CS246: Database Management Systems Lab

Lab # 14 (1 Questions, 55 Marks)
Lab session: AL1
Held on: 22-Apr-2024 (Mon)
Lab Timings: 14:00 to 17:00 Hours Pages: 3
Submission time: 16:45 Hrs, 08-Apr-2024
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a. This lab assignment is based on the concepts covered in chapter 5 **Advanced SQL** in the CS245 theory class.

b. You can refer to the text book for SQL syntax.

Question 1: (55 points)

Pivot tables and OLAP functions Using `MySQL` perform the following tasks:

Task 01 (1 mark) Create a database named *week13*

Task 02 (3 marks) **Create tables**

a. A `location` table containing the following

1^{st} column	`location_id`	integer
2^{nd} column	`city`	string of characters of fixed size 10
3^{rd} column	`state`	string of characters of fixed size 2
4^{th} column	`country`	string of characters of fixed size 20

with `location_id` as primary key.

b. A `product` table containing the following

1^{st} column	`product_id`	integer
2^{nd} column	`product_name`	string of characters of fixed size 10
3^{rd} column	`category`	string of characters of fixed size 2
4^{th} column	`price`	integer

with `product_id` as primary key.

c. A `sale` table containing the following

1^{st} column	`product_id`	integer
2^{nd} column	`time_id`	integer
3^{rd} column	`location_id`	integer
4^{th} column	`sales`	integer

with `product_id, time_id, location_id` as primary key.

Task 03 (3 marks) **populate data**

a. Populate data from file `location.csv` into table `location`

b. Populate data from file `product.csv` into table `product`

c. Populate data from file `sale.csv` into table `sale`

Task 04 (48 marks) Building a `pivot table`

	WI	CA	Total
1995	63	81	144
1996	38	107	145
1997	75	35	110
Total	176	223	399

`year_state_01`

a. (12 marks) Construct a pivot table `year_state_01` - *method - 01*
   - Whose columns are `states` WI, CA, total
   - Whose rows are `years` 1995, 1996, 1997, total

   by writing the following *individual queries* to construct the pivot table

   i. Compute the total sales for the state WI in the year 1995
   ii. Compute the total sales for the state CA in the year 1995
   iii. Compute the total sales in the year 1995 for the states (WI, CA)
   iv. Compute the total sales for the state WI in the year 1996
   v. Compute the total sales for the state CA in the year 1996
   vi. Compute the total sales in the year 1996 for the states (WI, CA)
   vii. Compute the total sales for the state WI in the year 1997
   viii. Compute the total sales for the state CA in the year 1997
   ix. Compute the total sales in the year 1997 for the states (WI, CA)
   x. Compute the total sales for the states WI in the years (1995, 1996, 1997)
   xi. Compute the total sales for the states CA in the years (1995, 1996, 1997)
   xii. Compute the total sales for the states (WI, CA) in the years (1995, 1996, 1997)
   xiii. The result of all the above queries should be a `year_state` pivot table

b. (12 marks) Construct a pivot table `year_state_02` - *method - 02*

	WI	CA
1995	63	81
1996	38	107
1997	75	35

`year_state_02_01`

	Total
1995	144
1996	145
1997	110

`year_state_02_02`

	WI	CA
Total	176	223

`year_state_02_03`

	Total
	399

`year_state_02_04`

   i. (3 marks) Write a single query using `sale, location` tables to generate `year_state_02_01`
   ii. (3 marks) Write a single query using `year_state_02_01` table to generate `year_state_02_02`

iii. (3 marks) Write a single query using `year_state_02_01` table to generate `year_state_02_03`

iv. (3 marks) Write a single query using either `year_state_02_02` or `year_state_02_03` to generate `year_state_02_04`

c. (12 marks) Construct a pivot table `year_state_03` - *method - 03*

- Compute the pivot table through a **single query**.
- Hint 1: The query would involve `group by` over year
- Hint 2: For each column of the pivot table, use `case` statement and `sum` aggregation function

d. (12 marks) Construct a pivot table `year_state_04` - *method - 04*

- (12 marks) Compute the pivot table through `rollup` operation