



PES University, Bengaluru

Department of Computer Science & Engineering

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Subject: Object Oriented Analysis and Design with Java

Title: EXAM PORTAL

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Project Description

Our project is an Exam Portal that allows registered users to take quizzes and view their results. The system provides a user-friendly interface for both students and admins. Users can register themselves on the portal and log in to take quizzes on various topics. The portal offers a wide range of categories of quizzes to choose from.

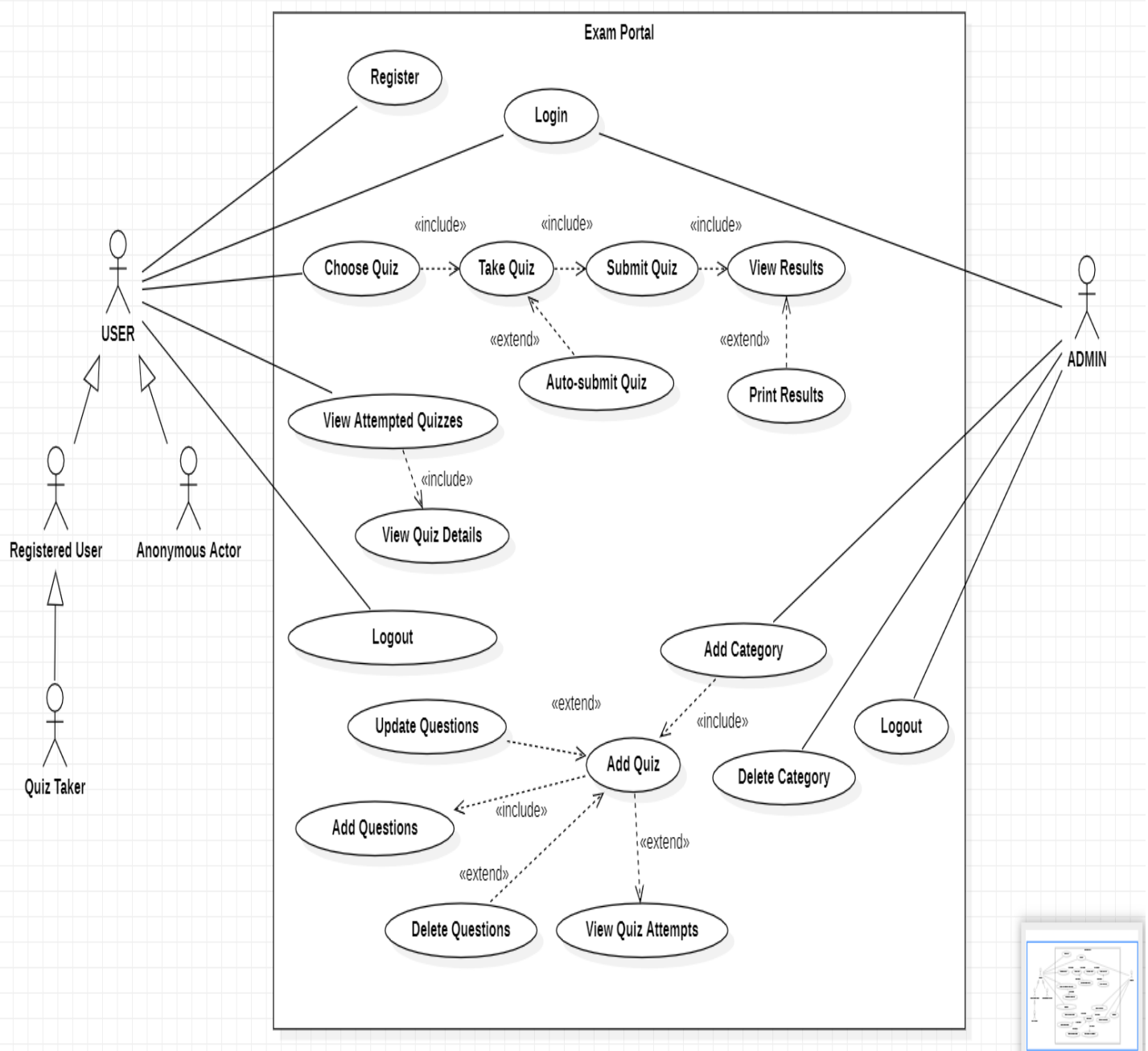
Once logged in, users can select a quiz, take it, and submit their answers before the timer is over. The system also allows users to view their results and provides an option to print them. Users can view their attempted quizzes and their details, such as date and time, category, and score.

The admin has exclusive rights to manage the quiz portal. The admin can log in using their credentials and can add new quiz categories, questions, view questions, update questions, and delete questions. Additionally, the admin can view who and when these quizzes are attempted by users.

The system also provides robust security features to protect user data and maintain confidentiality. All user data is stored securely and can only be accessed by authorized users.

Our Exam Portal aims to provide an efficient and reliable platform for conducting online quizzes and assessments. It is suitable for educational institutions, training centers, and other organizations that require a platform for conducting online assessments. With our Exam Portal, users can take quizzes from anywhere, anytime, and get instant results, , making learning convenient and fun.

I. Use Case Diagram:



Use Case Specification:

1.

Name: Register

Summary: A new user can register for an account on the Exam Portal.

Actors: Registered User

Preconditions: The user wants to use our exam portal.

Description:

- The user clicks on the "Register" button.
- The Exam Portal displays a registration form.
- The user fills out the form with their personal information and chooses a username and password.
- The user submits the form and the Exam Portal registers their account.

Exceptions:

- If the username is already taken, the Exam Portal displays an error message and prompts the user to choose a different username.

Post-condition: The user is registered with the Exam Portal and can log in with their username and password

2.

Name: Login

Summary: Registered users can log in to the Exam Portal.

Actors: Registered User

Preconditions: The user has registered with the Exam Portal.

Description:

- The user enters their username and password.
- The Exam Portal verifies the login credentials.
- If the credentials are correct, the Exam Portal logs the user in and displays their dashboard.

Exceptions:

- If the username or password is incorrect, the Exam Portal displays an error message and prompts the user to enter their credentials again.

Post-condition: The user is logged in to the Exam Portal.

3.

Name: Take Quiz

Summary: Registered users can take a quiz on the Exam Portal.

Actors: Registered User, Quiz Taker

Preconditions:

- The user is registered with the Exam Portal and has logged in.
- The user has selected a quiz to take.

Description:

- The user clicks on the "Take Quiz" button for the selected quiz.
- The Exam Portal displays the quiz questions and a timer.
- The user selects their answers for each question and submits the quiz before the timer runs out.
- The Exam Portal displays the quiz results, including the user's score and any correct/incorrect answers.
- The user can choose to print their results.

Exceptions:

- If the user does not submit the quiz before the timer runs out, the Exam Portal auto-submits the quiz and displays the results.

Post-conditions:

- The user can view their quiz results, including their score and any correct/incorrect answers.
- The user can view all quizzes they have attempted and their details, including the date and time.

4.

Name: Manage Quizzes

Summary: The admin can manage quizzes on the Exam Portal by adding, updating, or deleting quiz categories and questions.

Actors: Admin

Preconditions: The admin has logged in to the Exam Portal with their username and password.

Description:

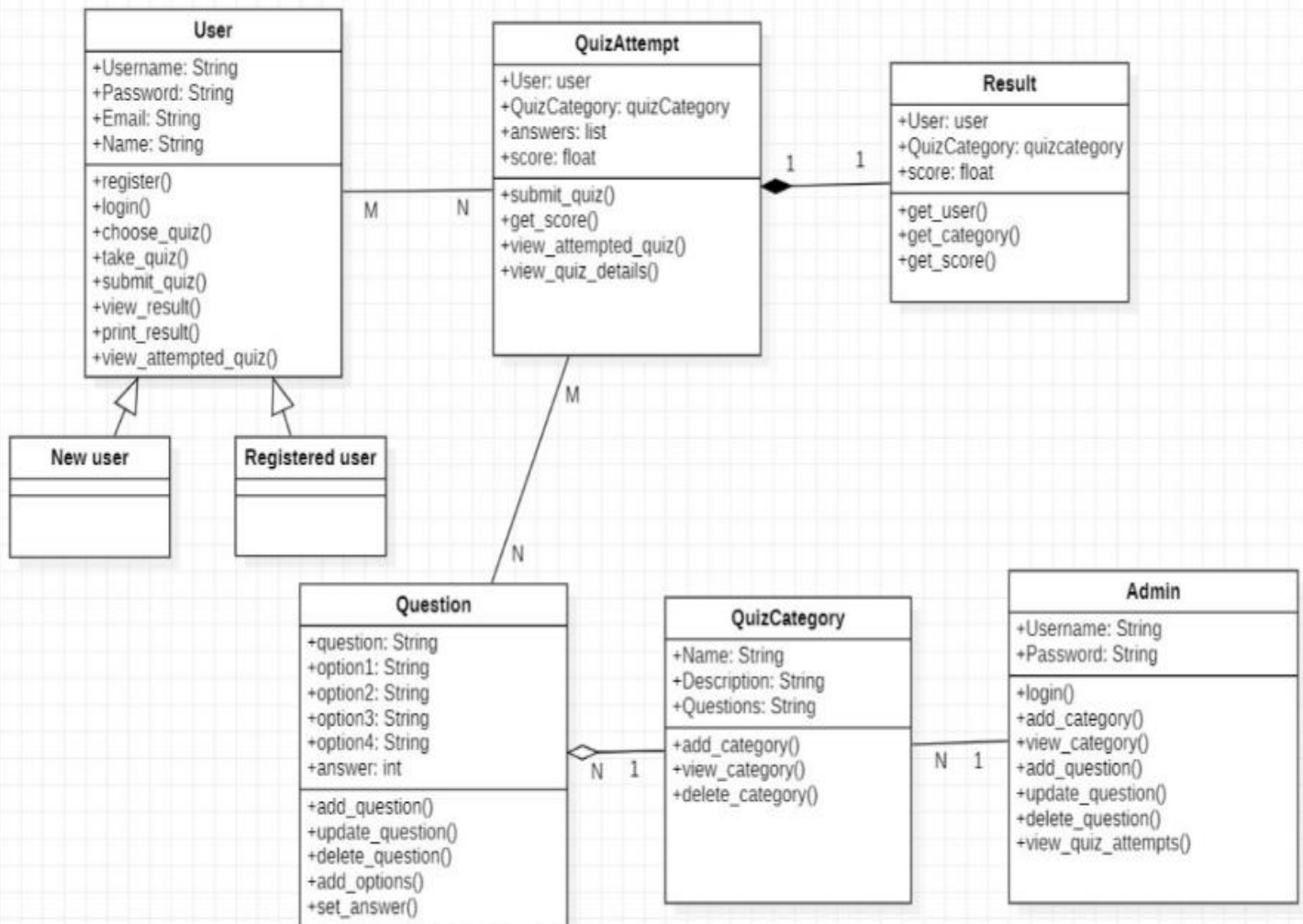
- The admin clicks on the "Manage Quizzes" button.
- The Exam Portal displays a list of quiz categories.
- The admin can select a category to view its questions and options to add, update, or delete questions.
- To add a new question, the admin clicks on the "Add Question" button, enters the question and its answer choices, and saves it to the category.
- To update an existing question, the admin clicks on the "Update Question" button, selects the question to update, makes the necessary changes, and saves it.
- To delete a question, the admin clicks on the "Delete Question" button, selects the question to delete, and confirms the deletion.
- The admin can also view quiz attempt details, including which user and when quizzes were attempted.

