



Apex Institute of Technology

Department of Computer Science & Engineering

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Branch: Computer Science & Engineering (AIML)

Section/Group:24AIT-KRG-1/G2

Semester:4th

Subject Name: DBMS

1. Aim

To understand and implement SQL SELECT queries using various clauses such as WHERE, ORDER BY, GROUP BY, and HAVING to retrieve and manipulate data efficiently from relational database tables.

2. Objective of the Session

- To practice writing SQL SELECT statements.
- To apply filtering conditions using the WHERE clause.
- To sort query results using the ORDER BY clause.
- To group records using the GROUP BY clause.
- To filter grouped data using the HAVING clause.
- To analyze data using aggregate functions like COUNT(), SUM(), AVG(), MIN(), and MAX().

3. 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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4. Procedure of the Practical

- (1) Start the system and log in to the computer.
- (2) Open PgAdmin (PostgreSQL).
- (3) Create or select the required database (e.g., lab_db).
- (4) Create the EMPLOYEE table using the given schema.
- (5) Insert sample data into the EMPLOYEE table.
- (6) Execute the queries step-by-step according to the practical steps.
- (7) Verify the output after each query execution.
- (8) Capture screenshots of execution and results for record.
- (9) Save the work and upload worksheet (Word + PDF) on GitHub.

5. I/O Analysis (Input / Output Analysis)

Input: SQL commands and queries executed in PgAdmin (table creation, insertion, and SELECT queries).

Output: Result tables displayed in PgAdmin showing department-wise average salary after applying WHERE, HAVING, and ORDER BY clauses.

SQL Implementation (PgAdmin / PostgreSQL)

A) Create Database (Optional):

```
CREATE DATABASE lab_db;
```

B) Create Table:

```
CREATE TABLE EMPLOYEE (
    emp_id INT PRIMARY KEY,
    emp_name VARCHAR(30) NOT NULL,
```



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```
        department VARCHAR(30) NOT NULL,  
        salary INT NOT NULL,  
        joining_date DATE  
    );
```

C) Insert Sample Records:

```
INSERT INTO EMPLOYEE (emp_id, emp_name, department, salary,  
joining_date) VALUES  
  
(1,'RAHUL','HR',25000,DATE '2022-01-10'),  
(2,'ANITA','HR',32000,DATE '2021-05-12'),  
(3,'AMIT','IT',45000,DATE '2020-03-15'),  
(4,'NEHA','IT',38000,DATE '2022-07-20'),  
(5,'ROHAN','SALES',18000,DATE '2023-02-05'),  
(6,'PRIYA','SALES',28000,DATE '2021-11-18'),  
(7,'KARAN','FINANCE',52000,DATE '2019-09-30'),  
(8,'SIMRAN','FINANCE',48000,DATE '2020-12-25');
```

Step 1 Query:

```
SELECT department, AVG(salary) AS avg_salary  
FROM EMPLOYEE  
GROUP BY department;
```

Step 2 Query:

```
SELECT department, AVG(salary) AS avg_salary  
FROM EMPLOYEE  
WHERE salary > 20000  
GROUP BY department;
```



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Step 3 Query:

```
SELECT department, AVG(salary) AS avg_salary  
FROM EMPLOYEE  
WHERE salary > 20000  
GROUP BY department  
HAVING AVG(salary) > 30000;
```

Step 4 Query:

```
SELECT department, AVG(salary) AS avg_salary  
FROM EMPLOYEE  
WHERE salary > 20000  
GROUP BY department  
HAVING AVG(salary) > 30000  
ORDER BY avg_salary DESC;
```

6. Learning Outcome

- Understood the syntax and usage of SQL SELECT statements.
- Gained practical knowledge of WHERE clause for filtering rows.
- Learned grouping operations using GROUP BY clause.
- Applied HAVING clause to filter grouped results.
- Sorted query outputs using ORDER BY clause.
- Got hands-on experience in PostgreSQL execution using PgAdmin.



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7. Screenshots

Query Query History

```
1 CREATE TABLE EMPLOYEE (
2     emp_id INT PRIMARY KEY,
3     emp_name VARCHAR(30) NOT NULL,
4     department VARCHAR(30) NOT NULL,
5     salary INT NOT NULL,
6     joining_date DATE
7 );
8 
```

Data Output Messages Notifications

```
CREATE TABLE
```

Query returned successfully in 224 msec.


```
9 INSERT INTO EMPLOYEE (emp_id, emp_name, department, salary, joining_date) VALUES
10 (1,'RAHUL','HR',25000,DATE '2022-01-10'),
11 (2,'ANITA','HR',32000,DATE '2021-05-12'),
12 (3,'AMIT','IT',45000,DATE '2020-03-15'),
13 (4,'NEHA','IT',38000,DATE '2022-07-20'),
14 (5,'ROHAN','SALES',18000,DATE '2023-02-05'),
15 (6,'PRIYA','SALES',28000,DATE '2021-11-18'),
16 (7,'KARAN','FINANCE',52000,DATE '2019-09-30'),
17 (8,'SIMRAN','FINANCE',48000,DATE '2020-12-25');
```

Data Output Messages Notifications

```
INSERT 0 8
```

Query returned successfully in 149 msec.


```
18 SELECT department, AVG(salary) AS avg_salary
19 FROM EMPLOYEE
20 GROUP BY department;
```

Data Output Messages Notifications

Showing rows: 1 to 4 Page No: 1 of 1

	department	avg.salary
1	character varying (30)	numeric
1	FINANCE	50000.00000000000000
2	SALES	23000.00000000000000
3	IT	41500.00000000000000
4	HR	28500.00000000000000



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```
22 SELECT department, AVG(salary) AS avg_salary
23 FROM EMPLOYEE
24 WHERE salary > 20000
25 GROUP BY department;
```

Data Output Messages Notifications

	department character varying (30)	avg_salary numeric
1	FINANCE	50000.00000000000000
2	SALES	28000.00000000000000
3	IT	41500.00000000000000
4	HR	28500.00000000000000

Showing rows: 1 to 4 | | Page No: 1 of 1

```
27 SELECT department, AVG(salary) AS avg_salary
28 FROM EMPLOYEE
29 WHERE salary > 20000
30 GROUP BY department
31 HAVING AVG(salary) > 30000;
```

Data Output Messages Notifications

	department character varying (30)	avg_salary numeric
1	FINANCE	50000.00000000000000
2	IT	41500.00000000000000

Showing rows: 1 to 2 | | Page No: 1 of 1

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

Data Output Messages Notifications

	department character varying (30)	avg_salary numeric
1	FINANCE	50000.00000000000000
2	IT	41500.00000000000000

Showing rows: 1 to 2 | | Page No: 1 of 1