test cases, and view all the questions once the test starts and they can start with any particular question.

Examiner Dashboard

Examiner will be provided with a dashboard for students and Examiner. Dashboard will provide information using graph, score cards, key performance indicators as well as grid data presentation.

Non Requirements

Security

Registered examiner will allow to view dashboard with all information gathered from examination scheduled and conducted. Each Member will be to access system through authentication process. System will provide access to the content ,operations using Role based security (Authorization) (Permissions based on Role). Using SSL in all transactions which will be performed stakeholder. It would protect confidential information shared by system. System will automatically log out of all stakeholder after some time due to inactiveness. System will block operations for inactive stakeholder and would redirect

for authentication, system will have a feature that counts how many times a student has switched the tab, if it exceeds the limit set by the Examiner the student will be logged out. System will internally maintain secure communication channel between Servers (Web Servers , App Servers, database Server) Sensitive data will be always encrypted across communication. User proper firewall to protect servers from outside fishing, vulnerable attacks.

Reliability

The system will backup business data on regular basis and recover in short time duration to keep system operational continuous updates are maintained , continuous Administration is done to keep system operational. During peak hours system will maintain same user experience by managing load balancing .

Availability

uptime: 24*7 available 90%

Maintainability

A Commercial database software will be used to maintain System data Persistence. A readymade Web Server will be installed to host the Web Site to manage server capabilities. IT operations team will easily monitor and configure System using Administrative tools provided by Servers. Separate environment will be maintained for system for isolation in production, testing, and development.

Portability

PDA: Portable Device Application System will provide portable User Interface (HTML, CSS, JS) through users will be able to access the Web Site. System can be deployed to single server, to Linux, Cloud (Azure or AWS or GCP)

Accessibility

Only registered members will be able to access the site and view the data after authentication. Management team can reject or approve updating, deletion requests based on role provided. Admin will be able to view daily, weekly, monthly dashboard.

Durability

Requirements may include ensuring that the system can withstand the expected usage and traffic over time, and that the system and its components can be easily maintained or replaced as needed.

Efficiency

Requirements may include ensuring that the system can perform its intended function with minimal resource usage, such as minimizing load times and ensuring fast response times for users.

Modularity

Requirements may include designing the system with interchangeable components or modules, allowing for flexibility in maintenance, upgrade, and replacement of individual components, making the system more adaptable to change and less prone to failure. Additionally, it can also include designing the system to be easily extensible by adding new features, modules, or components.

Scalability

Scalability is the measure of a system's ability to increase or decrease in performance and cost in response to changes in application and system processing demands. System will be able to provide consistent user experience to stake holder as well as visitors irrespective of load.

Safety

Website will be secure from malicious attack, fishing. Website portal functionalities are protected from outside with proper firewall configuration. Website portal will be always kept updated with latest anti-virus software. Business data will be backed up periodically to ensure safety of data using incremental back up strategy. Role based security will be applied for Application data and operations accessibility.

Moderator

In the context of an online exam portal on CodeMaze , a moderator would be a user with administrative privileges who is responsible for managing the exam portal, ensuring its smooth operation, and resolving any issues that may arise.

Some of the key responsibilities of moderator for an online exam portal on CodeMaze may include .

User Management:

Exam Management:

Technical Support:

Security Management:

Reporting and Analytics:

SYSTEM DESIGN

System design is the solution for the creation of a new system. This phase focuses on the detailed implementation of the feasible system. Its emphasis on translating design. Specifications to performance specification. System design has two phases of development.

- Logical Design

- Physical

Design During logical design phase the analyst describes inputs (sources), outputs(destinations), databases (data sores) and procedures (data flows) all in a format that meets the user requirements. The analyst also specifies the needs of the user at a level that virtually determines the information flow in and out of the system and the data resources. Here the logical design is done through data flow diagrams and database design. The physical design is followed by physical design or coding. Physical design produces the working system by defining the design specifications, which specify exactly what the candidate system must do. The programmers write the necessary programs that accept input from the user, perform necessary processing on accepted data and produce the required report on a hard copy or display it on the screen.

INPUT AND OUTPUT DESIGN

Input design:

Input design is the link that ties the information system into the world of its users. The input design involves determining the inputs, validating the data, minimizing the data entry and provides a multi-user facility. Inaccurate inputs are the most common cause of errors in data processing. Errors entered by the data entry operators can be controlled by input design. The user-originated inputs are converted to a computer-based format in the input design. Input data are collected and organized into groups of similar data. Once identified, the appropriate input media are selected for processing. All the input data are validated and if any data violates any conditions, the user is warned by a message. If the data satisfies all the conditions, it is transferred to the appropriate tables in the database. In this project the student details are to be entered at the time of registration. A page is designed for this purpose which is user friendly and easy to use. The design is done such that users get appropriate messages when exceptions occur.

Output design:

Computer output is the most important and direct source of information to the user. Output design is a very important phase since the output needs to be in an efficient manner. Efficient and intelligible output design improves the system relationship with the user and helps in decision making. Allowing the user to view the sample screen is important because the user is the ultimate judge of the quality of output. The output module of this system is the selected notifications.

DATABASE DESIGN

Database

Databases are the storehouses of data used in the software systems. The data is stored in tables inside the database. Several tables are created for the manipulation of the data for the system. Two essential settings for a database are

- Primary key - the field that is unique for all the record occurrences
- Foreign key - the field used to set relation between tables

Normalization is a technique to avoid redundancy in the tables.

System tools:

The various system tools that have been used in developing both the front end and the back end of the project are being discussed in this chapter.

FRONT END:

React is a library which is developed by Facebook and is utilized to implement the frontend. React (also known as React.js or ReactJS) is a free and open-source front-end JavaScript library for building user interfaces or UI components. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single page or mobile applications. However, React is only concerned with state management and rendering that state to the DOM, so creating React applications usually requires the use of additional libraries for routing, as well as certain client-side functionality.

BACKEND:

The back end is implemented using MySQL which is used to design databases. MySQL: MySQL is the world's second most widely used open-source relational database management system (RDBMS). The SQL phrase stands for Structured Query Language. An application software called Navicert was used to design the tables in MySQL.

Spring-Boot:

This is used to connect MySQL and fetch data from database and store the data in database. The Spring Framework is an application framework and inversion of control container for the Java platform.

The framework's core features can be used by any Java application, but there are extensions for building web applications on top of the Java EE (Enterprise Edition) platform. Although the framework does not impose any specific programming model, it has become popular in the Java community as an addition to the Enterprise JavaBeans (EJB) model. The Spring Framework is Open-source Framework.

