Project Report on Online MCQ System

1. Title of the Project

Development of an Online MCQ (Multiple Choice Questions) Examination System

2. Tools and Technologies Used

- NetBeans IDE: Java-based development environment (for UI, logic)
- IntelliJ IDEA: Backend coding, debugging, and application logic
- MySQL: Database to store users, questions, and results
- MySQL Workbench: GUI tool for database modeling and query testing

3. Introduction

This project is a web-based Online MCQ System that facilitates the creation and execution of multiple-choice tests. The system is aimed at educational institutions, recruitment firms, and training departments to automate assessments and provide instant results.

4. Objectives

- Develop a secure, scalable online exam system.
- Automate the question evaluation process.
- Create a system that is easy to use by both administrators and students.
- Store and manage questions, results, and user data in a structured database.

5. System Architecture

Backend (Java):

- Developed using Java in IntelliJ IDEA
- JDBC used to connect to MySQL database
- Business logic includes user authentication, question randomization, and result calculation

Frontend:

- Developed using Java Swing (via NetBeans) for UI

Database (MySQL):

- Modeled using MySQL Workbench

- Tables: users, questions, tests, results

6. Features

Admin Panel:

- Secure login

- Add/update/delete questions

- View student results

- Create test sessions

Student Panel:

- Register/Login

- Join test

- Answer MCQs within time limit

- Submit answers and view results

8. Database Design (ER Diagram Overview)

Entities:

- User: ID, Name, Email, Password, Role

- Question: ID, Subject, QuestionText, OptionA-D, CorrectAnswer

- Result: ID, UserID, TestID, Score, Timestamp

Relationships:

- One user can attempt multiple tests

- Each test consists of multiple questions

9. Testing & Evaluation

- Unit Testing: Each module tested separately

- Integration Testing: Checked data flow between modules

- Database Testing: Verified queries using Workbench
- Performance Testing: Tested concurrent user sessions

10. Challenges Faced

- JDBC connection stability across IDEs
- UI layout management in Java Swing
- Ensuring SQL injection protection
- Handling simultaneous test submissions

11. Future Scope

- Integration with web technologies (Spring Boot, Angular)
- AI-based cheating detection
- Mobile compatibility (Android/iOS)
- Adaptive difficulty level based on user performance
- Export result data to Excel or PDF

12. Conclusion

The Online MCQ System built using Java (NetBeans & IntelliJ), and MySQL successfully meets the goal of automating objective-type examinations.

The system provides secure login, test-taking, real-time scoring, and database management.

It is ideal for educational institutions and can be further scaled with modern frameworks.