Knowledge Engineering Lab (CS6335)

(Assignment - 4 [OLAP])

National Institute of Technology, Warangal

(Submitted to - *Dr. Ramakrishnudu T*)

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Answer - 1.

`location_table`

`location_key`	`street`	`city`	`province_or_state`	`country`
NDLS	New Delhi	New Delhi	New Delhi	India
NITW	Kazipet	Warangal	Telangana	India
BLR	Electronic City	Bangaluru	Karnataka	India
HLD	Haldwani	Nainital	Uttarakhand	India

`branch_table`

`brach_key`	`branch_name`	`branch_type`
BR01	Northern Branch	Regional
BR02	Southern Branch	Regional
BR03	Main Branch	Country
BR04	Western Branch	Regional

`item_table`

`item_key`	`item_name`	`brand`	`item_type`	`supplier_type`
1	Mobile Phone	Nokia	Flip	Regular
2	Laptop	Dell	Touch	New
3	TV	Sony	Android	Regular
4	XBox	Microsoft	Console	New

`time_table`

`time_key`	`day`	`day_of_the_week`	`month_name`	`quarter`	`year`
T01	12	Monday	January	I	2021
T02	07	Wednesday	October	IV	2020
T03	21	Sunday	May	II	2021
T04	24	Tuesday	December	IV	2021

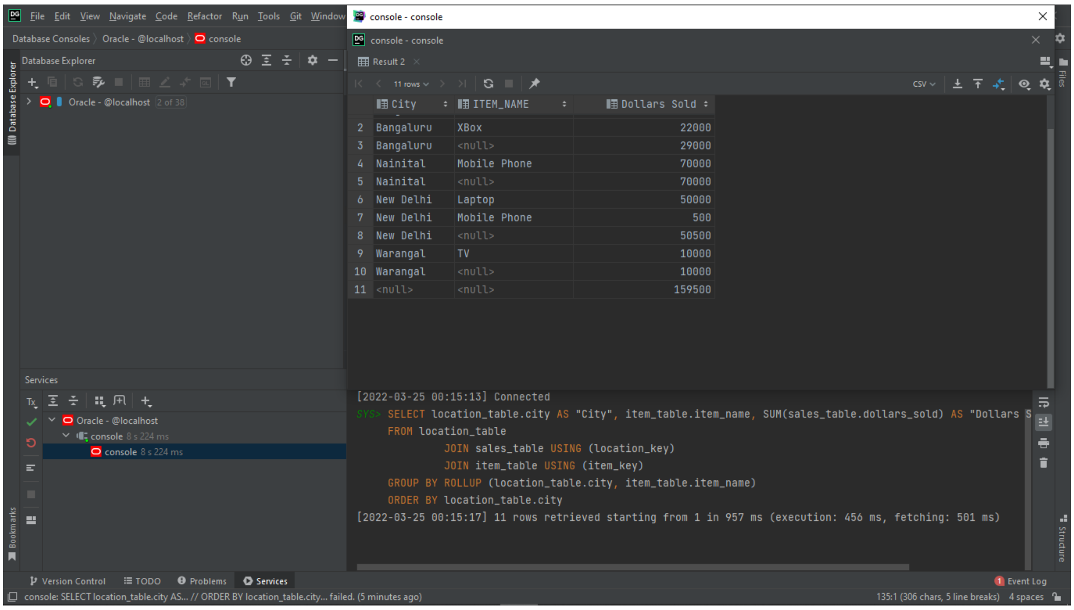
`sales_table`

sales_key	time_key	item_key	branch_key	location_key	dollars_sold	units_sold
S01	T01	1	BR01	NDLS	500	2
S02	T02	2	BR01	NDLS	50000	1
S03	T01	3	BR02	NITW	10000	2
S04	T03	1	BR03	BLR	7000	5
S05	T04	1	BR03	HLD	70000	2
S06	T02	4	BR03	BLR	22000	1

