Experiment 2.1

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Semester: 5th	**Date of Performance: 24/09/25**
Subject Name: ADBMS	**Subject Code: 23CSP-333**

1. **Aim:** Views: Performance Benchmarking : Normal View vs. Materialized View
2. **Requirements(Hardware/Software):** MySQL, PostgreSQL, Oracle, or SQL Server
3. **DBMS script and output:**

Medium-Level Problem

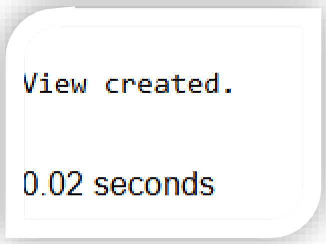
Problem Title: Performance Benchmarking : Normal View vs. Materialized View

Procedure (Step-by-Step):

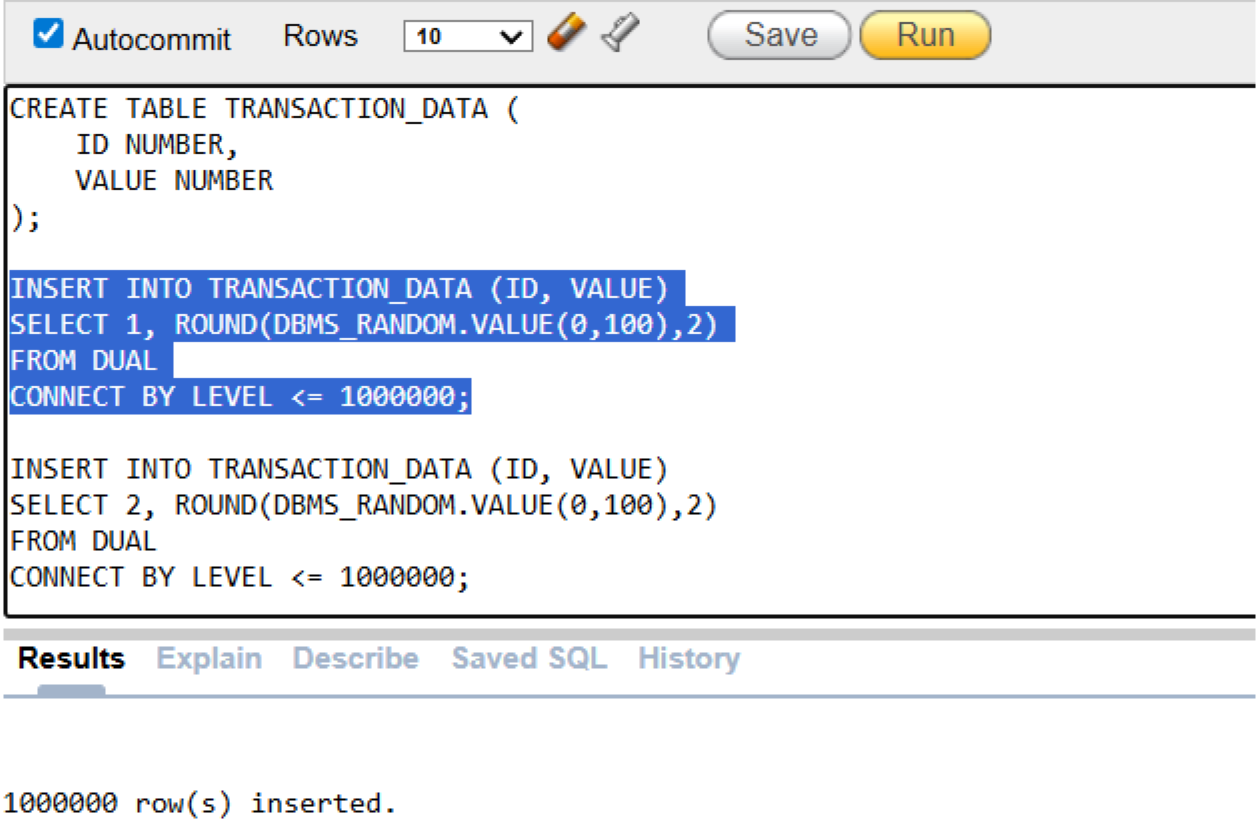
1. Create a large dataset:
  - Create a table names transaction_data (id , value) with 1 million records.
    - take id 1 and 2, and for each id, generate 1 million records in value column
  - Use Generate_series () and random() to populate the data.
2. Create a normal view and materialized view to for sales_summary, which includes total_quantity_sold, total_sales, and total_orders with aggregation.