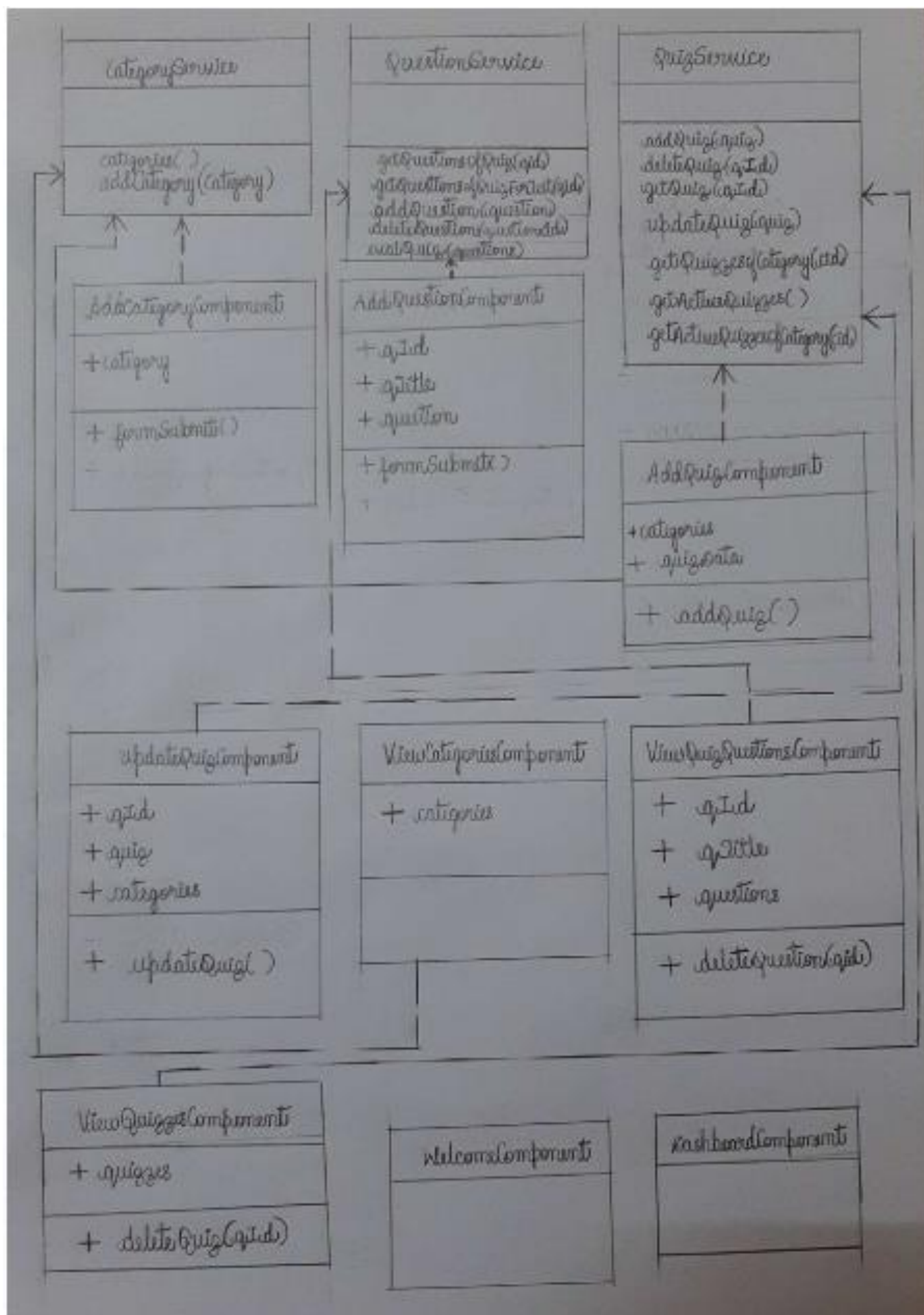
Exceptions:

- If the admin is not authorized to manage quizzes, the Exam Portal displays an error message and does not allow access to the Manage Quizzes feature.

Post-conditions: The quiz categories and questions can be updated or deleted, and quiz attempt details can be viewed.

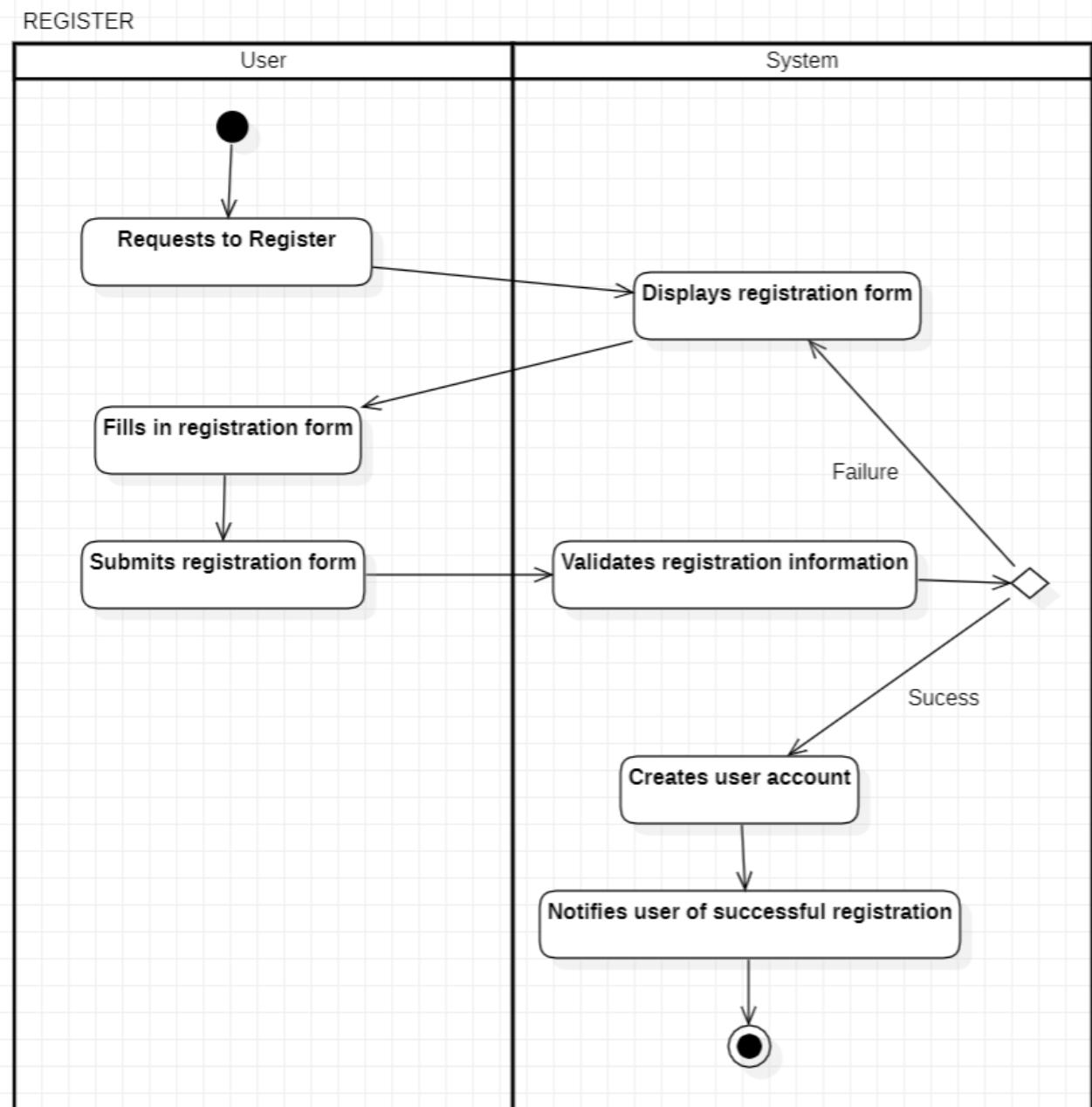
II. Class Diagram:





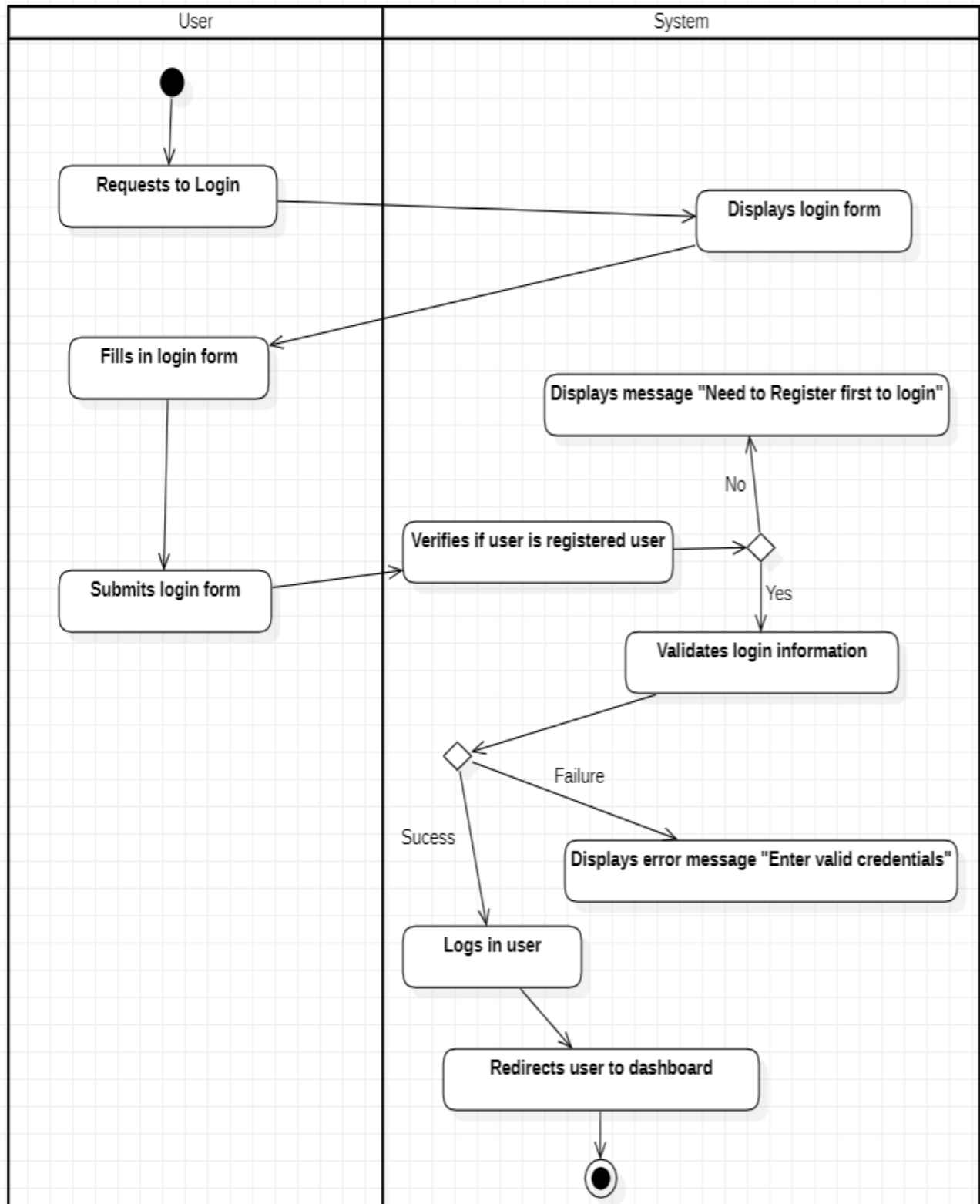
III. Activity Diagram:

Name: Register



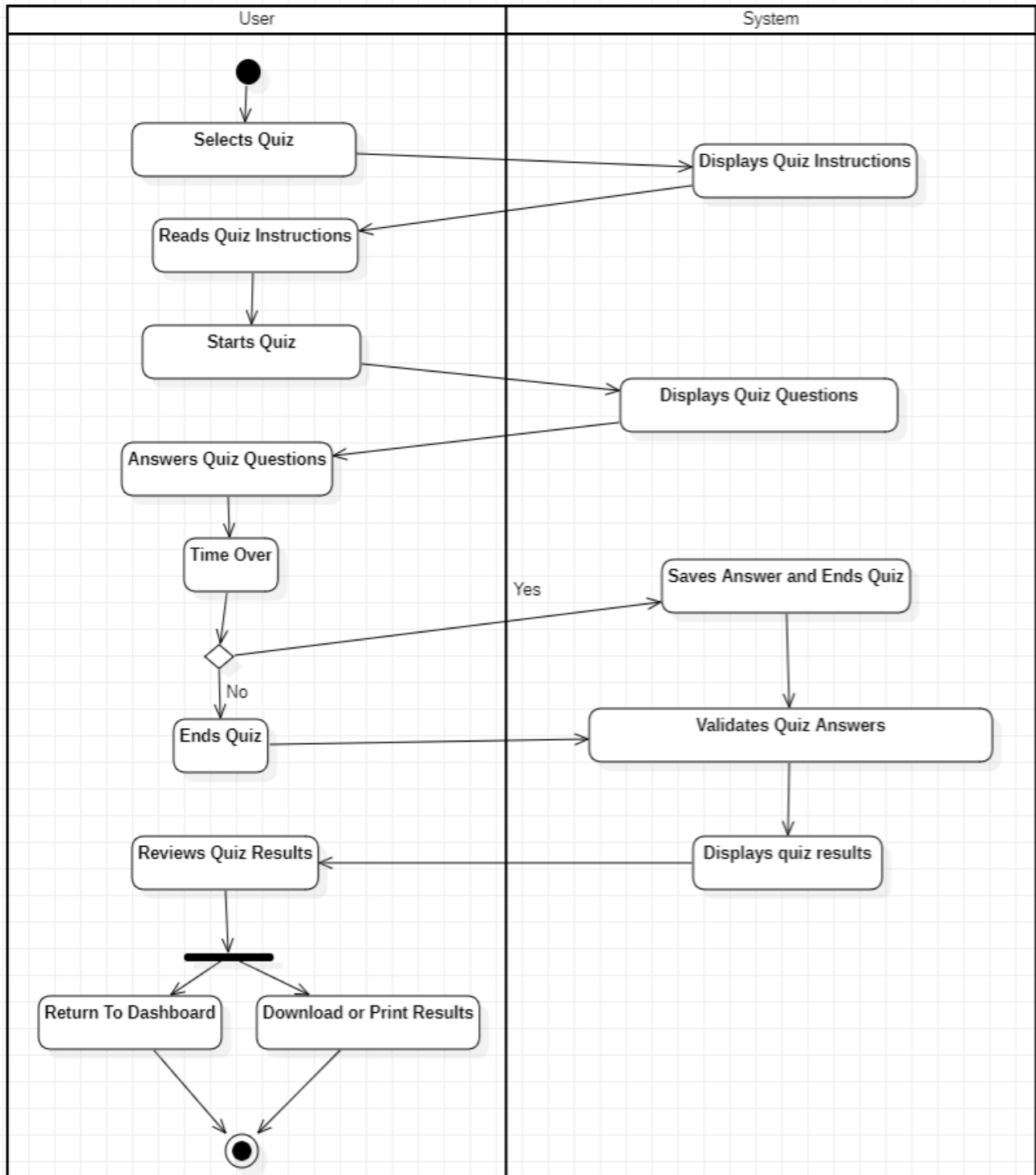
Name: Login

LOGIN

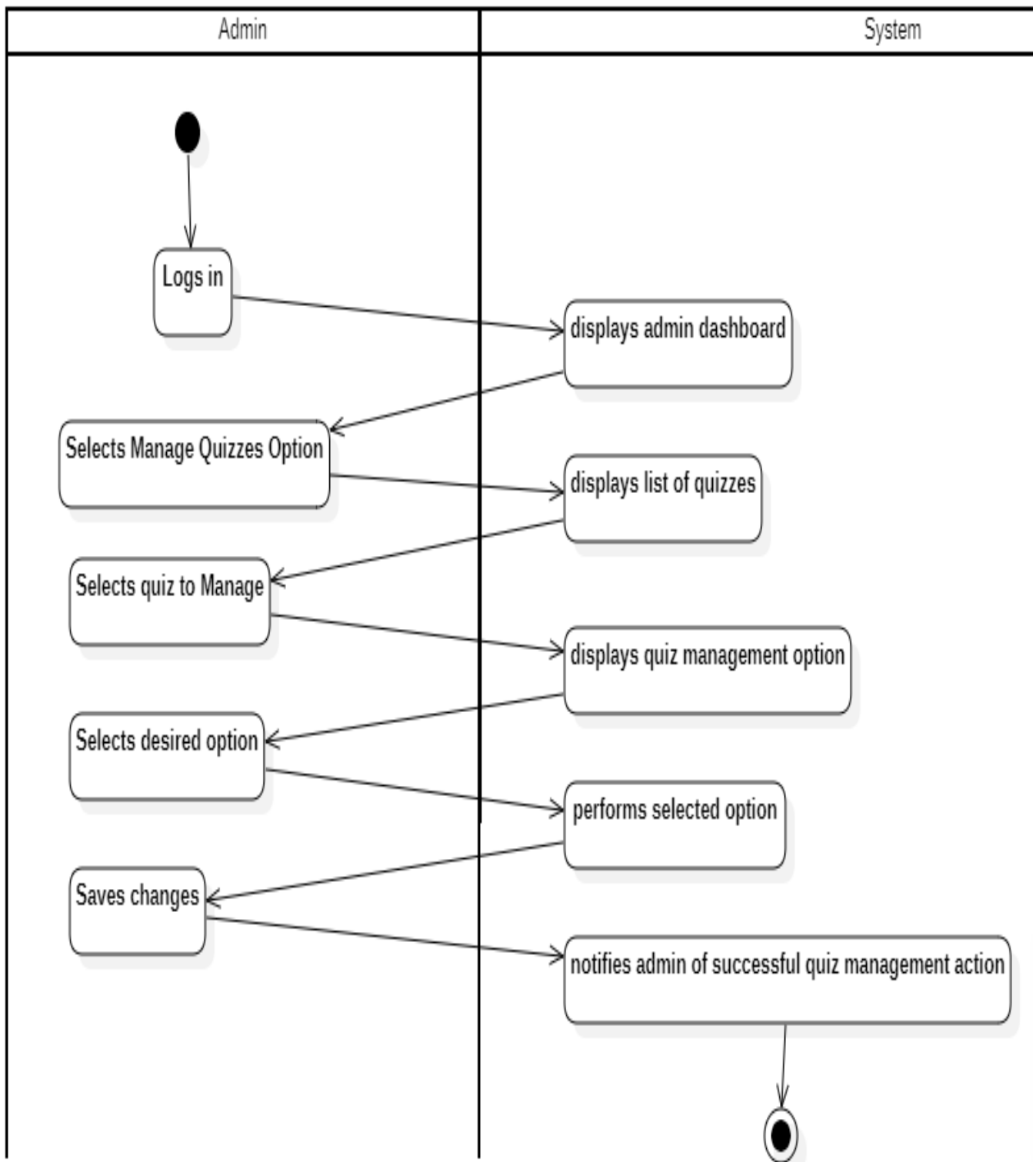


Name: Take Quiz

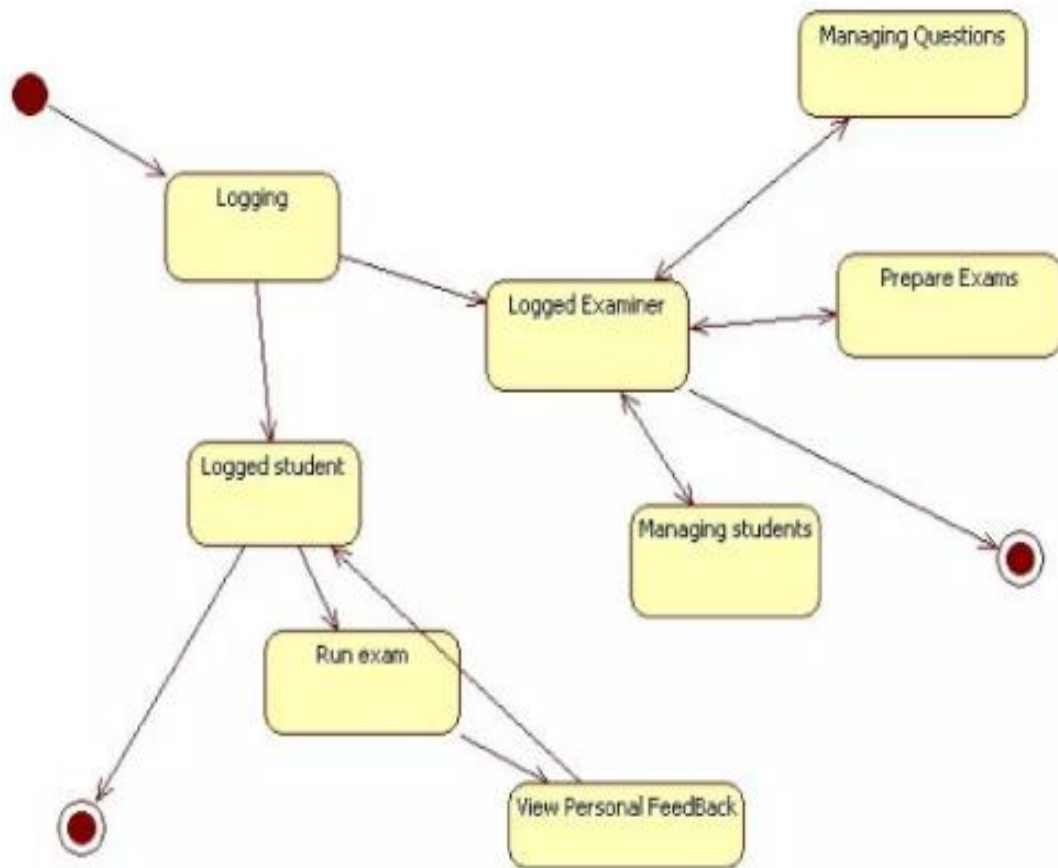
TAKE QUIZ



Name: Manage Quizzes



IV. State Diagram:



➤ **Architecture Pattern**

Architecture Pattern used by Application is **Model View Controller (MVC)** which separates the application into three interconnected parts: the model (data), the view (user interface), and the controller (business logic).

➤ **Design Principles:**

1) Single Responsibility Principle (SRP)

- ★ The User Class Has A Single Responsibility, Which Is To Represent The Data Of A User.
- ★ The Authority class has a single responsibility of defining the authority string for a user.
- ★ The JwtRequest class has only one responsibility, which is to represent a JWT authentication request.
- ★ The Quiz class has a single responsibility, which is to represent the quiz data model.
- ★ The Question class has a single responsibility, which is to represent a question in an exam.
- ★ The Category class has a single responsibility,

2) Open/Closed Principle (OCP)

- The Quiz class is open for extension, but closed for modification.
- The Category class.

3) Liskov Substitution Principle (LSP)

The Quiz class can be used wherever the base class Object is expected, without affecting the correctness of the program.

➤ Design Pattern

Domain Model Pattern

The Role class has been implemented as a domain model, which encapsulates the behavior and attributes of a specific concept in the application domain.

The class contains fields and methods to manage role-related data.

The Java Persistence API (JPA) design pattern: JPA is a Java-based ORM framework that provides a set of interfaces and annotations to map Java objects to a relational database. The @ManyToOne and @Id annotations in this code are part of the JPA API.(User-Role.java)

The Data Access Object (DAO) pattern:

DAO is a design pattern that separates the database access logic from the business logic of an application.

Object-Relational Mapping (ORM) -

The application is using the JPA (Java Persistence API) to map Java objects to database tables, allowing for seamless integration between the application's Java code and the database.

The class Quiz is annotated with the JPA annotations @Entity, @Id, @GeneratedValue, @Column, @ManyToOne, and @OneToMany. These annotations are used to define the mapping between the Java class Quiz and the relational database table.

Builder design pattern:

The Quiz class could potentially be used with a builder pattern to provide more readable and maintainable code when creating new instances of the Quiz class.

The Question class has a default constructor and getter/setter methods, which can be used to build objects.

Repository pattern:

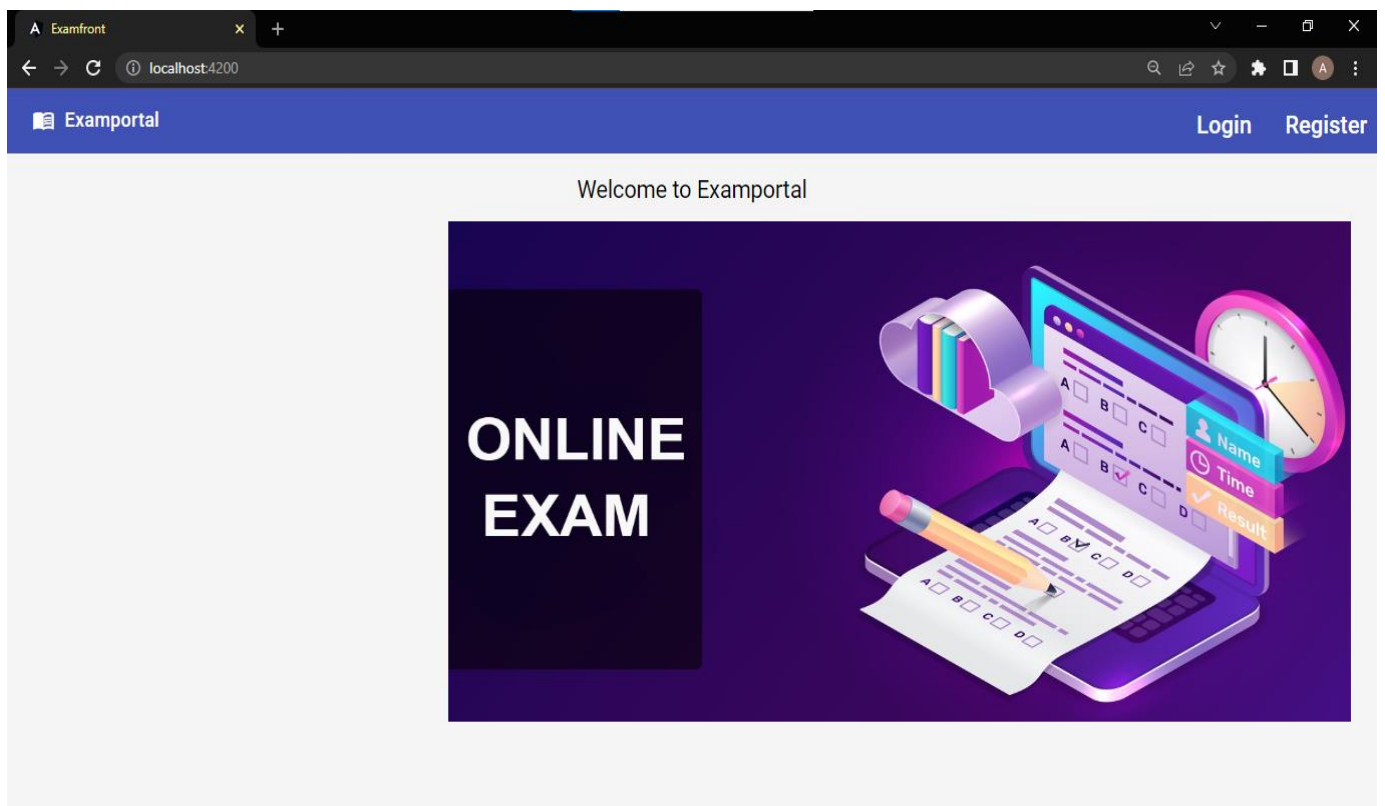
The Question class does not directly interact with the database. Instead, it is likely used by a repository or service layer to persist and retrieve data.

The Category class acts as a Data Access Object by providing methods to access and manipulate the data stored in the category table.