Answer - 1 - (A)

```sql
SELECT location_table.city AS "City", item_table.item_name,
    SUM(sales_table.dollars_sold) AS "Dollars Sold"
FROM location_table
         JOIN sales_table USING (location_key)
         JOIN item_table USING (item_key)
GROUP BY ROLLUP (location_table.city, item_table.item_name)
ORDER BY location_table.city;
```

Sample Output



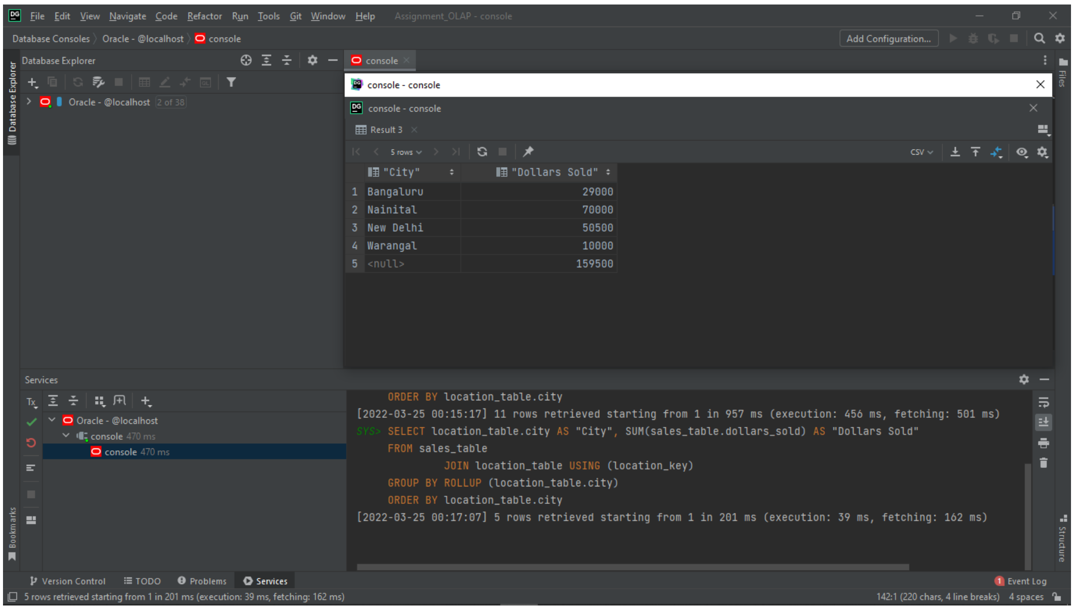
	City	ITEM_NAME	Dollars Sold
2	Bangaluru	XBox	22000
3	Bangaluru	<null>	29000
4	Nainital	Mobile Phone	70000
5	Nainital	<null>	70000
6	New Delhi	Laptop	50000
7	New Delhi	Mobile Phone	500
8	New Delhi	<null>	50500
9	Warangal	TV	10000
10	Warangal	<null>	10000
11	<null>	<null>	159500

```
[2022-03-25 00:15:13] Connected
SYS> SELECT location_table.city AS "City", item_table.item_name, SUM(sales_table.dollars_sold) AS "Dollars S
     FROM location_table
              JOIN sales_table USING (location_key)
              JOIN item_table USING (item_key)
     GROUP BY ROLLUP (location_table.city, item_table.item_name)
     ORDER BY location_table.city
[2022-03-25 00:15:17] 11 rows retrieved starting from 1 in 957 ms (execution: 456 ms, fetching: 501 ms)
```

Answer - 1 - (B)

```sql
SELECT location_table.city AS "City", SUM(sales_table.dollars_sold) AS "Dollars
↪  Sold"
FROM sales_table
         JOIN location_table USING (location_key)
GROUP BY ROLLUP (location_table.city)
ORDER BY location_table.city;
```

Sample Output



	"City"	"Dollars Sold"
1	Bangaluru	29000
2	Nainital	70000
3	New Delhi	50500
4	Warangal	10000
5	<null>	159500

```
    ORDER BY location_table.city
[2022-03-25 00:15:17] 11 rows retrieved starting from 1 in 957 ms (execution: 456 ms, fetching: 501 ms)
SYS> SELECT location_table.city AS "City", SUM(sales_table.dollars_sold) AS "Dollars Sold"
    FROM sales_table
             JOIN location_table USING (location_key)
    GROUP BY ROLLUP (location_table.city)
    ORDER BY location_table.city
[2022-03-25 00:17:07] 5 rows retrieved starting from 1 in 201 ms (execution: 39 ms, fetching: 162 ms)
```

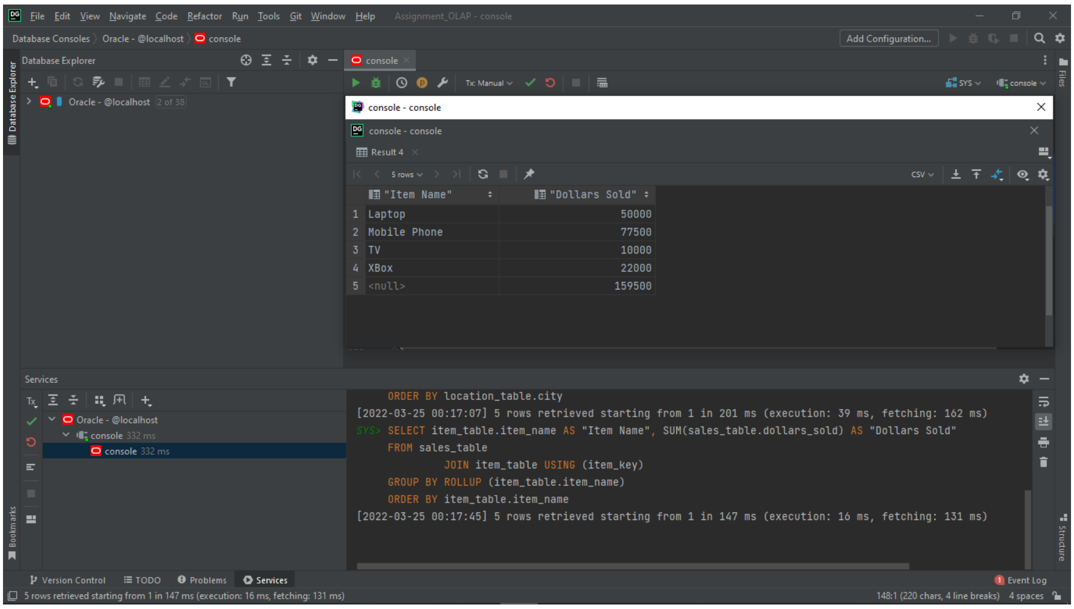
5 rows retrieved starting from 1 in 201 ms (execution: 39 ms, fetching: 162 ms)

142:1 (220 chars, 4 line breaks) 4 spaces

`Answer - 1 - (C)`

```sql
SELECT item_table.item_name AS "Item Name", SUM(sales_table.dollars_sold) AS
↪  "Dollars Sold"
FROM sales_table
         JOIN item_table USING (item_key)
GROUP BY ROLLUP (item_table.item_name)
ORDER BY item_table.item_name;
```

Sample Output


File Edit View Navigate Code Refactor Run Tools Git Window Help Assignment_OLAP - console
Database Consoles > Oracle - @localhost > console
Database Explorer
Oracle - @localhost 2 of 38
console
Tx: Manual
SYS
console - console
Result 4
5 rows
CSV
Services
Oracle - @localhost
console 332 ms
console 332 ms
Version Control
TODO
Problems
Services
Event Log
148:1 (220 chars, 4 line breaks) 4 spaces

	"Item Name"	"Dollars Sold"
1	Laptop	50000
2	Mobile Phone	77500
3	TV	10000
4	XBox	22000
5	<null>	159500

```
    ORDER BY location_table.city
[2022-03-25 00:17:07] 5 rows retrieved starting from 1 in 201 ms (execution: 39 ms, fetching: 162 ms)
SYS> SELECT item_table.item_name AS "Item Name", SUM(sales_table.dollars_sold) AS "Dollars Sold"
    FROM sales_table
            JOIN item_table USING (item_key)
    GROUP BY ROLLUP (item_table.item_name)
    ORDER BY item_table.item_name
[2022-03-25 00:17:45] 5 rows retrieved starting from 1 in 147 ms (execution: 16 ms, fetching: 131 ms)
```

5 rows retrieved starting from 1 in 147 ms (execution: 16 ms, fetching: 131 ms)

`Answer - 1 - (D):` Number of dimensions, `n = 4`

Distinct tuples in each dimension, `p = 4`

Hence, the maximum number of cells in the base cuboid $= p^n = 4^4 = 256$

`Answer - 1 - (E):` The minimum number of cells in the base cuboid $= p = 4$

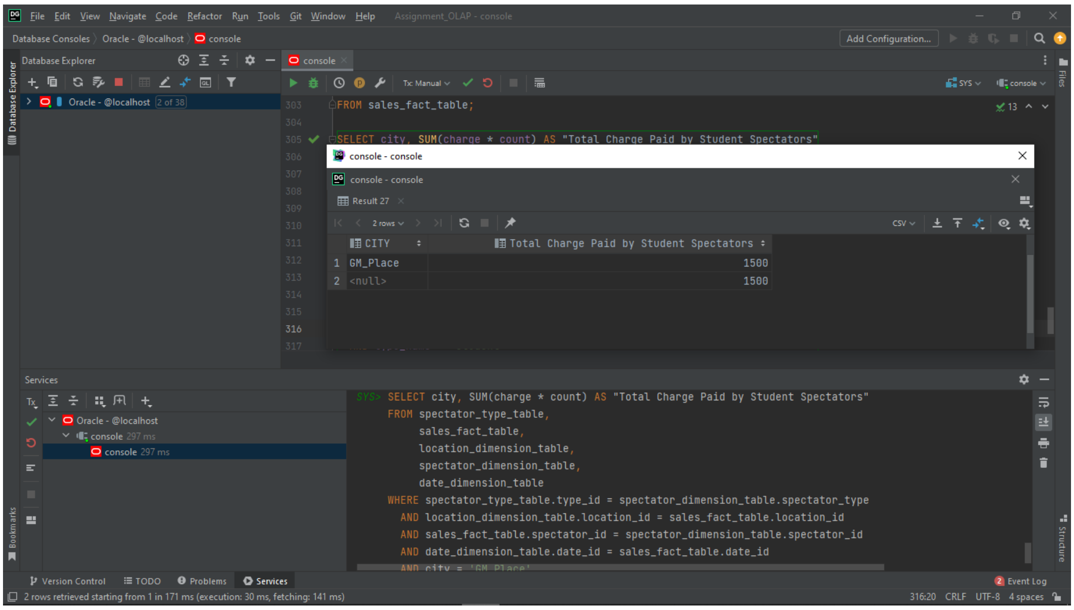
`Answer - 2:` The specific OLAP operations to be performed are:

1. Roll-up on `date` from `date_id` to `year`.
2. Roll-up on `game` from `game_id` to all.
3. Roll-up on `location` from `location_id` to `location_name`.
4. Roll-up on `spectator` from `spectator_id` to `status`.
5. Dice with `status="student", location_name = "GM Place", year = 2010`.

`Answer - 2 - (A)`

```sql
SELECT city, SUM(charge * count) AS "Total Charge Paid by Student Spectators"
FROM spectator_type_table,
     sales_fact_table,
     location_dimension_table,
     spectator_dimension_table,
     date_dimension_table
WHERE spectator_type_table.type_id = spectator_dimension_table.spectator_type
  AND location_dimension_table.location_id = sales_fact_table.location_id
  AND sales_fact_table.spectator_id = spectator_dimension_table.spectator_id
  AND date_dimension_table.date_id = sales_fact_table.date_id
  AND city = 'GM_Place'
  AND year = '2010'
  AND type_name = 'Student'
GROUP BY ROLLUP (city);
```

Sample Output



```
FROM sales_fact_table;

SELECT city, SUM(charge * count) AS "Total Charge Paid by Student Spectators"
```

	CITY	Total Charge Paid by Student Spectators
1	GM_Place	1500
2	<null>	1500

```
SYS> SELECT city, SUM(charge * count) AS "Total Charge Paid by Student Spectators"
     FROM spectator_type_table,
          sales_fact_table,
          location_dimension_table,
          spectator_dimension_table,
          date_dimension_table
     WHERE spectator_type_table.type_id = spectator_dimension_table.spectator_type
       AND location_dimension_table.location_id = sales_fact_table.location_id
       AND sales_fact_table.spectator_id = spectator_dimension_table.spectator_id
       AND date_dimension_table.date_id = sales_fact_table.date_id
       AND city = 'GM_Place'
```

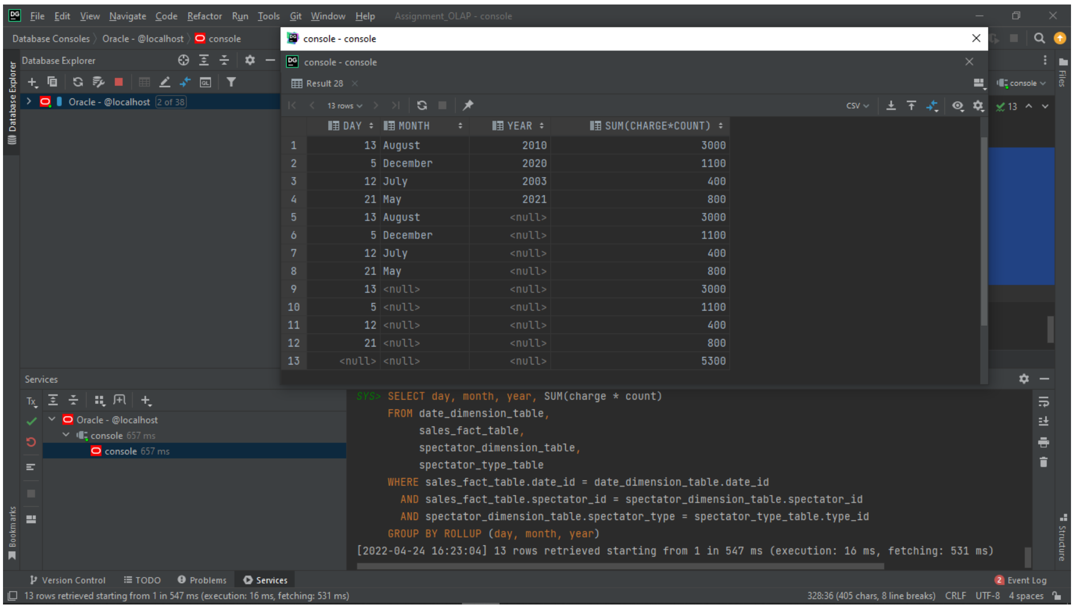
2 rows retrieved starting from 1 in 171 ms (execution: 30 ms, fetching: 141 ms)

