# **Student Course Management Database**

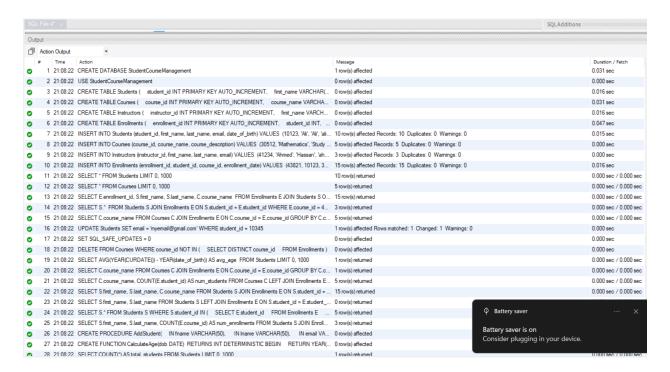
The Student Course Management project involves the creation of a database to manage student enrollments in various courses. The database is designed with four primary tables: Students, Courses, Instructors, and Enrollments. The project also includes inserting sample data, running queries to retrieve information, and implementing stored procedures and functions.

#### **Database Creation**

```
SQL statement:
CREATE DATABASE StudentCourseManagement;
USE StudentCourseManagement;
Students Table
CREATE TABLE Students (
    student id INT PRIMARY KEY AUTO_INCREMENT,
    first name VARCHAR(50),
    last name VARCHAR(50),
    email VARCHAR(100),
    date of birth DATE
);
Courses Table
CREATE TABLE Courses (
    course id INT PRIMARY KEY AUTO INCREMENT,
    course name VARCHAR(100),
    course description TEXT
);
Instructors Table
CREATE TABLE Instructors (
    instructor id INT PRIMARY KEY AUTO INCREMENT,
    first name VARCHAR(50),
    last name VARCHAR(50),
    email VARCHAR(100)
);
Enrollments Table
CREATE TABLE Enrollments (
    enrollment id INT PRIMARY KEY AUTO INCREMENT,
    student id INT,
    course id INT,
    enrollment date DATE,
    FOREIGN KEY (student_id) REFERENCES Students(student_id),
    FOREIGN KEY (course id) REFERENCES Courses (course id));
```

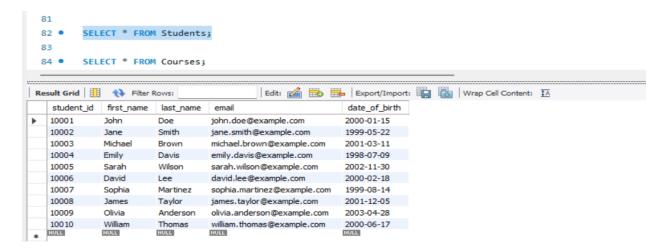
#### 3. Data Insertion

-- Inserting data into Students table INSERT INTO Students (student id, first name, last name, email, date of birth) VALUES (10123, 'Ali', 'Ali', 'ali.ali@gmail.com', '2000-01-15'), (10234, 'Fatima', 'Ahmad', 'fatima.ahmad@gmail.com', '1999-05-22'), (10345, 'Mariam', 'Barakat', 'mariam.barakat@gmail.com', '2001-03-11'), (10456, 'Sara', 'Hosseini', 'sara.hosseini@gmail.com', '1998-07-09'), (10567, 'Youssef', 'Omari', 'youssef.omari@gmail.com', '2002-11-30'), (10678, 'Saeed', 'Nasser', 'saeed.alnasser@gmail.com', '2000-02-18'), (10789, 'Jamila', 'Zaid', 'jamila.alzaid@gmail.com', '1999-08-14'), (10890, 'Ibrahim', 'Fatih', 'ibrahim.alfatih@gmail.com', '2001-12-05'), (10901, 'Hala', 'Sadiq', 'hala.alsadiq@gmail.com', '2003-04-28'), (11012, 'Rashid', 'Madani', 'rashid.almadani@gmail.com', '2000-06-17'); -- Inserting data into Courses table INSERT INTO Courses (course id, course name, course description) VALUES (30512, 'Mathematics', 'Study of numbers and shapes.'), (40987, 'Physics', 'Study of matter and energy.'), (21874, 'Chemistry', 'Study of substances and their interactions.'), (52301, 'Biology', 'Study of living organisms.'), (63429, 'Computer Science', 'Study of computers and computational systems.'); -- Inserting data into Instructors table INSERT INTO Instructors (instructor id, first name, last name, email) (41234, 'Ahmed', 'Hassan', 'ahmed.alhassan@gmail.com'), (52345, 'Laila', 'Mansoor', 'fatima.almansoor@gmail.com'), (63456, 'Omar', 'Sayed', 'omar.alsayed@gmail.com'); -- Inserting data into Enrollments table INSERT INTO Enrollments (enrollment id, student id, course id, enrollment date) VALUES (43821, 10123, 30512, '2024-01-10'), (59234, 10234, 40987, '2024-01-15'), (48375, 10345, 21874, '2024-01-20'), (15792, 10456, 52301, '2024-02-01'), (67289, 10567, 63429, '2024-02-05'), (32817, 10678, 30512, '2024-02-10'), (84920, 10789, 40987, '2024-02-15'), (71524, 10890, 21874, '2024-03-01'), (29573, 10901, 52301, '2024-03-05'), (64831, 11012, 63429, '2024-03-10'), (43928, 10123, 40987, '2024-04-01'), (58273, 10234, 21874, '2024-04-05'), (72839, 10345, 52301, '2024-04-10'), (16492, 10456, 63429, '2024-05-01'), (73948, 10567, 30512, '2024-05-05');