Table Structure

```
mysql> desc admin_tbl;
```

Field	Type	Null	Key	Default	Extra
admin_id	bigint	NO	PRI	NULL	auto_increment
admin_email	varchar(255)	NO	UNI	NULL	
admin_firstname	varchar(255)	NO		NULL	
admin_lastname	varchar(255)	NO		NULL	
admin_password	varchar(255)	NO		NULL	
username	varchar(100)	YES	MUL	NULL	

```
6 rows in set (0.04 sec)
```

```
mysql> desc batch_tbl;
```

Field	Type	Null	Key	Default	Extra
batch_id	bigint	NO	PRI	NULL	auto_increment
batch_created	date	NO		NULL	
batch_description	varchar(1000)	YES		NULL	
batch_name	varchar(255)	NO		NULL	

```
4 rows in set (0.00 sec)
```

```
mysql> desc student_tbl;
```

Field	Type	Null	Key	Default	Extra
std_prn	bigint	NO	PRI	NULL	
std_email	varchar(255)	NO	UNI	NULL	
std_firstname	varchar(255)	NO		NULL	
std_lastname	varchar(255)	NO		NULL	
std_password	varchar(255)	NO		NULL	
std_rollno	varchar(255)	NO	UNI	NULL	
batch_id	bigint	NO	MUL	NULL	
username	varchar(100)	YES	MUL	NULL	

```
8 rows in set (0.00 sec)
```



```
mysql> desc question_tbl;
```

Field	Type	Null	Key	Default	Extra
question_id	bigint	NO	PRI	NULL	auto_increment
question_marks	int	NO		NULL	
question_text	longtext	NO		NULL	

3 rows in set (0.00 sec)

```
mysql> desc test_tbl;
```

Field	Type	Null	Key	Default	Extra
test_id	bigint	NO	PRI	NULL	auto_increment
test_description	longtext	YES		NULL	
test_duration	int	NO		NULL	
test_end_date	date	NO		NULL	
test_max_marks	int	NO		NULL	
test_max_questions	int	NO		NULL	
test_start_date	date	NO		NULL	
test_title	varchar(255)	NO		NULL	

8 rows in set (0.00 sec)

```
mysql> desc test_case_tbl;
```

Field	Type	Null	Key	Default	Extra
case_id	int	NO	PRI	NULL	auto_increment
case_input	longtext	NO		NULL	
case_marks	int	NO		NULL	
case_output	longtext	NO		NULL	
question_id	bigint	NO	MUL	NULL	

5 rows in set (0.00 sec)

IACSD

```
mysql> desc master_tbl;
```

Field	Type	Null	Key	Default	Extra
admin_id	bigint	NO	PRI	NULL	
question_id	bigint	NO	PRI	NULL	
student_prn	bigint	NO	PRI	NULL	
test_id	bigint	NO	PRI	NULL	
result_code_answer	longtext	YES		NULL	
result_obtained_marks	int	YES		NULL	

6 rows in set (0.00 sec)

```
mysql> desc login;
```

Field	Type	Null	Key	Default	Extra
username	varchar(100)	NO	PRI	NULL	
password	varchar(255)	NO		NULL	

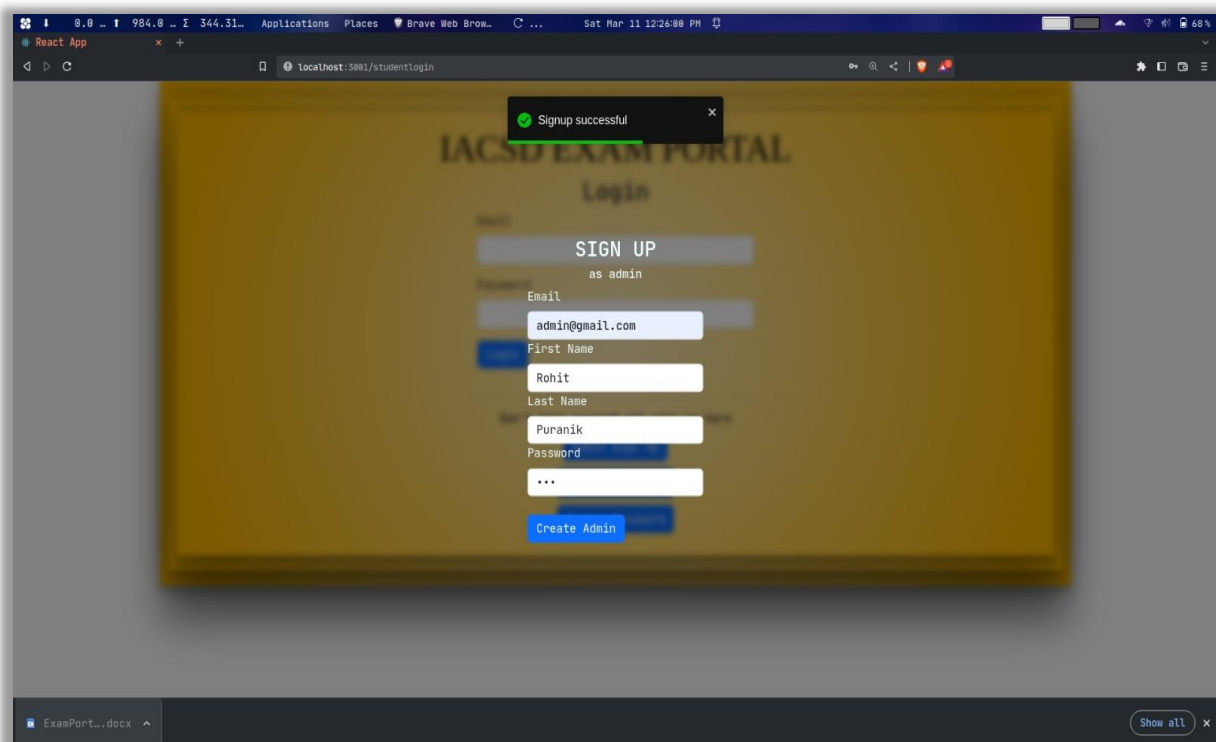
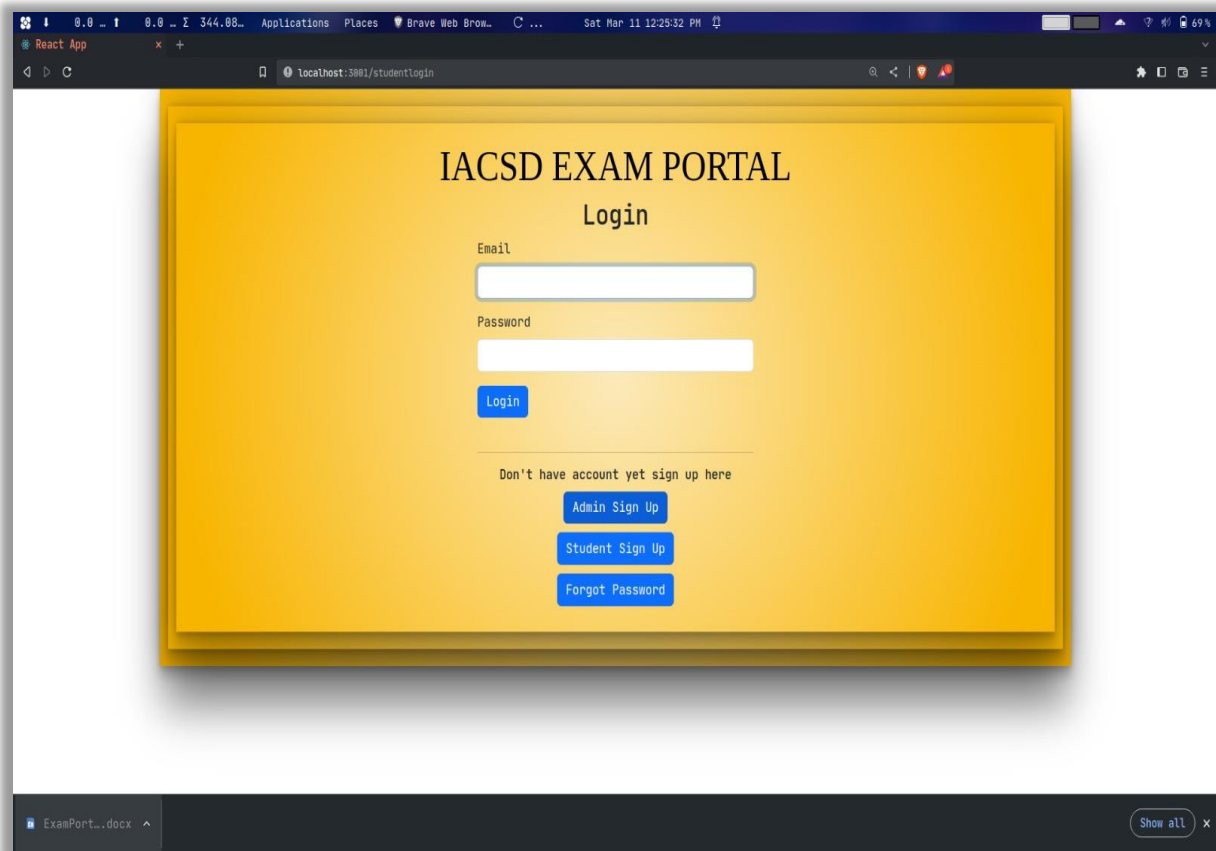
2 rows in set (0.00 sec)

