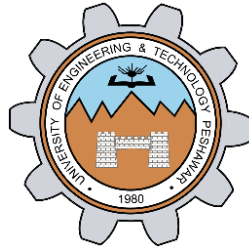# DBMS Lab Project

CSE-403L Database Management System Lab

Spring 2025

Group Members:

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Class Section: C

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

Submitted to:

Engr. Sumayyea Salahuddin

June 02, 2025

Department of Computer Systems Engineering

UET Peshawar

Finalized Conceptual Schema

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.

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.

Detailed 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.

ENTITY RELATIONSHIP DIAGRAM (ERD)
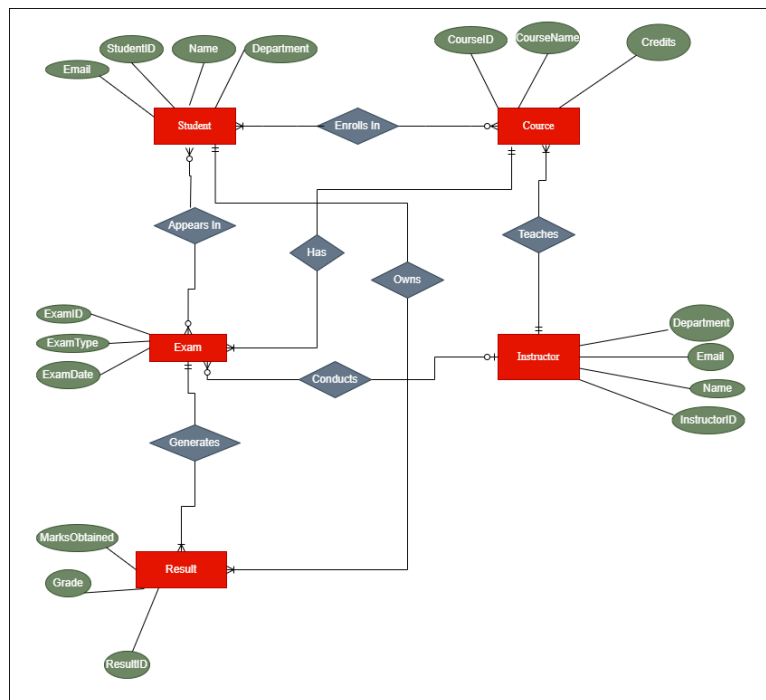
ENHANCED ENTITY RELATIONSHIP DIAGRAM (EERD)
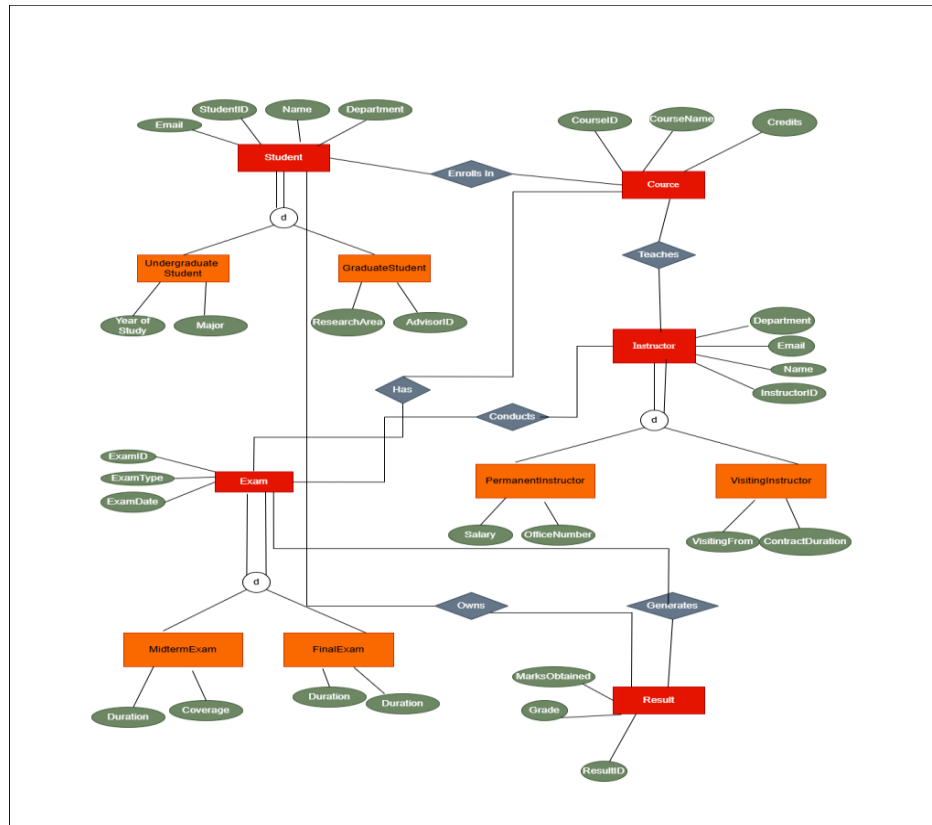
FINALIZED NORMALIZED RELATION

