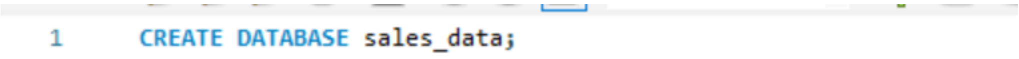
QUERY SHEET

Project: OLAP Operations using MySQL

Objective: Perform OLAP operations (Drill Down, Rollup, Cube, Slice, and Dice) on the "sales_sample" table to analyze sales data. The project will include the following tasks:

1. Database Creation

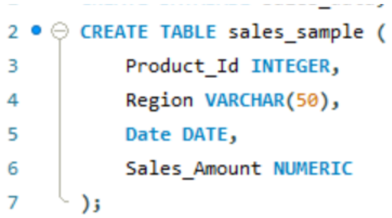
a. Create a database to store the sales data.



```
CREATE DATABASE sales_data;
```

b. Create a table named "sales_sample" with the specified columns:

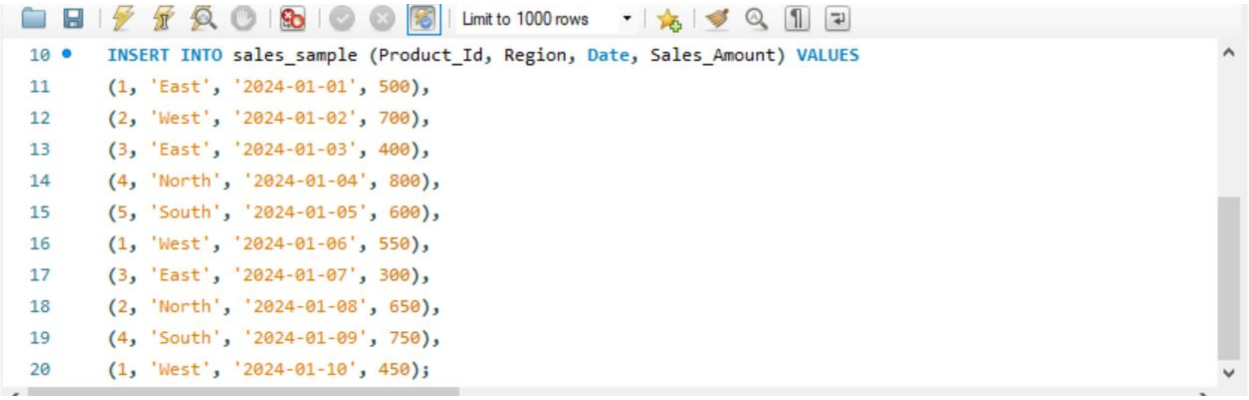
- Product_Id (Integer)
- Region (varchar(50))-like East ,West etc
- Date (Date)
- Sales_Amount (int/numeric)



```
CREATE TABLE sales_sample (
    Product_Id INTEGER,
    Region VARCHAR(50),
    Date DATE,
    Sales_Amount NUMERIC
);
```

2. Data Creation

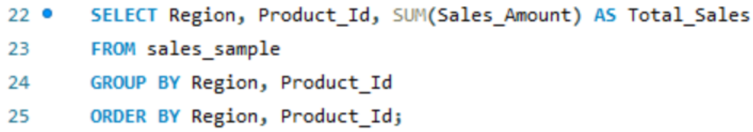
Insert 10 sample records into the "sales_sample" table, representing sales data.



```
INSERT INTO sales_sample (Product_Id, Region, Date, Sales_Amount) VALUES
(1, 'East', '2024-01-01', 500),
(2, 'West', '2024-01-02', 700),
(3, 'East', '2024-01-03', 400),
(4, 'North', '2024-01-04', 800),
(5, 'South', '2024-01-05', 600),
(1, 'West', '2024-01-06', 550),
(3, 'East', '2024-01-07', 300),
(2, 'North', '2024-01-08', 650),
(4, 'South', '2024-01-09', 750),
(1, 'West', '2024-01-10', 450);
```

