

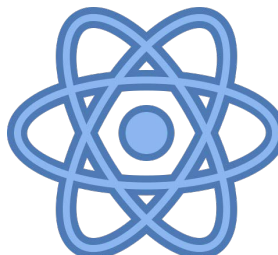




# QuizMasterPro



COMSATS University Islamabad, Lahore Campus  
Block-B, Department of Electrical and Computer Engineering  
COMSATS Institute of Information Technology, 1.5KM Defence Road, Off Raiwind Road, Lahore

## Semester Project

1	Course Code and Title	CSC371 Database Systems I [FA22-BCE-A & B]
2	Credit Hours	3+1
3	Assessment Type	Semester Project
5	Semester	5 <sup>th</sup>
6	Resource Person	Modassir Ishfaq
7	Submission Date	13-12-2024
8	Assessment Details	Semester Final Project

No.	Code and Name of Course	Name of Instructor	Lab Project Implementation details (Assignment, Project, Lab)	Evaluation regime (how and when Lab Project is evaluated)
1	CSC-371	Modassir Ishfaq	Frontend + Backend consisting of GUI	Documentation Demonstration
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## Abstract

QuizMasterPro is an innovative web-based quiz management system developed to address critical vulnerabilities in existing online examination platforms. By leveraging modern web technologies and robust database design, the project aims to create a fair, secure, and user-friendly quiz environment for educational institutions.

- Advanced randomized questioning
- Immediate grading system
- Comprehensive performance analytics
- Enhanced academic integrity mechanisms

## Introduction

### 1.1 Objective

The primary objective of QuizMasterPro is to develop a comprehensive, secure, and user-friendly web-based quiz management system that addresses the limitations of existing online examination platforms at COMSATS University Lahore Campus.

### 1.2 Background: The Origin Story

#### *Identifying the Challenge*

The existing student portal suffered from significant security vulnerabilities that allowed students to:

- Use Chrome extensions to automatically extract and search for quiz answers
- Exploit browser's 'Inspect Element' feature to reveal hardcoded correct answers
- Manipulate online assessment processes with relative ease

### *Motivation*

Two young engineers, Faizan Shurjeel and Abdullah Laeeq, were driven by a vision to:

- Restore academic integrity
- Create a technologically advanced solution
- Develop a Free and Open-Source Software (FOSS) platform

### *Core Challenges*

- Prevent answer extraction through browser tools
- Ensure fair assessment mechanisms
- Provide robust quiz management system

### 1.3 Technological Overview

Technology Stack:

- Frontend: React
- Backend: Express.js, Node.js
- Database: SQL Server
- Hosting: AWS RDS

## 2. System Requirements

### *Functional Requirements*

1. Multiple-choice quiz format
2. Randomized question selection
3. Automatic start time tracking
4. Immediate grading system
5. Answer option obfuscation
6. Comprehensive performance analytics

### *Technical Requirements*

- Real-time performance tracking
- Secure user authentication
- Cross-browser compatibility
- Responsive web interface

## 3. Technology Stack

### *Frontend*

- React.js
- State Management: Context
- Styling: Tailwind CSS

### *Backend*

- Express.js
- Node.js

### *Database*

- SQL Server
- ORM: Sequelize
- Hosted on AWS RDS

## 4. Key Innovations

### *Security Features*

- Dynamic question randomization
- Client-side answer obfuscation
- Secure API communications
- Role-based access control

### *Performance Tracking*

- Detailed quiz statistics
- Individual student progress monitoring

- Immediate grading mechanisms

## **5. Challenges Overcome**

### ***Technical Hurdles***

1. SQL Server Management Studio Limitations
  - 32-bit software constraints
  - Poor development tooling
2. Technology Integration
  - Complex data routing
  - API data conversion challenges
  - Seamless technology ecosystem integration

### ***Solution Strategies***

- Custom configuration scripts
- Modular design approach
- Robust error handling mechanisms

## **6. Future Roadmap**

### ***Planned Enhancements***

1. Next.js platform migration
2. Cross-platform mobile/desktop applications
3. AI-driven adaptive quizzing
4. Enhanced security features

## **7. Conclusion**

### ***Project Achievements***

- Developed secure, user-friendly quiz platform
- Addressed online assessment vulnerabilities
- Created scalable FOSS solution

