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Internship Task - RDBMS and SQL Task #1

SQL case-based assignment using a **University Database** schema. This assignment will involve queries related to students, courses, departments, professors, and enrollments. I'll walk through the case, describe the database schema, and then provide 10 SQL queries related to university data analysis.

Database Schema

`Students` Table:

Column Name	Data Type	Description
student_id	INT	Primary key
first_name	VARCHAR(100)	Student's first name
last_name	VARCHAR(100)	Student's last name
email	VARCHAR(100)	Student's email address
phone	VARCHAR(20)	Student's phone number
date_of_birth	DATE	Student's date of birth
enrollment_date	DATE	Date the student enrolled
department_id	INT	Foreign key (references `Departments`)

`Courses` Table:

Column Name	Data Type	Description
course_id	INT	Primary key
course_name	VARCHAR(100)	Course name
department_id	INT	Foreign key (references `Departments`)
professor_id	INT	Foreign key (references `Professors`)
credits	INT	Number of credits for the course

`Departments` Table:

Column Name	Data Type	Description
department_id	INT	Primary key
department_name	VARCHAR(100)	Department name

`Professors` Table:

Column Name	Data Type	Description
professor_id	INT	Primary key
first_name	VARCHAR(100)	Professor's first name
last_name	VARCHAR(100)	Professor's last name
email	VARCHAR(100)	Professor's email address
phone	VARCHAR(20)	Professor's phone number

`Enrollments` Table:

Column Name	Data Type	Description
enrollment_id	INT	Primary key
student_id	INT	Foreign key (references `Students`)

Column Name	Data Type	Description
course_id	INT	Foreign key (references `Courses`)
enrollment_date	DATE	Date the student enrolled in the course
grade	VARCHAR(5)	Grade received in the course

Case Study: University Data Analysis

Background:

You are a database analyst for a university. The university wants to generate several reports based on student enrollment, courses, professors, departments, and performance analysis.

SQL Queries for the Case Study

1. Find the Total Number of Students in Each Department

2. List All Courses Taught by a Specific Professor

3. Find the Average Grade of Students in Each Course

4. List All Students Who Have Not Enrolled in Any Courses

5. Find the Number of Courses Offered by Each Department

6. List All Students Who Have Taken a Specific Course (e.g., 'Database Systems')

7. Find the Most Popular Course Based on Enrollment Numbers

8. Find the Average Number of Credits Per Student in a Department

9. List All Professors Who Teach in More Than One Department

10. Get the Highest and Lowest Grade in a Specific Course (e.g., 'Operating Systems')

Task Summary:

This SQL case study simulates the analysis of university-related data, with queries that focus on **students**, **courses**, **professors**, **departments**, and **enrollments**. The queries are designed to answer various questions such as finding the total number of students in a department, identifying the most popular courses, calculating average grades, and analyzing professor workloads across departments.

Each query uses SQL concepts such as `JOIN`, `GROUP BY`, `COUNT()`, `AVG()`, `MAX()`, `MIN()`, and filtering with `WHERE`. The data analysis could be useful for academic planning, performance tracking, and resource allocation within the university.