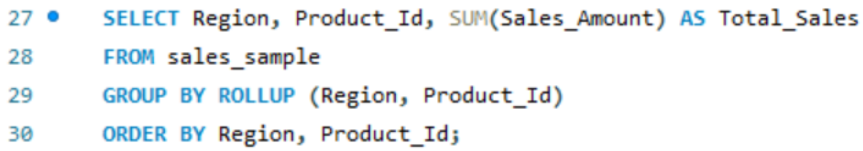
3. Perform OLAP operations

a) Drill Down-Analyze sales data at a more detailed level. Write a query to perform drill down from region to product level to understand sales performance.



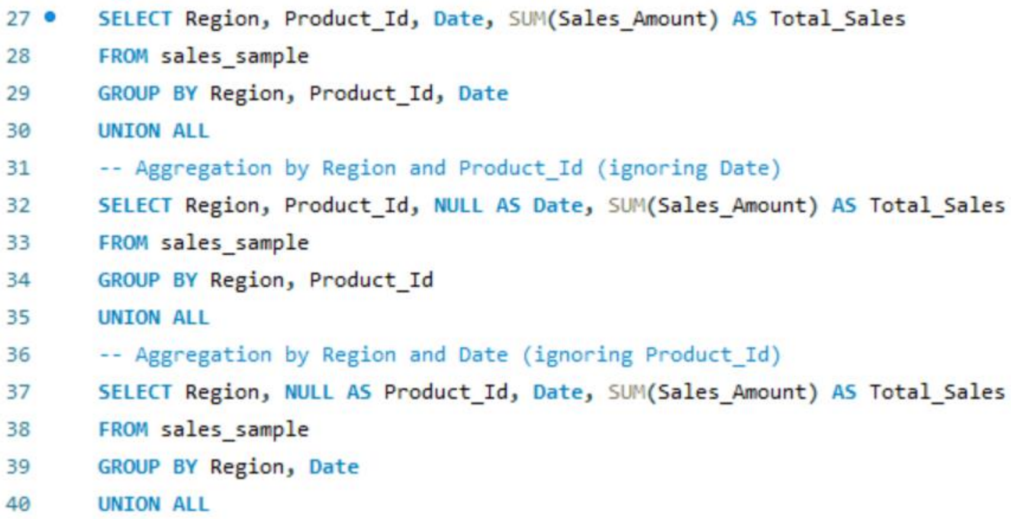
```
SELECT Region, Product_Id, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Product_Id
ORDER BY Region, Product_Id;
```

b) Rollup- To summarize sales data at different levels of granularity. Write a query to perform roll up from product to region level to view total sales by region.

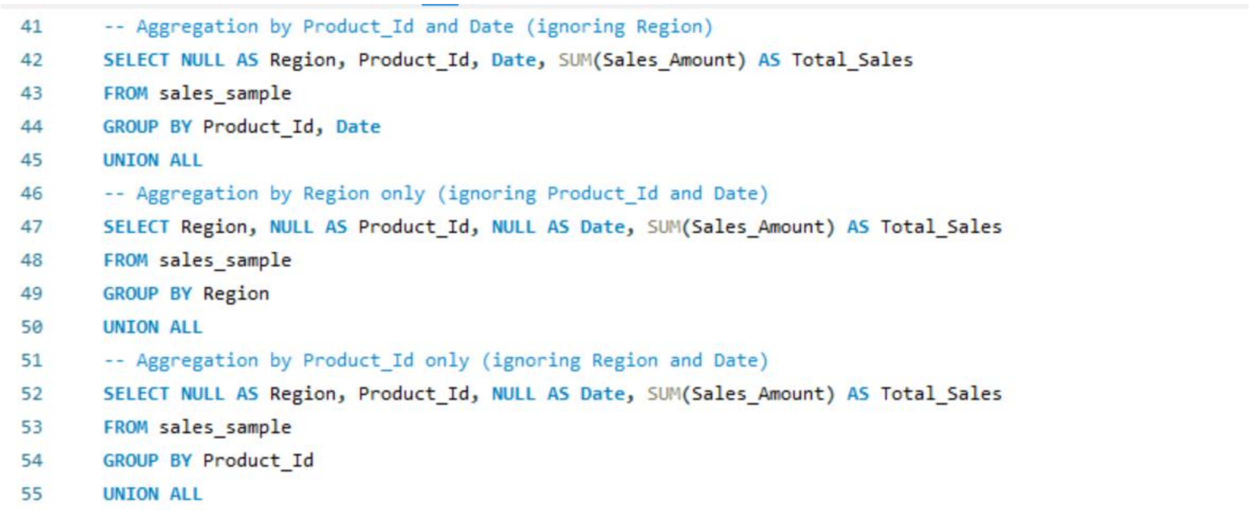


```sql
SELECT Region, Product_Id, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY ROLLUP (Region, Product_Id)
ORDER BY Region, Product_Id;
```

