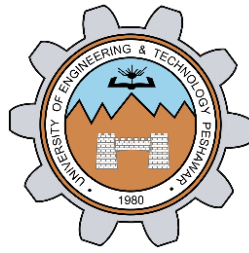# DBMS Lab Project

CSE-403L Database Management System Lab

Spring 2025

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Class Section: C

Submitted to:

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Department of Computer Systems Engineering

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TITLE: -
Exam and Result Management System

1.1 Introduction:

The traditional system of manually maintaining students' exam and result records is slow, prone to errors, and lacks centralized access. The proposed system automates this process using a relational database and web technologies to improve accuracy, accessibility, and efficiency By shifting this manual method to the computerized system, we can boost our work efficiencies, reduce our work loads, we can reduce our time that we spend in maintaining the records and we don't need to waste paper and trees that we need to cut to maintain our records. One of the biggest issue of the manual labor was that if one of records is changed at one instance, it takes a lot of time in updating in all the other related entities and places wherever the work was saved. So this projects also helps in the updation of the entities at all the places in just a click if one of the entities is changed, it doesn't take much time to update all the other records.

1.2 Objectives:

- ❖ To securely store student, exam, instructor, and result information using a centralized database.
- ❖ To eliminate manual errors in result processing through automation and validation mechanisms.
- ❖ To provide an intuitive, user-friendly interface for teachers, administrators, and examination staff.
- ❖ To automate result calculation and generation based on predefined marking schemes and grade thresholds.
- ❖ To ensure fast and efficient result publishing with minimal administrative effort.
- ❖ To maintain confidentiality and data privacy through role-based access control and secure login.
- ❖ To enable real-time result access for students and parents via web portal or mobile interface.
- ❖ To generate customizable reports, mark sheets, and transcripts in digital format.
- ❖ To offer audit logs for all administrative activities to maintain system transparency and accountability.
- ❖ To support scalability for handling large datasets and multiple departments or campuses.
- ❖ To back up all data regularly to prevent loss during unexpected failures or system errors.

1.3 Entity Description

| Entity Name	Description
Student	Stores detailed records of each enrolled student including personal info, registration number, contact details, and course enrollment. Each student can be linked to multiple courses and exams, and their academic progress is tracked over time.
Instructor	Contains information about faculty members such as name, ID, department, and contact details. Instructors are assigned to courses, conduct exams, input marks, and play a critical role in student evaluation.
Course	Represents academic subjects with details like course code, title, credit hours, and prerequisites. Courses are taught by instructors and taken by students. Each course has associated exams and contributes to CGPA calculation.
Exam	Keeps records of assessments linked to specific courses. Includes exam type (quiz, midterm, final), date, total marks, and duration. Enables tracking of student attendance and supports result publishing and rechecking.
Result	Documents student performance in exams with data on marks obtained, grade, percentage, and pass/fail status. Links students to exams and is used for generating report cards, transcripts, and performance analytics.

1.4 Business Rules:-

❖ A student can register for multiple courses in a semester, but cannot register for the same course more than once in the same academic term.

❖ Each course must have at least one assigned instructor, and one of them must be designated as the course coordinator responsible for overall management and grading.

❖ A course can have multiple exams such as quizzes, midterms, finals, or practicals, but each exam must be linked to only one course.

❖ A student can appear in multiple exams, but the system allows only one result entry per student for each exam to avoid duplication or conflict.

❖ Instructors can manage and evaluate multiple exams. They are solely responsible for entering accurate marks and ensuring timely result submission.

❖ Every result must be linked to a valid student and a valid exam. The system must verify the existence of both before result entry is allowed.

❖ Students are restricted from viewing their results until the instructor has officially published them in the system.

❖ All exams must be scheduled at least seven days in advance. Any rescheduling must be immediately communicated to all enrolled students via system notifications.

❖ Marks for each exam must be entered within ten days from the exam date. Delays beyond this period will require administrative approval or system override.