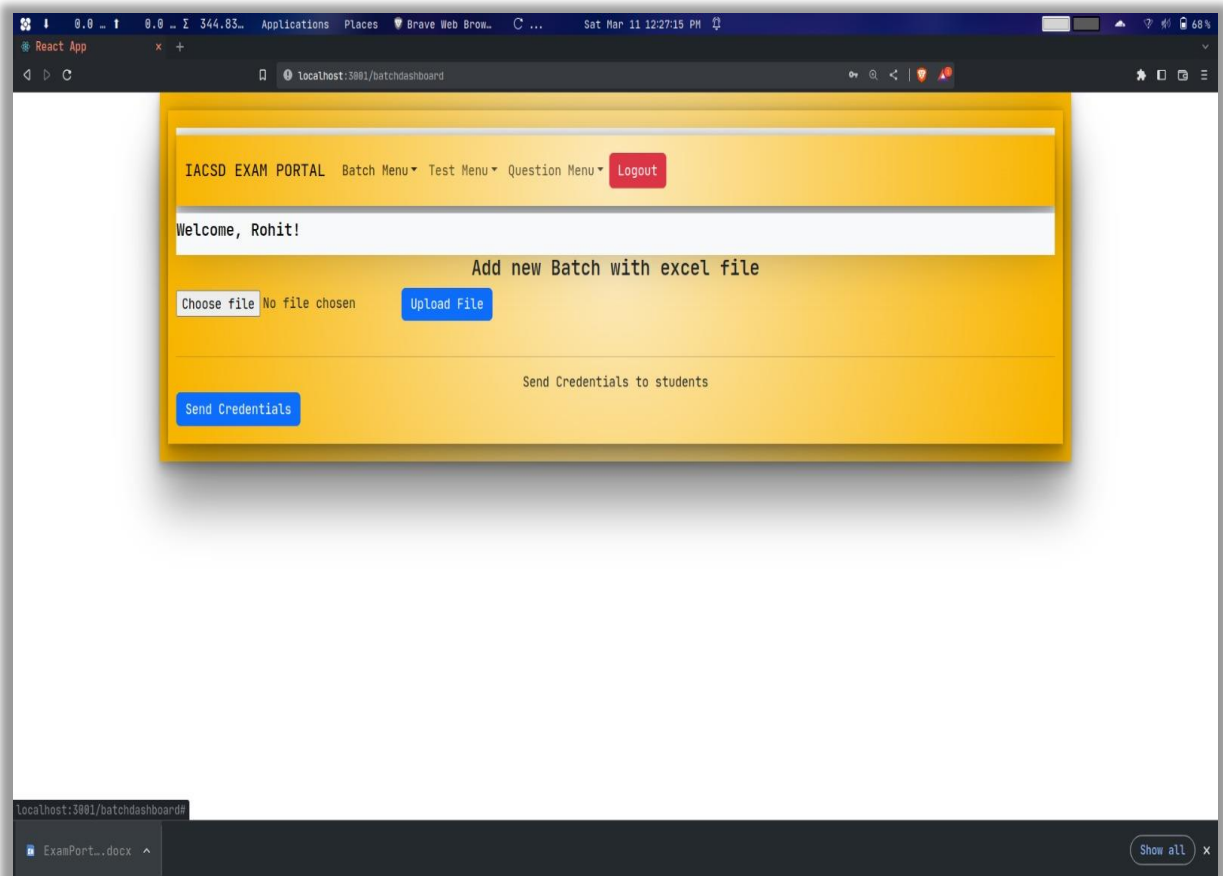
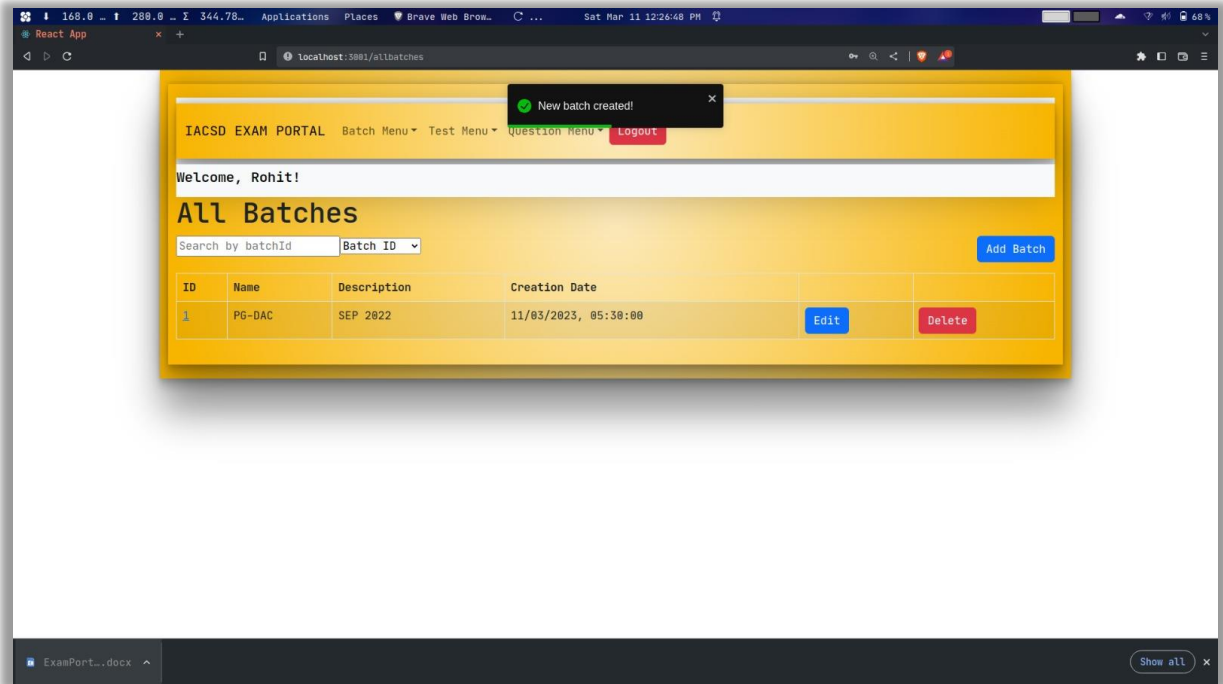
```
mysql> desc one_time_password_table;
```

