

PRACTICAL 2

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_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
```

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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\$
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Direct Sales	2000-10	US	682,297
Direct Sales	2000-10		774,222
Direct Sales			1,497,646
			1,790,032

15 rows selected.

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2. 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
```

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	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\$
--------------	----------	------------

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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, 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')
AND countries.country_iso_code IN ('FR', 'US')
GROUP BY
ROLLUP(channels.channel_desc, calendar_month_desc,
countries.country_iso_code);
```

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CHANNEL_DESC	CALENDAR	CO	SALES\$
--------------	----------	----	---------

Internet	2000-09	FR	9,597
Internet	2000-09	US	124,224
Internet	2000-09		133,821
Internet			133,821
Direct Sales	2000-09	FR	61,202
Direct Sales	2000-09	US	638,201
Direct Sales	2000-09		699,403
Direct Sales			699,403
			833,224

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 2000 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

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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  
channels.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

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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 2000 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
```


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```
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
--------------	----	--	-----------

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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(calendar_month_desc) as MO, GROUPING(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')
```

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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	16,569	0	0	0
Internet	2000-09	US	124,224	0	0	0
Internet	2000-09		140,793	0	0	1
Internet	2000-10	GB	14,539	0	0	0
Internet	2000-10	US	137,054	0	0	0
Internet	2000-10		151,593	0	0	1
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	0	1
Direct Sales	2000-10	GB	91,925	0	0	0

CHANNEL_DESC	CALENDAR	CO	SALES\$	CH	MO	CO
--------------	----------	----	---------	----	----	----

Direct Sales	2000-10	US	682,297	0	0	0
Direct Sales	2000-10		774,222	0	0	1
Direct Sales			1,497,646	0	1	1
			1,790,032	1	1	1

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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 2000 using GROUPING SETS.

Calculate aggregates over three groupings:

1 (channel_desc, calendar_month_desc, country_iso_code)

2 (channel_desc, country_iso_code)

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

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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.

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Q8: 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 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

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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 CALENDAR 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 channel_class,channel_total,country_region,country_iso_code,  
SUM(amount_sold)
```

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```
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 ('2000-09', '2000-10')

AND countries.country_iso_code IN ('GB', 'US')

AND channels.channel_desc IN ('Direct Sales', 'Internet')

GROUP BY rollup (channel_total,channel_class) ,rollup(country_region,country_iso_code);
```

CHANNEL_CLASS	CHANNEL_TOTAL	COUNTRY_REGION	CO SUM(AMOUNT_SOLD)
---------------	---------------	----------------	---------------------

	Europe	GB	208256.85
	Europe		208256.85
	Americas	US	1581775.44
	Americas		1581775.44
			1790032.29
	Channel total Europe	GB	208256.85
	Channel total Europe		208256.85
	Channel total Americas	US	1581775.44
	Channel total Americas		1581775.44
	Channel total		1790032.29
Direct	Channel total Europe	GB	177148.35

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CHANNEL_CLASS CHANNEL_TOTAL COUNTRY_REGION CO SUM(AMOUNT_SOLD)

```
-----
Direct      Channel total Europe      177148.35
Direct      Channel total Americas      US    1320497.4
Direct      Channel total Americas      1320497.4
Direct      Channel total                1497645.75
Indirect    Channel total Europe      GB    31108.5
Indirect    Channel total Europe      31108.5
Indirect    Channel total Americas      US    261278.04
Indirect    Channel total Americas      261278.04
Indirect    Channel total                292386.54
```

20 rows selected.

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

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

```
DEPTNO JOB      SUM(SAL)
-----
```

```
29025
CLERK      4150
ANALYST    6000
```

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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.

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```
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 UPPER(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.

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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')
co.country_name
```

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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
--------------	----------	----	-----------------	-------------

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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.

// 7 is binary of 111 it tells for how many dimensions used.