Step 1: Unnormalized Form (UNF)

Example of unnormalized form capturing event and booking data together:
BookingDetails(event_id, event_title, event_date, event_time, venue, admin_name, customer_name, customer_email, customer_phone, booking_status)

Step 2: First Normal Form (1NF)

Ensure atomic values and eliminate repeating groups:
Event(event_id, title, date, time, venue, admin_name)
Customer(customer_id, name, email, phone)
Booking(booking_id, event_id, customer_id, status)

Step 3: Second Normal Form (2NF)

Remove partial dependencies (non-key attributes depending on part of the composite key):
Admin(admin_id, name)

Event(event_id, admin_id, title, date, time, venue)
Customer(customer_id, name, email, phone)
Booking(booking_id, event_id, customer_id, status)

Step 4: Third Normal Form (3NF)

Remove transitive dependencies:
Admin(admin_id, name, email, password, created_at)
Event(event_id, admin_id, title, description, date, time, venue, available_seats, price, created_at)
Customer(customer_id, name, email, phone)
Booking(booking_id, event_id, customer_id, status, booking_date)

Final Relations in 3NF
1. Admin(admin_id, name, email, password, created_at)
2. Event(event_id, admin_id, title, description, date, time, venue, available_seats, price, created_at)
3. Customer(customer_id, name, email, phone)
4. Booking(booking_id, event_id, customer_id, status, booking_date)

SQL DATABASE TABLES AND QUERIES

Sample Queries

- **Retrieve all students:**

  ```
  SELECT * FROM Student;
  ```

- **Find results for a student:**

  ```
  SELECT r.result_id, c.course_name, r.marks
  FROM Result r
  JOIN Exam e ON r.exam_id = e.exam_id
  JOIN Course c ON e.course_id = c.course_id
  WHERE r.student_id = 1;
  ```

- **List all courses taught by an instructor:**

  ```
  SELECT course_name
  FROM Course
  ```