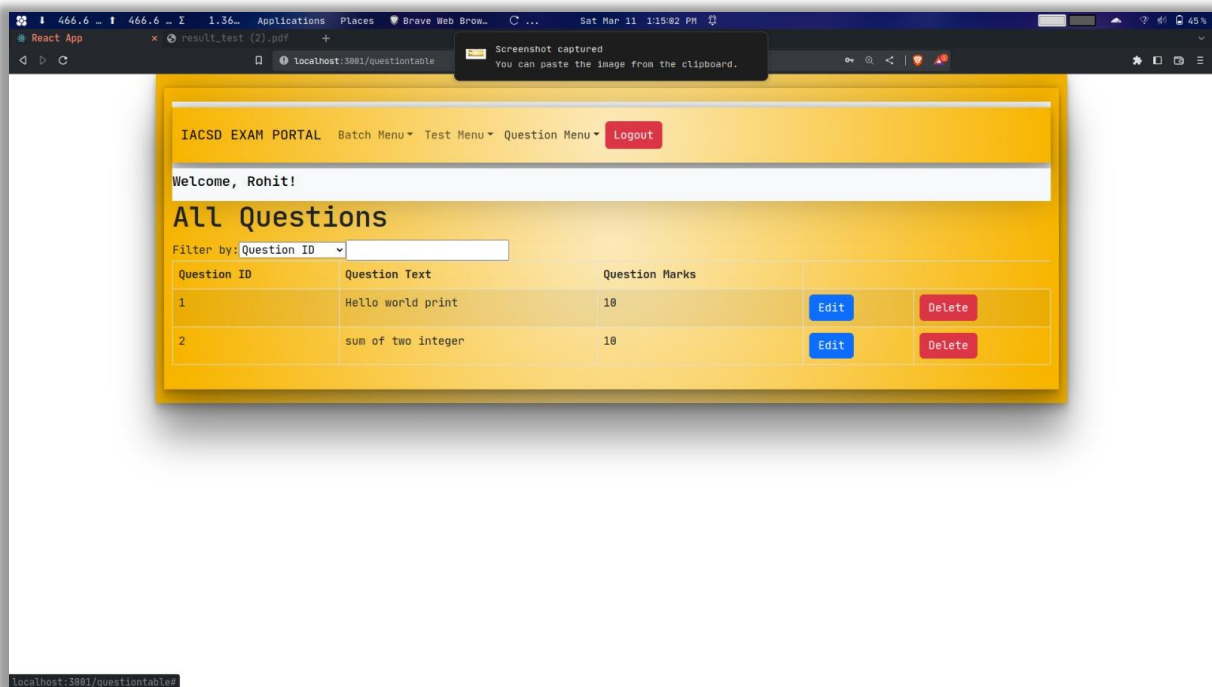
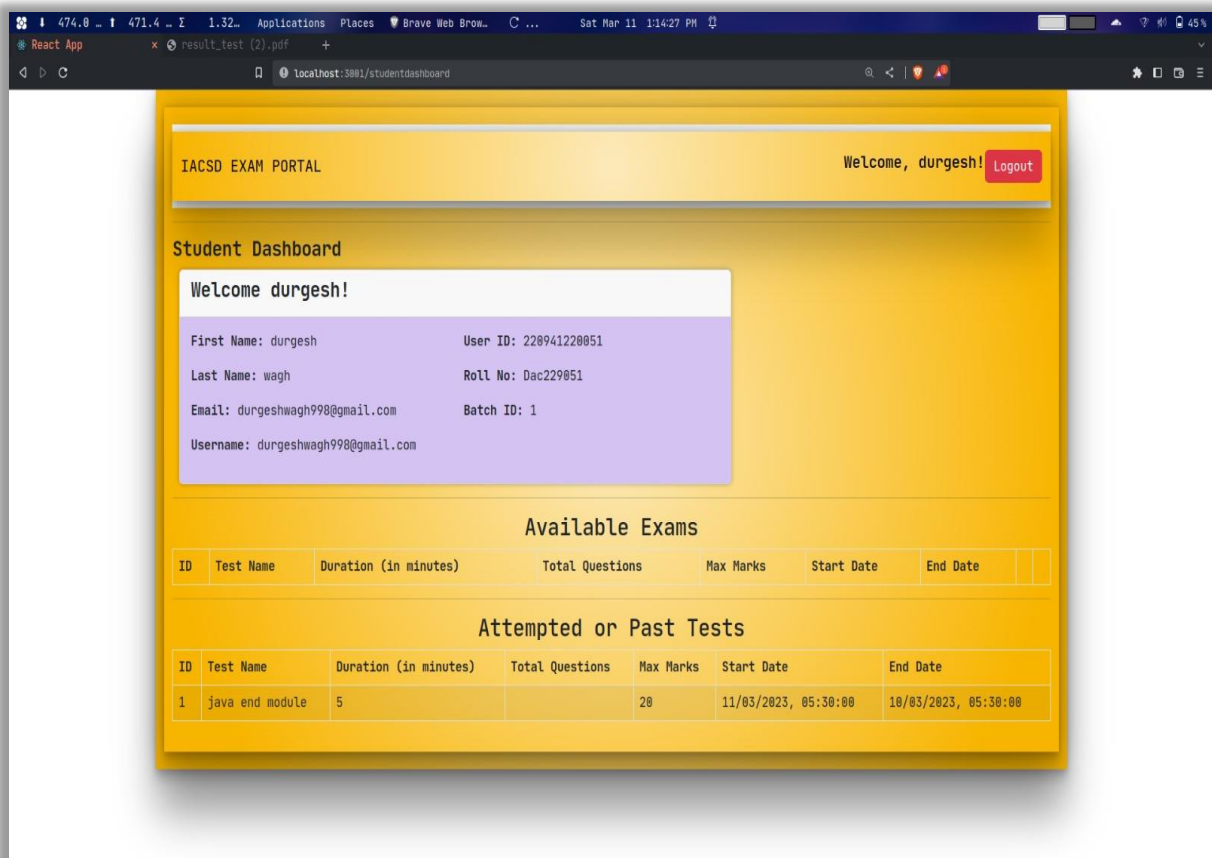
Field	Type	Null	Key	Default	Extra
user_name	varchar(255)	NO	PRI	NULL	
one_time_password	varchar(255)	YES		NULL	
otp_expiration_time	time	YES		NULL	

3 rows in set (0.00 sec)

PROJECT DIAGRAMS







IACSD EXAM PORTAL Batch Menu Test Menu Question Menu Logout

Welcome, Rohit!