❖ Student grades are calculated based on a pre-defined grading policy that is standardized and consistently applied across all courses.

1.5   ENTITY RELATIONSHIP DIAGRAM (ERD)
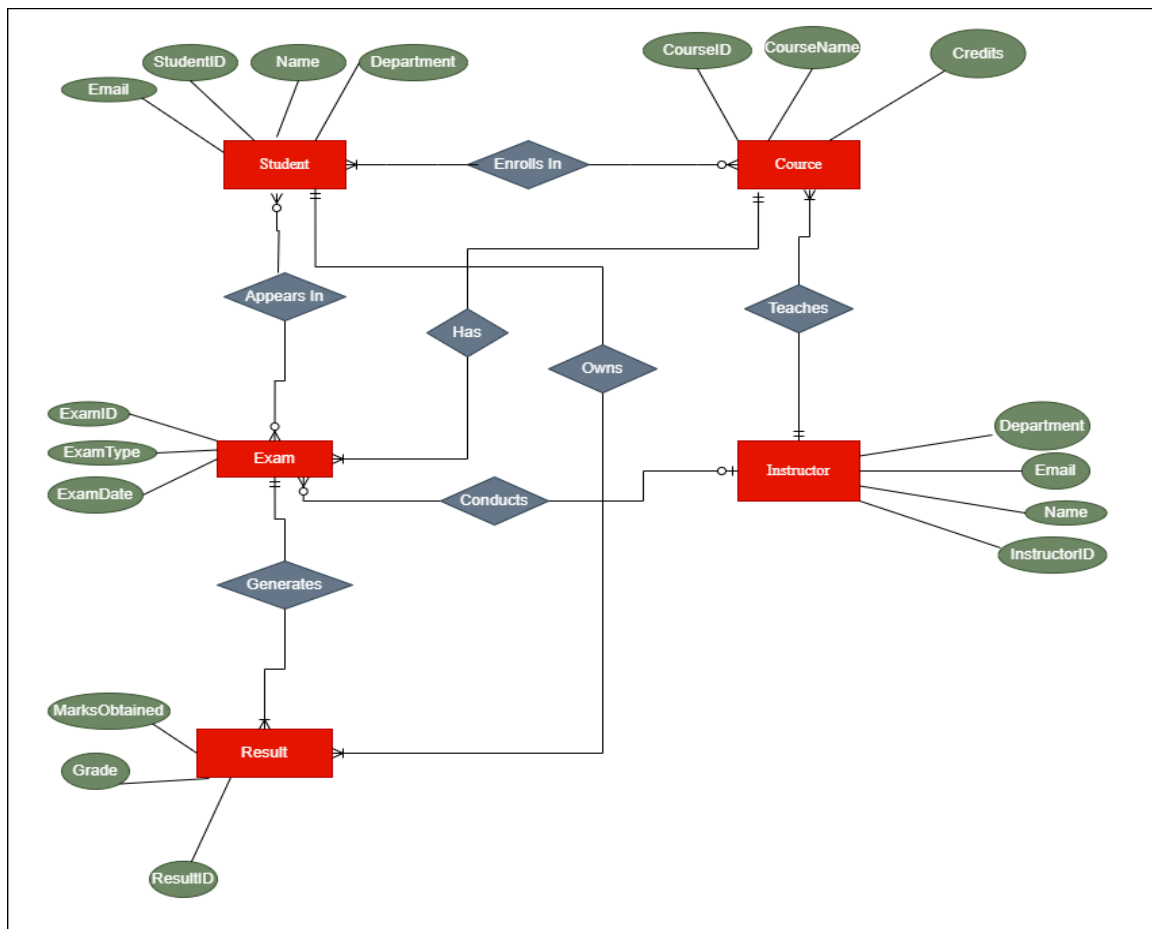
1.6 ENHANCED ENTITY RELATIONSHIP DIAGRAM (EERD)
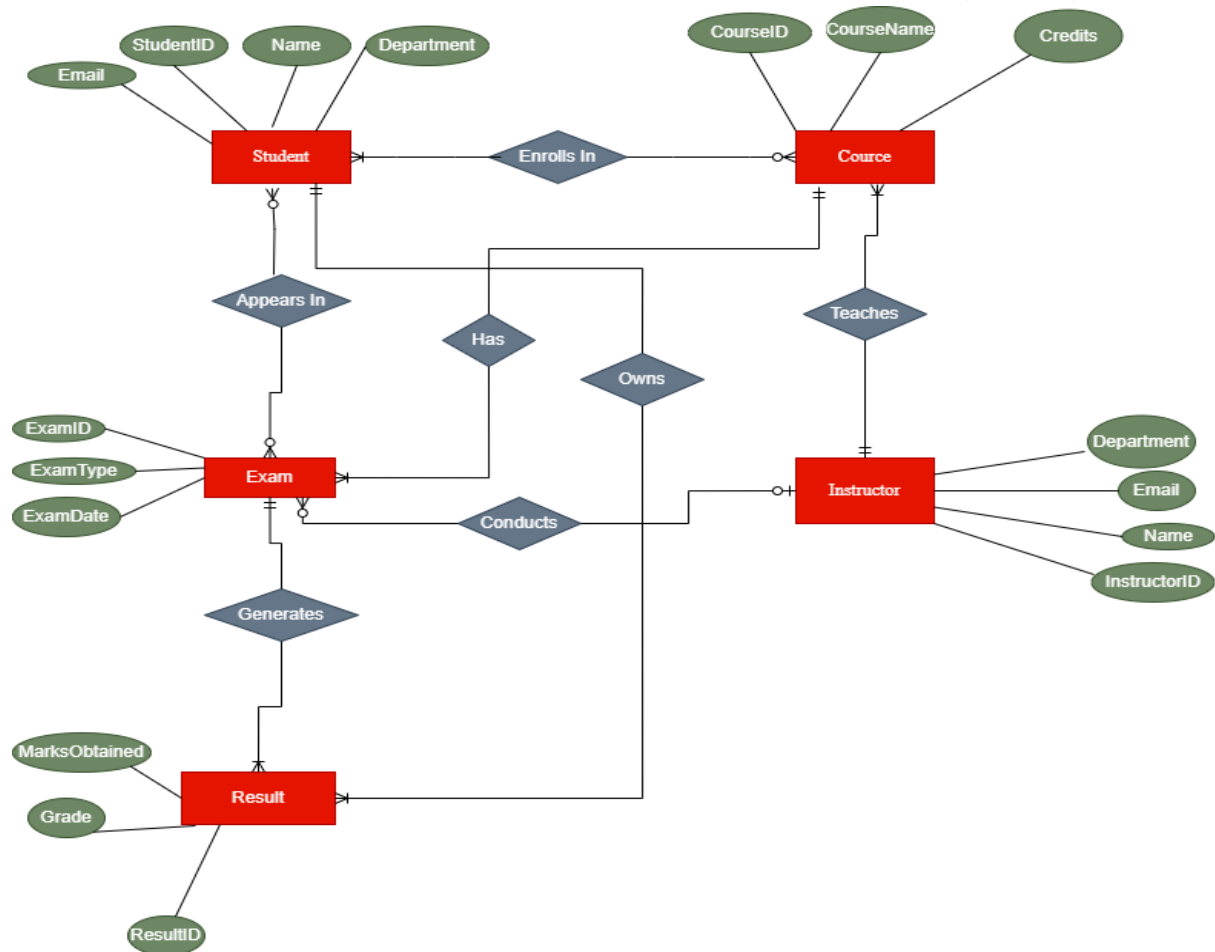
1.7 Technologies Used:

- **Frontend:** HTML, Tailwind CSS
- **Backend:** PHP (Laravel)
- **Database:** MySQL
- **Tools:** XAMPP, phpMyAdmin

1.8 System Modules:

- **Student Management:** Add/edit student records.
- **Course Management:** Create and manage courses.
- **Instructor Module:** Assign instructors to courses.
- **Exam Management:** Define exams linked to courses.
- **Result Management:** Enter and calculate grades based on marks.
- **Authentication System:** Role-based access for admin, teacher, student.

1.9 Entities and Their Attributes:

1. **Student**

   * ❖ *Attributes:* StudentID (Primary Key), Name, Department, Email
   * ❖ Represents students enrolled in the institution. Each student can register for multiple courses and appear in exams.

2. **Course**

   * ❖ *Attributes:* CourseID (Primary Key), CourseName, Credits
   * ❖ Represents academic courses offered. Courses are taught by instructors and taken by students.

3. **Instructor**

   * ❖ *Attributes:* InstructorID (Primary Key), Name, Department, Email
   * ❖ Represents faculty members responsible for teaching and evaluating students through exams.

4. **Exam**

   * ❖ *Attributes:* ExamID (Primary Key), ExamType, ExamDate
   * ❖ Represents examinations conducted for courses. Each exam is associated with a course and conducted by an instructor.

5. **Result**

   * ❖ *Attributes:* ResultID (Primary Key), MarksObtained, Grade
   * ❖ Stores the performance of students in exams. Each result links a student with a specific exam.

1.10 ER Diagram Summary:

* ❖ **Students** *enroll in* multiple **Courses** (many-to-many relationship).
* ❖ **Instructors** *teach* Courses and one of them *owns* the course as a coordinator.
* ❖ **Students** *appear in* multiple **Exams**, and each **Exam** is *conducted by* an **Instructor**.
* ❖ Each **Exam** is associated with exactly one **Course** (*has* relationship).
* ❖ **Results** are *generated* for every exam a student appears in. A result links a **Student** and an **Exam**, ensuring performance tracking.

1.11 Database Design:

Based on the ER diagram, the relational schema (tables and keys) would look like this:

1. **Student Table**

    Fields: StudentID (PK), Name, Department, Email

2. **Course Table**

    Fields: CourseID (PK), CourseName, Credits

3. **Instructor Table**

    Fields: InstructorID (PK), Name, Department, Email

4. **Exam Table**

    Fields: ExamID (PK), ExamType, ExamDate, CourseID (FK), InstructorID (FK)

5. **Result Table**

    Fields: ResultID (PK), StudentID (FK), ExamID (FK), MarksObtained, Grade

6. **Student Course Table** *(For Many-to-Many between Student & Course)*

    Fields: StudentID (FK), CourseID (FK)

    Composite primary key: (StudentID, CourseID)

7. **Instructor Course Table** *(To map which instructors teach which course and who is the coordinator)*

    Fields: InstructorID (FK), CourseID (FK), IsCoordinator (Boolean)

    Composite primary key: (InstructorID, CourseID)

1.12 Key Features:

1. **Secure Student Information Management**
   Stores detailed student data including ID, name, department, and email with strict access control to ensure privacy.
2. **Course Registration Module**
   Allows students to register for multiple courses per semester, with validations to prevent duplicate registrations.
3. **Instructor Assignment System**
   Enables admin to assign one or more instructors to courses, with one designated as the course coordinator.
4. **Exam Scheduling & Management**
   Supports creation and scheduling of various exam types (e.g., midterm, final, quiz) linked to specific courses and instructors.
5. **Student-Exam Participation Tracking**
   Records which students appeared in which exams, ensuring attendance tracking and eligibility validation.
6. **Automated Result Generation**
   Instructors can enter marks directly into the system; the system calculates grades based on predefined grading rules.
7. **Real-time Result Publishing**
   Results remain hidden until published by the instructor, after which students can access their grades securely.
8. **Role-Based Access Control (RBAC)**
   Ensures that only authorized users (students, instructors, admin) can access relevant parts of the system.
9. **Standardized Grading Policy Enforcement**
   Grades are auto-calculated using a uniform institutional grading policy, ensuring fairness and consistency.
10. **Relational Database Backend**
    Efficient use of foreign keys and entity relationships ensures data integrity, accuracy, and normalization.
11. **Report Generation & Analytics**
    Supports generation of transcripts, individual report cards, and overall performance summaries for analysis.
12. **Error Reduction & Validation Mechanisms**
    Eliminates manual entry mistakes through validations at each data entry point, including result submission deadlines.
13. **Scalability & Extensibility**
    Designed to accommodate future features like CGPA calculators, rechecking requests, backlog exams, or mobile access.