WHERE instructor_id = 1;

```
MariaDB [(none)]> use studentApp;
Database changed
MariaDB [studentApp]> show tables;
+----------------------------+
| Tables_in_studentapp       |
+----------------------------+
| cache                      |
| cache_locks                |
| course_student             |
| courses                    |
| exam_student               |
| exams                      |
| failed_jobs                |
| graduate_students          |
| instructors                |
| job_batches                |
| jobs                       |
| migrations                 |
| password_reset_tokens      |
| permanent_instructors      |
| results                    |
| sessions                   |
| students                   |
| undergraduate_students     |
| users                      |
| visiting_instructors       |
+----------------------------+
20 rows in set (0.001 sec)
```

```
MariaDB [studentApp]> describe users;
+-------------------+---------------------+------+-----+---------+----------------+
| Field             | Type                | Null | Key | Default | Extra          |
+-------------------+---------------------+------+-----+---------+----------------+
| id                | bigint(20) unsigned | NO   | PRI | NULL    | auto_increment |
| name              | varchar(255)        | NO   |     | NULL    |                |
| email             | varchar(255)        | NO   | UNI | NULL    |                |
| email_verified_at | timestamp           | YES  |     | NULL    |                |
| password          | varchar(255)        | NO   |     | NULL    |                |
| remember_token    | varchar(100)        | YES  |     | NULL    |                |
| created_at        | timestamp           | YES  |     | NULL    |                |
| updated_at        | timestamp           | YES  |     | NULL    |                |
+-------------------+---------------------+------+-----+---------+----------------+
8 rows in set (0.031 sec)

MariaDB [studentApp]> select * from stuents;
ERROR 1146 (42S02): Table 'studentapp.stuents' doesn't exist
MariaDB [studentApp]> select * from students;
+----+---------------+-------------------------------+------------+--------+---------------------+---------------------+
| id | name          | email                         | department | gender | created_at          | updated_at          |
+----+---------------+-------------------------------+------------+--------+---------------------+---------------------+
|  2 | zhair         | 22pwcse2148@uetpeshawar.edu.pk| main       | Male   | 2025-06-17 10:54:04 | 2025-06-17 10:54:04 |
|  5 | Muhammad Umar | niaziumar98@gmail.com         | kjsow      | Male   | 2025-06-17 11:10:20 | 2025-06-17 11:10:20 |
|  6 | Muhammad      | 22pwcse2148344@gmail.com      | skdjsn     | Male   | 2025-06-17 11:39:33 | 2025-06-17 11:39:33 |
|  7 | zhair         | zahir@gmail.com               | skdjsn     | Female | 2025-06-17 11:40:01 | 2025-06-17 11:40:01 |
|  8 | okasha        | jshfiues@gmail.com            | dcsewr     | Female | 2025-06-18 17:04:23 | 2025-06-18 17:04:23 |
+----+---------------+-------------------------------+------------+--------+---------------------+---------------------+
5 rows in set (0.020 sec)
```

```
MariaDB [studentApp]> select * from instructors;
+----+---------------+-------------------------------+------------+---------------------+---------------------+
| id | name          | email                         | department | created_at          | updated_at          |
+----+---------------+-------------------------------+------------+---------------------+---------------------+
|  1 | rehmat        | niaziumar98@gmail.com         | dcse       | 2025-06-17 09:25:02 | 2025-06-17 09:25:02 |
|  2 | Muhammad Umar | 22pwcse2148@uetpeshawar.edu.pk| electrical | 2025-06-17 11:12:23 | 2025-06-17 11:12:23 |
|  3 | laijan        | 22pwcse248@uetpeshawar.edu.pk | main       | 2025-06-17 14:12:44 | 2025-06-17 14:12:44 |
+----+---------------+-------------------------------+------------+---------------------+---------------------+
3 rows in set (0.008 sec)

MariaDB [studentApp]> select * from courses;
+----+------+----------+--------------+---------------------+---------------------+
| id | code | title    | credit_hours | created_at          | updated_at          |
+----+------+----------+--------------+---------------------+---------------------+
|  1 | 1234 | urdu     |            3 | 2025-06-17 09:25:31 | 2025-06-17 09:25:31 |
|  2 | 6547 | english  |            3 | 2025-06-17 09:25:50 | 2025-06-17 09:25:50 |