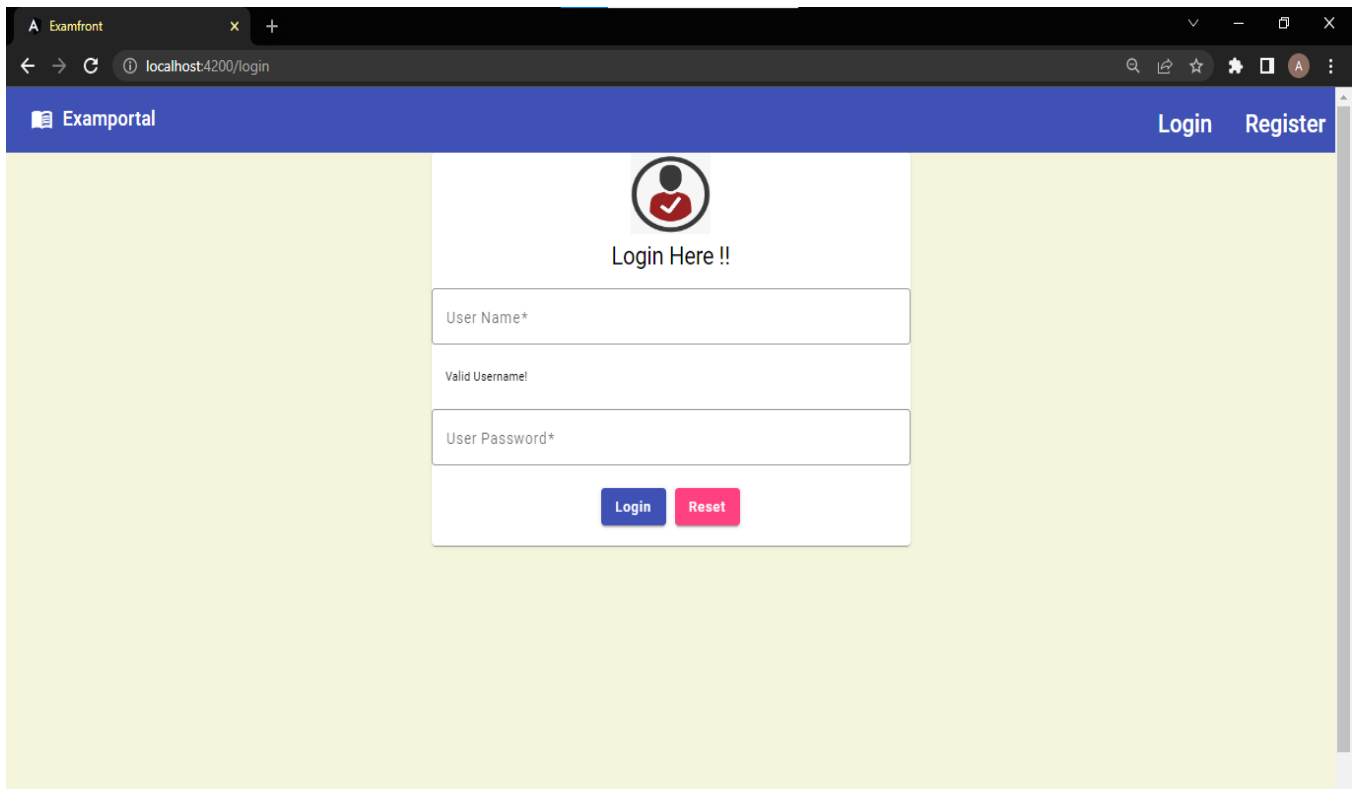
➤ Output Screenshots:

User Interface

Home Page



Login Page



The screenshot shows a web browser window with the address bar displaying "localhost:4200/login". The page has a blue header with "Examportal" on the left and "Login Register" on the right. The main content area has a light yellow background. In the center, there is a white box containing a login form. At the top of the box is a circular icon with a red checkmark and the text "Login Here !!". Below this are two input fields: "User Name*" and "User Password*", with a "Valid Username!" error message below the first. At the bottom of the box are two buttons: "Login" (blue) and "Reset" (pink).

Examportal Login Register

Login Here !!

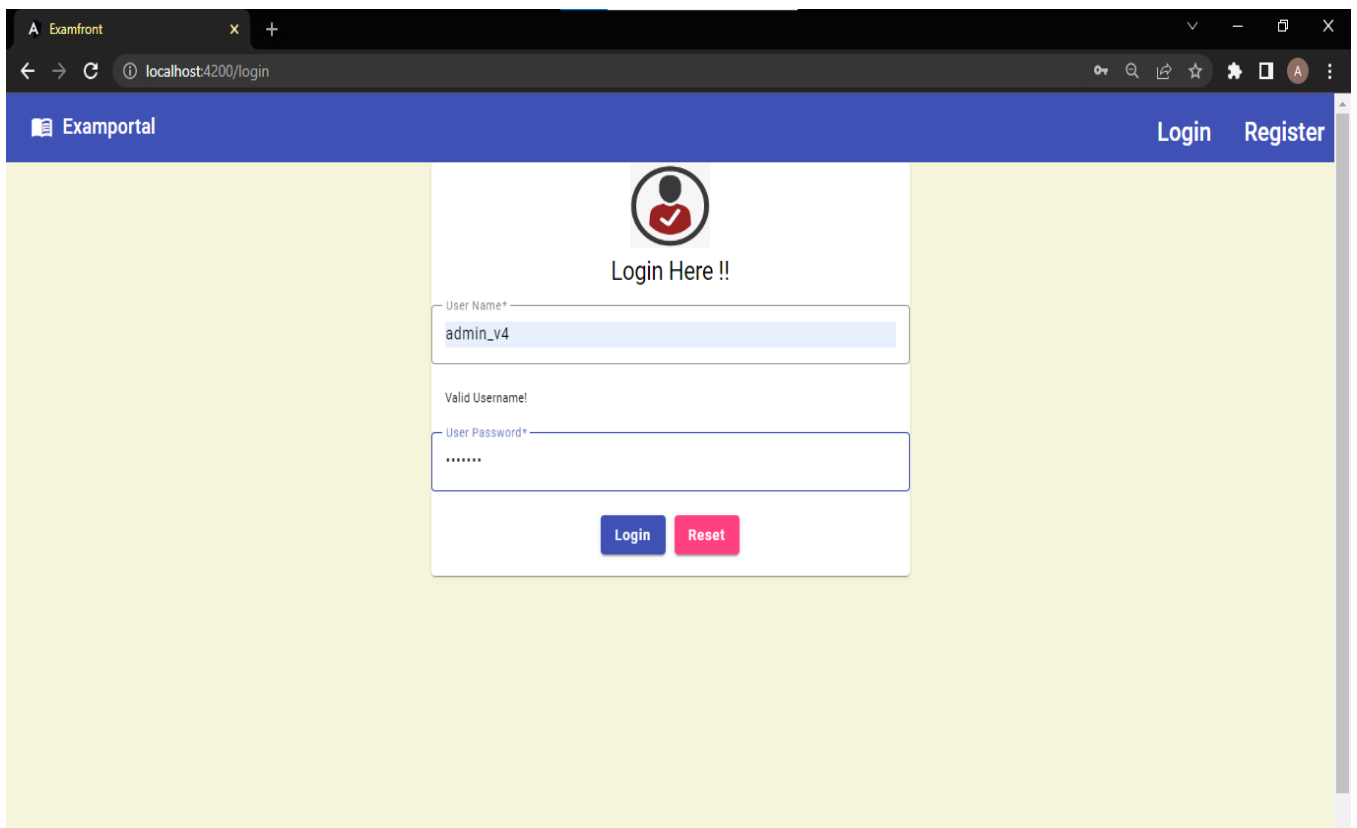
User Name*

Valid Username!

User Password*

Login Reset

Admin Login



This screenshot is identical to the one above, but the "User Name*" input field now contains the text "admin_v4". The "Valid Username!" error message is still present below the field. The "User Password*" field is empty and masked with dots. The "Login" and "Reset" buttons remain at the bottom.

Examportal Login Register

Login Here !!

User Name*

admin_v4

Valid Username!

User Password*

.....

