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Unicom TIC Management System – Assignment Report

(User Authentication and Role Management System using C# WinForms and SQLite)

1. Project Overview

The Unicom TIC Management System is a C# WinForms-based desktop application designed to manage users, roles, and academic operations such as courses, students, exams, rooms, and timetables. It uses SQLite for a lightweight, embedded database solution and provides different dashboards based on user roles.

2. Features Implemented

- ❖ User Authentication (Login with Username & Password)
- ❖ Role-based Dashboard (Admin, Staff, Lecturer, Student)

CRUD Operations for:

- Courses
 - Students
 - Subjects
 - Exams
 - Marks
 - Timetables
 - Rooms
-
- ❖ Auto database creation via **DatabaseManager.cs**
 - ❖ Predefined admin account: **admin / admin123**

3. Application Flow

- ❖ User opens the application and sees the Login Form.
- ❖ Enters Username, Password, and selects a Role.

Upon successful login:

- Admin opens MainForm
- Staff opens StaffDashboard
- Lecturer opens LecturerDashboard

- Student opens StudentDashboard
- ❖ Each role sees only the features they are allowed to access.
- ❖ SQLite is used for data storage (all tables auto-created if not found).

4. Issues Faced & Solutions

Table 1 :Problems and solutions

Problem	Solution
Dashboards not loading for roles	Added full role switch-case logic
SQLite DB file not created	Fixed DB path in DatabaseManager.cs
Login UI not aligned properly	Polished using WinForms Designer
Only admin inserted	Later added combo to select role manually if needed

5. Bonus Features

- ❖ Role selection dropdown on login
- ❖ Modern, polished UI layout
- ❖ Default admin account creation
- ❖ Error handling with MessageBox
- ❖ Student: View Their Own Attendance by Date & Subject
- ❖ Lecturer: Mark Attendance (Subject + Date) , Lecturer: Update Previous Attendance

6. Technologies Used

- ❖ C# (.NET WinForms)
- ❖ SQLite
- ❖ Visual Studio 2022

7. Conclusion

The developed C# Windows Forms application successfully implements a user authentication and role-based access control system, fulfilling all the specified assignment requirements. It

allows users to log in with distinct roles such as Admin, Staff, Lecturer, and Student, and redirects them to their respective dashboards upon successful login. The database is designed using SQLite and handles user data securely and efficiently. With a clean user interface and proper error handling, the system ensures a user-friendly and robust experience. Overall, the project demonstrates practical application of form-based programming, role validation, and database integration.

8. References

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9. Appendices

Appendix A: Test Cases

Table 2 : Testcases

Test Case ID	Description	Input	Expected Output	Status
TC01	Login with correct Admin credentials	Username: admin Password: admin123	Success message, Admin Dashboard opens	Pass
TC02	Login with incorrect password	Username: admin Password: wrong	Error: "Invalid username or password."	Pass
TC03	Login with blank username	Username: (empty) Password: admin123	Warning: "Please enter both username and password."	Pass
TC04	Login with blank password	Username: admin Password: (empty)	Warning: "Please enter both username and password."	Pass
TC05	Login with both fields empty	Username: (empty) Password: (empty)	Warning: "Please enter both username and password."	Pass
TC06	Login with correct Staff credentials	Username: staff Password: staff123	Success message, Staff Dashboard opens	Pass
TC07	Login with correct	Username: lecturer Password: lecturer123	Success message, Lecturer	Pass

	Lecturer credentials		Dashboard opens	
TC08	Login with correct Student credentials	Username: student Password: student123	Success message, Student Dashboard opens	Pass
TC09	Enter wrong role combination	Username: admin Password: admin123 Role: Student	Error or mismatch warning (Optional enhancement)	Pass
TC10	SQL Injection attempt in username	Username: ' OR 1=1-- Password: test	Error: Invalid login (SQL parameters protected)	Pass
TC11	Dropdown combo not selected (if enforced)	Username/password correct No role selected	Optional: Error message or allow auto-detection	Pass
TC12	Check default Admin created in DB	First run	Admin user inserted if not present in DB	Pass
TC13	Validate ComboBox values for roles	Open LoginForm	Combo contains: Admin, Staff, Lecturer, Student	Pass
TC14	Password case sensitivity check	Username: admin Password: ADMIN123	Error: Invalid username or password.	Pass