1.13 Benefits:

1. **Improved Accuracy in Result Processing**
   Eliminates human errors in grade calculation, data entry, and result compilation through automation.
2. **Time-Saving for Faculty and Administration**
   Automates repetitive tasks like mark entry, grade calculation, and report generation—freeing up staff for other responsibilities.
3. **Centralized Data Storage**
   All student, course, exam, and result data is stored in a single, structured database—easy to access and maintain.
4. **Real-Time Access to Results**
   Students can view their grades instantly once published, reducing the need for manual result distribution.
5. **Quick Report and Transcript Generation**
   Reduces the time and effort needed to generate performance reports, mark sheets, and transcripts.
6. **Easy Exam Management**
   Schedules, changes, and notifications are managed efficiently, keeping students and instructors informed and prepared.
7. **Scalable for Future Expansion**
   The system can be extended to support additional features such as CGPA tracking, rechecking requests, or mobile compatibility.

1.14 Project and Output Snippets
Homepage:

Signup Page:

Login Page:-

Dashboard:

Student:

Instructor Management:

Course Management:

Exams:
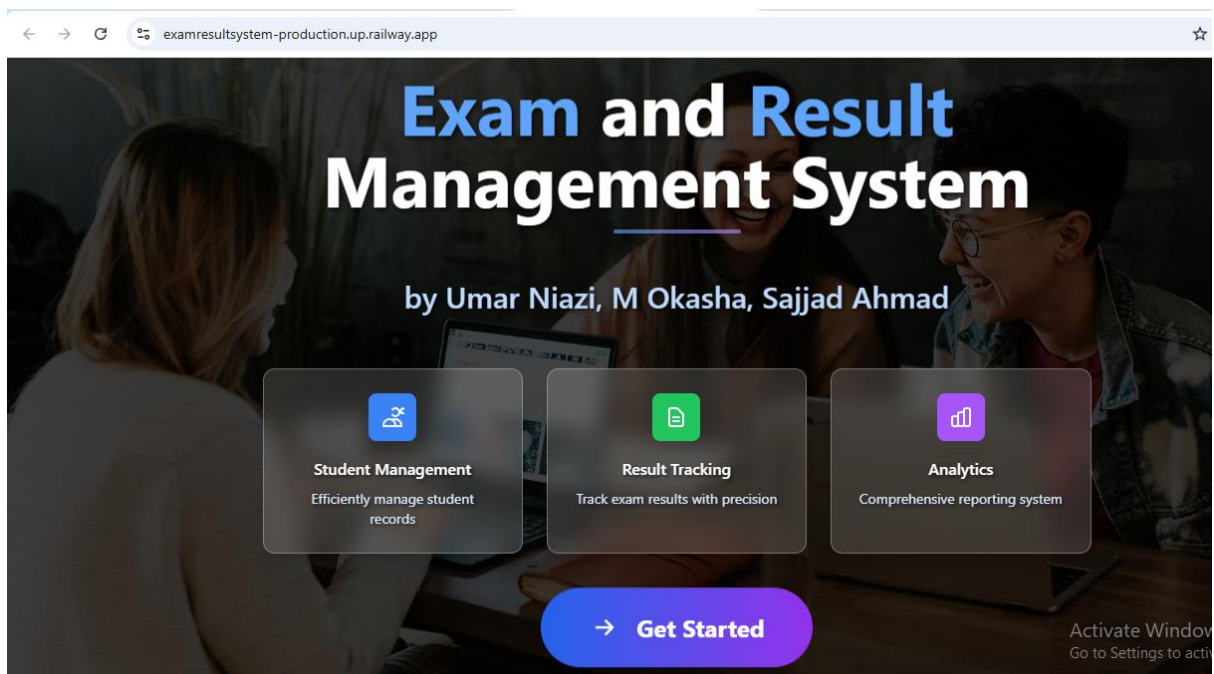
	examresultsystem-production.up.railway.app/admin/exams		

