Worksheet -1.1

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Subject Name: TECHNICAL TRAINING I   **Subject Code: 25CAP-652**

1. **Aim/Overview of the practical:**
   To implement and analyze SQL SELECT queries using filtering, sorting, grouping, and aggregation

   concepts in PostgreSQL for efficient data retrieval and analytical reporting.

2. **Objective:**

   • To retrieve specific data using filtering conditions ,
   • To sort query results using single and multiple attributes ,
   • To perform aggregation using grouping techniques ,
   • To apply conditions on aggregated data.

3. **S/W Requirement:**

   → Oracle Database Express Edition
   → postgreSQL.

   Procedure:

   Step 1: Database and Table Preparation

   • Start the PostgreSQL server.
   • Open the PostgreSQL client tool.

• Create a database for the experiment.
• Prepare a sample table representing customer orders containing details such as customer name, product, quantity, price, and order date.
• Insert sufficient sample records to allow meaningful analysis.

Step 2: Filtering Data Using Conditions

• Execute data retrieval operations to display only those records that satisfy specific conditions, such as higher-priced orders.
• Observe how filtering limits the number of rows returned.

Step 3: Sorting Query Results

• Retrieve selected columns from the table and arrange the output based on numerical values such as price.
• Perform sorting using both ascending and descending order.
• Apply sorting on more than one attribute to understand priority-based ordering.
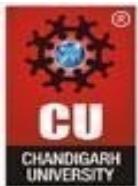
Step 4: Grouping Data for Aggregation

• Group records based on a common attribute such as product.
• Calculate aggregate values like total sales for each group.
• Analyze how multiple rows are combined into summarized results.

Step 5: Applying Conditions on Aggregated Data

• Apply conditions on grouped results to retrieve only those groups that satisfy specific aggregate criteria.
• Compare the difference between row-level filtering and group-level filtering.

Step 6: Conceptual Understanding of Filtering vs Aggregation Conditions
• Analyze scenarios where conditions are incorrectly applied before grouping.
• Correctly apply conditions after grouping to avoid logical errors.

4. Code:

```sql
CREATE TABLE customer_orders(
    order_id INT PRIMARY KEY ,
    customer_name VARCHAR(50),
    product VARCHAR(50),
    quantity INT,
    price INT,
    order_date DATE
);

INSERT INTO customer_orders
(order_id,customer_name,product,quantity,price,order_date)VALUES
(1,'Sanchit Katoch','Laptop',1,85000,'2025-01-10'),
(2,'Roshan Kumar Singh','Mouse',2,1780,'2025-01-11'),
(3,'Anindita Dhar','Laptop',1,52250,'2025-01-12'),
(4,'Ashi Gupta','Keyboard',1,2575,'2025-01-12'),
(5,'Pratham','Mouse',3,1800,'2025-01-13'),
(6,'Swayam','Laptop',2,120000,'2025-01-14');

--step 2
SELECT * FROM customer_orders WHERE price>40000;

--step3
--asc
SELECT customer_name,product,price FROM customer_orders ORDER BY price ASC;
--desc
SELECT customer_name,product,price FROM customer_orders ORDER BY price DESC;
--mul col
SELECT customer_name,product,price FROM customer_orders ORDER BY product ASC, price
DESC;

--step4
SELECT product, SUM(price) AS total_sales FROM customer_orders GROUP BY product;

--step5
SELECT product, SUM(price) AS total_sales FROM customer_orders GROUP BY product
HAVING SUM(price)>50000;

--step6
SELECT product, SUM(price) FROM customer_orders GROUP BY product HAVING
SUM(price)>50000;
```

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5. Output:

step 2 output :-

order_id [PK] integer	customer_name character varying (50)	product character varying (50)	quantity integer	price integer	order_date date
1	Sanchit Katoch	Laptop	1	85000	2025-01-10
3	Anindita Dhar	Laptop	1	52250	2025-01-12
6	Swayam	Laptop	2	120000	2025-01-14

step 3 outputs (ascending, descending, mul_cols respectively) :-

customer_name character varying (50)	product character varying (50)	price integer
Roshan Kumar Singh	Mouse	1780
Pratham	Mouse	1800
Ashi Gupta	Keyboard	2575
Anindita Dhar	Laptop	52250
Sanchit Katoch	Laptop	85000
Swayam	Laptop	120000

customer_name character varying (50)	product character varying (50)	price integer
Swayam	Laptop	120000
Sanchit Katoch	Laptop	85000
Anindita Dhar	Laptop	52250
Ashi Gupta	Keyboard	2575
Pratham	Mouse	1800
Roshan Kumar Singh	Mouse	1780

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	customer_name character varying (50)	product character varying (50)	price integer
1	Ashi Gupta	Keyboard	2575
2	Swayam	Laptop	120000
3	Sanchit Katoch	Laptop	85000
4	Anindita Dhar	Laptop	52250
5	Pratham	Mouse	1800
6	Roshan Kumar Singh	Mouse	1780

step 4 output :-

	product character varying (50)	total_sales bigint
1	Mouse	3580
2	Keyboard	2575
3	Laptop	257250

step 5 output :-

	product character varying (50)	total_sales bigint
1	Laptop	257250

step 6 output :-

	product character varying (50)	sum bigint
1	Laptop	257250

6. Learning Outcome:

- Understood how data can be filtered to retrieve only relevant records from a database.
- Learnt how sorting improves readability and usefulness of query results in reports.
- Gained the ability to group data for analytical purposes.
- Clearly able to differentiate between row-level conditions and group-level conditions.