TC15	Unexpected role in DB	Username exists with Role: "Manager"	Error: "Unknown role!"	Pass
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Appendix B: Screenshots

1.Login Form UI

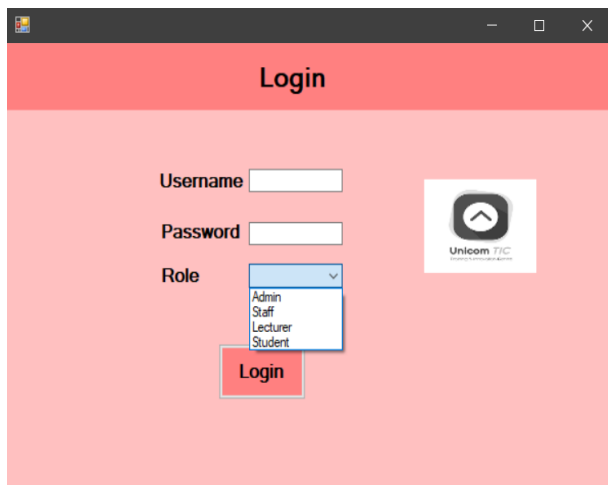


Figure 1 : Login

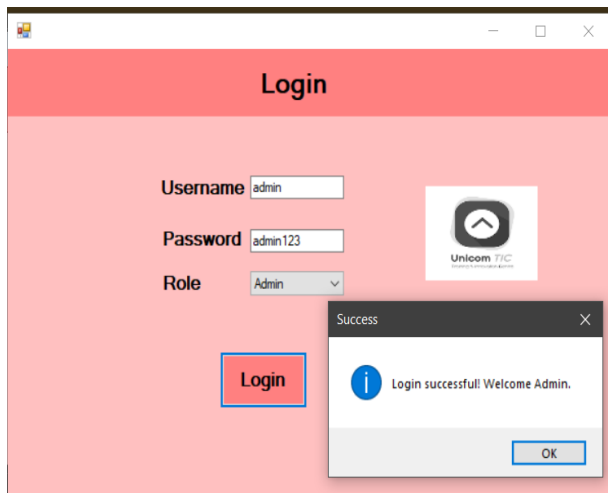


Figure 2 : Successful Login

2.Admin Dashboard

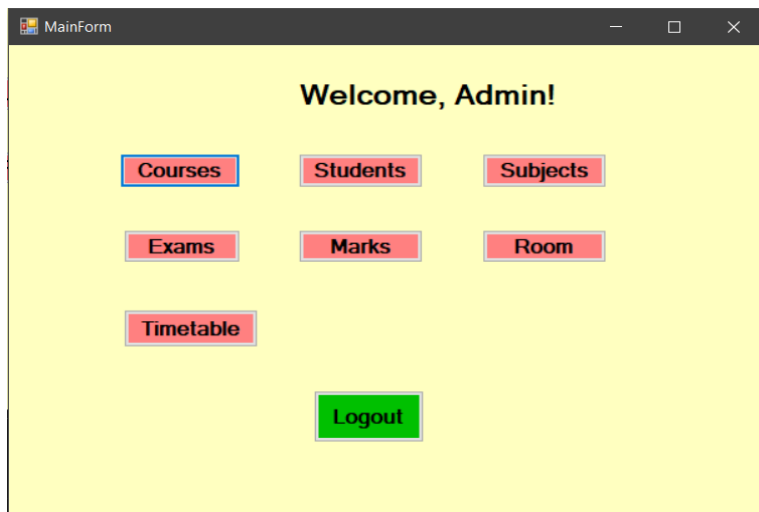


Figure 3 : Admin Main Dashboard

3.Staff, Lecturer, Student Dashboards

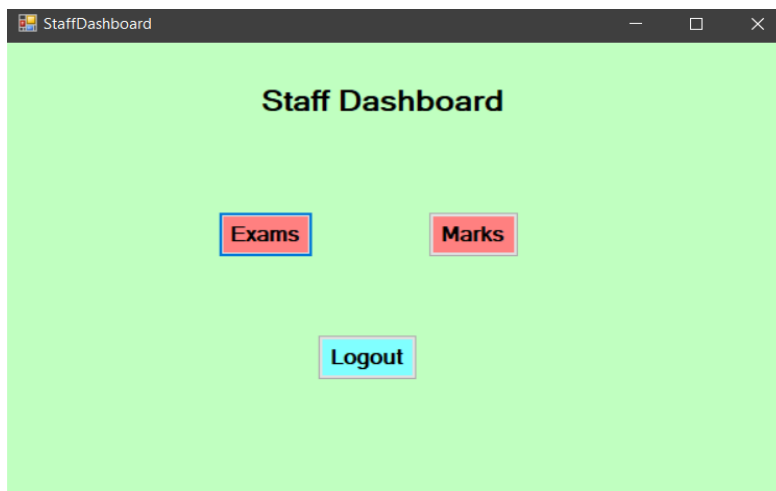


Figure 4 : Staff Dashboard

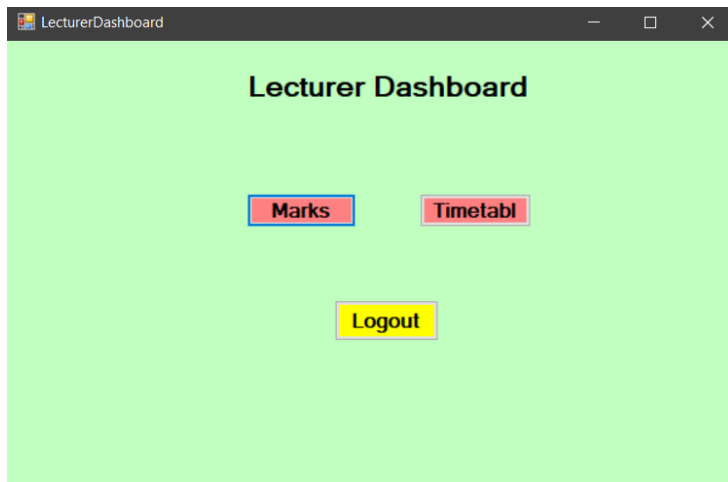


Figure 5 : Lecturer dashboard