	Admin Dashboard	Students	Instructors	Courses	**Exams**	Results	Users		**Super Admin** ∨

Exams

[Create New Exam]

Exam created successfully!

TITLE	COURSE	DATE	ACTIONS
Mid Term	islamait	2025-07-08	[View] [Edit] [Delete]

Result Management:

	Admin Dashboard	Students	Instructors	Courses	Exams	**Results**	Users		**Super Admin** ∨

Result Management

[Add New Result]

Result added successfully.

#	STUDENT	COURSE	EXAM	GRADE	ACTIONS
1	Muhammad Okasha	islamait	Mid Term	A	[View] [Edit] [Delete]

Users:

	Admin Dashboard	Students	Instructors	Courses	Exams	Results	**Users**		**Super Admin** ∨

User Management

← Back to Dashboard

USER		EMAIL	CURRENT ROLE	ACTIONS
MU	Muhammad Umar ID: 1	niaziumar98@gmail.com	User	[User∨]
SU	Super Admin ID: 2	superadmin@gmail.com	Admin	[Admin]
KA	Kashif ID: 3	muhammadokasha195@gmail.com	User	[User∨]
FA	farman ID: 4	farman@gmail.com	User	[User∨]

Database:

Adding New Student:

Add New Student

Registration Number

2148

Name

Muhammad Umar

Email

muhammadumar9898

Department

DCSE

Student Type

Undergraduate

Gender

Male

Back   Save Student

Update in Student Section:

Update in Database:

Database before Update in Instructor Section:

Update at Website:

Verified in Database:

Database Before Update in Courses:

Update in Website:

Add New Course

Course Name:

DBMS

Course Code:

304-L

Credits:

3

Description:

This is new test subject

Back   Save Course

Verification in Database:


```
1 row in set (0.5265 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL > SELECT * FROM courses;
+----+----------+--------+---------+------------------------+---------------------+---------------------+
| id | name     | code   | credits | description            | created_at          | updated_at          |
+----+----------+--------+---------+------------------------+---------------------+---------------------+
|  1 | islamait | 123    |       3 | dbddusnabd             | 2025-07-06 14:58:30 | 2025-07-06 14:58:30 |
|  2 | DBMS     | 304-L  |       3 | This is new test subject | 2025-07-08 09:22:21 | 2025-07-08 09:22:21 |
+----+----------+--------+---------+------------------------+---------------------+---------------------+
2 rows in set (0.2410 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL >
```

Before Update In Exams Section:


```
2 rows in set (0.2410 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL >
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL > SELECT * FROM exams;
+----+----------+------------+-----------+---------------------+---------------------+
| id | title    | exam_date  | course_id | created_at          | updated_at          |
+----+----------+------------+-----------+---------------------+---------------------+
|  1 | Mid Term | 2025-07-23 |         1 | 2025-07-08 09:04:52 | 2025-07-08 09:04:52 |
+----+----------+------------+-----------+---------------------+---------------------+
1 row in set (0.1536 sec)
```

Update in Website:

Exams

Exam created successfully!

