**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( ).

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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.

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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);

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CHANNEL\_DESC CALENDAR CO SALES$

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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.

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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);

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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.

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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

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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.

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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

across calendar\_month\_desc and country\_id for each channel\_desc value.

 It does not produce a grand total row.

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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);

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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.

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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

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);

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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.

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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

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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')

GROUP BY

ROLLUP(channels.channel\_desc, calendar\_month\_desc,

countries.country\_iso\_code);

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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

15 rows selected.

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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:

 (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 ((channels.channel\_desc, calendar\_month\_desc,

countries.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.

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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 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.

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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)

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

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.

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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

MANAGER 8275

SALESMAN 5600

PRESIDENT 5000

10 8750

10 CLERK 1300

10 MANAGER 2450

10 PRESIDENT 5000

20 10875

DEPTNO JOB SUM(SAL)

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20 CLERK 1900

20 ANALYST 6000

20 MANAGER 2975

30 9400

30 CLERK 950

30 MANAGER 2850

30 SALESMAN 5600

18 rows selected.

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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 UPPER(countries.country\_name) LIKE 'U%'

GROUP BY

ROLLUP(channels.channel\_desc,countries.country\_name);

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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

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.

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