Database Management System

(Assignment No 01)

Session (2022-2026)

Program/Class

BS-Computer Science / 5rd Section-A

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Type Of Database To Create

You are managing a **student management system** database that contains the following tables:

1. Students

student_id	first_name	last_name	enrollment_year	major	gpa
1	John	Doe	2022	CS	3.5
2	Jane	Smith	2021	IT	3.7
3	Alice	Johnson	2023	CS	3.2
4	Bob	Lee	2021	IT	2.8
5	Charlie	Brown	2022	CS	3.9

2. Courses

course_id	course_name	credit_hours
101	Database Systems	3
102	Computer Networks	4
103	Software Engineering	3
104	Cybersecurity Basics	2

3. Enrollments

enrollment_id	student_id	course_id	semester	grade
1	1	101	Spring	A
2	2	102	Fall	B
3	3	101	Fall	C
4	4	104	Spring	B
5	1	103	Fall	A

Creating Database StudentManagement

```
CREATE DATABASE StudentManagement;
USE StudentManagement;

CREATE TABLE Students (
    student_id INT PRIMARY KEY,
    first_name VARCHAR(50),
    last_name VARCHAR(50),
    enrollment_year INT,
    major VARCHAR(50),
    gpa DECIMAL(3, 2)
);

INSERT INTO Students (student_id, first_name, last_name, enrollment_year, major, gpa)
VALUES
(1, 'John', 'Doe', 2022, 'CS', 3.5),
(2, 'Jane', 'Smith', 2021, 'IT', 3.7),
(3, 'Alice', 'Johnson', 2023, 'CS', 3.2),
(4, 'Bob', 'Lee', 2021, 'IT', 2.8),
(5, 'Charlie', 'Brown', 2022, 'CS', 3.9);

CREATE TABLE Courses (
    course_id INT PRIMARY KEY,
    course_name VARCHAR(100),
    credit_hours INT
);

INSERT INTO Courses (course_id, course_name, credit_hours) VALUES
(101, 'Database Systems', 3),
(102, 'Computer Networks', 4),
(103, 'Software Engineering', 3),
(104, 'Cybersecurity Basics', 2);

CREATE TABLE Enrollments (
    enrollment_id INT PRIMARY KEY,
    student_id INT,
    course_id INT,
    semester VARCHAR(20),
    grade CHAR(1),
    FOREIGN KEY (student_id) REFERENCES Students(student_id),
    FOREIGN KEY (course_id) REFERENCES Courses(course_id)
);

INSERT INTO Enrollments (enrollment_id, student_id, course_id, semester, grade) VALUES
(1, 1, 101, 'Spring', 'A'),
(2, 2, 102, 'Fall', 'B'),
(3, 3, 101, 'Fall', 'C'),
(4, 4, 104, 'Spring', 'B'),
(5, 1, 103, 'Fall', 'A');
```

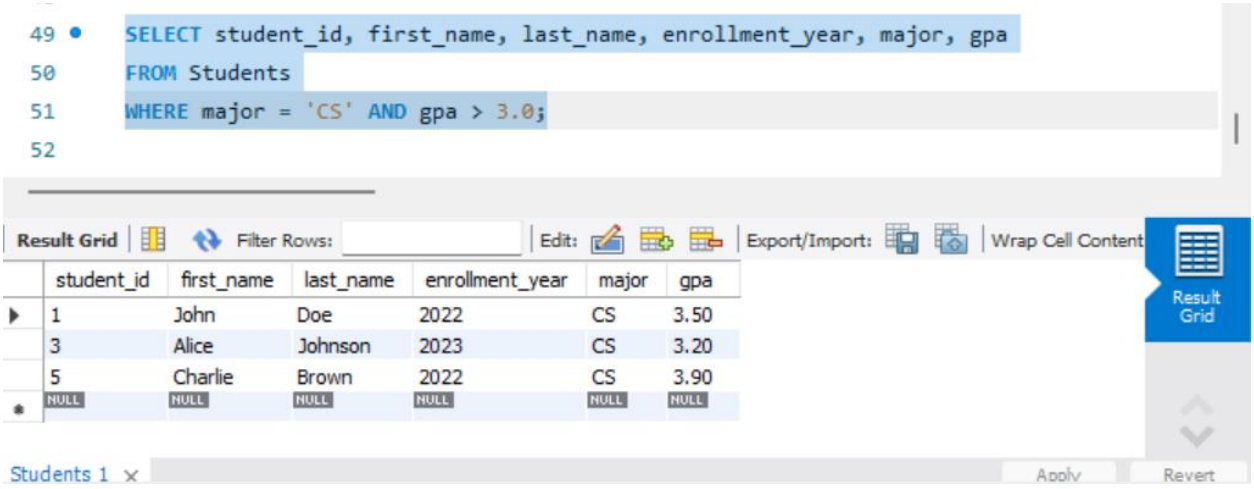
Write SQL queries to answer the following questions:

1. **Retrieve all students** who are enrolled in a **CS major** and have a **GPA greater than 3.0**.