Update Question

Question id: 1

Question Text

Hello world print

Question Marks

10

Update

Add Test Cases

Add Test Case

Current test cases

Test Case 1

Edit Delete

IACSD EXAM PORTAL Batch Menu Test Menu Question Menu Logout

Welcome, Rohit!

Create New Test

Test Title

Enter test title

Test Description

Enter test description

Test Duration (in minutes)

Enter test duration

Test Maximum Questions

Enter test maximum questions

Test Maximum Marks

Enter test maximum marks

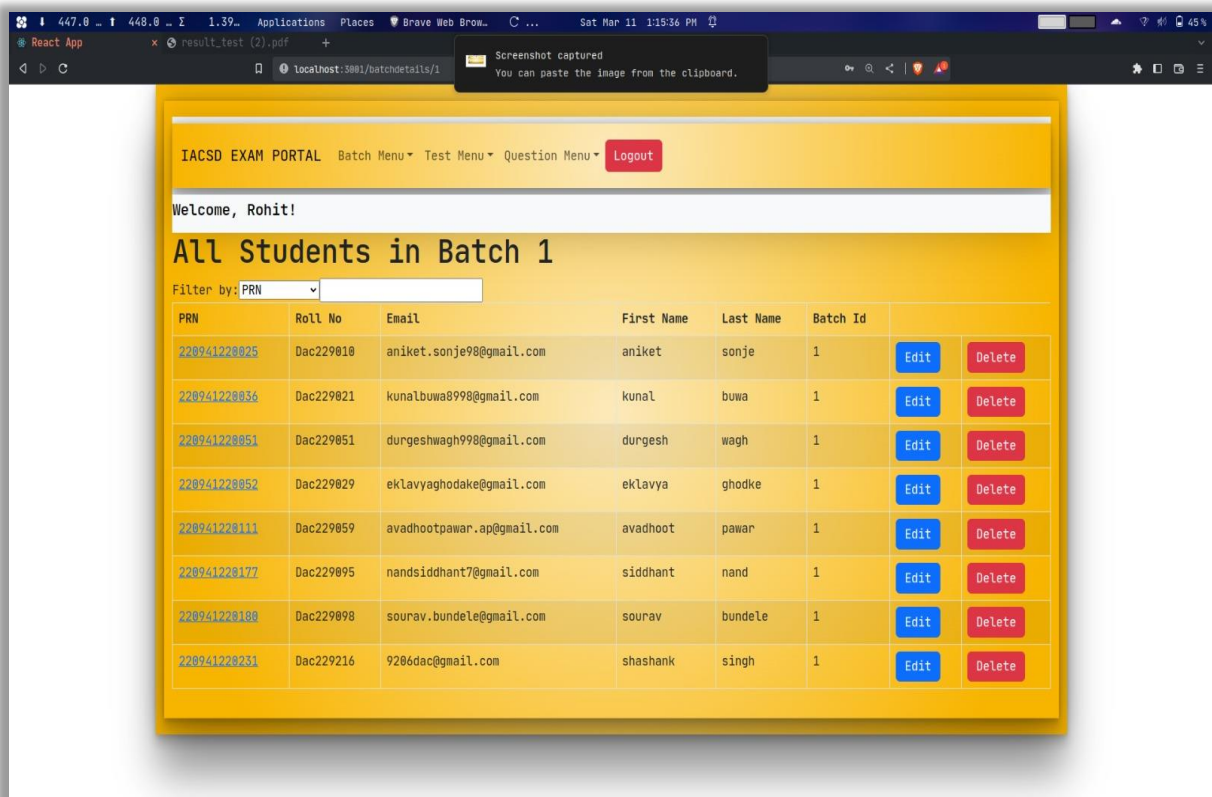
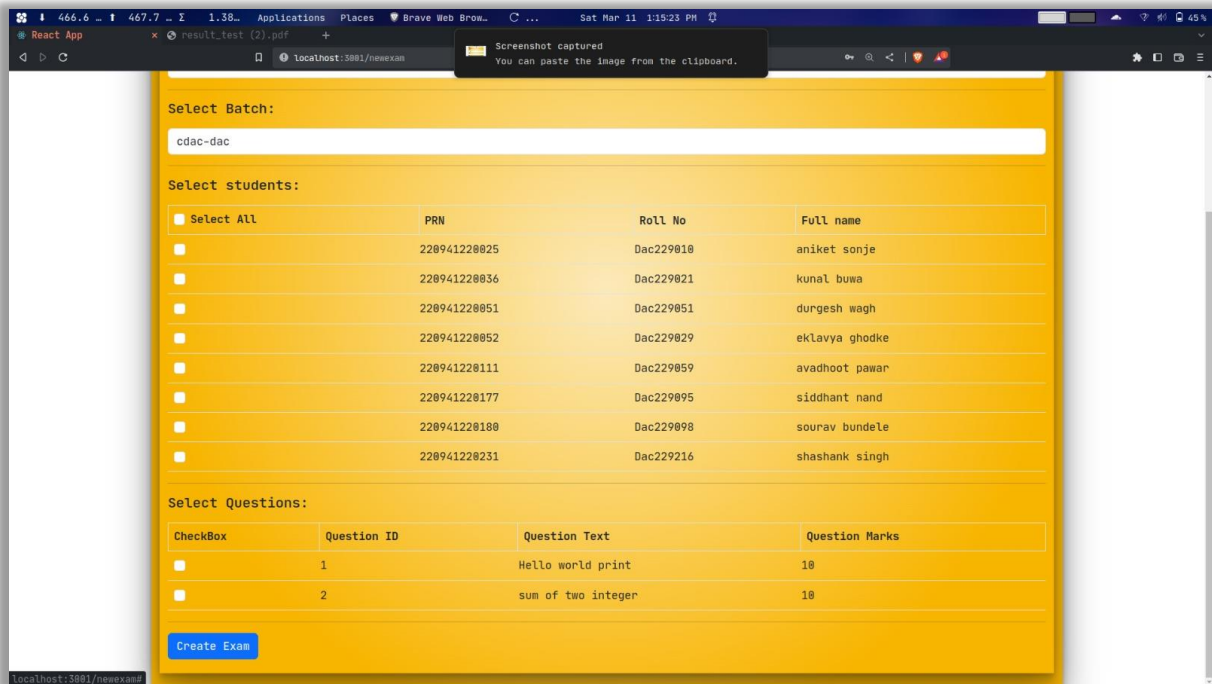
Test Start Date

