PRACTICAL NO: 02

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DATE : 30-JULY-2019

Aim: Write and Execute SQL aggregation queries for data warehouse.

Details: To run queries for CUBE, PARTIAL CUBE, ROLLUP, PARTIAL ROLLUP, GROUPING, GROUPING SETS, GROUP_ID( )

--
Q1. Find the total sales by country_id and channel_desc for the US and GB through the Internet and direct sales in September 2000 and October 2000 using ROLL-UP Extension.

The query should return the following:

- The aggregation rows that would be produced by GROUP BY ,
- The First-level subtotals aggregating across country_id for each combination of channel_desc and calendar_month.
- Second-level subtotals aggregating across calendar_month.

--

```
SELECT channels.channel_desc, calendar_month_desc, countries.country_iso_code,
    TO_CHAR(SUM(amount_sold), '9,999,999,999') SALES$
    FROM sales, customers, times, channels, countries
    WHERE sales.time_id=times.time_id
        AND sales.cust_id=customers.cust_id
        AND customers.country_id = countries.country_id
        AND sales.channel_id = channels.channel_id
        AND channels.channel_desc IN ('Direct Sales', 'Internet')
        AND times.calendar_month_desc IN ('2000-09', '2000-10')
        AND countries.country_iso_code IN ('GB', 'US')
        GROUP BY ROLLUP(channels.channel_desc,
calendar_month_desc,countries.country_iso_code);

/
```

```
CHANNEL_DESC        CALENDAR CO SALES$
-------------------- -------- -- --------------
Internet            2000-09  GB        16,569
Internet            2000-09  US       124,224
```

```
Internet          2000-09          140,793
Internet          2000-10  GB       14,539
Internet          2000-10  US      137,054
Internet          2000-10          151,593
Internet                          292,387
Direct Sales      2000-09  GB       85,223
Direct Sales      2000-09  US      638,201
Direct Sales      2000-09          723,424
Direct Sales      2000-10  GB       91,925

CHANNEL_DESC      CALENDAR CO SALES$
------------------- -------- -- --------------
Direct Sales      2000-10  US      682,297
Direct Sales      2000-10          774,222
Direct Sales                      1,497,646
                            1,790,032

15 rows selected.
 /


--
Q2. Find the total sales by country_id and channel_desc for the US and GB through the
Internet and direct sales in September 2000 and
October 2009 using CUBE aggregation across three dimensions- channel_desc,
calendar_month_desc, countries.country_iso_code.
--

SELECT channels.channel_desc, calendar_month_desc, countries.country_iso_code,
      SUM(amount_sold) SALES$
      FROM sales, customers, times, channels, countries
      WHERE sales.time_id=times.time_id
      AND sales.cust_id=customers.cust_id
      AND customers.country_id = countries.country_id
      AND sales.channel_id = channels.channel_id
      AND channels.channel_desc IN ('Direct Sales', 'Internet')
      AND times.calendar_month_desc IN ('2000-09', '2000-10')
      AND countries.country_iso_code IN ('GB', 'US')
      GROUP BY
```

```
      CUBE(channels.channel_desc, calendar_month_desc, countries.country_iso_code);
/

CHANNEL_DESC        CALENDAR CO    SALES$
-------------------- -------- -- ----------
                       1790032.29
                     GB  208256.85
                     US 1581775.44
               2000-09     864216.84
               2000-09  GB  101792.28
               2000-09  US  762424.56
               2000-10     925815.45
               2000-10  GB  106464.57
               2000-10  US  819350.88
Internet                   292386.54
Internet                 GB    31108.5

CHANNEL_DESC        CALENDAR CO    SALES$
-------------------- -------- -- ----------
Internet                 US  261278.04
Internet           2000-09     140793.11
Internet           2000-09  GB   16569.36
Internet           2000-09  US  124223.75
Internet           2000-10     151593.43
Internet           2000-10  GB   14539.14
Internet           2000-10  US  137054.29
Direct Sales               1497645.75
Direct Sales             GB  177148.35
Direct Sales             US  1320497.4
Direct Sales       2000-09     723423.73

CHANNEL_DESC        CALENDAR CO    SALES$
-------------------- -------- -- ----------
Direct Sales               2000-09     GB      85222.92
Direct Sales               2000-09     US     638200.81
Direct Sales               2000-10             774222.02
Direct Sales               2000-10      GB      91925.43
Direct Sales               2000-10      US      682296.59
```