TITLE	COURSE	DATE	ACTIONS
Mid Term	islamait	2025-07-08	View Edit Delete
Final	islamait	2025-07-08	View Edit Delete

Verification in Database:


```
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL > SELECT * FROM exams;
+----+-----------+------------+-----------+---------------------+---------------------+
| id | title     | exam_date  | course_id | created_at          | updated_at          |
+----+-----------+------------+-----------+---------------------+---------------------+
|  1 | Mid Term  | 2025-07-23 |         1 | 2025-07-08 09:04:52 | 2025-07-08 09:04:52 |
|  2 | Final     | 2025-07-23 |         1 | 2025-07-08 09:24:46 | 2025-07-08 09:24:46 |
+----+-----------+------------+-----------+---------------------+---------------------+
2 rows in set (0.4711 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL >
```

Before Update in Results:


```
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL >
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL > SELECT * FROM results;
+----+------------+-----------+---------+-------+---------------------+---------------------+
| id | student_id | course_id | exam_id | grade | created_at          | updated_at          |
+----+------------+-----------+---------+-------+---------------------+---------------------+
|  1 |          1 |         1 |       1 | A     | 2025-07-08 09:05:54 | 2025-07-08 09:05:54 |
+----+------------+-----------+---------+-------+---------------------+---------------------+
1 row in set (0.2206 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl  studentApp  SQL >
```

Update in Website:

Result Management

Result added successfully.

| #	STUDENT	COURSE	EXAM	GRADE	ACTIONS
1	Muhammad Okasha	islamait	Mid Term	A	View Edit Delete
2	Muhammad Umar	islamait	Final	A	View Edit Delete

Verification in Database:

```
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL | > SELECT * FROM results;
+----+------------+-----------+---------+-------+---------------------+---------------------+
| id | student_id | course_id | exam_id | grade | created_at          | updated_at          |
+----+------------+-----------+---------+-------+---------------------+---------------------+
|  1 |          1 |         1 |       1 | A     | 2025-07-08 09:05:54 | 2025-07-08 09:05:54 |
|  2 |          3 |         1 |       2 | A     | 2025-07-08 09:28:02 | 2025-07-08 09:28:02 |
+----+------------+-----------+---------+-------+---------------------+---------------------+
2 rows in set (0.1928 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL | >
```

Student Portal:

Checking Results:

Updated Result in Website:

Student Results

Name
Muhammad Umar

Registration Number
2149

Department
DCSE

Student Type
Undergraduate

Academic Summary

4 Current GPA
Based on 1 course(s)

Course Results

COURSE CODE	COURSE NAME	GRADE	CREDITS
123	islamait	A	3

[Check Another Result] [View Transcript] [Back to Dashboard]

UNOFFICIAL TRANSCRIPT:

UNOFFICIAL TRANSCRIPT

This is an unofficial transcript for internal use only

Student Name
Muhammad Umar

Department
DCSE

Registration Number
2149

Student Type
Undergraduate

Email
muhammadumar9898@gmail.com

Gender
Male

Academic Summary

4	**1**	**3**	**1**
Cumulative GPA	Total Courses	Total Credits	A Grades

Course History

COURSE CODE	COURSE NAME	CREDITS	GRADE	GRADE POINTS	SEMESTER
123	islamait	3	A	4	2025-07

Grade Legend

A/A+ = 4.0   B/B+ = 3.0-3.3   C/C+ = 2.0-2.3   F = 0.0

Generated on: July 8, 2025 at 9:32 AM
This is an unofficial transcript for internal use only

[Print] [Back to Dashboard]

1.15 GitHub Link:

Here is the GitHub link of the repository uploaded online:

https://github.com/niazi98/exam_result_system

1.16 Conclusion:

The Exam and Result Management System provides a reliable, scalable solution to automate the academic result process in educational institutions. It ensures data accuracy, fast processing, and ease of access for users with different roles.

1.17 REFERENCES

1. Lecture notes and slides provided by Sumayyea Salahuddin, Lecturer, DCSE Dept.
2. Class discussions and examples explained during lectures.
3. [Draw.io (https://www.draw.io)] – Used for creating ER and Enhanced ER diagrams.
4. ChatGPT by OpenAI – Used for conceptual guidance, entity design, relationships, and documentation support.
5. Online database modeling resources and tutorials (e.g., GeeksforGeeks, Tutorials Point) for EERD concepts.