Query:

```
SELECT student_id, first_name, last_name, enrollment_year, major, gpa
FROM Students
WHERE major = 'CS' AND gpa > 3.0;
```

Screenshot:

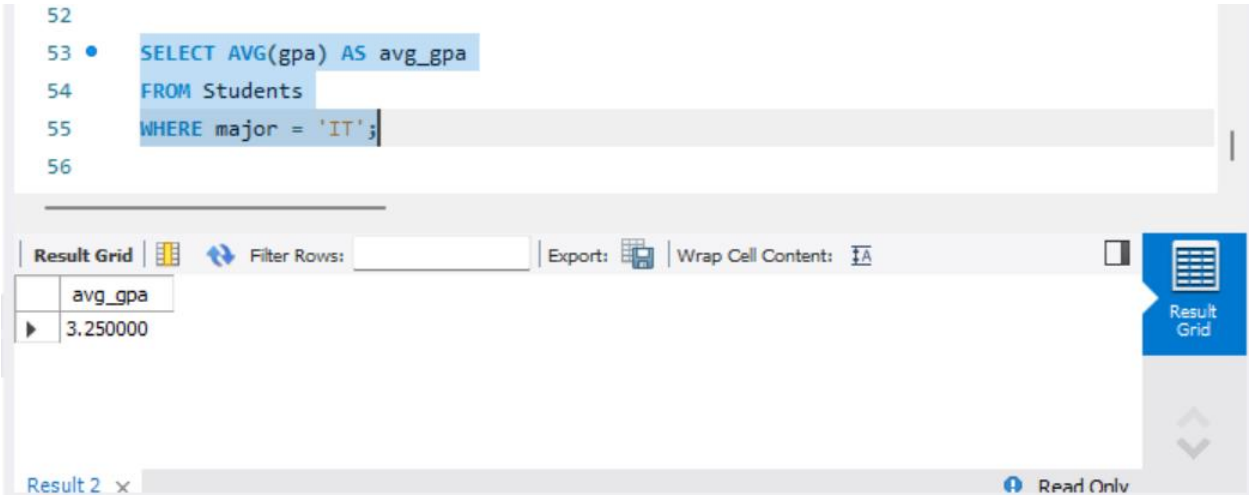


2. Find the **average GPA** of students enrolled in the **IT major**.

Query:

```
SELECT AVG(gpa) AS avg_gpa
FROM Students
WHERE major = 'IT';
```

Screenshot:



3. List all courses along with the **number of students enrolled** in each course.

Query:

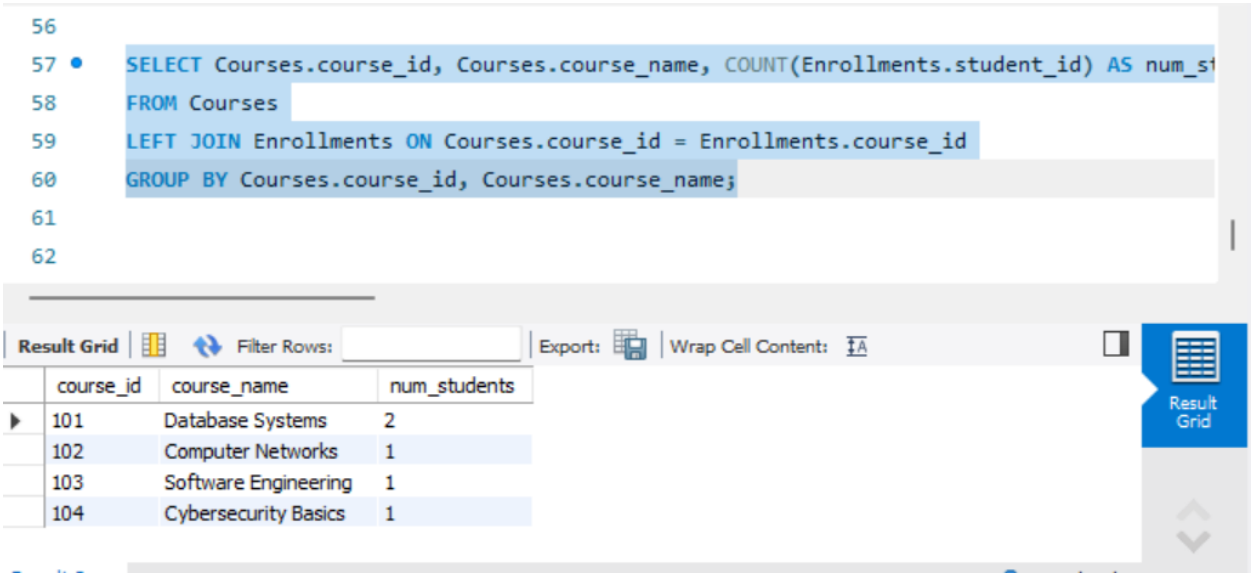
```
SELECT Courses.course_id, Courses.course_name, COUNT(Enrollments.student_id) AS num_students

FROM Courses

LEFT JOIN Enrollments ON Courses.course_id = Enrollments.course_id

GROUP BY Courses.course_id, Courses.course_name;
```

Screenshot:

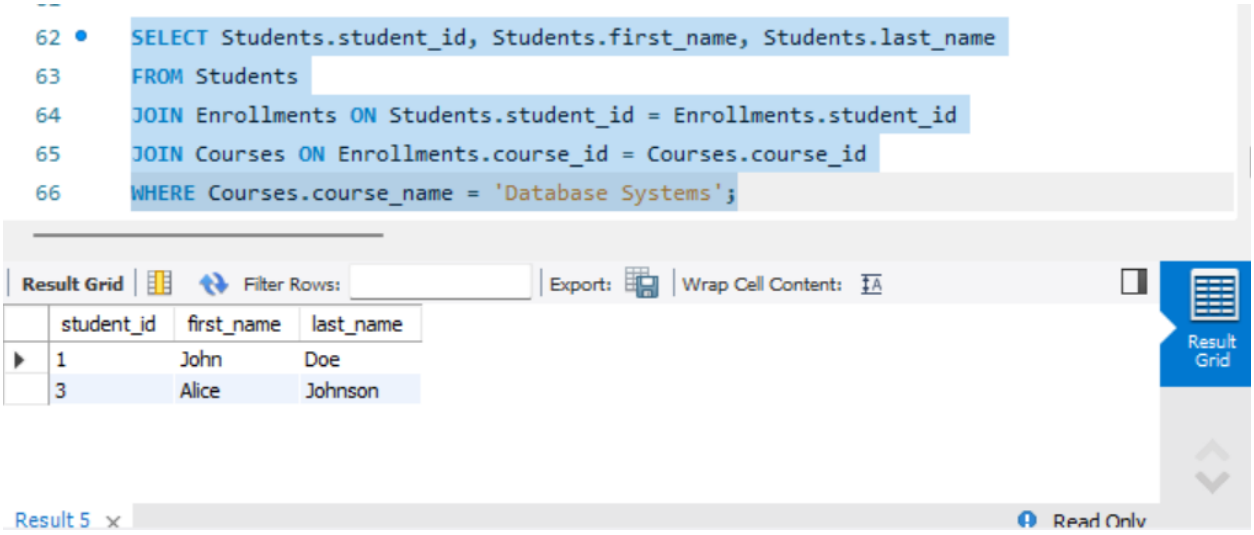


4. Identify students who are taking the **Database Systems course** in any semester.

Query:

```
SELECT Students.student_id, Students.first_name, Students.last_name
FROM Students
JOIN Enrollments ON Students.student_id = Enrollments.student_id
JOIN Courses ON Enrollments.course_id = Courses.course_id
WHERE Courses.course_name = 'Database Systems';
```

Screenshot:



5. Display students who received a **grade of A in at least two courses**.

Query:

```
SELECT Students.student_id, Students.first_name, Students.last_name
FROM Students
JOIN Enrollments ON Students.student_id = Enrollments.student_id
WHERE Enrollments.grade = 'A'
GROUP BY Students.student_id, Students.first_name, Students.last_name
HAVING COUNT(Enrollments.course_id) >= 2;
```

Screenshot: