

```

CREATE TABLE Students (
  id INT PRIMARY KEY,
  name VARCHAR(255),
  email VARCHAR(255),
  enrollment_year INT,
  major VARCHAR(255)
);
CREATE TABLE Courses (
  id INT PRIMARY KEY,
  name VARCHAR(255),
  department_id INT,
  credits INT,
  FOREIGN KEY (department_id) REFERENCES Departments(id)
);
CREATE TABLE Instructors (
  id INT PRIMARY KEY,
  name VARCHAR(255),
  email VARCHAR(255),
  department_id INT,
  FOREIGN KEY (department_id) REFERENCES Departments(id)
);
CREATE TABLE Enrollments (
  id INT PRIMARY KEY,
  student_id INT,
  course_id INT,
  grade CHAR(1),
  FOREIGN KEY (student_id) REFERENCES Students(id),
  FOREIGN KEY (course_id) REFERENCES Courses(id)
);
CREATE TABLE Departments (
  id INT PRIMARY KEY,
  name VARCHAR(255)
);
-- Insert data
INSERT INTO Departments (id, name) VALUES
(1, 'Computer Science'),
(2, 'Mathematics'),
(3, 'Physics');
--Insert data
INSERT INTO Students (id, name, email, enrollment_year, major) VALUES
(1, 'Alice Johnson', 'alice.johnson@example.com', 2020, 'Computer Science'),
(2, 'Bob Smith', 'bob.smith@example.com', 2021, 'Mathematics'),
(5, 'Eve Wilson', 'eve.wilson@example.com', 2022, 'Mathematics');
--Insert data
INSERT INTO Courses (id, name, department_id, credits) VALUES
(1, 'Algorithms', 1, 4),
(2, 'Data Structures', 1, 3),
(3, 'Calculus', 2, 3),
(4, 'Linear Algebra', 2, 3),

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(5, 'Quantum Mechanics', 3, 4);
--Insert data
INSERT INTO Instructors (id, name, email, department_id) VALUES
(1, 'Dr. Smith', 'dr.smith@cs.edu', 1),
(3, 'Dr. Johnson', 'dr.johnson@physics.edu', 3);
--Insert data
INSERT INTO Enrollments (id, student_id, course_id, grade) VALUES
(1, 1, 1, 'A'),
(2, 1, 2, 'B'),
(3, 2, 3, 'A'),
(4, 2, 4, 'B'),
(5, 5, 3, 'A'),
(6, 5, 4, 'A');

```

-- Query 1: List all students enrolled in courses taught by instructors from the "Computer Science" department.

```

SELECT s.name AS student_name, c.name AS course_name, i.name AS instructor_name
FROM Students s
JOIN Enrollments e ON s.id = e.student_id
JOIN Courses c ON e.course_id = c.id
JOIN Instructors i ON c.department_id = i.department_id
JOIN Departments d ON i.department_id = d.id
WHERE d.name = 'Computer Science';

```

-- Query 2: Find the average grade for each course, grouped by course name.

```

SELECT c.name AS course_name,
       AVG(CASE
            WHEN e.grade = 'A' THEN 4
            WHEN e.grade = 'B' THEN 3
            WHEN e.grade = 'C' THEN 2
            WHEN e.grade = 'D' THEN 1
            WHEN e.grade = 'F' THEN 0
            END) AS avg_grade
FROM Courses c
JOIN Enrollments e ON c.id = e.course_id
GROUP BY c.name;

```

-- Query 3: Find the names of students who have taken more than one course in the Mathematics department.

```

SELECT s.name AS student_name
FROM Students s
JOIN Enrollments e ON s.id = e.student_id
JOIN Courses c ON e.course_id = c.id
JOIN Departments d ON c.department_id = d.id
WHERE d.name = 'Mathematics'
GROUP BY s.name
HAVING COUNT(e.course_id) > 1;

```

-- Query 4: List all departments along with the total number of students enrolled in their courses.

```
SELECT d.name AS department_name,  
       COUNT(DISTINCT e.student_id) AS total_students  
FROM Departments d  
JOIN Courses c ON d.id = c.department_id  
JOIN Enrollments e ON c.id = e.course_id  
GROUP BY d.name;
```

-- Query 5: Find the names of instructors who teach courses with no student enrollments.

```
SELECT i.name AS instructor_name  
FROM Instructors i  
JOIN Courses c ON i.department_id = c.department_id  
LEFT JOIN Enrollments e ON c.id = e.course_id  
WHERE e.id IS NULL;
```

Output:

```
1|Alice Johnson|me.hasnine@gmail.com|Computer Science|2022  
2|Bob Smith|sk4022062@gmail.com|Mathematics|2023  
1|Algorithms|1|4  
2|Data Structures|1|3  
1|Dr. Smith|drsmith@gmail.com|1  
1|1|1|A  
2|1|2|B  
1|Computer Science  
Alice Johnson|Algorithms|Dr. Smith  
Alice Johnson|Data Structures|Dr. Smith  
  
[Execution complete with exit code 0]
```

```
2|Mathematics  
3|Calculus|2|3  
4|Linear Algebra|2|3  
2|Bob Smith|Mathematics  
5|Eve Wilson|Mathematics  
3|2|3|A  
4|2|4|B  
5|5|3|A  
6|5|4|A  
Bob Smith  
Eve Wilson  
  
[Execution complete with exit code 0]
```

```
3|Physics  
5|Quantum Mechanics|3|4|3  
3|Dr. Johnson|3  
1|1|1|A  
2|1|2|B  
3|2|3|A  
4|5|3|A  
Dr. Johnson  
  
[Execution complete with exit code 0]
```

```
3|Calculus|2|3  
4|Linear Algebra|2|3  
3|2|3|A  
4|2|4|B  
5|5|3|A  
6|5|4|A  
Calculus|4.0  
Linear Algebra|3.5  
  
[Execution complete with exit code 0]
```

```
1|Computer Science  
2|Mathematics  
1|Algorithms|1  
3|Calculus|2  
1|1|1|A  
2|1|2|B  
3|2|3|A  
5|5|3|A  
Computer Science|1  
Mathematics|2  
  
[Execution complete with exit code 0]
```