|  3 | 4328 | oirji    |            2 | 2025-06-17 11:11:53 | 2025-06-17 11:11:53 |
|  4 | 954  | islamiat |            3 | 2025-06-17 11:12:07 | 2025-06-17 11:12:07 |
+----+------+----------+--------------+---------------------+---------------------+
4 rows in set (0.009 sec)
```

```
MariaDB [studentApp]> select * from exams;
+----+-------+------------+-----------+---------------------+---------------------+
| id | title | exam_date  | course_id | created_at          | updated_at          |
+----+-------+------------+-----------+---------------------+---------------------+
|  1 | mid   | 2025-06-10 |         2 | 2025-06-17 09:26:15 | 2025-06-17 09:26:15 |
|  2 | mid   | 2025-06-28 |         2 | 2025-06-17 14:02:07 | 2025-06-17 14:02:07 |
+----+-------+------------+-----------+---------------------+---------------------+
2 rows in set (0.005 sec)

MariaDB [studentApp]> select * from results;
+----+------------+-----------+-------+---------------------+---------------------+
| id | student_id | course_id | grade | created_at          | updated_at          |
+----+------------+-----------+-------+---------------------+---------------------+
|  2 |          2 |         1 | A     | 2025-06-17 11:34:32 | 2025-06-17 11:34:32 |
|  3 |          6 |         2 | C     | 2025-06-17 17:04:18 | 2025-06-17 17:04:18 |
|  4 |          7 |         3 | B     | 2025-06-18 09:58:00 | 2025-06-18 09:58:00 |
+----+------------+-----------+-------+---------------------+---------------------+
3 rows in set (0.005 sec)
```

```
MariaDB [studentApp]> select * from undergraduate_students;
+------------+-----------+------------+-----------------------+
| student_id | name      | department | email                 |
+------------+-----------+------------+-----------------------+
|          1 | Ali Khan  | CS         | ali.khan@uni.edu.pk   |
|          2 | Sara Ahmad| IT         | sara.ahmad@uni.edu.pk |
+------------+-----------+------------+-----------------------+
2 rows in set (0.013 sec)

MariaDB [studentApp]> select * from graduate_students
    -> select * from graduate_students;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syn
om graduate_students' at line 2
MariaDB [studentApp]> select * from graduate_students;
+------------+-------------+------------+------------------------+
| student_id | name        | department | email                  |
+------------+-------------+------------+------------------------+
|          3 | Bilal Saeed | CS         | bilal.saeed@uni.edu.pk |
|          4 | Ayesha Noor | SE         | ayesha.noor@uni.edu.pk |
+------------+-------------+------------+------------------------+
2 rows in set (0.008 sec)

MariaDB [studentApp]>
```

```
MariaDB [studentApp]> select * from exam_student;
+---------+------------+------------+
| exam_id | student_id | appeared_on |
+---------+------------+------------+
|     201 |          1 | 2024-12-01 |
|     202 |          2 | 2024-12-02 |
|     203 |          1 | 2024-12-03 |
|     204 |          3 | 2024-12-01 |
+---------+------------+------------+
4 rows in set (0.008 sec)

MariaDB [studentApp]> select * from course_student;
+------------+-----------+-------------+
| student_id | course_id | enrolled_on |
+------------+-----------+-------------+
|          1 |       101 | 2024-09-01  |
|          2 |       101 | 2024-09-03  |
|          1 |       102 | 2024-09-02  |
|          3 |       103 | 2024-09-04  |
+------------+-----------+-------------+
4 rows in set (0.005 sec)

MariaDB [studentApp]> select * from visiting_instructors;
+---------------+-----------------+------------+-------------------------+
| instructor_id | name            | department | email                   |
+---------------+-----------------+------------+-------------------------+
|           201 | Mr. Kamran Aziz | SE         | kamran.aziz@uni.edu.pk  |
|           202 | Ms. Saba Shah   | CS         | saba.shah@uni.edu.pk    |
+---------------+-----------------+------------+-------------------------+
2 rows in set (0.008 sec)

MariaDB [studentApp]> select * from permanent_instructors;
+---------------+-----------------+------------+-------------------------+
| instructor_id | name            | department | email                   |
+---------------+-----------------+------------+-------------------------+
|           101 | Dr. Imran Malik | CS         | imran.malik@uni.edu.pk  |
|           102 | Dr. Nadia Akbar | IT         | nadia.akbar@uni.edu.pk  |
+---------------+-----------------+------------+-------------------------+
2 rows in set (0.013 sec)
```