3. Compare the performance and execution time of both.

```
CREATE TABLE TRANSACTION_DATA (
   ID NUMBER,
   VALUE NUMBER
);

INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 1, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 1000000;

INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 2, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 1000000;

COMMIT;

CREATE OR REPLACE VIEW SALES_SUMMARY AS
SELECT
   ID,
   COUNT(*) AS TOTAL_QUANTITY_SOLD,
   SUM(VALUE) AS TOTAL_SALES,
   COUNT(DISTINCT ID) AS TOTAL_ORDERS
FROM TRANSACTION_DATA
GROUP BY ID;

CREATE MATERIALIZED VIEW SALES_SUMMARY_MV
BUILD IMMEDIATE
REFRESH COMPLETE ON DEMAND
AS
SELECT
   ID,
   COUNT(*) AS TOTAL_QUANTITY_SOLD,
   SUM(VALUE) AS TOTAL_SALES,
   COUNT(DISTINCT ID) AS TOTAL_ORDERS
FROM TRANSACTION_DATA
GROUP BY ID;

SELECT * FROM SALES_SUMMARY;
SELECT * FROM SALES_SUMMARY_MV;

EXEC DBMS_MVIEW.REFRESH('SALES_SUMMARY_MV');
```



```
View created.

0.02 seconds
```



```
CREATE TABLE TRANSACTION_DATA (
    ID NUMBER,
    VALUE NUMBER
);

INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 1, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 1000000;

INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 2, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 1000000;
```

```
1000000 row(s) inserted.
```

Hard Level Problem

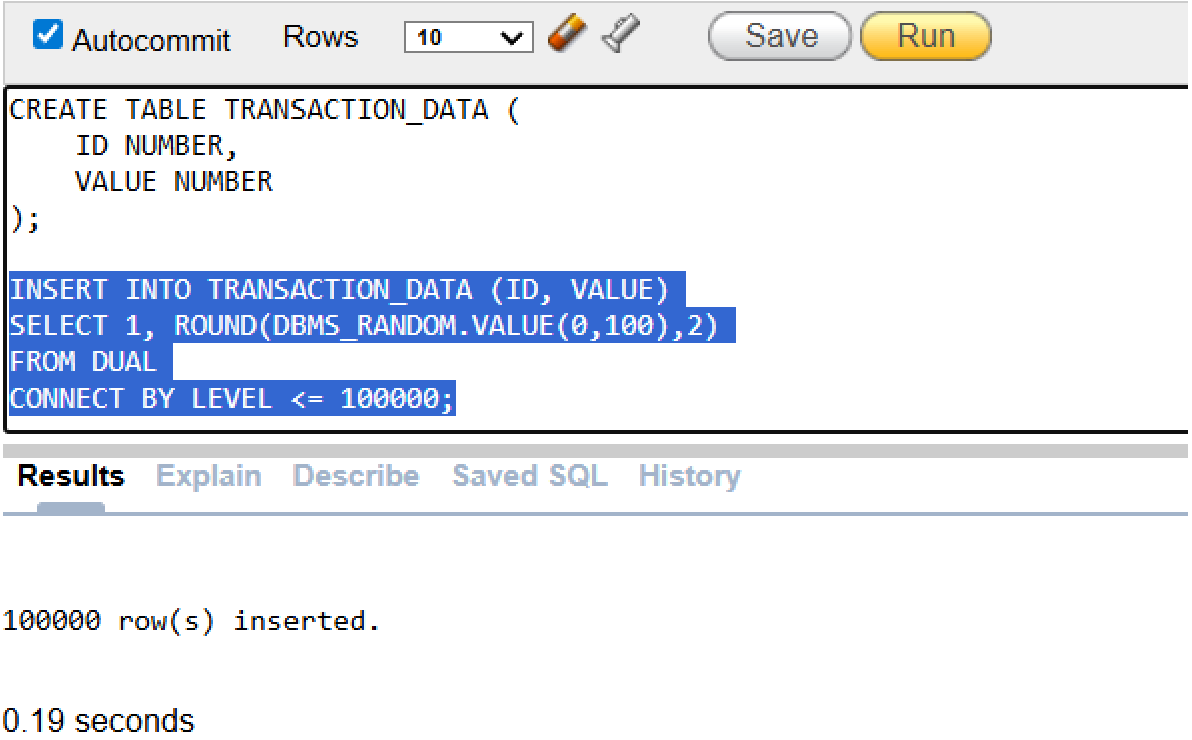
Problem Title: ***Securing Data Access with Views and Role-Based Permissions***