### ***Key Learnings***



- Importance of comprehensive security design
- Value of user-centric technological solutions
- Complexity of integrated software ecosystems

## **8. Acknowledgments**



Special thanks to:




- COMSATS University Islamabad, Lahore Campus
- Course Instructor: Modassir Ishfaq
- Open-source community



Admins	
 AdminID	INT
AdminName	NVARCHAR
Username	NVARCHAR
AdminRole	NVARCHAR




Attempted_Quiz	
 AttemptID	INT
 Quiz_SessionID	INT
Question_String	NVARCHAR
Actual_Answer	NVARCHAR
Student_Answer	NVARCHAR
Is_Correct_BIT	INT


Answer_Key	
 AnswerID	INT
 QuestionID	INT
 CorrectOptionID	INT



Students	
 StudentID	INT
StudentName	NVARCHAR
Username	NVARCHAR
 Deg_Prog	NVARCHAR

Quiz_Session	
 Quiz_SessionID	INT
 StudentID	INT
 Course_ID	INT
Quiz_Date	DATE
Start_Time	TIME
End_Time	TIME
Quiz_TotalScore	INT
Obtained_Marks	INT
Progress_Percentage	INT
Scholastic_Status	NVARCHAR

Option_Bank	
 OptionID	INT
 QuestionID	INT
Option_String	NVARCHAR

Student_Course	
 SC_ID	INT
 StudentID	INT
 Course_ID	INT

Question_Bank	
 QuestionID	INT
Question_String	NVARCHAR
Course_Code	NVARCHAR

Courses	
 Course_ID	INT
Course_Code	NVARCHAR
Course_Name	NVARCHAR
 Deg_Prog	NVARCHAR