316:20 CRLF UTF-8 4 spaces

Answer - 2 - (B)

```
SELECT day, month, year, SUM(charge * count)
FROM date_dimension_table,
     sales_fact_table,
     spectator_dimension_table,
     spectator_type_table
WHERE sales_fact_table.date_id = date_dimension_table.date_id
  AND sales_fact_table.spectator_id = spectator_dimension_table.spectator_id
  AND spectator_dimension_table.spectator_type = spectator_type_table.type_id
GROUP BY ROLLUP (day, month, year);
```

Sample Output



File Edit View Navigate Code Refactor Run Tools Git Window Help Assignment_OLAP - console
Database Consoles 〉 Oracle - @localhost 〉 console
console - console
Database Explorer
Oracle - @localhost 2 of 38
Result 28
13 rows
CSV
console
Services
Version Control
TODO
Problems
Services
Event Log

	DAY	MONTH	YEAR	SUM(CHARGE*COUNT)
1	13	August	2010	3000
2	5	December	2020	1100
3	12	July	2003	400
4	21	May	2021	800
5	13	August	<null>	3000
6	5	December	<null>	1100
7	12	July	<null>	400
8	21	May	<null>	800
9	13	<null>	<null>	3000
10	5	<null>	<null>	1100
11	12	<null>	<null>	400
12	21	<null>	<null>	800
13	<null>	<null>	<null>	5300

```
SYS> SELECT day, month, year, SUM(charge * count)
     FROM date_dimension_table,
          sales_fact_table,
          spectator_dimension_table,
          spectator_type_table
     WHERE sales_fact_table.date_id = date_dimension_table.date_id
       AND sales_fact_table.spectator_id = spectator_dimension_table.spectator_id
       AND spectator_dimension_table.spectator_type = spectator_type_table.type_id
     GROUP BY ROLLUP (day, month, year)
[2022-04-24 16:23:04] 13 rows retrieved starting from 1 in 547 ms (execution: 16 ms, fetching: 531 ms)
```

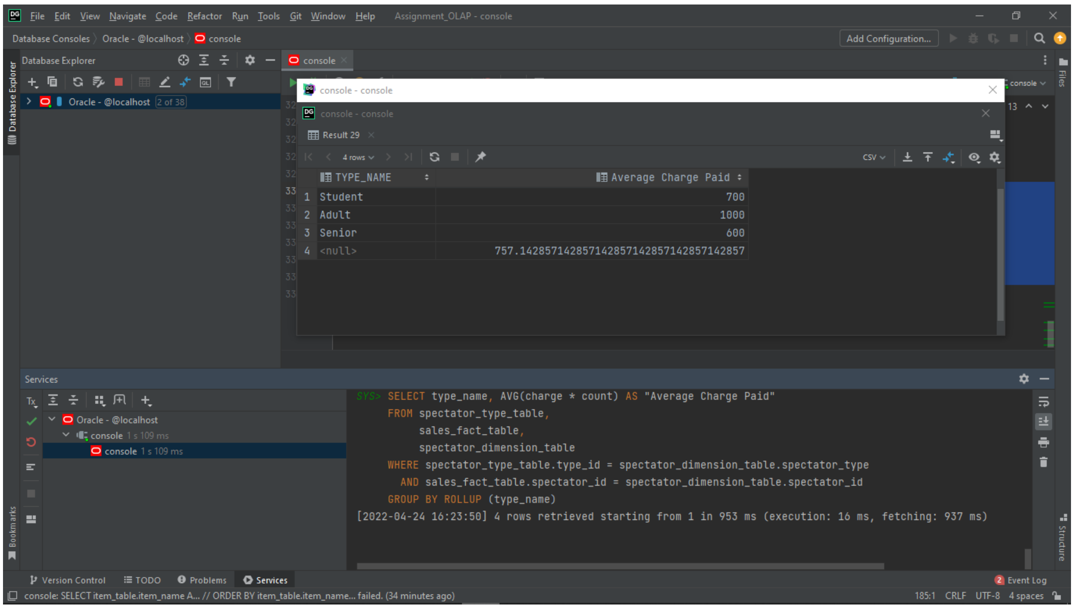
```
Oracle - @localhost
  console 657 ms
    console 657 ms
```

```
13 rows retrieved starting from 1 in 547 ms (execution: 16 ms, fetching: 531 ms)    328:36 (405 chars, 8 line breaks)  CRLF  UTF-8  4 spaces
```

