

Experiment No. 3

Aim: To implement OLAP operations: Slice, Dice, Rollup, Drilldown and Pivot.

Requirements: Windows/MAC/Linux O.S and MYSQL/Oracle SQL.

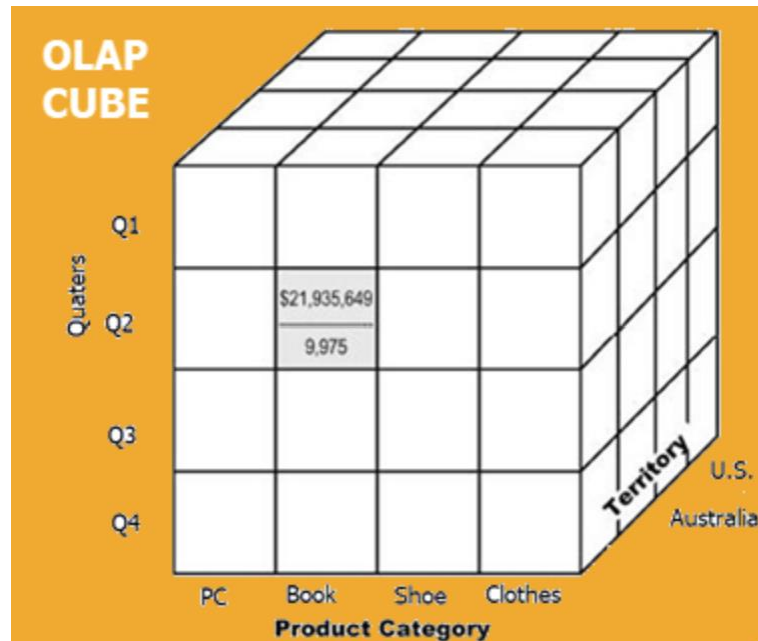
Problem statement: To implement OLAP operations: Slice, Dice, Rollup, Drilldown and Pivot on Electronic sales data set created in experiment 2.

Theory:

Online Analytical Processing (OLAP) is a category of software that allows users to analyse information from multiple database systems at the same time. It is a technology that enables analysts to extract and view business data from different points of view.

Analysts frequently need to group, aggregate and join data. These OLAP operations in data mining are resource intensive. With OLAP data can be pre-calculated and pre-aggregated, making analysis faster.

OLAP cube:



OLAP Cube

At the core of the OLAP concept, is an OLAP Cube. The OLAP cube is a data structure optimized for very quick data analysis.

The OLAP Cube consists of numeric facts called measures which are categorized by dimensions. OLAP Cube is also called the **hypercube**.

Basic analytical operations of OLAP

Four types of analytical OLAP operations are:

1. Roll-up
2. Drill-down

3. Slice and dice
4. Pivot (rotate)

1) Roll-up:

Roll-up is also known as “consolidation” or “aggregation.” The Roll-up operation can be performed in 2 ways

1. Reducing dimensions
2. Climbing up concept hierarchy. Concept hierarchy is a system of grouping things based on their order or level.

Roll-up on factsales, product_dw and time_dw:

```
MySQL 8.0 Command Line Client
mysql> SELECT yr, SUM(total_sales) FROM (factsales as fs NATURAL JOIN
-> product_dw as pd)JOIN time_dw as td ON fs.time_id = td.time_id
-> WHERE prod_name='Rice' GROUP BY yr;
+-----+-----+
| yr  | SUM(total_sales) |
+-----+-----+
| 2021 |          3200000 |
+-----+-----+
1 row in set (0.01 sec)
```

2) Drill-down

In drill-down data is fragmented into smaller parts. It is the opposite of the rollup process. It can be done via

- Moving down the concept hierarchy
- Increasing a dimension

Drill-down on factsales, product_dw and time_dw:

```
MySQL 8.0 Command Line Client
mysql>
mysql> SELECT qt,SUM(total_sales) FROM (factsales as fs NATURAL JOIN
-> product_dw as pd)JOIN time_dw as td ON fs.time_id=td.time_id
-> WHERE Prod_name='Rice' GROUP BY qt;
+-----+-----+
| qt | SUM(total_sales) |
+-----+-----+
| Q1 |          2920000 |
| Q2 |          280000  |
+-----+-----+
2 rows in set (0.00 sec)
```

3) Slice:

Here, one dimension is selected, and a new sub-cube is created.

Slice on factsales, product_dw and time_dw:

```
MySQL 8.0 Command Line Client
mysql> SELECT prod_name,total_sales
-> FROM factsales AS fs
-> INNER JOIN
-> product_dw AS pd
-> ON
-> fs.prod_id = pd.prod_id
-> AND
-> prod_name = 'Rice';
+-----+-----+
| prod_name | total_sales |
+-----+-----+
| Rice      |      80000 |
| Rice      |      70000 |
| Rice      |      10000 |
+-----+-----+
```

```
MySQL 8.0 Command Line Client
mysql> SELECT prod_name ,total_sales
-> FROM (factsales AS fs INNER JOIN product_dw AS pd
-> ON fs.prod_id = pd.prod_id and prod_name='Rice')
-> JOIN time_dw AS tw
-> ON fs.time_id = tw.time_id;
+-----+-----+
| prod_name | total_sales |
+-----+-----+
| Rice      |      80000 |
| Rice      |      10000 |
| Rice      |      30000 |
+-----+-----+
```

```
MySQL 8.0 Command Line Client
mysql> Select yr, max(Q1) 'Q1', max(Q2) 'Q2'
-> from (
-> select yr,
-> case when qt = 'Q1' then month end Q1,
-> case when qt = 'Q2' then month end Q2
-> from time_dw
-> ) time_dw group by yr;
+-----+-----+
| yr  | Q1      | Q2      |
+-----+-----+
| 2021 | January | May      |
+-----+-----+
1 row in set (0.00 sec)
```

4) Pivot

In Pivot, you rotate the data axes to provide a substitute presentation of data.

Pivot on time_dw:

```
mysql> SELECT yr,
-> MAX(IF(qt = "Q1", month,NULL)) AS "Q1",
-> MAX(IF(qt = "Q2", month,NULL)) AS "Q2"
-> FROM time_dw group by yr;
```

yr	Q1	Q2
2021	January	May

```
1 row in set (0.00 sec)
```



```
mysql>
mysql>
mysql> SELECT yr,
-> MAX(IF(qt = "Q1", month,NULL)) AS "Q1",
-> MAX(IF(qt = "Q2", month,NULL)) AS "Q2"
-> FROM time_dw;
```

yr	Q1	Q2
2021	January	May

```
1 row in set (0.00 sec)
```

Conclusion: We have successfully implemented OLAP operations on Electronic sales data set using MYSQL.