Deg_Program	
 Deg_Prog	NVARCHAR
Deg_Prog_Name	NVARCHAR

ENROLLS

CHOSEN FROM

Pursuing

CONDUCTED FOR

CONSISTS

DISPLAYED FOR

CORRESPONDS WITH

CROSS-CHECKED

PROVIDED WITH

RECORDED IN

ATTEMPTS



```
1  {/* Features Grid */}
2    <div className="container mx-auto px-4 pb-20">
3      <div className="grid grid-cols-1 md:grid-cols-2 lg:grid-cols-3 gap-8">
4        <FeatureCard
5          icon={<FaBrain className="text-4xl text-blue-400" />}
6          title="Smart Quizzes"
7          description="Experience adaptive quizzes that match your skill level. With our database of carefully curated questions across multiple courses, master your subjects one quiz at a time."
8          onClick={() => navigate("/")}
9        />
10
11       <FeatureCard
12         icon={<FaBook className="text-4xl text-green-400" />}
13         title="Course Library"
14         description="Access a comprehensive collection of courses from various programs including BSCS, BCE, BSSE, and more. Each course is structured for optimal learning and retention."
15         onClick={() => navigate("/courses")}
16       />
17
18       <FeatureCard
19         icon={<FaChartLine className="text-4xl text-purple-400" />}
20         title="Progress Analytics"
21         description="Track your learning journey with detailed analytics. View your quiz history, performance metrics, and improvement trends in real-time."
22         onClick={() => navigate("/analytics")}
23       />
24
25       <FeatureCard
26         icon={<FaClock className="text-4xl text-yellow-400" />}
27         title="Timed Assessments"
28         description="Challenge yourself with timed quizzes that simulate exam conditions. Improve your time management skills while testing your knowledge."
29         onClick={() => navigate("/assessments")}
30       />
31
32       <FeatureCard
33         icon={<FaMedal className="text-4xl text-red-400" />}
34         title="Achievement System"
35         description="Earn badges and certificates as you progress. Track your scholastic status and celebrate your academic victories with our comprehensive reward system."
36         onClick={() => navigate("/achievements")}
37       />
38
39       <FeatureCard
40         icon={<FaUserGraduate className="text-4xl text-indigo-400" />}
41         title="Student Portal"
42         description="Access your personalized dashboard to manage enrolled courses, view upcoming assessments, and track your overall academic progress."
43         onClick={() => navigate("/dashboard")}
44       />
45     </div>
46   </div>
```



```
1  // backend/server.js
2  const express = require("express");
3  const sql = require("mssql");
4  const cors = require("cors");
5  const dotenv = require("dotenv");
6
7  // Load environment variables from .env file
8  dotenv.config();
9  const DB_USER = process.env.MASTER_DB_USER;
10 const DB_PASSWORD = process.env.MASTER_DB_PASSWORD;
11 console.log("DB_USER:", DB_USER);
12 console.log("DB_PASSWORD:", DB_PASSWORD);
13
14 const app = express();
15 const corsOptions = {
16   origin: "http://localhost:3000", // Adjust this to match your frontend's URL
17   optionsSuccessStatus: 200,
18 };
19 app.use(cors(corsOptions));
20 app.use(express.json());
21
22 const port = 3000; // Ensure the port is set to 3000
23
24 // User login endpoint
25 app.post("/login", async (req, res) => {
26   console.log("Login attempt:", req.body);
27   const { username, password } = req.body;
28   const config = {
29     user: username,
30     password: password,
31     server: "quizmasterpro.c568kmee42lu.eu-north-1.rds.amazonaws.com",
32     database: "quizmasterpro",
33     options: {
34       encrypt: true,
35       trustServerCertificate: true,
36       connectionTimeout: 30000,
37       enableArithAbort: true,
38     },
39   };
40
41   try {
42     console.log("Attempting database connection ...");
43     await sql.connect(config);
44     console.log("Database connection successful");
45     res.json({ message: "Login successful" });
46   } catch (err) {
47     console.error("SQL error:", err);
48     res.status(401).json({ error: "Invalid credentials" });
49   }
50 });
```



```

1 // src/Login.js
2 import React, { useState, useContext } from "react";
3 import { AuthContext } from "../Contexts/AuthContext";
4 import { motion } from "framer-motion";
5 import { FaUser, FaLock, FaUserGraduate, FaUserShield } from "react-icons/fa";
6
7 const Login = ({ onLogin }) => {
8   const { setUsername, setPassword, setLoginType, setVerified } =
9     useContext(AuthContext);
10   const [localUsername, setLocalUsername] = useState("");
11   const [localPassword, setLocalPassword] = useState("");
12   const [message, setMessage] = useState("");
13   const [loginType, setLocalLoginType] = useState("");
14   const [isLoading, setIsLoading] = useState(false);
15
16   const handleSubmit = async (e) => {
17     e.preventDefault();
18     setIsLoading(true);
19     try {
20       console.log("Logging in with:", localUsername, localPassword);
21       console.log("gonna post to http://localhost:3000/login");
22       const response = await fetch("http://localhost:3000/login", {
23         method: "POST",
24         headers: { "Content-Type": "application/json" },
25         body: JSON.stringify({
26           username: localUsername,
27           password: localPassword,
28         }),
29       });
30       const data = await response.json();
31       if (response.ok) {
32         setMessage(data.message);
33         setUsername(localUsername);
34         setPassword(localPassword);
35         setLoginType(loginType);
36         setVerified(true);
37         onLogin(localUsername, localPassword);
38       } else {
39         setMessage(data.error || "Login failed");
40       }
41     } catch (error) {
42       console.error("Error logging in:", error);
43       console.log("Login failed form Login.js");
44       setMessage("Login failed");
45     } finally {
46       setIsLoading(false);
47     }
48   };