Login Reset

Admin Dashboard

Examfront

localhost:4200/admin

Logout admin_v4

Menu

Home

Profile

Categories

Add Categories

Quizzes

Add Quiz

Logout

Welcome to ADMIN Panel

Examfront

localhost:4200/admin/profile

Logout admin_v4

Menu

Home

Profile

Categories

Add Categories

Quizzes

Add Quiz

Logout

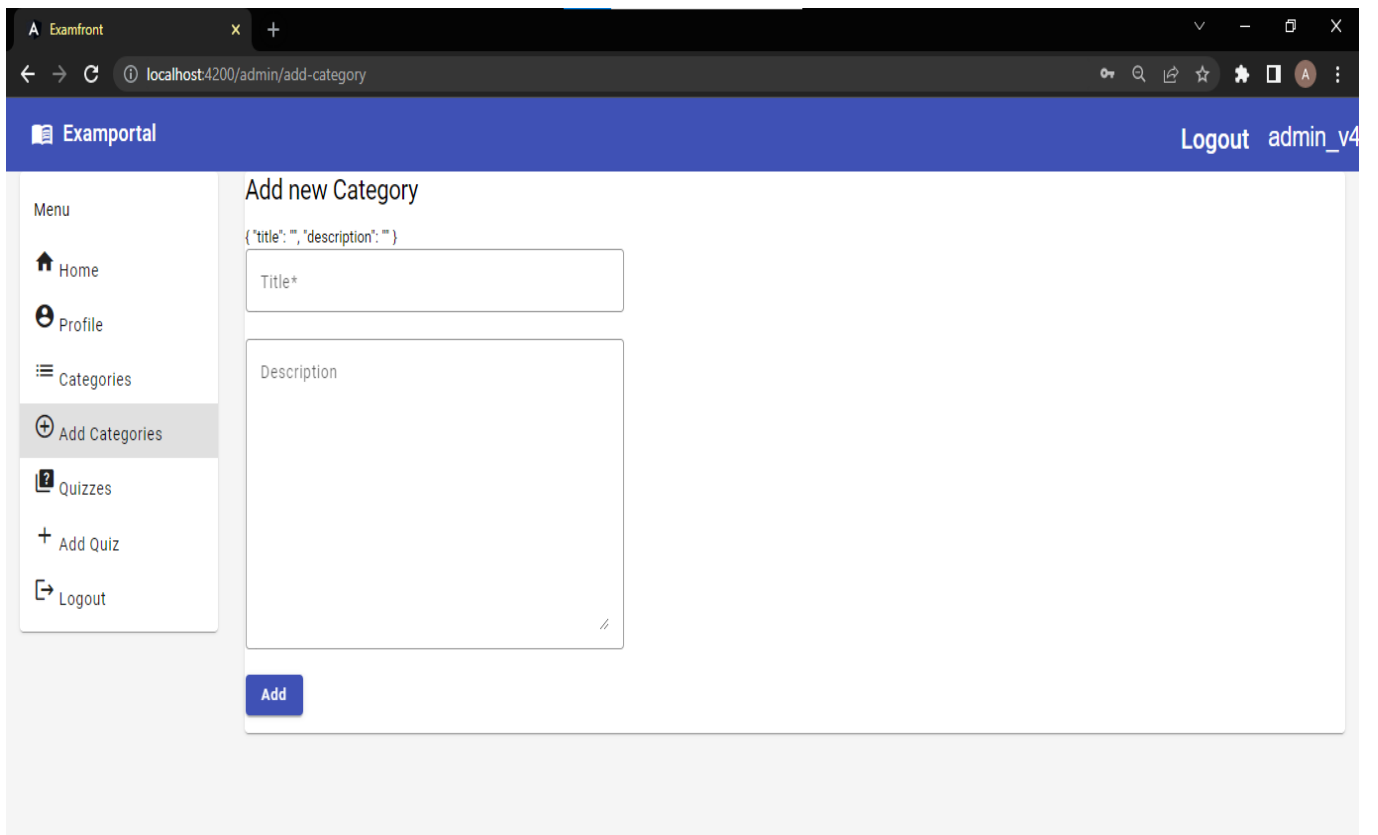
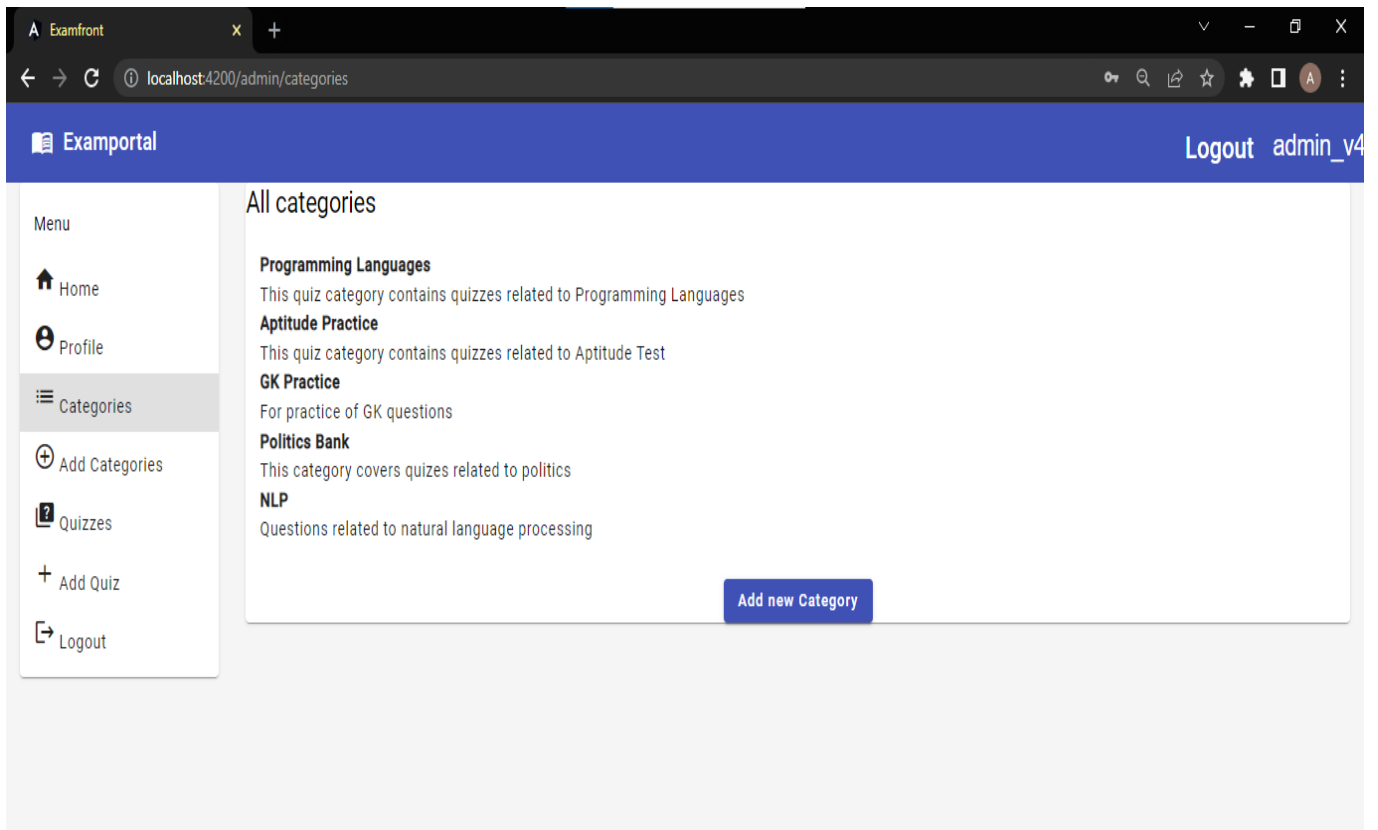
Your profile Details

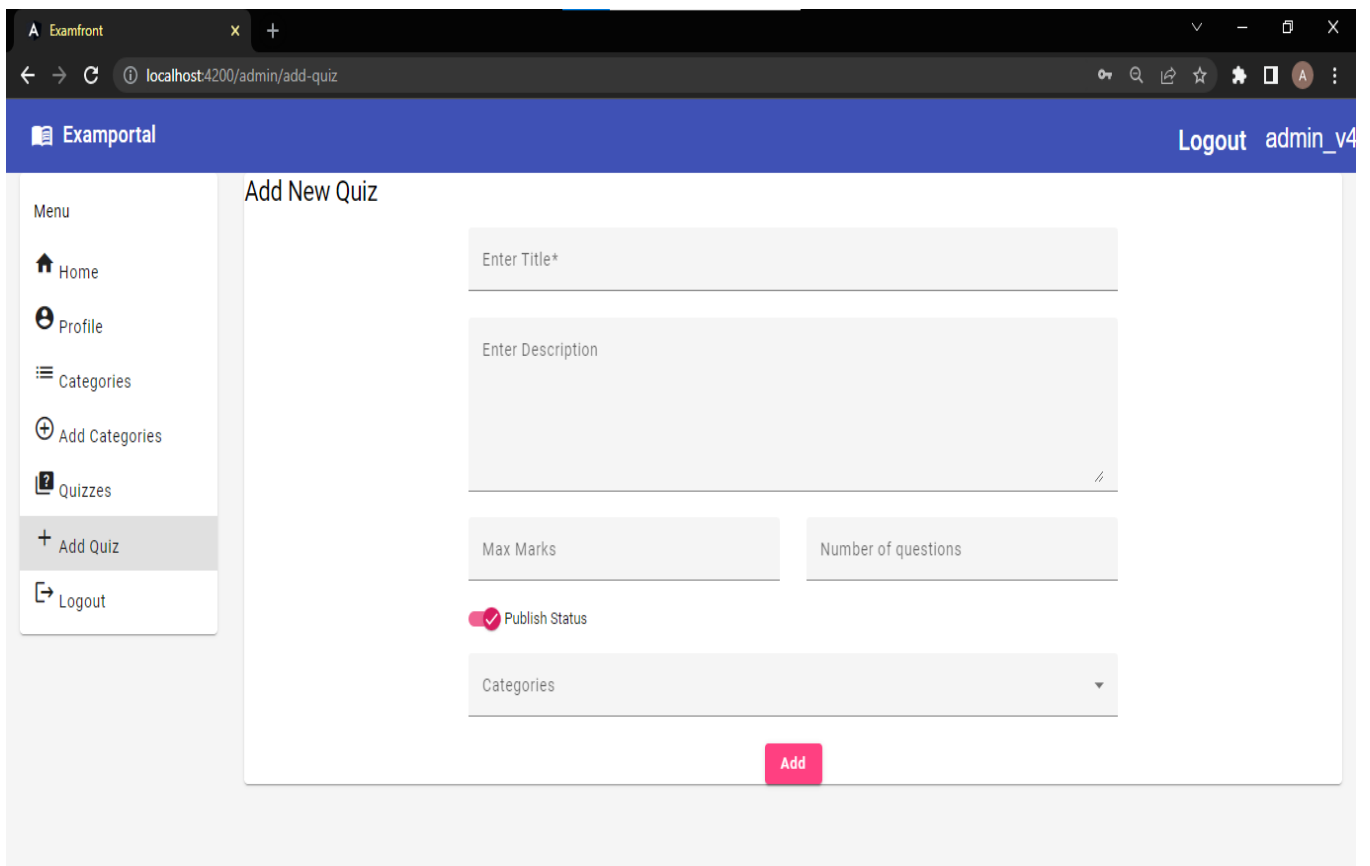
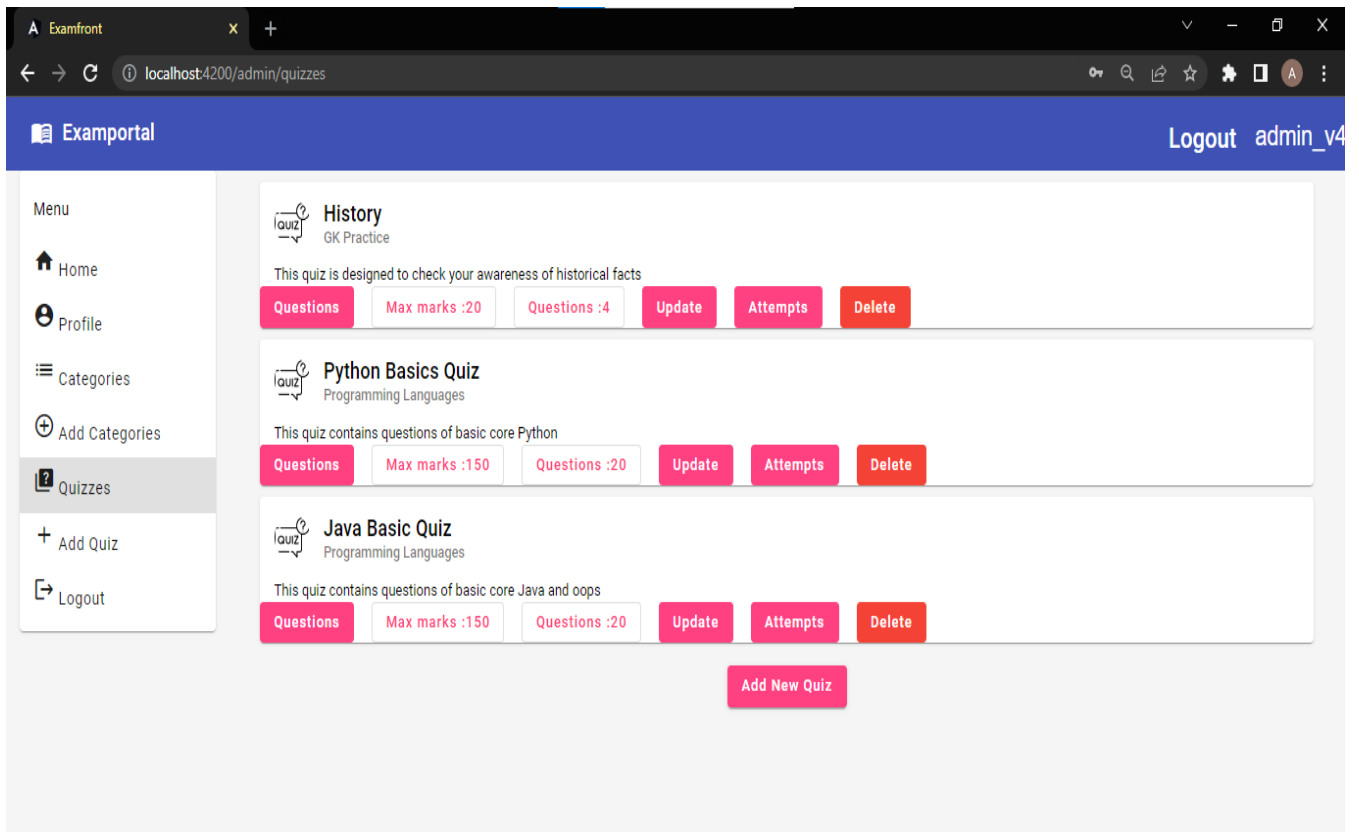
Almas Banu