27 rows selected.
/

--
Q3. Find the total sales by country_iso and channel_desc for the US and France through the Internet and direct sales in September 2000

--
```
SELECT channels.channel_desc,countries.country_iso_code,sum(amount_sold) sales
      FROM sales,channels,countries,customers,times
      WHERE sales.time_id=times.time_id
      AND sales.cust_id=customers.cust_id
      AND customers.country_id = countries.country_id
      AND sales.channel_id = channels.channel_id
      AND countries.country_iso_code in ('US','FR')
      AND channels.channel_desc IN ('Direct Sales', 'Internet')
      AND times.calendar_month_desc IN ('2000-09')
      GROUP BY CUBE(channels.channel_desc,countries.country_iso_code);

/

CHANNEL_DESC        CO     SALES
-------------------- -- ----------
                        833223.68
                     FR   70799.12
                     US  762424.56
Internet                133820.61
Internet             FR    9596.86
Internet             US  124223.75
Direct Sales            699403.07
Direct Sales         FR   61202.26
Direct Sales         US  638200.81

9 rows selected.
/

--
```

Q4. Find the total sales by country_id and channel_desc for the US and GB through the Internet and direct sales in September 2000 and October 2009 using PARTIAL ROLL-UP. The query should return the following:

• Regular aggregation rows that would be produced by GROUP BY without using ROLLUP.
• First-level subtotals aggregating across country_id for each combination of channel_desc and calendar_month_desc.
• Second-level subtotals aggregating across calendar_month_desc and country_id for each channel_desc value.
• It does not produce a grand total row.

```
--
SELECT
calendar_month_desc,countries.country_iso_code,channels.channel_desc,sum(amount
_sold)sales$
      from sales,channels,countries,customers,times
      WHERE sales.time_id=times.time_id
      AND sales.cust_id=customers.cust_id
      AND customers.country_id = countries.country_id
      AND sales.channel_id = channels.channel_id
      AND countries.country_iso_code in ('US','GB')
      AND channels.channel_desc IN ('Direct Sales', 'Internet')
      AND times.calendar_month_desc IN ('2000-09','2000-10')
      GROUP BY
channel_desc,ROLLUP(countries.country_iso_code,times.calendar_month_desc);

/
CALENDAR CO CHANNEL_DESC           SALES$
-------- -- -------------------- ----------
2000-09  GB Internet              16569.36
2000-10  GB Internet              14539.14
      GB Internet               31108.5
2000-09  US Internet             124223.75
2000-10  US Internet             137054.29
      US Internet              261278.04
        Internet               292386.54
2000-09  GB Direct Sales          85222.92
2000-10  GB Direct Sales          91925.43
      GB Direct Sales          177148.35
2000-09  US Direct Sales         638200.81
```

```
CALENDAR CO CHANNEL_DESC           SALES$
-------- -- -------------------- ----------
2000-10  US Direct Sales         682296.59
         US Direct Sales          1320497.4
           Direct Sales         1497645.75

14 rows selected.
 /

--
Q5. Find the total sales by country_id and channel_desc for the US and GB through the
Internet and direct sales in September 2000 and October 2009 using PARTIAL CUBE
aggregation on month and country code and GROUP BY on channel_desc.
--

SELECT
calendar_month_desc,countries.country_iso_code,channels.channel_desc,sum(amount
_sold)sales$
       from sales,channels,countries,customers,times
       WHERE sales.time_id=times.time_id
       AND sales.cust_id=customers.cust_id
       AND customers.country_id = countries.country_id
       AND sales.channel_id = channels.channel_id
       AND countries.country_iso_code in ('US','GB')
       AND channels.channel_desc IN ('Direct Sales', 'Internet')
       AND times.calendar_month_desc IN ('2000-09','2000-10')
       GROUP BY
channel_desc,cube(countries.country_iso_code,times.calendar_month_desc);
/
CALENDAR CO CHANNEL_DESC           SALES$
-------- -- -------------------- ----------
           Internet             292386.54
2000-09    Internet               140793.11
2000-10    Internet               151593.43
         GB Internet              31108.5
2000-09  GB Internet               16569.36
2000-10  GB Internet               14539.14
         US Internet             261278.04
2000-09  US Internet               124223.75
```

```
2000-10  US Internet            137054.29
         Direct Sales         1497645.75
2000-09     Direct Sales         723423.73

CALENDAR CO CHANNEL_DESC           SALES$
-------- -- -------------------- ----------
2000-10     Direct Sales         774222.02
       GB Direct Sales          177148.35
2000-09  GB Direct Sales           85222.92
2000-10  GB Direct Sales           91925.43
       US Direct Sales          1320497.4
2000-09  US Direct Sales          638200.81
2000-10  US Direct Sales          682296.59

18 rows selected.
 /

--
Q6. Use GROUPING to create a set of mask columns for the result set of Q1.
• Create grouping on channel_desc and name it as CH
• Create grouping calendar_month_desc and name it as MO
• Create grouping on country_iso_code and name it as CO
--

SELECT channels.channel_desc, calendar_month_desc,countries.country_iso_code,
SUM(amount_sold) SALES$ ,
GROUPING(channels.channel_desc)AS CH,
GROUPING(TIMES.CALENDAR_MONTH_DESC)AS MO,
GROUPING(COUNTRIES.COUNTRY_ISO_CODE)AS CO
      FROM sales, customers, times, channels, countries
      WHERE sales.time_id=times.time_id
      AND sales.cust_id=customers.cust_id
      AND customers.country_id = countries.country_id
      AND sales.channel_id = channels.channel_id
      AND channels.channel_desc IN ('Direct Sales', 'Internet')
      AND times.calendar_month_desc IN ('2000-09', '2000-10')
      AND countries.country_iso_code IN ('GB', 'US')
      GROUP BY
```

```
      ROLLUP(channels.channel_desc, calendar_month_desc,
countries.country_iso_code);
/
CHANNEL_DESC        CALENDAR CO    SALES$        CH        MO        CO
-------------------- -------- -- ---------- ---------- ---------- ----------
Internet            2000-09  GB   16569.36         0         0         0
Internet            2000-09  US  124223.75         0         0         0
Internet            2000-09      140793.11         0         0         1
Internet            2000-10  GB   14539.14         0         0         0
Internet            2000-10  US  137054.29         0         0         0
Internet            2000-10      151593.43         0         0         1
Internet                         292386.54         0         1         1
Direct Sales        2000-09  GB   85222.92         0         0         0
Direct Sales        2000-09  US  638200.81         0         0         0
Direct Sales        2000-09      723423.73         0         0         1
Direct Sales        2000-10  GB   91925.43         0         0         0

CHANNEL_DESC        CALENDAR CO    SALES$        CH        MO        CO
-------------------- -------- -- ---------- ---------- ---------- ----------
Direct Sales        2000-10  US  682296.59         0         0         0
Direct Sales        2000-10      774222.02         0         0         1
Direct Sales                    1497645.75         0         1         1
                              1790032.29         1         1         1

15 rows selected
 /

--
```