```

```

1 // src/App.js
2 import React, { useEffect, useContext, useState } from "react";
3 import "../App.css";
4 import { Routes, Route, Navigate, useNavigate } from "react-router-dom";
5 import Login from "../components/Login";
6 import Home from "../components/Home";
7 import Navigation from "../components/Navigation";
8 import { AuthContext } from "../Contexts/AuthContext";
9 import StudentDashboard from "../Students/StudentDashboard";
10 import AdminDashboard from "../Admins/AdminDashboard";
11 import Progress from "../Students/Progress";
12 import Analytics from "../Students/Analytics";
13 import CourseDetails from "../Students/CourseDetails";
14 import TakeQuiz from "../Students/TakeQuiz";
15
16 function App() {
17   const {
18     username,
19     password,
20     loginType,
21     setUsername,
22     setPassword,
23     verified,
24     setVerified,
25     setUserData,
26   } = useContext(AuthContext);
27   const navigate = useNavigate();
28   const [loading, setLoading] = useState(false);
29   const [error, setError] = useState(null);
30
31   useEffect(() => {
32     const verifyUser = async () => {
33       if (!username || !password || !loginType) return;
34       setLoading(true);
35       setError(null);
36
37       try {
38         const response = await fetch(`http://localhost:3000/userverification`, {
39           method: "GET",
40           headers: {
41             "Content-Type": "application/json",
42             "x-username": username,
43             "x-password": password,
44             "x-logintype": loginType,
45           },
46         });
47         const data = await response.json();
48         if (response.ok) {
49           console.log("Verification data:", data); // Log the entire response
50           setUserData(data.data); // Ensure you are setting the correct part of the response
51           setVerified(true);
52           if (loginType === "admin") {
53             navigate("/admin");
54           } else {
55             navigate("/student");
56           }
57         } else {
58           console.log(data);
59           setError(data.error || "Failed to verify user");
60           console.error("Failed to verify user:", data.error);
61           handleLogout();
62         }
63       } catch (error) {
64         setError("Error connecting to server");
65         console.error("Error verifying user:", error);
66         handleLogout();
67       } finally {
68         setLoading(false);
69       }
70     };
71
72     verifyUser();
73     }, [username, password, loginType]);

```

# Welcome to QuizMasterPro

Your intelligent learning companion designed to transform education through interactive assessments and personalized progress tracking.

[Start Learning](#)

## Smart Quizzes

Experience adaptive quizzes that match your skill level. With our database of carefully curated questions across multiple courses, master your subjects one quiz at a time.

[Learn more →](#)

## Course Library

Access a comprehensive collection of courses from various programs including BSCS, BCE, BSSE, and more. Each course is structured for optimal learning and retention.

[Learn more →](#)

## Progress Analytics

Track your learning journey with detailed analytics. View your quiz history, performance metrics, and improvement trends in real-time.

[Learn more →](#)

## Timed Assessments



## Achievement System



## Student Portal




# Welcome to QuizMasterPro

Please sign in to your account

**Username**

 Enter your username

**Password**

 Enter your password

**Select Account Type**

 Admin

 Student


Sign in

Loading...

# Welcome to QuizMasterPro

Please sign in to your account


Username


 Abdullah

Password

 .....

Select Account Type

 Admin

 Student

Sign in

Login successful

# Welcome back, Faizan

BSCS - Your learning journey continues here

Program  
**BSCS**

Enrolled Courses  
**3 Courses**

Overall Progress  
**0.00%**

## Your Courses

Track your progress and continue learning

Total Courses  
**3**

**CS101**

Introduction to Programming

Progress  
**0%**

Attempts  
**0**

[View Details →](#)

**CS102**

Data Structures

Progress  
**0%**

Attempts  
**0**

[View Details →](#)

**CS103**

Algorithms

Progress  
**0%**

Attempts  
**0**

[View Details →](#)

localhost:3001 says

Quiz submitted successfully!

OK

☐ To allocate memory dy☐ To initialize member variables☐ To handle exceptions

Question 10 of 10

? CS101

**Which of the following is not a feature of C++?**☐ Multiple inheritance☐ Encapsulation☒ Garbage collection☐ Templates

Submit Quiz



# Welcome back, Student1

BSCS - Your learning journey continues here



Program

**BSCS**



Enrolled Courses

**3 Courses**



Overall Progress

**50.00%**

## Your Courses

Track your progress and continue learning

Total Courses

**3**



**CS101**

Introduction to Programming



Progress  
**80%**



Attempts  
**2**

[View Details →](#)



**CS102**

Data Structures



Progress  
**50%**



Attempts  
**1**

[View Details →](#)



**CS103**

Algorithms



Progress  
**20%**



Attempts  
**1**

[View Details →](#)



Progress Overview

Overall Progress  
50.0%

Courses Enrolled  
3

Total Attempts  
4

CS101

Introduction to Programming

80%  
Overall Progress

Attempts  
2

Avg Score  
80%

Best Score  
80%

View Quiz History

CS102

Data Structures

50%  
Overall Progress

Attempts  
1

Avg Score  
50%

Best Score  
50%

View Quiz History

CS103

Algorithms

20%  
Overall Progress

Overall Progress

50.0%

Total Quizzes

4

Active Courses

3