# 4. Querying the Database

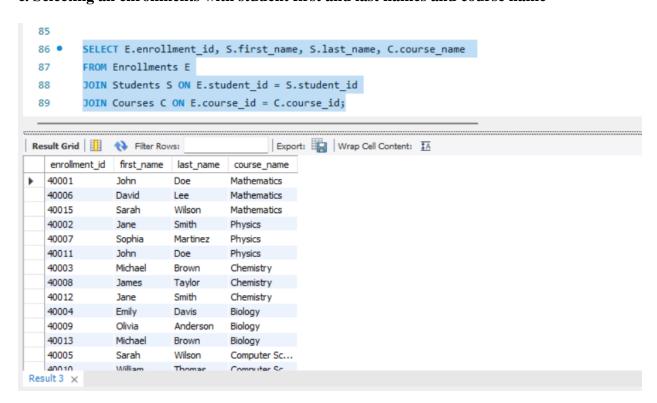
### a. Selecting All Students



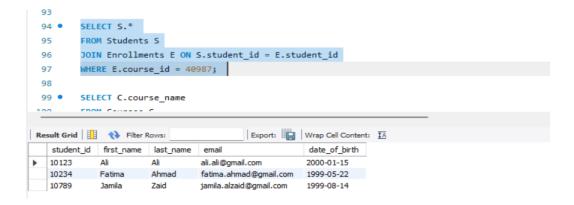
#### **b.** Selecting All Courses

```
83
 84 •
         SELECT * FROM Courses;
 85
         SELECT E.enrollment_id, S.first_name, S.last_name, C.course_name
 86 •
         FROM Enrollments E
 87
Edit: 🚄 📆 Export/Import: 🖫 🐻 Wrap Cell Content: 🖽
   course_id course_name
                              course description
  20001
            Mathematics
                             Study of numbers and shapes.
   20002
            Physics
                             Study of matter and energy.
   20003
             Chemistry
                             Study of substances and their interactions.
   20004
            Biology
                             Study of living organisms.
   20005
             Computer Science
                             Study of computers and computational systems.
  NULL
```

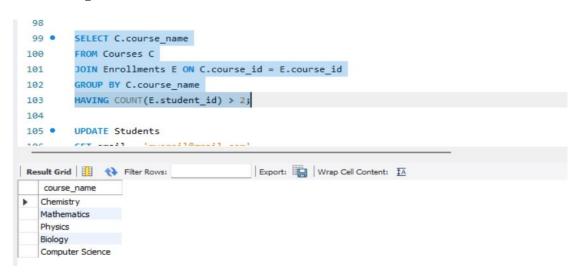
c. Selecting all enrollments with student first and last names and course name



d. Finding Students Enrolled in a Specific Course



#### e. Counting Courses with More Than Two Enrollments



# f. Updating Student Email

```
UPDATE Students

SET email = 'myemail@gmail.com'

WHERE student_id = 10345;

SET SQL SAFE UPDATES = 0;
```

### g. Deleting Courses with No Enrollments

```
DELETE FROM Courses
WHERE course_id NOT IN (
    SELECT DISTINCT course_id
    FROM Enrollments);
```

## h. Calculating Average Age of Students



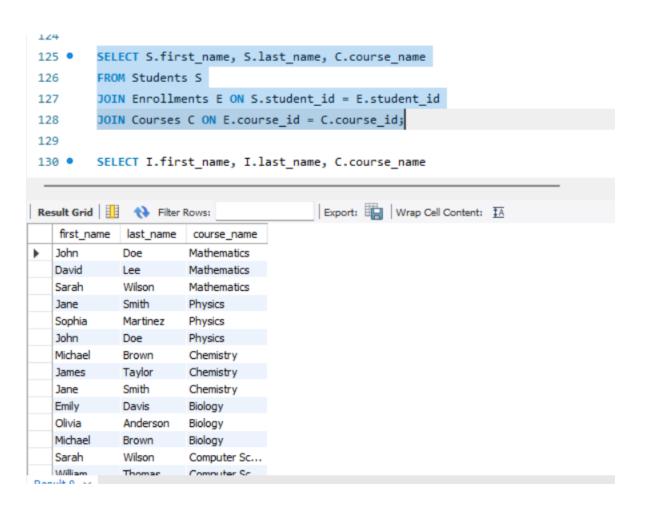
# i. Finding the Course with the Most Enrollments



j. List courses along with the number of students enrolled

```
119
         SELECT C.course name, COUNT(E.student id) AS num students
120 •
121
         FROM Courses C
         LEFT JOIN Enrollments E ON C.course_id = E.course_id
122
         GROUP BY C.course_name;
123
124
Result Grid
                                            Export: Wrap Cell Content: IA
              Filter Rows:
   course_name
                   num_students
  Mathematics
                   3
  Physics
                   3
  Chemistry
                   3
  Biology
                  3
  Computer Science
```