Procedure (Step-by-Step):

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

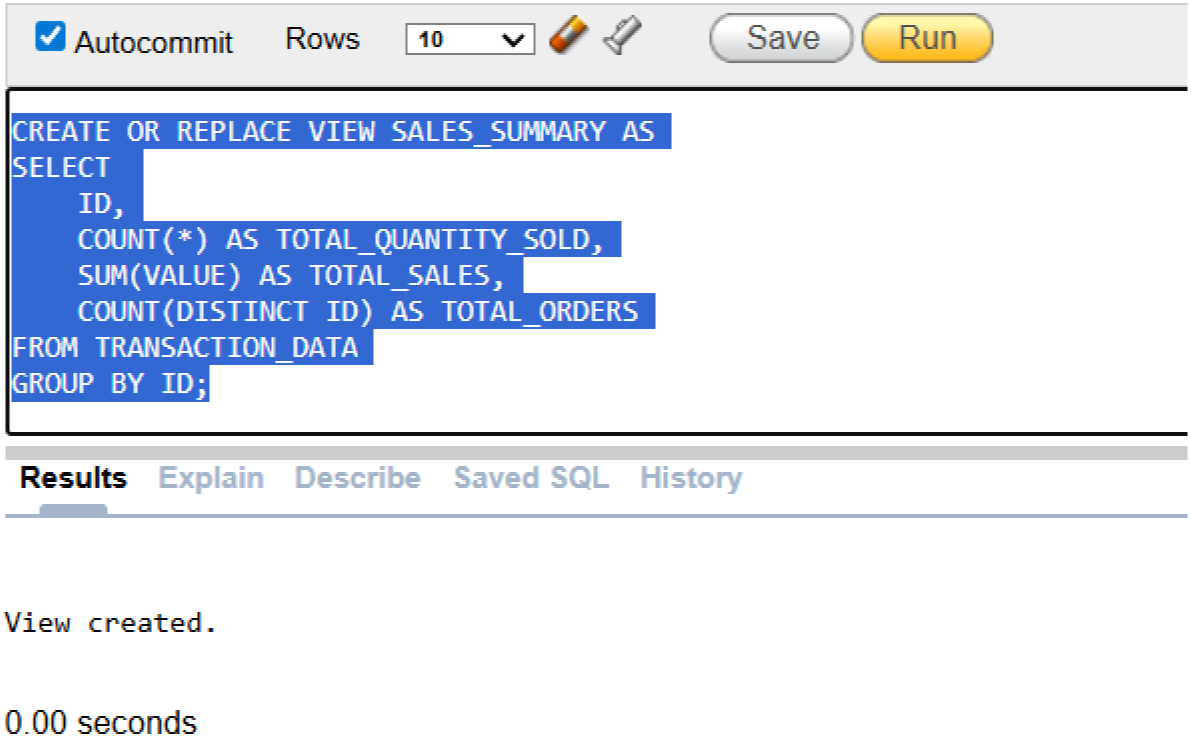
```
CREATE TABLE TRANSACTION_DATA (
   ID NUMBER,
   VALUE NUMBER
);
```

```
INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 1, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 100000;

INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 2, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 100000;

COMMIT;

CREATE OR REPLACE VIEW SALES_SUMMARY AS
SELECT
   ID,
   COUNT(*) AS TOTAL_QUANTITY_SOLD,
   SUM(VALUE) AS TOTAL_SALES,
   COUNT(DISTINCT ID) AS TOTAL_ORDERS
FROM TRANSACTION_DATA
GROUP BY ID;

CREATE USER REPORT_USER IDENTIFIED BY Report123;

GRANT CREATE SESSION TO REPORT_USER;

GRANT SELECT ON SALES_SUMMARY TO REPORT_USER;

REVOKE SELECT ON TRANSACTION_DATA FROM REPORT_USER;

SELECT * FROM SALES_SUMMARY;

EXEC DBMS_MVIEW.REFRESH('SALES_SUMMARY');
```



```
CREATE TABLE TRANSACTION_DATA (
    ID NUMBER,
    VALUE NUMBER
);

INSERT INTO TRANSACTION_DATA (ID, VALUE)
SELECT 1, ROUND(DBMS_RANDOM.VALUE(0,100),2)
FROM DUAL
CONNECT BY LEVEL <= 100000;
```