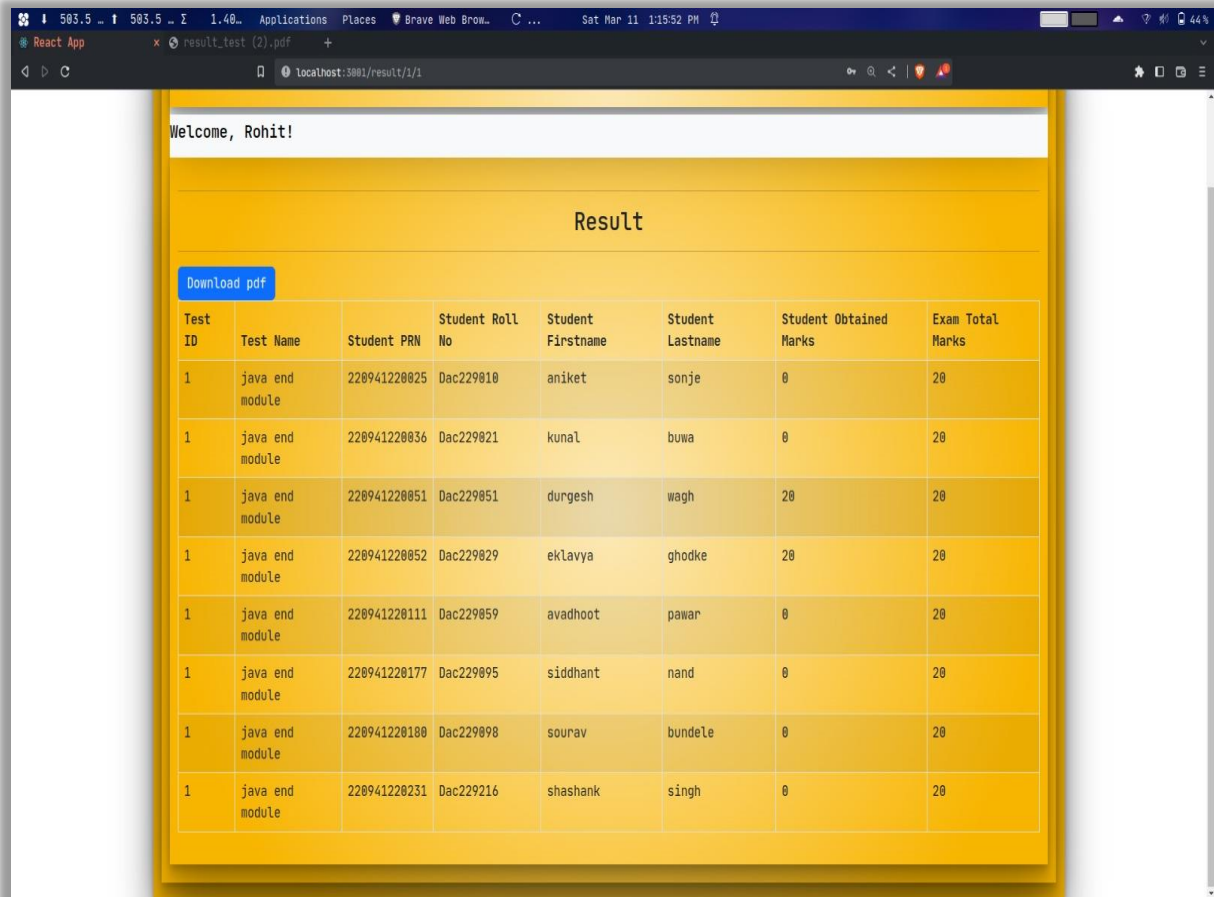
dd/mm/yyyy

Test End Date

dd/mm/yyyy

Submit



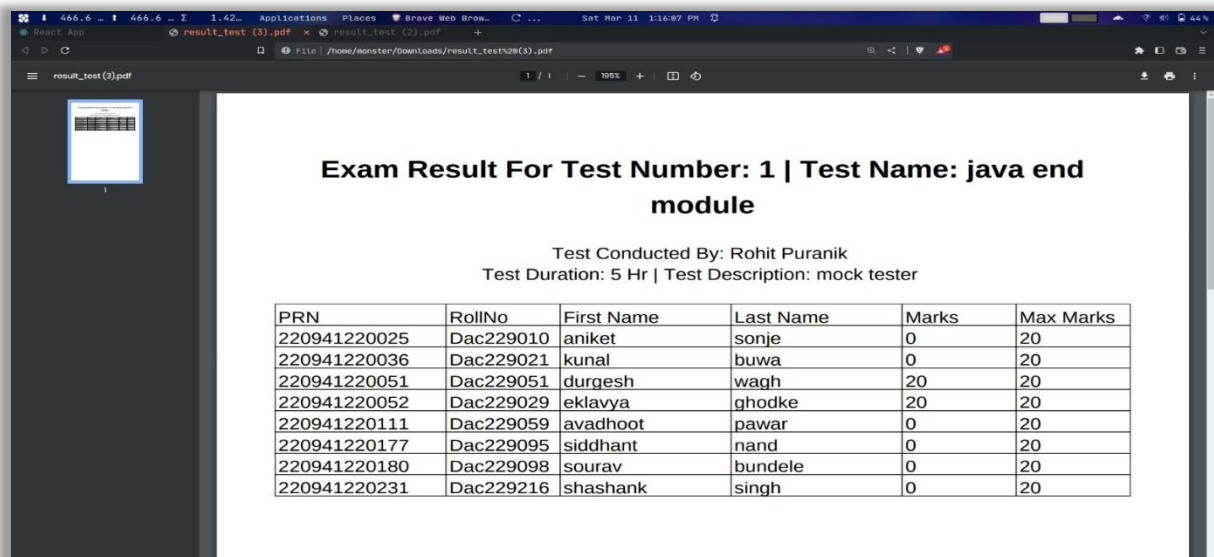


Welcome, Rohit!

Result

[Download pdf](#)