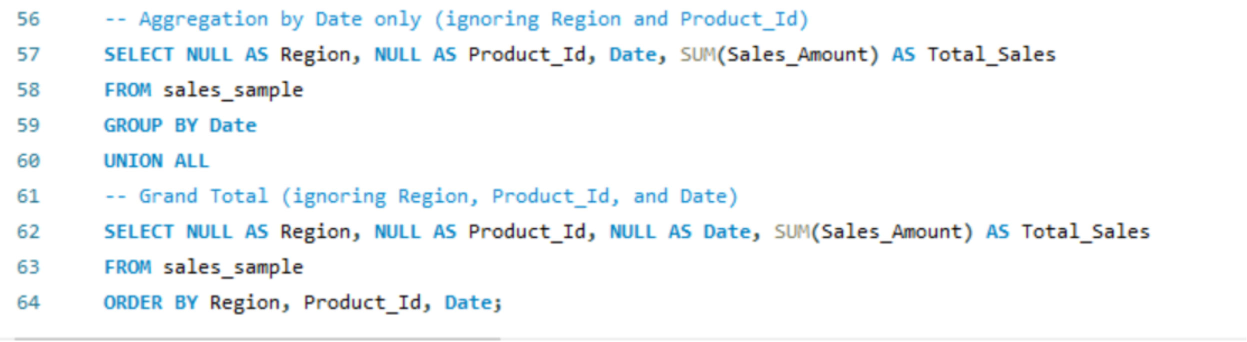
c) Cube - To analyze sales data from multiple dimensions simultaneously. Write a query to Explore sales data from different perspectives, such as product, region, and date.



```sql
SELECT Region, Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Product_Id, Date
UNION ALL
-- Aggregation by Region and Product_Id (ignoring Date)
SELECT Region, Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Product_Id
UNION ALL
-- Aggregation by Region and Date (ignoring Product_Id)
SELECT Region, NULL AS Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Date
UNION ALL
```

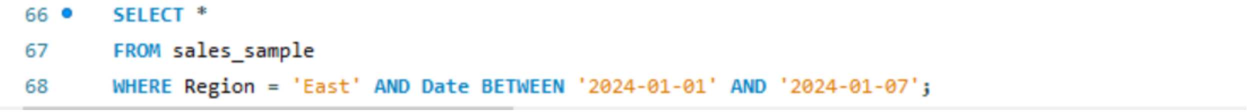


```sql
-- Aggregation by Product_Id and Date (ignoring Region)
SELECT NULL AS Region, Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Product_Id, Date
UNION ALL
-- Aggregation by Region only (ignoring Product_Id and Date)
SELECT Region, NULL AS Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region
UNION ALL
-- Aggregation by Product_Id only (ignoring Region and Date)
SELECT NULL AS Region, Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Product_Id
UNION ALL
```