Username	admin_v4
Userid	EXAM15
Role	ADMIN
Status	ACTIVE

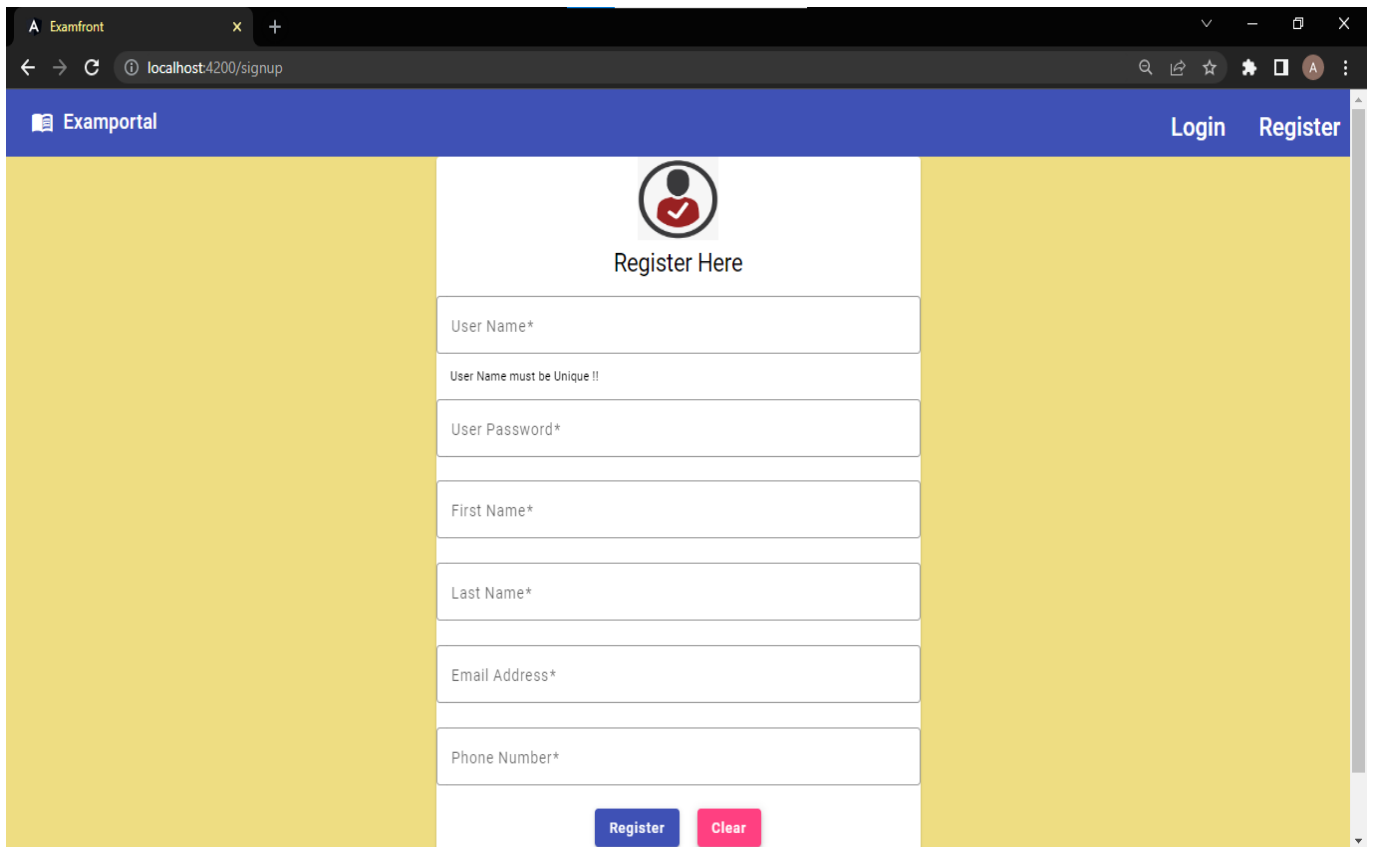
UPDATE

SHARE



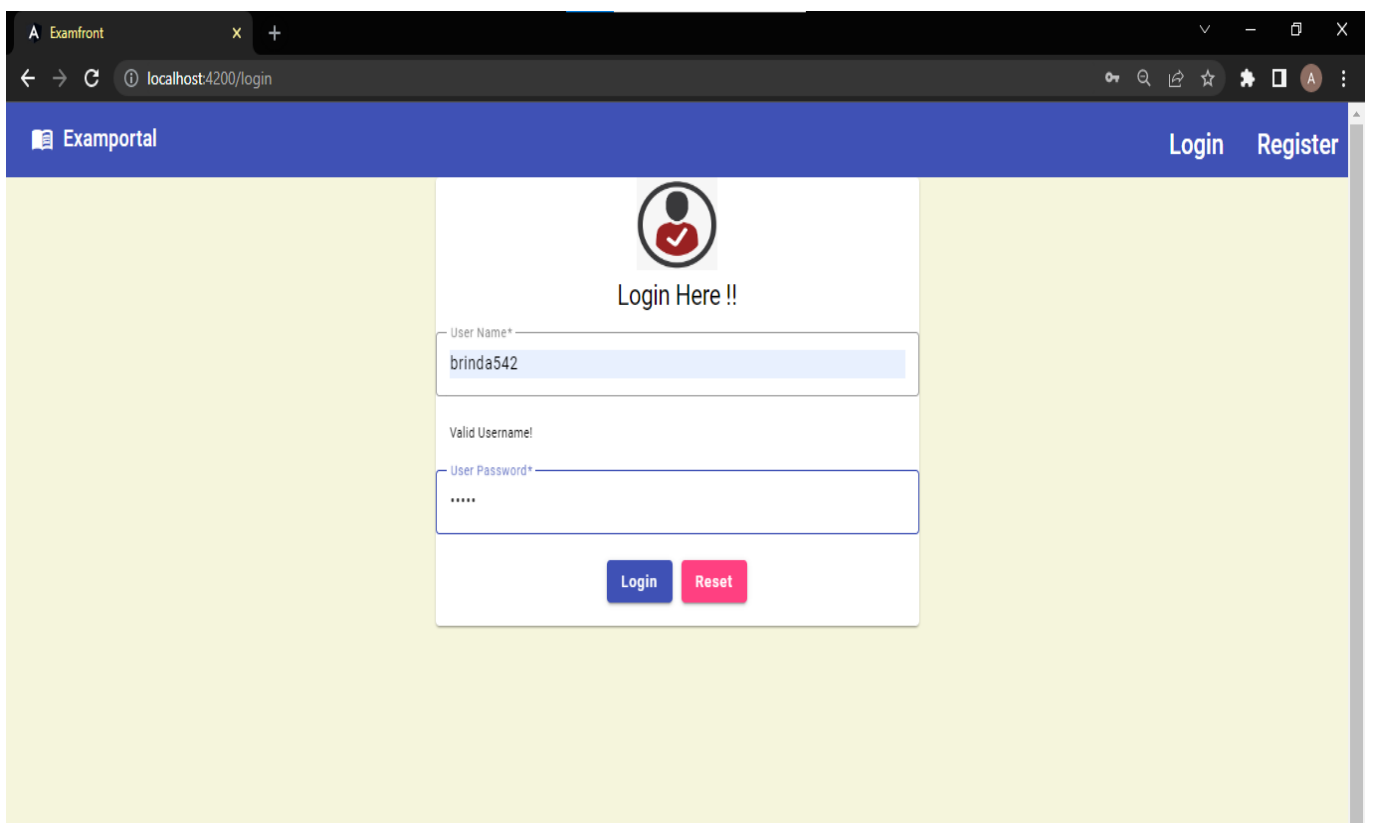


Registration Page



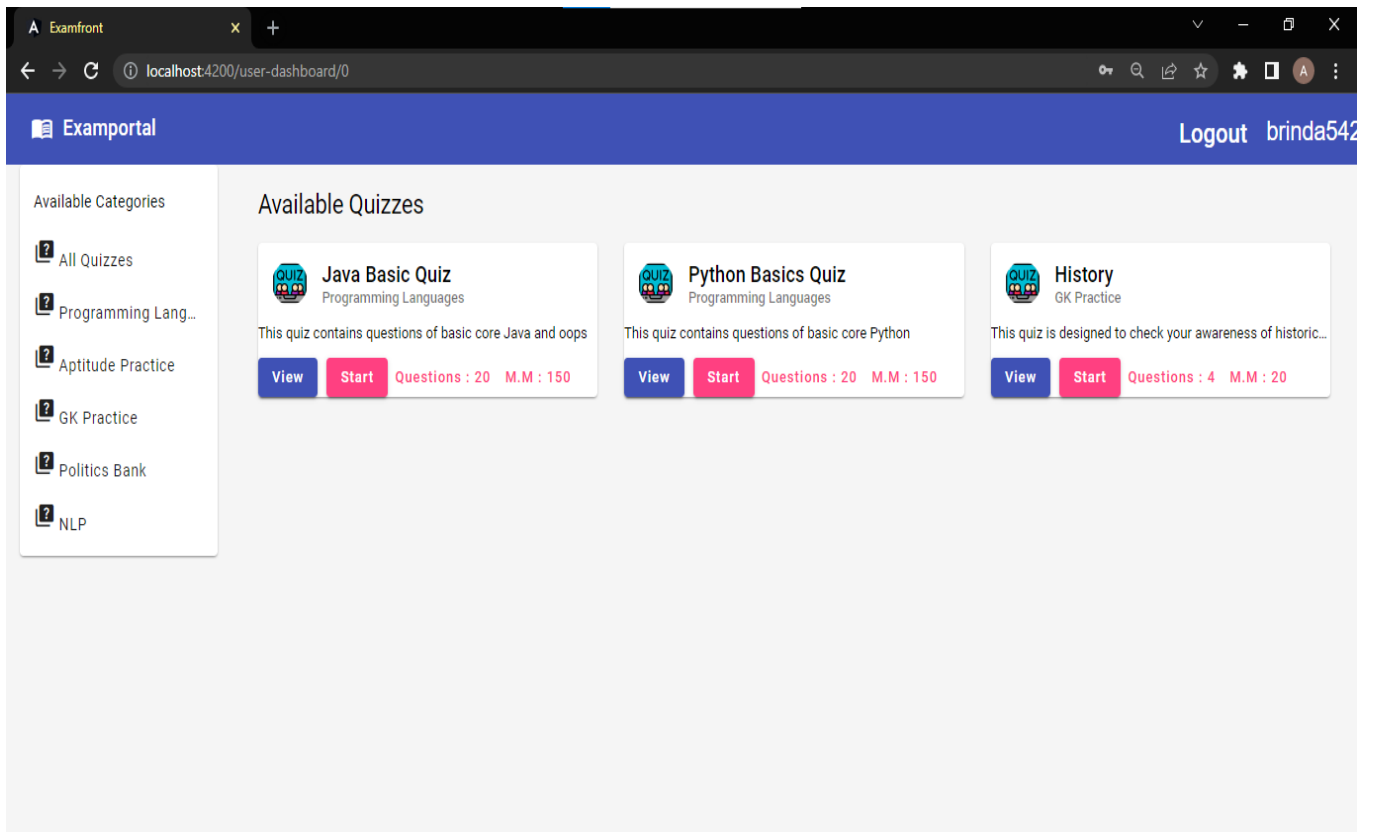
The screenshot shows a web browser window with the address bar displaying 'localhost:4200/signup'. The page has a blue header with 'Examportal' on the left and 'Login Register' on the right. The main content area has a yellow background. In the center, there is a white box containing a circular icon with a red checkmark and the text 'Register Here'. Below this, there are several input fields: 'User Name*', 'User Password*', 'First Name*', 'Last Name*', 'Email Address*', and 'Phone Number*'. A message 'User Name must be Unique !!' is displayed below the 'User Name*' field. At the bottom of the white box, there are two buttons: 'Register' (blue) and 'Clear' (pink).

User Login



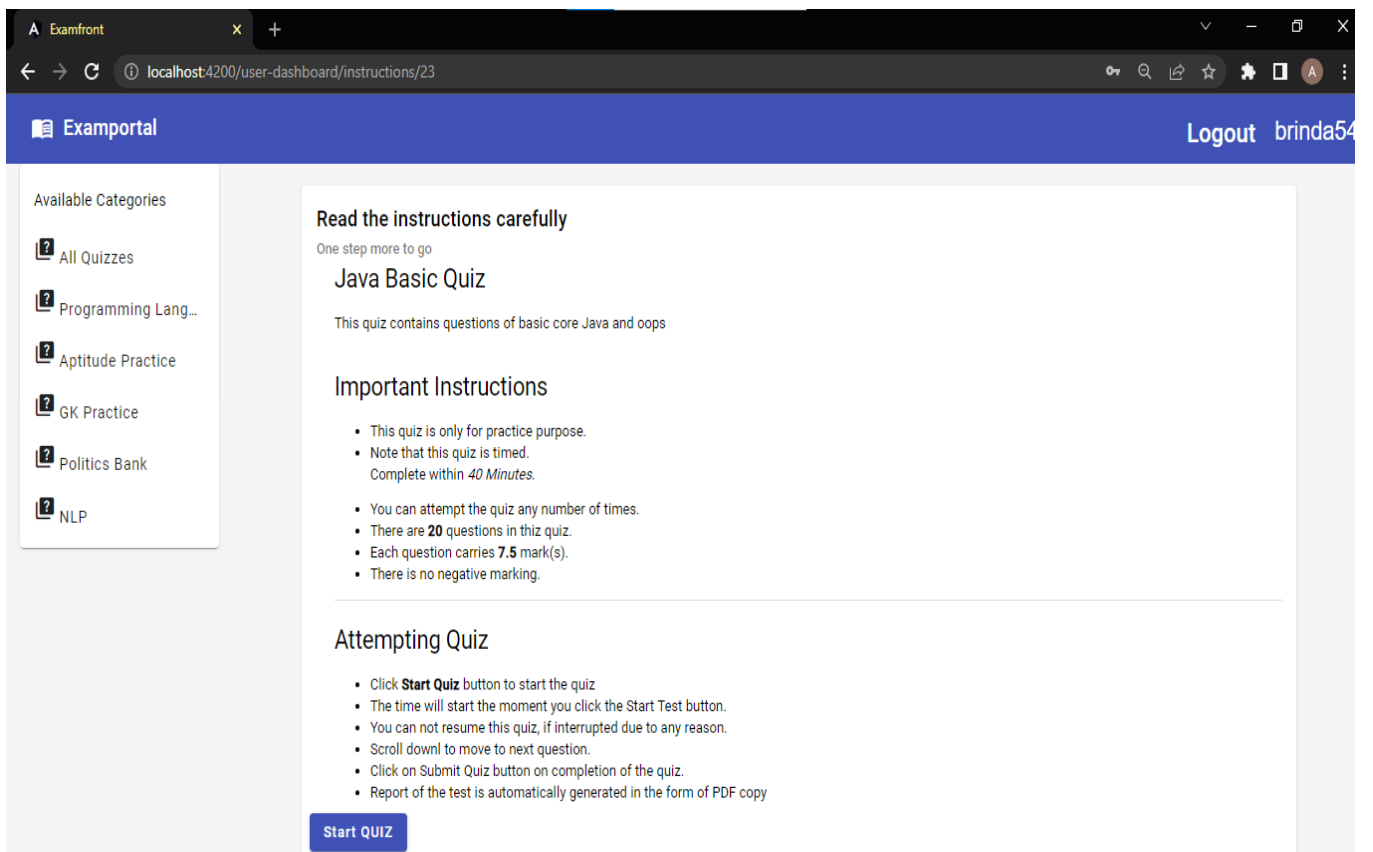
The screenshot shows a web browser window with the address bar displaying 'localhost:4200/login'. The page has a blue header with 'Examportal' on the left and 'Login Register' on the right. The main content area has a yellow background. In the center, there is a white box containing a circular icon with a red checkmark and the text 'Login Here !!'. Below this, there are two input fields: 'User Name*' and 'User Password*'. The 'User Name*' field contains the text 'brinda542'. Below the 'User Name*' field, there is a message 'Valid Username!'. The 'User Password*' field contains six dots. At the bottom of the white box, there are two buttons: 'Login' (blue) and 'Reset' (pink).

User Dashboard



The screenshot shows the 'User Dashboard' of the Examportal application. The browser address bar indicates the URL is localhost:4200/user-dashboard/0. The page features a blue header with the 'Examportal' logo and a 'Logout' button next to the user's name 'brinda542'. On the left, a sidebar lists 'Available Categories' including All Quizzes, Programming Lang..., Aptitude Practice, GK Practice, Politics Bank, and NLP. The main content area, titled 'Available Quizzes', displays three quiz cards: 'Java Basic Quiz' (Programming Languages, 20 questions, 150 M.M.), 'Python Basics Quiz' (Programming Languages, 20 questions, 150 M.M.), and 'History' (GK Practice, 4 questions, 20 M.M.). Each card includes a 'View' button and a 'Start' button.

