

Assignment No.7

Name :- Shailesh Pawar

PRN :- 123B1B230

Solve following SQL Queries:

1. Find students who have a CGPA higher than the university average CGPA

Code :-

```
select StudentID,Name,CGPA from Students_230
where CGPA > (select avg(CGPA) from Students_230);
```

Output :-

| StudentID | Name | CGPA |
|-----------|-------|------|
| 1 | Alice | 9.20 |
| 2 | Bob | 8.50 |
| 5 | Eve | 9.10 |
| 7 | Grace | 8.70 |
| 9 | Ivy | 9.00 |

2. Find students who have never enrolled in any course

Code :-

```
select DISTINCT s.StudentID,s.Name from Students_230 as s
left outer Join Enrollments_230 as e
on s.StudentID = e.StudentID;
```

Output :-

| StudentID | Name |
|-----------|---------|
| 1 | Alice |
| 2 | Bob |
| 3 | Charlie |
| 4 | David |
| 5 | Eve |
| 6 | Frank |
| 7 | Grace |
| 8 | Hank |
| 9 | Ivy |
| 10 | Jack |

3. Get courses that have no students enrolled

Code :-

```
select CourseID,CourseName from Courses_230
where CourseID not in (select distinct CourseID from Enrollments_230);
```

Output :-

```
OK, 0 records retrieved in 0.746ms
```

4. Get students enrolled in courses offered by the 'Computer Sci' department

Code :-

```
select distinct s.StudentID,s.Name,s.DepartmentID from Students_230 as s
Join Enrollments_230 as e
on s.StudentID = e.StudentID
Join Departments_230 as d
on s.DepartmentID = d.DepartmentID
where d.DeptName = 'Computer Sci';
```

Output :-

| StudentID | Name | DepartmentID |
|-----------|-------|--------------|
| 1 | Alice | 1 |

5. Find students who have the same age as the oldest student

Code :-

```
select Name,age from Students_230
where age = (select max(age) from Students_230);
```

Output :-

| Name | age |
|------|-----|
| Jack | 24 |

6. Retrieve courses where at least one student scored more than 85 marks

Code :-

```
SELECT DISTINCT c.*
FROM courses_230 c
JOIN enrollments_230 e ON c.CourseID = e.CourseID
WHERE e.Marks > 85;
```

Output :-

| CourseID | CourseName | DepartmentID |
|----------|------------------|--------------|
| CSE101 | Data Structures | 1 |
| ECE201 | Digital Circuits | 2 |
| BI0501 | Genetics | 5 |
| BUS901 | Marketing | 9 |
| MATH701 | Linear Algebra | 7 |

7. Find the highest CGPA in each department

Code :-

```
SELECT d.DepartmentID, d.DeptName, MAX(s.CGPA) AS Highest_CGPA
FROM students_230 s
JOIN departments_230 d ON s.DepartmentID = d.DepartmentID
GROUP BY d.DepartmentID, d.DeptName;
```

Output :-

| DepartmentID | DeptName | Highest_CGPA |
|--------------|----------------|--------------|
| 1 | Computer Sci | 9.20 |
| 2 | Electrical Eng | 8.50 |
| 3 | Mechanical Eng | 7.80 |
| 4 | Civil Eng | 6.90 |
| 5 | Biotechnology | 9.10 |
| 6 | Physics | 5.60 |
| 7 | Mathematics | 8.70 |
| 8 | Chemistry | 7.50 |
| 9 | Business | 9.00 |
| 10 | Psychology | 6.80 |

8. Get students who have enrolled in more than one course

Code :-

```
SELECT s.*FROM students_230 s
JOIN enrollments_230 e ON s.StudentID = e.StudentID
GROUP BY s.StudentID
HAVING COUNT(DISTINCT e.CourseID) > 1;
```

Output :-

| StudentID | Name | Age | DepartmentID | CGPA |
|-----------|---------|-----|--------------|------|
| 1 | Alice | 20 | 1 | 9.20 |
| 2 | Bob | 22 | 2 | 8.50 |
| 3 | Charlie | 21 | 3 | 7.80 |
| 4 | David | 23 | 4 | 6.90 |
| 5 | Eve | 19 | 5 | 9.10 |
| 6 | Frank | 20 | 6 | 5.60 |
| 7 | Grace | 22 | 7 | 8.70 |
| 8 | Hank | 21 | 8 | 7.50 |
| 9 | Ivy | 23 | 9 | 9.00 |
| 10 | Jack | 24 | 10 | 6.80 |

9. Get the department with the most students enrolled

Code :-

```
SELECT d.*
FROM departments_230 d
JOIN students_230 s ON d.DepartmentID = s.DepartmentID
GROUP BY d.DepartmentID
ORDER BY COUNT(s.StudentID) DESC
```

LIMIT 1;

Output :-

| DepartmentID | DeptName | HOD |
|--------------|--------------|-----------|
| 1 | Computer Sci | Dr. Smith |

10. Find students who are not enrolled in any course

Code :-

```
SELECT *  
FROM students_230 s  
WHERE NOT EXISTS (  
    SELECT 1 FROM enrollments_230 e  
    WHERE s.StudentID = e.StudentID  
);
```

Output :-

```
OK, 0 records retrieved in 0.779ms
```

11. Retrieve students who scored below the average marks in their courses

Code :-

```
SELECT s.*  
FROM students_230 s  
JOIN enrollments_230 e ON s.StudentID = e.StudentID  
WHERE e.Marks < (  
    SELECT AVG(Marks) FROM enrollments_230 e2  
    WHERE e.CourseID = e2.CourseID  
);
```