#### Select all students with their enrolled course



k. Find Students who are not enrolled in any course

```
131 • SELECT S.first_name, S.last_name

132 FROM Students S

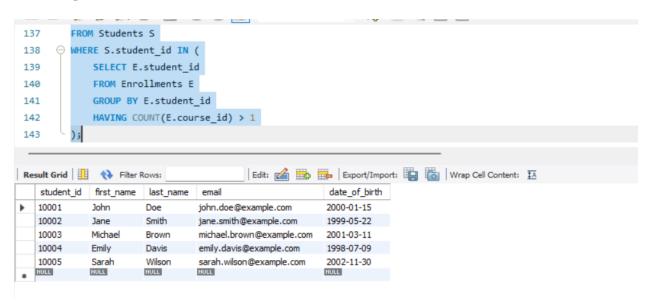
133 LEFT JOIN Enrollments E ON S.student_id = E.student_id

134 WHERE E.enrollment_id IS NULL;

Result Grid Filter Rows: Export: Wrap Cell Content: A

first_name last_name
```

## 1. Finding Students Enrolled in More Than One Course



#### m. Finding Top 3 Students with the Most Enrollments

```
146 •
        SELECT S.first_name, S.last_name, COUNT(E.course_id) AS num_enrollments
147
        FROM Students S
        JOIN Enrollments E ON S.student_id = E.student_id
148
        GROUP BY S.student_id
149
        ORDER BY num_enrollments DESC
150
        LIMIT 3;
151
                                       Export: Wrap Cell Content: A Fetch rows:
first_name
            last_name num_enrollments
 John
            Smith
                     2
  Jane
  Michael
            Brown
```

#### **5. Stored Procedures and Functions**

#### a. Add a Student

```
DELIMITER $$
CREATE PROCEDURE AddStudent (
    IN fname VARCHAR(50),
    IN lname VARCHAR(50),
    IN email VARCHAR(100),
    IN dob DATE
)
BEGIN
    INSERT INTO Students (first name, last name, email, date of birth)
    VALUES (fname, lname, email, dob);
END $$
DELIMITER ;
b.Calculate Age
DELIMITER $$
CREATE FUNCTION CalculateAge (dob DATE)
RETURNS INT
```

# DETERMINISTIC BEGIN RETURN YEAR(CURDATE()) - YEAR(dob); END \$\$ DELIMITER;

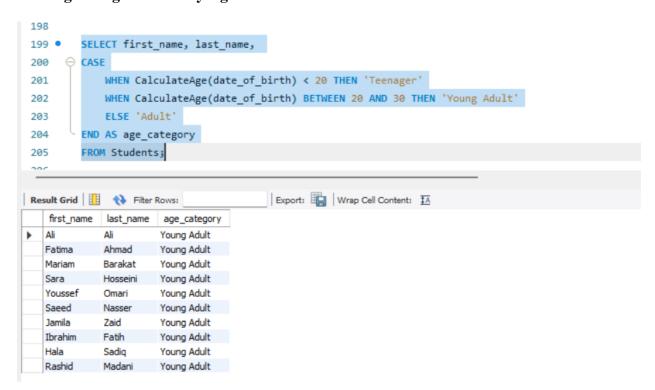
# 6. Additional Queries

# a. Counting Total Students

### b. Calculating Enrollment Statistics

```
1/3
174 •
         SELECT AVG(num_students), MIN(num_students), MAX(num_students)
175
             SELECT COUNT(E.student id) AS num students
176
             FROM Enrollments E
177
             GROUP BY E.course id
178
179
         ) AS EnrollmentStats;
                                           Export: Wrap Cell Content: IA
Result Grid Filter Rows:
   AVG(num students)
                    MIN(num students)
                                     MAX(num students)
  3.0000
                    3
                                     3
```

## c. Categorizing Students by Age



### d. Checking for Course Enrollments

```
187
        SELECT course_name
 188 •
        FROM Courses C
 189

→ WHERE EXISTS (
 190
 191
            SELECT 1
            FROM Enrollments E
 192
            WHERE E.course_id = C.course_id
 193
 194
Export: Wrap Cell Content: IA
   course_name
Mathematics
   Physics
   Chemistry
   Biology
   Computer Science
```