Taking Quiz



The screenshot shows the 'Taking Quiz' page for the 'Java Basic Quiz'. The browser address bar indicates the URL is localhost:4200/user-dashboard/instructions/23. The page features a blue header with the 'Examportal' logo and a 'Logout' button next to the user's name 'brinda542'. On the left, a sidebar lists 'Available Categories' including All Quizzes, Programming Lang..., Aptitude Practice, GK Practice, Politics Bank, and NLP. The main content area displays the quiz title 'Java Basic Quiz' and a description: 'This quiz contains questions of basic core Java and oops'. Below this, the 'Important Instructions' section lists: 'This quiz is only for practice purpose.', 'Note that this quiz is timed. Complete within 40 Minutes.', 'You can attempt the quiz any number of times.', 'There are 20 questions in this quiz.', 'Each question carries 7.5 mark(s).', and 'There is no negative marking.' The 'Attempting Quiz' section lists: 'Click Start Quiz button to start the quiz', 'The time will start the moment you click the Start Test button.', 'You can not resume this quiz, if interrupted due to any reason.', 'Scroll down to move to next question.', 'Click on Submit Quiz button on completion of the quiz.', and 'Report of the test is automatically generated in the form of PDF copy'. A blue 'Start QUIZ' button is located at the bottom of the instructions section.

Quiz Page

Examfront

localhost:4200/start/23

instructions

Ongoing Quiz **Java Basic Quiz**

Q1 What is java Programming?

☐ OOPS

☐ Function

☐ Collection

☐ Method

Q2 Founder of java?

☐ Albert Einstein

☐ James Gosling

☐ Faraday

☐ Dalton

Q3 Which of the following pattern builds a complex object using simple objects and using a step by step approach?

☐ Builder Pattern

☐ Bridge Pattern

☐ Adapter Pattern


☐ Filter Pattern

Submit Quiz

Progress

Quiz will automatically submit when timer reaches 00:00

5 min : 52 sec



Results Page

Examfront

localhost:4200/start/23

Examportal Logout brinda542

Quiz Result

Marks Got: 100

Correct Answers: 2

Questions Attempted: 3

Home
