



Experiment 5

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Subject Name: ADBMS

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1. Aim:

Question 1:

a) Create a large dataset:

Create a table names transaction_data (id , value) with 1 million records. o take id 1 and 2, and for each id, generate 1 million records in value column o Use Generate_series () and random() to populate the data.

b) Create a normal view and materialized view to for sales_summary, which includes total_quantity_sold, total_sales, and total_orders with aggregation.

c) Compare the performance and execution time of both.

Question 2:

The company TechMart Solutions stores all sales transactions in a central database. A new reporting team has been formed to analyze sales but they should not have direct access to the base tables for security reasons.

The database administrator has decided to:

Create restricted views to display only summarized, non-sensitive data.

Assign access to these views to specific users using DCL commands (GRANT, REVOKE).

2. Objective:

- To learn how to create large datasets in SQL using generate_series() and random().
- To practice creating and populating tables with millions of records efficiently.
- To understand how to create normal and materialized views for aggregated data.
- To analyze sales data using aggregate functions like SUM(), COUNT(), and AVG().
- To compare the performance and execution time of normal views versus materialized views for large datasets.



3. DBMS script and output:

Solution 1:

```
CREATE TABLE transaction_data (  
    id INT,  
    value NUMERIC  
);
```

```
INSERT INTO transaction_data (id, value)  
SELECT 1, random() * 1000  
FROM generate_series(1, 1000000);
```

```
INSERT INTO transaction_data (id, value)  
SELECT 2, random() * 1000  
FROM generate_series(1, 1000000);
```

```
CREATE OR REPLACE VIEW sales_summary_view AS  
SELECT  
    id,  
    COUNT(*) AS total_orders,  
    SUM(value) AS total_sales,  
    AVG(value) AS avg_transaction  
FROM transaction_data  
GROUP BY id;
```

```
SELECT * FROM sales_summary_view;
```

```
CREATE MATERIALIZED VIEW sales_summary_mv AS  
SELECT  
    id,  
    COUNT(*) AS total_orders,  
    SUM(value) AS total_sales,  
    AVG(value) AS avg_transaction  
FROM transaction_data  
GROUP BY id;
```

```
SELECT * FROM sales_summary_mv;
```

```
EXPLAIN ANALYZE
```



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```
SELECT * FROM sales_summary_view;
```

```
EXPLAIN ANALYZE
```

```
SELECT * FROM sales_summary_mv;
```

```
REFRESH MATERIALIZED VIEW sales_summary_mv;
```

	id	total_orders	total_sales	avg_transaction
▶	1	15625	7805937	499.5800
	2	15625	7811693	499.9484

Solution 2:

```
CREATE TABLE customer_master (  
  customer_id VARCHAR(5) PRIMARY KEY,  
  full_name VARCHAR(50) NOT NULL,  
  phone VARCHAR(15), email  
  VARCHAR(50), city VARCHAR(30)  
);
```

```
CREATE TABLE product_catalog (  
  product_id VARCHAR(5) PRIMARY KEY,  
  product_name VARCHAR(50) NOT NULL,  
  brand VARCHAR(30), unit_price  
  NUMERIC(10,2) NOT NULL  
);
```

```
CREATE TABLE sales_orders (  
  order_id SERIAL PRIMARY KEY,  
  product_id VARCHAR(5) REFERENCES product_catalog(product_id),  
  quantity INT NOT NULL, customer_id VARCHAR(5) REFERENCES  
  customer_master(customer_id), discount_percent NUMERIC(5,2),  
  order_date DATE NOT NULL  
);
```

```
INSERT INTO customer_master (customer_id, full_name, phone, email, city) VALUES  
( 'C1', 'Amit Sharma', '9876543210', 'amit.sharma@example.com', 'Delhi'),  
( 'C2', 'Priya Verma', '9876501234', 'priya.verma@example.com', 'Mumbai'),  
( 'C3', 'Ravi Kumar', '9988776655', 'ravi.kumar@example.com', 'Bangalore');
```



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```
INSERT INTO product_catalog (product_id, product_name, brand, unit_price) VALUES  
( 'P1', 'Smartphone X100', 'Samsung', 25000.00),  
( 'P2', 'Laptop Pro 15', 'Dell', 65000.00),  
( 'P3', 'Wireless Earbuds', 'Sony', 5000.00);
```

```
INSERT INTO sales_orders (product_id, quantity, customer_id, discount_percent, order_date)  
VALUES  
( 'P1', 2, 'C1', 5.00, '2025-09-01'),  
( 'P2', 1, 'C2', 10.00, '2025-09-02'),  
( 'P3', 3, 'C3', 0.00, '2025-09-03'),  
( 'P1', 1, 'C2', 5.00, '2025-09-04');
```

```
CREATE VIEW v_sales_summary AS  
SELECT  
    O.order_date,  
    P.product_name,  
    SUM(O.quantity) AS total_quantity_sold,  
    SUM((P.unit_price * O.quantity) - ((P.unit_price * O.quantity) * O.discount_percent / 100))  
AS total_sales,  
    COUNT(O.order_id) AS total_orders  
FROM sales_orders O  
JOIN product_catalog P ON O.product_id = P.product_id  
GROUP BY O.order_date, P.product_name;
```

```
CREATE ROLE reporting_user  
LOGIN  
PASSWORD 'report123';
```

```
GRANT SELECT ON v_sales_summary TO reporting_user;
```

```
SELECT * FROM v_sales_summary;
```

Result Grid

Filter Rows:

Export:

Wrap Cell Content:

	order_date	product_name	total_quantity_sold	total_sales	total_orders
▶	2025-09-01	Smartphone X100	2	47500.00000000	1
	2025-09-04	Smartphone X100	1	23750.00000000	1
	2025-09-02	Laptop Pro 15	1	58500.00000000	1
	2025-09-03	Wireless Earbuds	3	15000.00000000	1



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4. Learning Outcomes (What I have Learnt):

- Gained hands-on experience in creating large datasets and defining relational tables in PostgreSQL. ○ Learned to create normal views, materialized views, and aggregate transactional data efficiently.
- Understood performance differences between views and materialized views and how to refresh materialized views. ○ Acquired skills to secure data using restricted views and control access with GRANT and REVOKE commands.
- Practiced joining multiple tables, calculating totals, and providing summarized insights while protecting sensitive information.