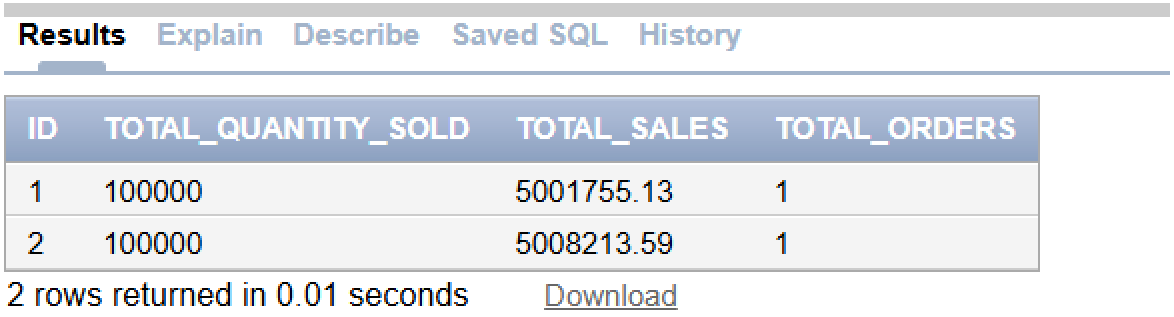
```
100000 row(s) inserted.

0.19 seconds
```



```
CREATE OR REPLACE VIEW SALES_SUMMARY AS
SELECT
    ID,
    COUNT(*) AS TOTAL_QUANTITY_SOLD,
    SUM(VALUE) AS TOTAL_SALES,
    COUNT(DISTINCT ID) AS TOTAL_ORDERS
FROM TRANSACTION_DATA
GROUP BY ID;
```

```
View created.
```

0.00 seconds



ID	TOTAL_QUANTITY_SOLD	TOTAL_SALES	TOTAL_ORDERS
1	100000	5001755.13	1
2	100000	5008213.59	1

2 rows returned in 0.01 seconds   Download

4. Learning Outcomes :

- Understand how to create **views in Oracle** to restrict access to sensitive data.
- Learn to **aggregate transactional data** using SQL for reporting purposes.
- Apply **DCL commands (GRANT and REVOKE)** to control user access to database objects.
- Gain knowledge of **creating and managing users** with specific privileges in Oracle.
- Demonstrate the ability to **securely provide summarized data** to reporting teams without exposing base tables.