Q7. Find the total sales by country_id and channel_desc for the US and GB through the Internet and direct sales in September 2000 and October 2009 using GROUPING SETS. Calculate aggregates over three groupings:

- (channel_desc, calendar_month_desc, country_iso_code)
- (channel_desc, country_iso_code)
- (calendar_month_desc, country_iso_code)

```
--
SELECT channels.channel_desc, calendar_month_desc, countries.country_iso_code,
TO_CHAR(SUM(amount_sold), '9,999,999,999') SALES$
FROM sales, customers, times, channels, countries
      WHERE sales.time_id=times.time_id
```

```
        AND sales.cust_id=customers.cust_id
        AND customers.country_id = countries.country_id
        AND sales.channel_id = channels.channel_id
        AND channels.channel_desc IN ('Direct Sales', 'Internet')
        AND times.calendar_month_desc IN ('2000-09', '2000-10')
        AND countries.country_iso_code IN ('GB', 'US')
        GROUP BY
        GROUPING SETS((channel_desc,calendar_month_desc,country_iso_code),
(channel_desc,country_iso_code),(calendar_month_desc,country_iso_code));

/
CHANNEL_DESC        CALENDAR CO SALES$
-------------------- -------- -- --------------
Internet            2000-09  GB        16,569
Direct Sales         2000-09  GB        85,223
Internet            2000-09  US       124,224
Direct Sales         2000-09  US       638,201
Internet            2000-10  GB        14,539
Direct Sales         2000-10  GB        91,925
Internet            2000-10  US       137,054
Direct Sales         2000-10  US       682,297
                  2000-09  GB       101,792
                  2000-09  US       762,425
                  2000-10  GB       106,465

CHANNEL_DESC        CALENDAR CO SALES$
-------------------- -------- -- --------------
                  2000-10  US       819,351
Direct Sales                GB       177,148
Internet                   GB        31,109
Direct Sales                US     1,320,497
Internet                   US       261,278

16 rows selected.
 /

--
```