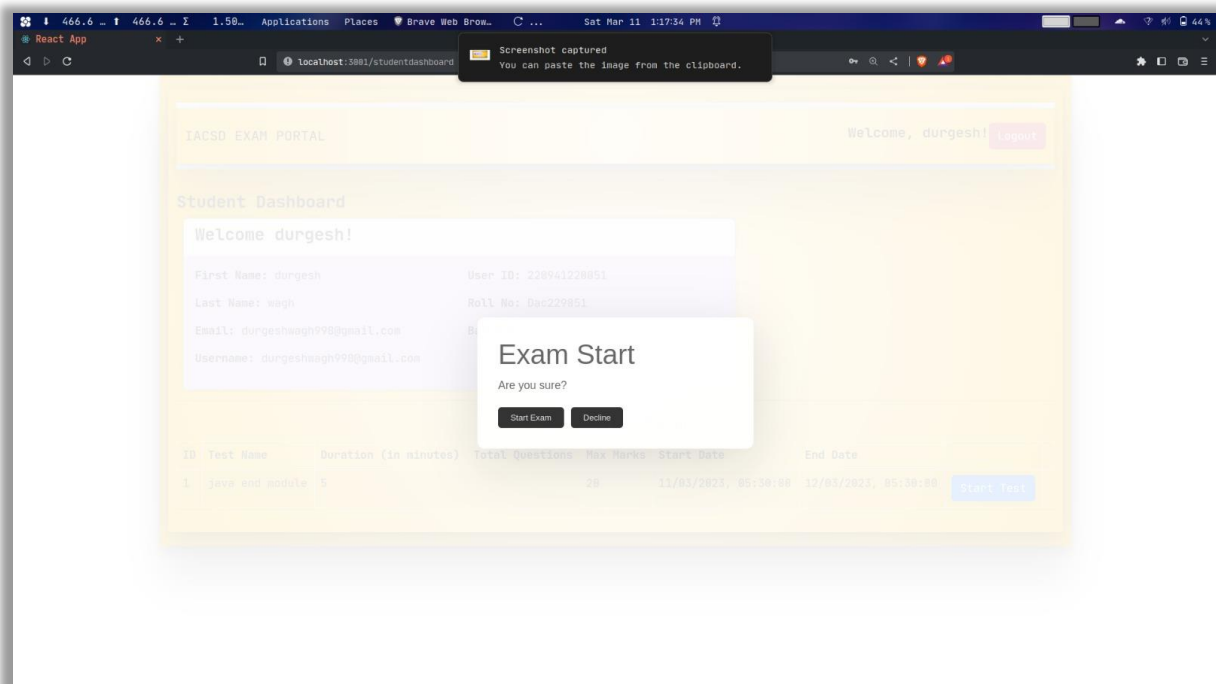
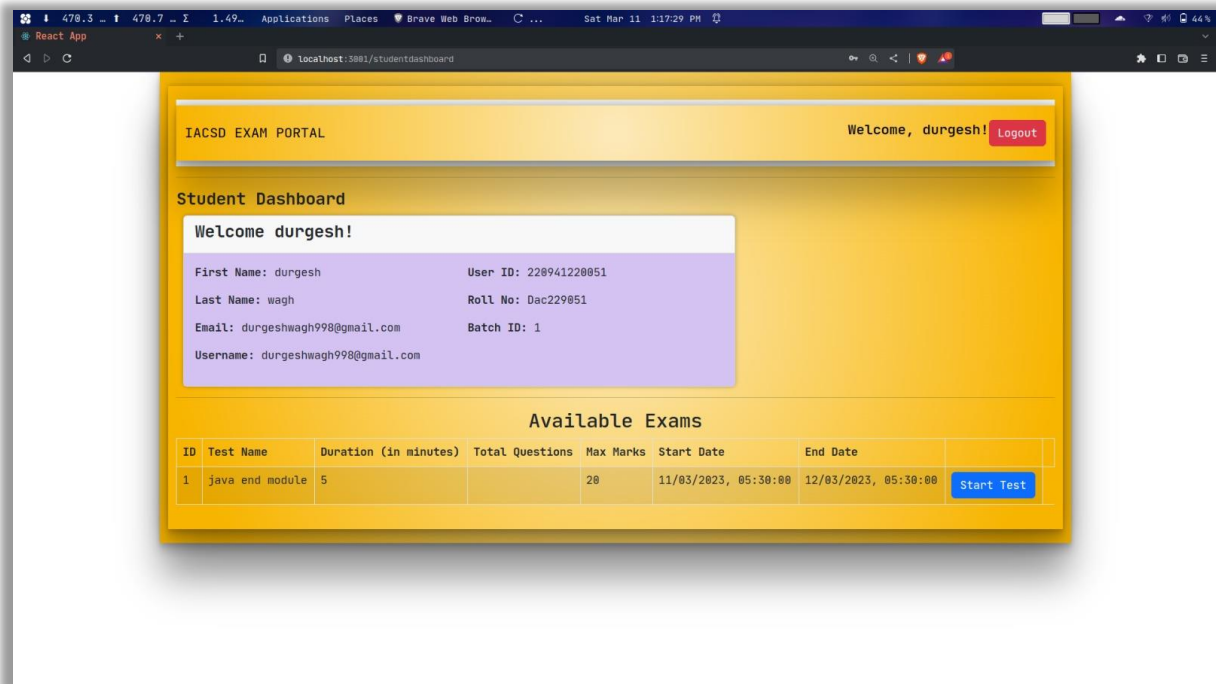
Test ID	Test Name	Student PRN	Student Roll No	Student Firstname	Student Lastname	Student Obtained Marks	Exam Total Marks
1	java end module	228941228025	Dac229010	aniket	sonje	0	20
1	java end module	228941228036	Dac229021	kunal	buwa	0	20
1	java end module	228941228051	Dac229051	durgesh	wagh	20	20
1	java end module	228941228052	Dac229029	eklavya	ghodke	20	20
1	java end module	228941228111	Dac229059	avadhoot	pawar	0	20
1	java end module	228941228177	Dac229095	siddhant	nand	0	20
1	java end module	228941228180	Dac229098	sourav	bundeale	0	20
1	java end module	228941228231	Dac229216	shashank	singh	0	20