Output :-

| StudentID | Name | Age | DepartmentID | CGPA |
|-----------|-------|-----|--------------|------|
| 2 | Bob | 22 | 2 | 8.50 |
| 5 | Eve | 19 | 5 | 9.10 |
| 5 | Eve | 19 | 5 | 9.10 |
| 6 | Frank | 20 | 6 | 5.60 |
| 6 | Frank | 20 | 6 | 5.60 |
| 7 | Grace | 22 | 7 | 8.70 |
| 7 | Grace | 22 | 7 | 8.70 |
| 8 | Hank | 21 | 8 | 7.50 |
| 9 | Ivy | 23 | 9 | 9.00 |
| 10 | Jack | 24 | 10 | 6.80 |

12. Find the department where the highest CGPA student belongs

Code :-

```
SELECT d.*
FROM departments_230 d
JOIN students_230 s ON d.DepartmentID = s.DepartmentID
WHERE s.CGPA = (SELECT MAX(CGPA) FROM students_230);
```

Output :-

| DepartmentID | DeptName | HOD |
|--------------|--------------|-----------|
| 1 | Computer Sci | Dr. Smith |

13. Find the department with the highest number of students enrolled

Code :-

```
SELECT d.*
FROM departments_230 d
JOIN students_230 s ON d.DepartmentID = s.DepartmentID
GROUP BY d.DepartmentID
ORDER BY COUNT(s.StudentID) DESC
LIMIT 1;
```

Output :-

| DepartmentID | DeptName | HOD |
|--------------|--------------|-----------|
| 1 | Computer Sci | Dr. Smith |

14. Get courses where the lowest score is higher than 70

Code :-

```
SELECT c.*
FROM courses_230 c
WHERE 70 < ALL (
    SELECT Marks FROM enrollments_230 e
    WHERE e.CourseID = c.CourseID
);
```

Output :-

| CourseID | CourseName | DepartmentID |
|----------|-----------------|--------------|
| BI0501 | Genetics | 5 |
| BUS901 | Marketing | 9 |
| CSE101 | Data Structures | 1 |
| MATH701 | Linear Algebra | 7 |

15. Retrieve students who have the same CGPA as 'Alice'

Code :-

```
SELECT *
FROM students_230
WHERE CGPA = (SELECT CGPA FROM students_230 WHERE Name = 'Alice');
```

Output :-

| StudentID | Name | Age | DepartmentID | CGPA |
|-----------|-------|-----|--------------|------|
| 1 | Alice | 20 | 1 | 9.20 |

16. Get the course where the maximum number of students have enrolled

Code :-

```
SELECT c.*
FROM courses_230 c
JOIN enrollments_230 e ON c.CourseID = e.CourseID
GROUP BY c.CourseID
ORDER BY COUNT(e.StudentID) DESC
LIMIT 1;
```

Output :-

| CourseID | CourseName | DepartmentID |
|----------|------------|--------------|
| BI0501 | Genetics | 5 |

17. Find students who are enrolled in more than two courses

Code :-

```
SELECT s.*
FROM students_230 s
JOIN enrollments_230 e ON s.StudentID = e.StudentID
GROUP BY s.StudentID
HAVING COUNT(DISTINCT e.CourseID) > 2;
```

Output :-

OK, 0 records retrieved in 0.774ms

18. Retrieve students who have scored the highest marks in any course(Hint: Use Join along with nested queries).

Code :-

```
SELECT s.*
FROM students_230 s
JOIN enrollments_230 e ON s.StudentID = e.StudentID
WHERE e.Marks = (
    SELECT MAX(Marks)
    FROM enrollments_230 e2
    WHERE e.CourseID = e2.CourseID
);
```

Output :-

| StudentID | Name | Age | DepartmentID | CGPA |
|-----------|---------|-----|--------------|------|
| 1 | Alice | 20 | 1 | 9.20 |
| 1 | Alice | 20 | 1 | 9.20 |
| 2 | Bob | 22 | 2 | 8.50 |
| 3 | Charlie | 21 | 3 | 7.80 |
| 3 | Charlie | 21 | 3 | 7.80 |
| 4 | David | 23 | 4 | 6.90 |
| 4 | David | 23 | 4 | 6.90 |
| 8 | Hank | 21 | 8 | 7.50 |
| 9 | Ivy | 23 | 9 | 9.00 |
| 10 | Jack | 24 | 10 | 6.80 |

19. Get the department with the lowest average CGPA

Code :-

```
SELECT d.*
FROM departments_230 d
JOIN students_230 s ON d.DepartmentID = s.DepartmentID
GROUP BY d.DepartmentID
ORDER BY AVG(s.CGPA) ASC
LIMIT 1;
```

Output :-

| DepartmentID | DeptName | HOD |
|--------------|----------|-----------|
| 6 | Physics | Dr. Adams |

20. Find the course in which the maximum number of students have failed (Marks < 40)

Code :-

```
SELECT c.*
FROM courses_230 c
JOIN enrollments_230 e ON c.CourseID = e.CourseID
WHERE e.Marks < 40
GROUP BY c.CourseID
ORDER BY COUNT(e.StudentID) DESC
LIMIT 1;
```

Output :-

| CourseID | CourseName | DepartmentID |
|----------|---------------------|--------------|
| CIV401 | Structural Analysis | 4 |