**Practical No 2:-**

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

Queries:-

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_desc and country_id for each channel_desc value.
 A grand total row.

```
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,
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
Cube(channels.channel_desc, calendar_month_desc,
countries.country_iso_code);
```

```
CHANNEL_DESC         CALENDAR CO SALES$
-------------------- -------- -- --------------
                                      1,790,032
                              GB        208,257
                              US      1,581,775
                     2000-09            864,217
                     2000-09  GB        101,792
                     2000-09  US        762,425
                     2000-10            925,815
                     2000-10  GB        106,465
                     2000-10  US        819,351
Internet                                292,387
Internet                      GB         31,109

CHANNEL_DESC         CALENDAR CO SALES$
-------------------- -------- -- --------------
Internet                      US        261,278
Internet             2000-09            140,793
Internet             2000-09  GB         16,569
Internet             2000-09  US        124,224
Internet             2000-10            151,593
Internet             2000-10  GB         14,539
Internet             2000-10  US        137,054
Direct Sales                            1,497,646
Direct Sales                  GB        177,148
Direct Sales                  US      1,320,497
Direct Sales         2000-09            723,424

CHANNEL_DESC         CALENDAR CO SALES$
-------------------- -------- -- --------------
Direct Sales         2000-09  GB         85,223
Direct Sales         2000-09  US        638,201
Direct Sales         2000-10            774,222
Direct Sales         2000-10  GB         91,925
Direct Sales         2000-10  US        682,297

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,
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')
AND countries.country_iso_code IN ('FR', 'US')
group by cube(channels.channel_desc,
countries.country_iso_code);
```

```
CHANNEL_DESC         CO SALES$
-------------------- -- --------------
                           833,224
                     FR     70,799
                     US    762,425
Internet                   133,821
Internet             FR      9,597
Internet             US    124,224
Direct Sales               699,403
Direct Sales         FR     61,202
Direct Sales         US    638,201

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 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 channel_desc, ROLLUP( 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

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 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 channels.channel_desc,
Cube( calendar_month_desc,countries.country_iso_code);

CHANNEL_DESC         CALENDAR CO SALES$
-------------------- -------- -- --------------
Internet                                292,387
Internet                         GB         31,109
Internet                         US        261,278
Internet             2000-09            140,793
Internet             2000-09  GB         16,569
Internet             2000-09  US        124,224
Internet             2000-10            151,593
Internet             2000-10  GB         14,539
Internet             2000-10  US        137,054
Direct Sales                          1,497,646
Direct Sales                     GB        177,148

CHANNEL_DESC         CALENDAR CO SALES$
-------------------- -------- -- --------------
Direct Sales                     US      1,320,497
Direct Sales         2000-09            723,424
Direct Sales         2000-09  GB         85,223
Direct Sales         2000-09  US        638,201
Direct Sales         2000-10            774,222
Direct Sales         2000-10  GB         91,925
```

```
Direct Sales         2000-10  US        682,297

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,
TO_CHAR(SUM(amount_sold), '9,999,999,999') SALES$,grouping(channel_desc) as
CH,grouping (country_iso_code) as CO,grouping(calendar_month_desc) as MO
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         CO         MO
-------------------- -------- -- -------------- ---------- ---------- ----------
Internet             2000-09  GB          16,569          0          0          0
Internet             2000-09  US         124,224          0          0          0
Internet             2000-09             140,793          0          1          0
Internet             2000-10  GB          14,539          0          0          0
Internet             2000-10  US         137,054          0          0          0
Internet             2000-10             151,593          0          1          0
Internet                                 292,387          0          1          1
Direct Sales         2000-09  GB          85,223          0          0          0
Direct Sales         2000-09  US         638,201          0          0          0
Direct Sales         2000-09             723,424          0          1          0
Direct Sales         2000-10  GB          91,925          0          0          0

CHANNEL_DESC         CALENDAR CO SALES$                CH         CO         MO
-------------------- -------- -- -------------- ---------- ---------- ----------
Direct Sales         2000-10  US         682,297          0          0          0
Direct Sales         2000-10             774,222          0          1          0
Direct Sales                           1,497,646          0          1          1
                                       1,790,032          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 calendar_month_desc,calendar_quarter_desc,calendar_year,
SUM(amount_sold)
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);
```

```
CALENDAR CALENDA CALENDAR_YEAR SUM(AMOUNT_SOLD)
-------- ------- ------------- ----------------
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

CALENDAR CALENDA CALENDAR_YEAR SUM(AMOUNT_SOLD)
-------- ------- ------------- ----------------
         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,country_region,country_iso_code,
SUM(amount_sold)
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(channel_total,channel_class),rollup(country_region,country_iso_code);
```

```
CHANNEL_TOTAL CHANNEL_CLASS        COUNTRY_REGION       CO SUM(AMOUNT_SOLD)
------------- -------------------- -------------------- -- ----------------
                                   Europe               GB        321244.43
                                   Europe                         321244.43
                                   Americas             US       2603472.57
                                   Americas                      2603472.57
                                                                    2924717
Channel total                      Europe               GB        321244.43
Channel total                      Europe                         321244.43
Channel total                      Americas             US       2603472.57
Channel total                      Americas                      2603472.57
Channel total                                                       2924717
Channel total Direct               Europe               GB        168161.48

CHANNEL_TOTAL CHANNEL_CLASS        COUNTRY_REGION       CO SUM(AMOUNT_SOLD)
------------- -------------------- -------------------- -- ----------------
Channel total Direct               Europe                         168161.48
```

```
Channel total Direct              Americas             US       1187917.74
Channel total Direct              Americas                      1187917.74
Channel total Direct                                            1356079.22
Channel total Others              Europe               GB         77265.46
Channel total Others              Europe                        77265.46
Channel total Others              Americas             US        729606.32
Channel total Others              Americas                      729606.32
Channel total Others                                            806871.78
Channel total Indirect            Europe               GB         75817.49
Channel total Indirect            Europe                        75817.49

CHANNEL_TOTAL CHANNEL_CLASS       COUNTRY_REGION       CO SUM(AMOUNT_SOLD)
------------- ------------------- -------------------- -- ---------------
Channel total Indirect            Americas             US        685948.51
Channel total Indirect            Americas                      685948.51
Channel total Indirect                                             761766

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)
```

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,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_iso_code IN ('GB', 'US')
AND countries.country_name LIKE 'U%'
GROUP BY
ROLLUP(channels.channel_desc , countries.country_name);
```

```
CHANNEL_DESC         COUNTRY_NAME                                SALES$
-------------------- ---------------------------------------- --------------
Internet             United Kingdom                                 31,109
Internet             United States of America                      261,278
Internet                                                           292,387
Direct Sales         United Kingdom                                177,148
Direct Sales         United States of America                    1,320,497
Direct Sales                                                     1,497,646
                                                                 1,790,032

7 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.
```