Q.8 Perform aggregation on amount sold. It should get aggregated by month first, then by all the months in each quarter, and then across all

months and quarters in the year.
--

```
SELECT times.calendar_month_desc as months,times.calendar_quarter_desc as
quarter ,times.calendar_year as years ,sum(amount_sold) as sales$
FROM sales, customers, times, channels, countries
      WHERE sales.time_id=times.time_id
      AND sales.cust_id=customers.cust_id
      AND customers.country_id = countries.country_id
      AND sales.channel_id = channels.channel_id
      AND channels.channel_desc IN ('Direct Sales', 'Internet')
      AND times.calendar_year in('1999')
      AND countries.country_iso_code IN ('GB', 'US')
      GROUP BY ROLLUP( calendar_year,calendar_quarter_desc,calendar_month_desc);

/
MONTHS   QUARTER     YEARS    SALES$
-------- ------- ---------- ----------
1999-01  1999-01      1999  974627.95
1999-02  1999-01      1999 1089255.92
1999-03  1999-01      1999   754026.7
       1999-01      1999 2817910.57
1999-04  1999-02      1999  708060.57
1999-05  1999-02      1999  818055.52
1999-06  1999-02      1999  729677.52
       1999-02      1999 2255793.61
1999-07  1999-03      1999  893452.47
1999-08  1999-03      1999  883460.92
1999-09  1999-03      1999  923577.01

MONTHS   QUARTER     YEARS    SALES$
-------- ------- ---------- ----------
       1999-03      1999  2700490.4
1999-10  1999-04      1999  715831.36
1999-11  1999-04      1999  742248.42
1999-12  1999-04      1999  841572.17
       1999-04      1999 2299651.95
                 1999 10073846.5
                    10073846.5
```

18 rows selected. /

--
Q.9 Implement concatenated rollup. First roll up on (channel_total, channel_class)
and second roll up on(country_region and country_iso_code)
--

```
SELECT
channels.channel_total,channels.channel_class,countries.country_region,countries.coun
try_iso_code,
TO_CHAR(SUM(amount_sold), '9,999,999,999') SALES$
FROM sales, customers, times, channels, countries
      WHERE sales.time_id=times.time_id
      AND sales.cust_id=customers.cust_id
      AND customers.country_id = countries.country_id
      AND sales.channel_id = channels.channel_id
      AND times.calendar_month_desc IN ('2001-09', '2001-10')
      AND countries.country_iso_code IN ('GB', 'US')
      GROUP BY

ROLLUP(channels.channel_total,channels.channel_class),ROLLUP(countries.country_regi
on,countries.country_iso_code);

/
CHANNEL_TOTAL CHANNEL_CLASS       COUNTRY_REGION      CO SALES$
------------- -------------------- -------------------- -- -------------
                          Europe               GB       321,244
                          Europe                        321,244
                          Americas             US       2,603,473
                          Americas                      2,603,473
                                                        2,924,717
Channel total             Europe               GB       321,244
Channel total             Europe                        321,244
Channel total             Americas             US       2,603,473
Channel total             Americas                      2,603,473
Channel total                                           2,924,717
Channel total Direct      Europe               GB       168,161

CHANNEL_TOTAL CHANNEL_CLASS       COUNTRY_REGION      CO SALES$
```

```
------------ ------------------- ------------------- -- --------------
Channel total Direct          Europe                    168,161
Channel total Direct          Americas          US      1,187,918
Channel total Direct          Americas                  1,187,918
Channel total Direct                                    1,356,079
Channel total Others          Europe            GB        77,265
Channel total Others          Europe                    77,265
Channel total Others          Americas          US        729,606
Channel total Others          Americas                  729,606
Channel total Others                                    806,872
Channel total Indirect        Europe            GB        75,817
Channel total Indirect        Europe                    75,817

CHANNEL_TOTAL CHANNEL_CLASS       COUNTRY_REGION      CO SALES$
------------ ------------------- ------------------- -- --------------
Channel total Indirect        Americas          US        685,949
Channel total Indirect        Americas                    685,949
Channel total Indirect                                    761,766

25 rows selected.
 /
--
```

Q10. Consider the following Query and make conclusion from the result obtained.