COMPREHENSIVE IMPLEMENTATION DETAILS:

Technology Stack

- **Backend:** Laravel Framework (PHP-based MVC)
- **Frontend:** HTML, Tailwind CSS
- **Database:** MySQL
- **Tools Used:** VS Code, phpMyAdmin, Composer, XAMPP Server

System Architecture

- **MVC (Model-View-Controller) Architecture:**
  The project is designed following the MVC pattern provided by Laravel to ensure separation of concerns, scalability, and clean code management.
- **Routing:**
  Laravel's web.php file was used to manage routes for both admin and student interfaces.

Modules Implemented

Admin Panel:

- Add, update, and delete exams.
- Add, update, and delete students.
- Upload and manage results.
- View result summaries.

Student Panel:

- Student registration and login.
- View personal results.
- Download result PDFs.

Backend Development

- **Laravel & PHP:**
  - Created models for *Student*, *Exam*, *and Result* to interact with the database efficiently.
  - Implemented CRUD (Create, Read, Update, Delete) operations using Laravel Controllers.
  - Applied Laravel's built-in validation for form submissions.
- **Database Design:**
  - Proper relational schema was designed.
  - Tables: students, exams, results, admins.
  - Relationships:
    - One-to-Many: An exam can have multiple results.

- One-to-Many: A student can have multiple results.

Frontend Development

- **Tailwind CSS:**
  - Created a clean, responsive, and modern UI.
  - Tailwind was used for fast, utility-first styling.
  - Custom dashboard design for both admin and students.
- **HTML:**
  - Designed user forms for registration, result entry, and result viewing.

Deployed Task:
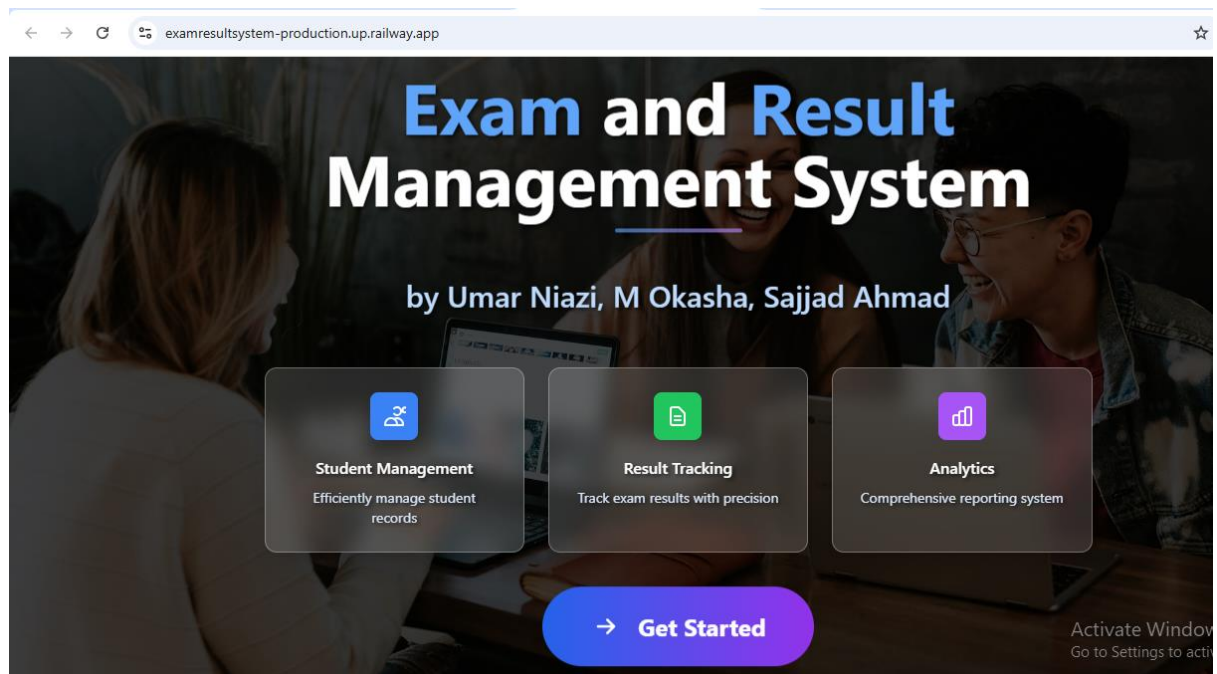
Exam & Result Management

Email

superadmin@gmail.com

Password

••••••••

☐ Remember me

Forgot your password? **LOG IN**

Don't have an account? Register

Admin Dashboard | Students | Instructors | Courses | Exams | Results | Users | Super Admin ⌄

Admin Dashboard

Welcome back, Super Admin!

✓ Admin Access

Total Students	Total Instructors	Total Courses	Total Results
2	0	1	0
View all students →	View all instructors →	View all courses →	View all results →

