



## **Project:** Final Project

### **Objective:**

The "Final Project" aims to synthesize and apply a broad range of SQL concepts through a comprehensive database design and query execution process. This project focuses on working with all types of SQL operations (CRUD, joins, subqueries, string and date manipulation, and more) to create a functional database system for a **University Course Management System**.

The students will implement a complete database system with tables related to students, courses, instructors, enrollments, and departments. This project will involve performing complex SQL queries, including all CRUD operations, aggregations, filtering, sorting, subqueries, and advanced SQL functions like window functions and the SQL CASE expression.

### **Project Overview:**

The University Course Management System will have the following tables:

1. **Students:** Stores information about students.
2. **Courses:** Stores details of courses available at the university.
3. **Instructors:** Contains information about the course instructors.
4. **Enrollments:** Manages which students are enrolled in which courses.
5. **Departments:** Contains details of academic departments within the university.

#### **1 Students Table**

##### **Fields:**

- StudentID
- FirstName
- LastName
- Email
- BirthDate
- EnrollmentDate

##### **Sample Data:**

StudentID	FirstName	LastName	Email	BirthDate	EnrollmentDate
1	John	Doe	john.doe@email.com	2000-01-15	2022-08-01
2	Jane	Smith	jane.smith@email.com	1999-05-25	2021-08-01

## 2 Courses Table

### Fields:

- CourseID
- CourseName
- DepartmentID
- Credits

### Sample Data:

Course ID	Course Name	DepartmentID	Credits
101	Introduction to SQL	1	3
102	Data Structures	2	4

## 3 Instructors Table

### Fields:

- InstructorID
- FirstName
- LastName
- Email
- DepartmentID

### Sample Data:

InstructorID	FirstName	LastName	Email	DepartmentID
1	Alice	Johnson	alice.johnson@univ.com	1
2	Bob	Lee	bob.lee@univ.com	2

## 4 Enrollments Table

### Fields:

- EnrollmentID
- StudentID
- CourseID
- EnrollmentDate

**Sample Data:**

EnrollmentID	StudentID	Course ID	EnrollmentDate
1	1	101	2022-08-01
2	2	102	2021-08-01

## 5 Departments Table

**Fields:**

- DepartmentID
- DepartmentName

**Sample Data:**

DepartmentID	DepartmentName
1	Computer Science
2	Mathematics

**Queries to Perform:**

1. Perform CRUD Operations on all tables.
2. Retrieve students who enrolled after 2022.
3. Retrieve courses offered by the Mathematics department with a limit of 5 courses.
4. Get the number of students enrolled in each course, filtering for courses with more than 5 students.
5. Find students who are enrolled in both Introduction to SQL and Data Structures.
6. Find students who are either enrolled in Introduction to SQL or Data Structures.
7. Calculate the average number of credits for all courses.
8. Find the maximum salary of instructors in the Computer Science department.
9. Count the number of students enrolled in each department.
10. INNER JOIN: Retrieve students and their corresponding courses.
11. LEFT JOIN: Retrieve all students and their corresponding courses, if any.
12. Subquery: Find students enrolled in courses that have more than 10 students.

13. Extract the year from the EnrollmentDate of students.
14. Concatenate the instructor's first and last name.
15. Calculate the running total of students enrolled in courses.
16. Label students as 'Senior' or 'Junior' based on their year of enrollment. (If the enrollment date is more than 4 years from the currendate, put the label 'Senior' otherwise 'Junior' )

### **Instructions:**

**Task Completion:** Ensure that you attempt all the assigned tasks given to you as part of the exam. Complete each task to the best of your ability, following the instructions provided.

**Assumptions:** Make suitable assumptions wherever necessary, based on the requirements and instructions provided. Document any assumptions made in your project documentation or README.md file.

**GitHub Repository:** Create a GitHub repository to host your project. Upload your project files, including source code, and documentation to the repository. Ensure that you provide a clear and descriptive README.md file.

**No Copying:** Do not copy code or any other content from your classmates or any other source. Plagiarism is strictly prohibited and can result in severe consequences, including academic penalties. Ensure that all the code and content in your project are original and properly attributed to the appropriate sources, if applicable.

**Submission:** Once you have completed your project and uploaded it to your GitHub repository, submit the GitHub repository link to your instructor or as instructed. Double-check that your repository is properly organized and includes all the required files as per the instructions provided.

Remember to follow the instructions provided professionally, make suitable assumptions wherever necessary, and avoid copying code or content from unauthorized sources. Good luck with your project work!

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**Final Project**  
**SQL**

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**BRING ON YOUR CODING ATTITUDE**