--

Query: (scott Schema)

```
SELECT deptno, job, SUM(sal) FROM emp
GROUP BY CUBE(deptno, job);

/
    DEPTNO JOB       SUM(SAL)
---------- --------- ----------
                     29025
           CLERK          4150
           ANALYST        6000
           MANAGER        8275
           SALESMAN       5600
           PRESIDENT      5000
        10                8750
        10 CLERK          1300
```

```
        10 MANAGER        2450
        10 PRESIDENT      5000
        20              10875

   DEPTNO JOB        SUM(SAL)
---------- --------- ----------
        20 CLERK          1900
        20 ANALYST        6000
        20 MANAGER        2975
        30              9400
        30 CLERK           950
        30 MANAGER        2850
        30 SALESMAN       5600

18 rows selected. /

--
Q11. Find the total sales by country name and channel_desc for the country name
starting from U through
 the Internet and direct sales in September 2000 and October.
--

SELECT channels.channel_desc, calendar_month_desc, countries.country_name,
TO_CHAR(SUM(amount_sold), '9,999,999,999') SALES$
FROM sales, customers, times, channels, countries
        WHERE sales.time_id=times.time_id
        AND sales.cust_id=customers.cust_id
        AND customers.country_id = countries.country_id
        AND sales.channel_id = channels.channel_id
        AND channels.channel_desc IN ('Direct Sales', 'Internet')
        AND times.calendar_month_desc IN ('2000-09', '2000-10')
        AND countries.country_name like 'U%'
        GROUP BY
        ROLLUP(channels.channel_desc, calendar_month_desc, countries.country_name);

/

CHANNEL_DESC        CALENDAR COUNTRY_NAME               SALES$
-------------------- -------- -------------------------- --------------
```

```
Internet          2000-09  United Kingdom              16,569
Internet          2000-09  United States of America    124,224
Internet          2000-09                              140,793
Internet          2000-10  United Kingdom              14,539
Internet          2000-10  United States of America    137,054
Internet          2000-10                              151,593
Internet                                                292,387
Direct Sales      2000-09  United Kingdom              85,223
Direct Sales      2000-09  United States of America    638,201
Direct Sales      2000-09                              723,424
Direct Sales      2000-10  United Kingdom              91,925

CHANNEL_DESC      CALENDAR COUNTRY_NAME                SALES$
------------------- -------- ---------------------------- -------------
Direct Sales      2000-10  United States of America    682,297
Direct Sales      2000-10                              774,222
Direct Sales                                           1,497,646
                                                       1,790,032

15 rows selected. /

--
Q12. Analyze the output
--

SELECT ch.channel_desc, t.calendar_month_desc, co.country_iso_code,
SUM(s.amount_sold) sum_amount_sold, GROUPING_ID( ch.channel_desc,
t.calendar_month_desc, co.country_iso_code) grouping_id
FROM sales s, customers cu, times t, channels ch, countries co
      WHERE s.time_id=t.time_id
      AND s.cust_id=cu.cust_id
      AND cu.country_id = co.country_id
      AND s.channel_id = ch.channel_id
      AND ch.channel_desc IN ('Direct Sales', 'Internet')
      AND t.calendar_month_desc IN ('2001-09', '2001-10')
      AND co.country_iso_code IN ('GB', 'US')
      GROUP BY ROLLUP( ch.channel_desc, t.calendar_month_desc,
co.country_iso_code);
```

/

```
 CHANNEL_DESC        CALENDAR CO SUM_AMOUNT_SOLD GROUPING_ID
-------------------- -------- -- --------------- -----------
Internet             2001-09  GB       36806.73           0
Internet             2001-09  US      299621.96           0
Internet             2001-09          336428.69           1
Internet             2001-10  GB       39010.76           0
Internet             2001-10  US      386326.55           0
Internet             2001-10          425337.31           1
Internet                              761766           3
Direct Sales         2001-09  GB       92865.04           0
Direct Sales         2001-09  US      621197.94           0
Direct Sales         2001-09          714062.98           1
Direct Sales         2001-10  GB       75296.44           0

CHANNEL_DESC        CALENDAR CO SUM_AMOUNT_SOLD GROUPING_ID
-------------------- -------- -- --------------- -----------
Direct Sales         2001-10  US       566719.8           0
Direct Sales         2001-10          642016.24           1
Direct Sales                         1356079.22           3
                                    2117845.22           7

15 rows selected.
```

It tells about how many dimensions are considered for calculating the GRAND TOTAL by calculating the decimal value of binary no. of dimensions.
i.e. here,(111) in binary is 7 which implies -> all 3 dimensions are considered.
/