Quick Actions

+ Add Student   + Add Course

+ Add Exam   + Add Result

Student Statistics

Undergraduate Students   2

Graduate Students   0

View Detailed Statistics

Activate Windows
Go to Settings to activate Wi

```
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL > SHOW TABLES;
+-----------------------+
| Tables_in_studentApp  |
+-----------------------+
| cache                 |
| cache_locks           |
| course_student        |
| courses               |
| exam_student          |
| exams                 |
| failed_jobs           |
| graduate_students     |
| instructors           |
| job_batches           |
| jobs                  |
| migrations            |
| password_reset_tokens |
| permanent_instructors |
| results               |
| sessions              |
| students              |
| undergraduate_students|
| users                 |
| visiting_instructors  |
+-----------------------+
```

```
20 rows in set (0.1500 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL > SELECT * FROM students;
+----+---------------------+------------------+-----------------------------+------------+--------+---------------+--------
------------+--------------------+
| id | registration_number | name             | email                       | department | gender | student_type  | created
_at        | updated_at         |
+----+---------------------+------------------+-----------------------------+------------+--------+---------------+--------
------------+--------------------+
|  1 | 2146                | Muhammad Okasha  | muhammadokasha195@gmail.com | Dcse       | Male   | undergraduate | 2025-07
-03 16:15:55 | 2025-07-03 16:15:55 |
|  2 | 2148                | farmanullah      | farman@gmail.com            | electrical | Male   | undergraduate | 2025-07
-06 14:58:00 | 2025-07-06 14:58:00 |
+----+---------------------+------------------+-----------------------------+------------+--------+---------------+--------
------------+--------------------+
```

```
2 rows in set (0.1671 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL > SELECT * FROM students;
+----+---------------------+------------------+-----------------------------+------------+--------+---------------+--------
------------+--------------------+
| id | registration_number | name             | email                       | department | gender | student_type  | created
_at         | updated_at        |
+----+---------------------+------------------+-----------------------------+------------+--------+---------------+--------
------------+--------------------+
|  1 | 2146                | Muhammad Okasha  | muhammadokasha195@gmail.com | Dcse       | Male   | undergraduate | 2025-07
-03 16:15:55 | 2025-07-03 16:15:55 |
|  2 | 2148                | farmanullah      | farman@gmail.com            | electrical | Male   | undergraduate | 2025-07
-06 14:58:00 | 2025-07-06 14:58:00 |
|  3 | 2149                | Muhammad Umar    | muhammadumar9898@gmail.com  | DCSE       | Male   | undergraduate | 2025-07
-08 09:15:23 | 2025-07-08 09:15:23 |
+----+---------------------+------------------+-----------------------------+------------+--------+---------------+--------
------------+--------------------+
3 rows in set (0.3549 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL >
```

```
1 row in set (0.1550 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL > SELECT * FROM instructors;
+----+----------------+--------------------------+------------+---------------------+---------------------+
| id | name           | email                    | department | created_at          | updated_at          |
+----+----------------+--------------------------+------------+---------------------+---------------------+
|  1 | ali ahmed      | okashaboss934@gmail.com  | DCSE       | 2025-07-08 09:01:04 | 2025-07-08 09:01:04 |
|  2 | ali ahmed khan | muhammadali@example.com  | DCSE       | 2025-07-08 09:18:52 | 2025-07-08 09:18:52 |
+----+----------------+--------------------------+------------+---------------------+---------------------+
2 rows in set (0.2022 sec)
MySQL  exam-result-system-niaziumar98-8034.e.aivencloud.com:17428 ssl | studentApp | SQL >
```

```
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 >
```

```
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)
```

```
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 >
```

```
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 >
```

Key Features

- Secure authentication (Laravel Breeze/Jetstream can also be used if integrated).
- Role-based access: Separate dashboards for admin and students.
- Responsive design for mobile and desktop.

Deployment

- Local deployment using XAMPP server.
- Laravel's php artisan serve used for running the project on localhost.
- Option to deploy on platforms like Render, though free tier may have limitations.

Challenges Faced

- Deployment on free platforms required credit card verification.
- Initial configuration issues with Laravel routing.
- Learning curve with Tailwind CSS utilities.

Deployment Links:

- **Website Link:** https://examresultsystem-production.up.railway.app/
- **MySQL Database:** Run this command
  mysqlsh --sql mysql://avnadmin:AVNS_hzYL_kr-80iU2puhWkC@exam-result-system-niaziumar98-8034.e.aivencloud.com:17428/studentApp?ssl-mode=REQUIRED
- **Admin Panel:** https://examresultsystem-production.up.railway.app/admin/dashboard
- **Admin Credentials:**
  - **Email:** superadmin@gmail.com
  - **Password:** admin123