Answer - 2 - (C)

```sql
SELECT type_name, AVG(charge * count) AS "Average Charge Paid"
FROM spectator_type_table,
     sales_fact_table,
     spectator_dimension_table
WHERE spectator_type_table.type_id = spectator_dimension_table.spectator_type
  AND sales_fact_table.spectator_id = spectator_dimension_table.spectator_id
GROUP BY ROLLUP (type_name);
```

Sample Output



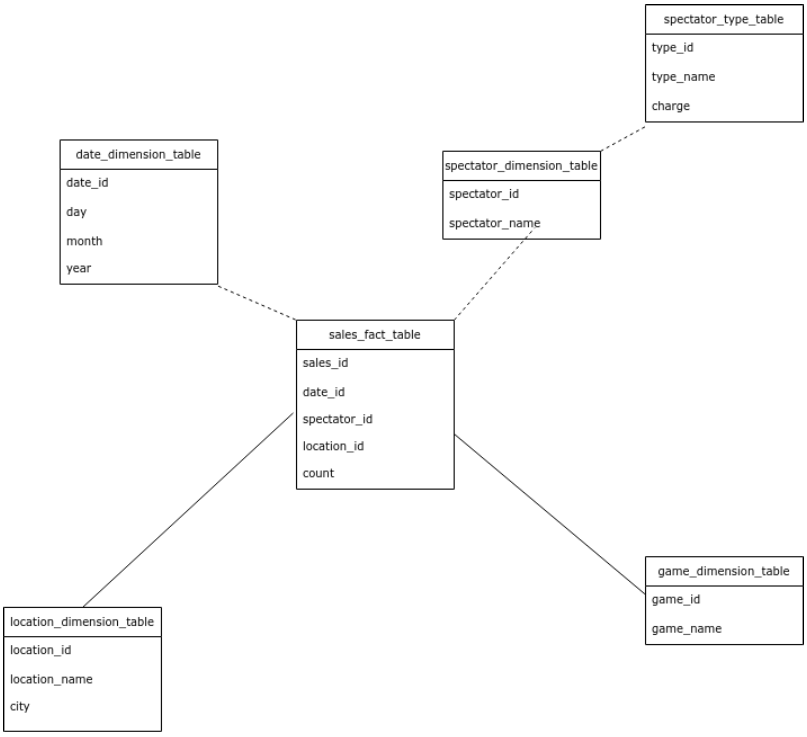
Result 29

	TYPE_NAME	Average Charge Paid
1	Student	700
2	Adult	1000
3	Senior	600
4	<null>	757.142857142857142857142857142857

```
SYS> SELECT type_name, AVG(charge * count) AS "Average Charge Paid"
     FROM spectator_type_table,
          sales_fact_table,
          spectator_dimension_table
     WHERE spectator_type_table.type_id = spectator_dimension_table.spectator_type
       AND sales_fact_table.spectator_id = spectator_dimension_table.spectator_id
     GROUP BY ROLLUP (type_name)
[2022-04-24 16:23:50] 4 rows retrieved starting from 1 in 953 ms (execution: 16 ms, fetching: 937 ms)
```

console: SELECT item_table.item_name A... // ORDER BY item_table.item_name... failed. (34 minutes ago)

Answer - 2 - (D) Sample Output


spectator_type_table
type_id
type_name
charge
date_dimension_table
date_id
day
month
year
spectator_dimension_table
spectator_id
spectator_name
sales_fact_table
sales_id
date_id
spectator_id
location_id
count
game_dimension_table
game_id
game_name
location_dimension_table
location_id
location_name
city