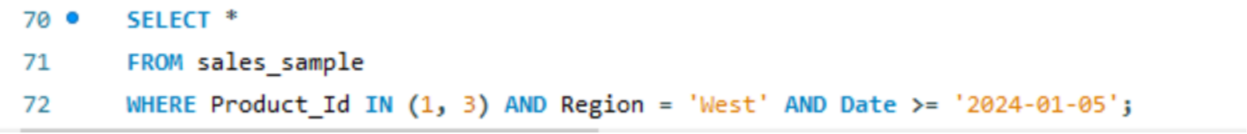
```
-- Aggregation by Date only (ignoring Region and Product_Id)
SELECT NULL AS Region, NULL AS Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Date
UNION ALL
-- Grand Total (ignoring Region, Product_Id, and Date)
SELECT NULL AS Region, NULL AS Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
ORDER BY Region, Product_Id, Date;
```

d) Slice- To extract a subset of data based on specific criteria. Write a query to slice the data to view sales for a particular region or date range.



```
SELECT *
FROM sales_sample
WHERE Region = 'East' AND Date BETWEEN '2024-01-01' AND '2024-01-07';
```

e) Dice - To extract data based on multiple criteria. Write a query to view sales for specific combinations of product, region, and date



```
SELECT *
FROM sales_sample
WHERE Product_Id IN (1, 3) AND Region = 'West' AND Date >= '2024-01-05';
```

Full Query

1.Create the database:

CREATE DATABASE sales_data;

USE sales_data;

2.Create the sales_sample table:

CREATE TABLE sales_sample (
Product_Id INTEGER,
Region VARCHAR(50),
Date DATE, Sales_Amount NUMERIC);

INSERT INTO sales_sample (Product_Id, Region, Date, Sales_Amount) VALUES
(1, 'East', '2024-01-01', 500),
(2, 'West', '2024-01-02', 700),
(3, 'East', '2024-01-03', 400),
(4, 'North', '2024-01-04', 800),
(5, 'South', '2024-01-05', 600),
(1, 'West', '2024-01-06', 550),

```
(3, 'East', '2024-01-07', 300),
(2, 'North', '2024-01-08', 650),
(4, 'South', '2024-01-09', 750),
(1, 'West', '2024-01-10', 450);
```

3. OLAP Operations

a) Drill Down

```
SELECT Region, Product_Id, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Product_Id
ORDER BY Region, Product_Id;
```

b) Rollup

```
SELECT Region, Product_Id, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY ROLLUP (Region, Product_Id)
ORDER BY Region, Product_Id;
```

c) Cube

```
SELECT Region, Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY CUBE (Region, Product_Id, Date)
ORDER BY Region, Product_Id, Date;
```

OR

While using MySQL we can replace cube function using UNION as MySQL doesn’t supports cube function. Below is the Query we can use while using MySQL platform.

```
SELECT Region, Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Product_Id, Date
UNION ALL


SELECT Region, Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Product_Id
UNION ALL

SELECT Region, NULL AS Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region, Date
UNION ALL
```

```
SELECT NULL AS Region, Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Product_Id, Date
UNION ALL

SELECT Region, NULL AS Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Region
UNION ALL

SELECT NULL AS Region, Product_Id, NULL AS Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Product_Id
UNION ALL

SELECT NULL AS Region, NULL AS Product_Id, Date, SUM(Sales_Amount) AS Total_Sales
FROM sales_sample
GROUP BY Date
UNION ALL

SELECT NULL AS Region, NULL AS Product_Id, NULL AS Date, SUM(Sales_Amount) AS
Total_Sales
FROM sales_sample
ORDER BY Region, Product_Id, Date;
```

d) Slice

```
SELECT *
FROM sales_sample
WHERE Region = 'East' AND Date BETWEEN '2024-01-01' AND '2024-01-07';
```

e) Dice

```
SELECT *
FROM sales_sample
WHERE Product_Id IN (1, 3) AND Region = 'West' AND Date >= '2024-01-05';
```