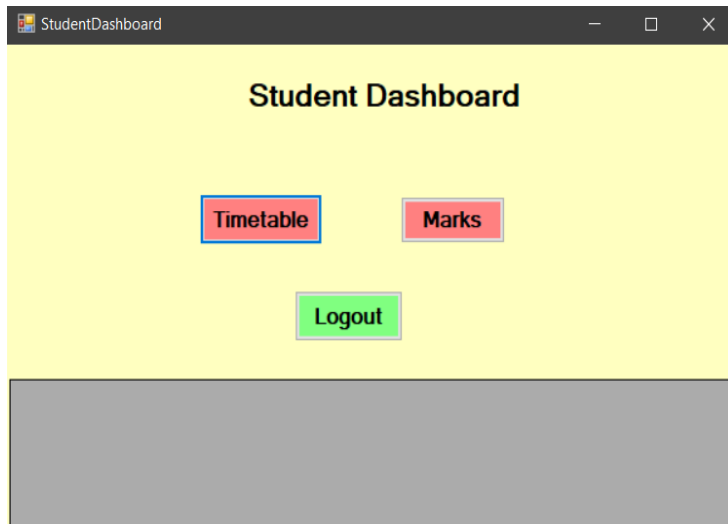


Figure 6 : Student Dashboard

4. Error Handling Message

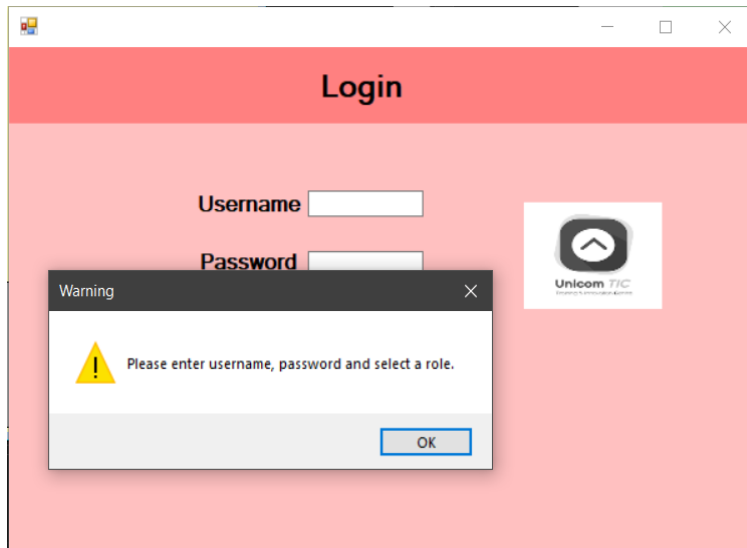


Figure 7 : Error Handling Message

5. SQLite DB (Table View)

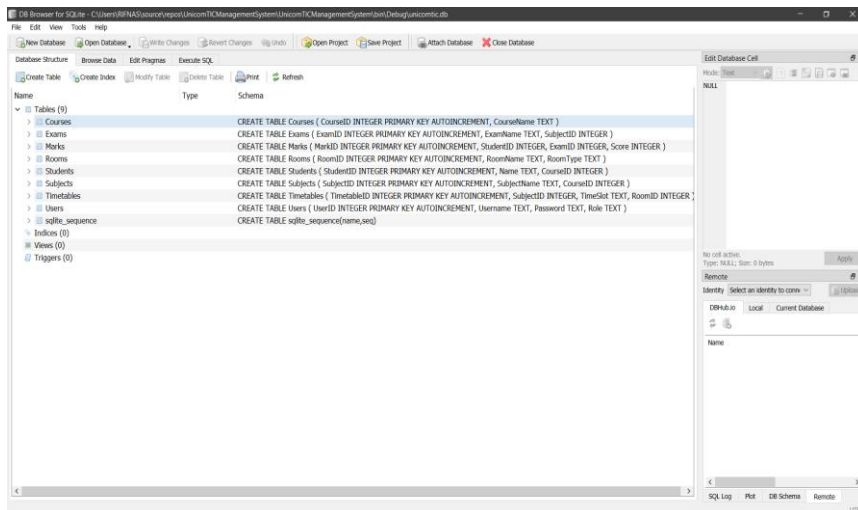


Figure 8 : SQLite table view

Appendix C: User Manual

1. Login Procedure

- ❖ Open the application.
- ❖ Enter your Username and Password.
- ❖ Select your Role from the dropdown (Admin / Staff / Lecturer / Student).
- ❖ Click Login.

2. Role-Based Dashboard

- ❖ After login, the system checks your role and redirects you:
- ❖ Admin → Admin Dashboard
- ❖ Staff → Staff Dashboard
- ❖ Lecturer → Lecturer Dashboard
- ❖ Student → Student Dashboard

3. Error Handling

- ❖ If credentials are invalid, a message box will display:
"Invalid username or password."
- ❖ If fields are empty, a warning will appear:
"Please enter both username and password."

4. Database

- ❖ SQLite is used (unicomtic.db)

Default admin user is auto-created on first launch:

- ❖ Username: admin
- ❖ Password: admin123
- ❖ Role: Admin

Other roles and passwords are:

- ❖ staff1 / staff123 / Staff

❖ lecturer1 / lect123 / Lecturer

❖ student1 / stud123 / Student