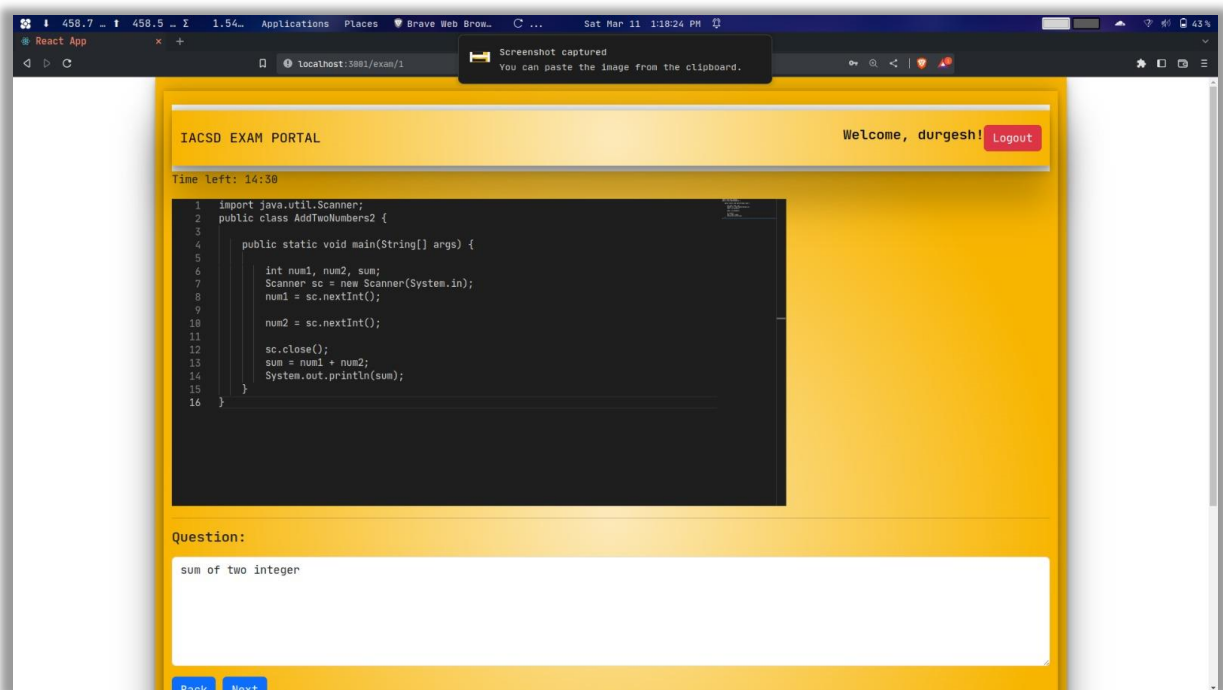
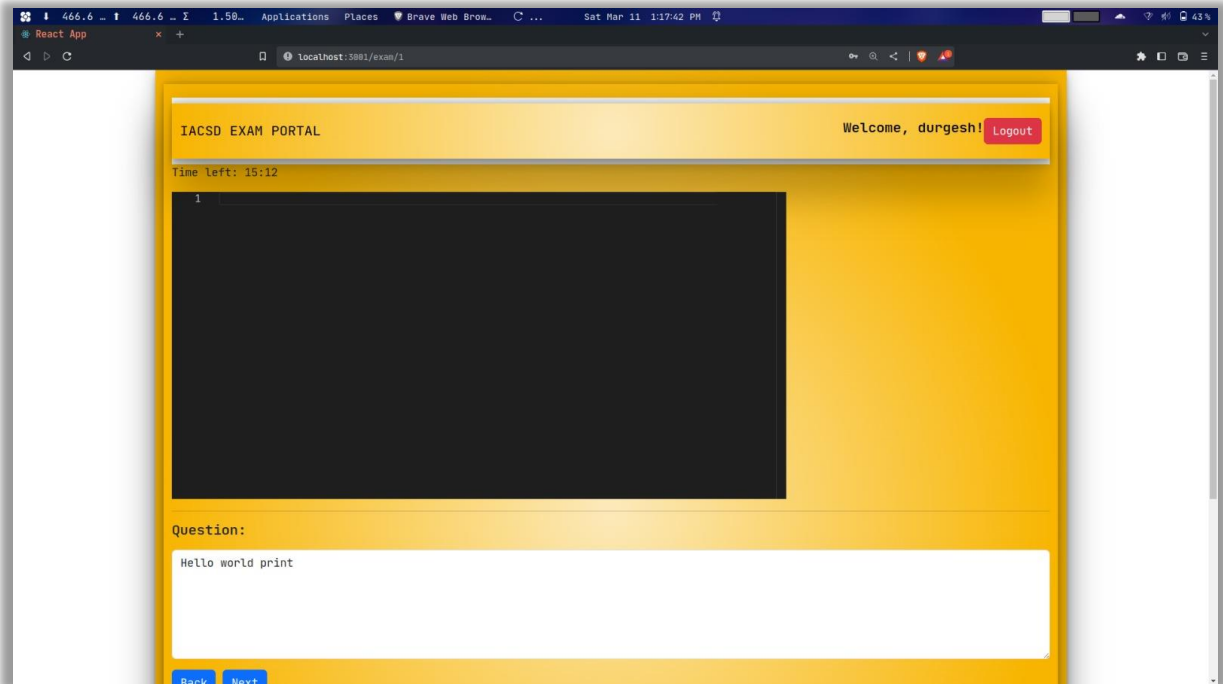


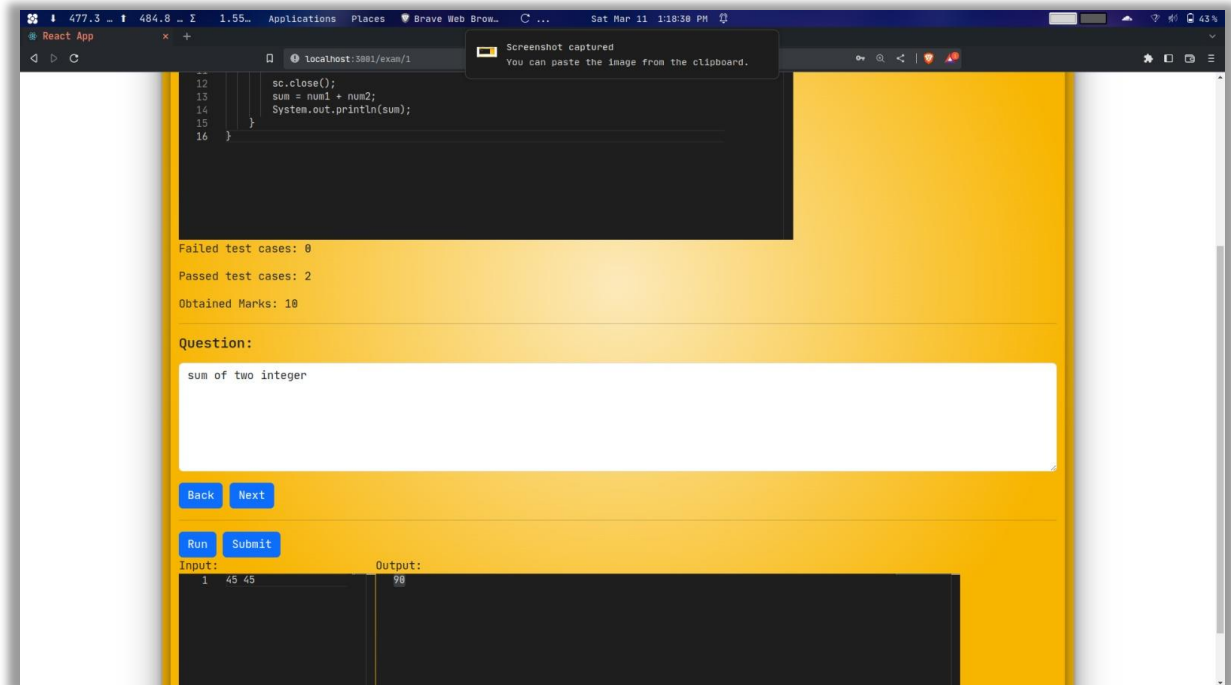
Exam Result For Test Number: 1 | Test Name: java end module

Test Conducted By: Rohit Puranik
Test Duration: 5 Hr | Test Description: mock tester

PRN	RollNo	First Name	Last Name	Marks	Max Marks
220941220025	Dac229010	aniket	sonje	0	20
220941220036	Dac229021	kunal	buwa	0	20
220941220051	Dac229051	durgesh	wagh	20	20
220941220052	Dac229029	eklavya	ghodke	20	20
220941220111	Dac229059	avadhoot	pawar	0	20
220941220177	Dac229095	siddhant	nand	0	20
220941220180	Dac229098	sourav	bundeale	0	20
220941220231	Dac229216	shashank	singh	0	20







Conclusion

The CodeMaze online exam portal is a powerful platform for conducting online assessments and evaluations of candidates. This platform provides a range of features and tools that make it easy to create, manage, and administer exams.

In conclusion, the CodeMaze online exam portal is an excellent solution for any organization looking to conduct online assessments. It offers a comprehensive set of features and tools that make it easy to create, manage, and administer exams. Additionally, the platform provides an intuitive user interface that ensures candidates can complete assessments easily and quickly.

Overall, the CodeMaze online exam portal is a reliable and effective solution that can help organizations streamline their assessment processes and make data-driven decisions based on candidate performance.

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