

## **Experiment 1.2 – SQL SELECT Queries with WHERE, GROUP BY, HAVING, ORDER BY**

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### **Experiment**

**Experiment 1.2: Practicing SQL SELECT queries with WHERE, GROUP BY, HAVING, and ORDER BY clauses to retrieve and analyze data from the EMPLOYEE table.**

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### **Aim**

The aim of this experiment is to practice writing SQL SELECT statements to filter, group, sort, and calculate average salary for meaningful analysis of employee data.

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### **Objective**

- Practice writing SQL SELECT statements.
  - Apply filtering conditions using the WHERE clause.
  - Group records using the GROUP BY clause.
  - Filter grouped data using the HAVING clause.
  - Sort query results using the ORDER BY clause.
  - Calculate average salary using the AVG() aggregate function.
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### **Software Requirements**

- **Database: Oracle XE or PostgreSQL (PgAdmin)**
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### **Practical / Experiment Steps**

1. Display the department name and the average salary of employees for each department.
  2. Consider only those employees whose salary is greater than 20,000.
  3. Display only those departments where the average salary is greater than 30,000.
  4. Arrange the final output in descending order of average salary.
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## Procedure of the Experiment

1. Start the system and log in to the computer.
2. Open the required database tool (Oracle XE or PgAdmin).
3. Connect to the database containing the EMPLOYEE table.
4. Examine the EMPLOYEE table structure and data.
5. Write SQL SELECT queries according to the practical steps.
6. Execute each query and verify the output.
7. Take screenshots of all four queries in order (s1 to s4) for record.
8. Save the work.

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## Input / Output Details

### Input

- EMPLOYEE table with columns: emp\_id, emp\_name, department, salary, joining\_date.
- SQL SELECT queries using WHERE, GROUP BY, HAVING, ORDER BY, and AVG().

### Output

- Step 1: Average salary of employees by department.

The screenshot shows a SQL IDE with three queries in the editor and their output in a table below. The queries are: 1. A basic GROUP BY query. 2. A query with a WHERE clause filtering for salaries above 20,000. 3. A query with a HAVING clause filtering for average salaries above 30,000. The output table shows the results for the first query, with columns 'department' and 'avg\_salary'.

```
16
17 SELECT department, AVG(salary) AS avg_salary
18 FROM employee
19 GROUP BY department;
20
21 SELECT department, AVG(salary) AS avg_salary
22 FROM employee
23 WHERE salary > 20000
24 GROUP BY department;
25
26 SELECT department, AVG(salary) AS avg_salary
27 FROM employee
28 GROUP BY department
29 HAVING AVG(salary) > 30000;
30
```

Data Output		Messages	Notifications
	department character varying (100)	avg_salary numeric	
1	Finance	39000.000000000000	
2	Sales	27000.000000000000	
3	IT	27500.000000000000	
4	HR	30000.000000000000	

- Step 2: Average salary by department for employees with salary > 20,000.

```

21 SELECT department, AVG(salary) AS avg_salary
22 FROM employee
23 WHERE salary > 20000
24 GROUP BY department;

26 SELECT department, AVG(salary) AS avg_salary
27 FROM employee
28 GROUP BY department
29 HAVING AVG(salary) > 30000;

31 SELECT department, AVG(salary) AS avg_salary
32 FROM employee
33 WHERE salary > 20000
34 GROUP BY department
35 HAVING AVG(salary) > 30000
36 ORDER BY avg_salary DESC;
37

```

	department character varying (100)	avg_salary numeric
1	Sales	27000.000000000000
2	IT	40000.000000000000
3	Finance	39000.000000000000
4	HR	30000.000000000000

- Step 3: Departments where average salary > 30,000.

```

24 GROUP BY department;

26 SELECT department, AVG(salary) AS avg_salary
27 FROM employee
28 GROUP BY department
29 HAVING AVG(salary) > 30000;

31 SELECT department, AVG(salary) AS avg_salary
32 FROM employee
33 WHERE salary > 20000
34 GROUP BY department
35 HAVING AVG(salary) > 30000
36 ORDER BY avg_salary DESC;
37

```

	department character varying (100)	avg_salary numeric
1	Finance	39000.000000000000

- Step 4: Departments with average salary > 30,000 for salary > 20,000, sorted in descending order.

```
29  HAVING AVG(salary) > 30000;  
30  
31  SELECT department, AVG(salary) AS avg_salary  
32  FROM employee  
33  WHERE salary > 20000  
34  GROUP BY department  
35  HAVING AVG(salary) > 30000  
36  ORDER BY avg_salary DESC;  
37
```

Data Output Messages Notifications

	department character varying (100)	avg_salary numeric
1	IT	40000.000000000000
2	Finance	39000.000000000000

- Screenshots (s1 to s4) attached showing query execution results in order.

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## Learning Outcome

**After completing this experiment, the student will be able to:**

- Filter records using the WHERE clause.
- Group records using the GROUP BY clause.
- Apply conditions on grouped data using the HAVING clause.
- Sort query results using ORDER BY.
- Analyze data using AVG() for meaningful insights.
- Write complex queries combining multiple SQL clauses efficiently.