CUBE & ROLLUP

```
GROUP BY
CUBE  (column1, column2, column3)
```

```
GROUP BY
GROUPING SETS  (
(column1, column2, column3),
(column1, column2),
(column1, column3),
(column2, column3),
(column1),
(column2),
(column3),
()
)
```

CUBE & ROLLUP

```
GROUP BY
ROLLUP  (column1, column2, column3)
```

```
GROUP BY
GROUPING SETS  (
(column1, column2, column3),
(column1, column2),
(column1),
()
)
```

Hierarchy

Challenge

Write a query that calculates a booking amount rollup for the hierarchy of quarter, month, week in month and day.

quarter numeric	month numeric	week_in_month text	day date	booking_amount numeric
2	6	3	2017-06-21	441900.00
2	6	3	[null]	441900.00
2	6	4	2017-06-22	775300.00
2	6	4	2017-06-23	1822000.00

Hint

Pattern for week in month is 'w'.

Self-join

Referencing employee_id

employee_id integer	name character varying (50)	manager_id integer
1	Liam Smith	[null]
2	Oliver Brown	1
3	Elijah Jones	1
4	William Miller	1
5	James Davis	2
6	Olivia Hernandez	2

Self-join

Referencing employee_id

employee_id integer	name character varying (50)	manager_id integer	employee_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	1	1
3	Elijah Jones	1	1
4	William Miller	1	1
5	James Davis	2	2
6	Olivia Hernandez	2	2

Self-join

Referencing employee_id

employee_id integer	name character varying (50)	manager_id integer	employee_id integer	manager character varying (50)
1	Liam Smith	[null]	[null]	[null]
2	Oliver Brown	1	1	Liam Smith
3	Elijah Jones	1	1	Liam Smith
4	William Miller	1	1	Liam Smith
5	James Davis	2	2	Oliver Brown
6	Olivia Hernandez	2	2	Oliver Brown

Self-join

Standard join with itself

```
SELECT
t1.column1,
t2.column1
[,…]
FROM table1 t1
LEFT JOIN table1 t2
ON t1.column1=t2.column1
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
t1.column1,
t2.column1
[,…]
FROM employee t1
LEFT JOIN employee t2
ON t1.column1=t2.column1
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
t1.column1,
t2.column1
[,…]
FROM employee emp
LEFT JOIN employee mng
ON t1.column1=t2.column1
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
t1.column1,
t2.column1
[,…]
FROM employee emp
LEFT JOIN employee mng
ON emp.manager_id=t2.column1
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
t1.column1,
t2.column1
[,…]
FROM employee emp
LEFT JOIN employee mng
ON emp.manager_id=mng.employee_id
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
emp.employee_id,
t2.column1
[,…]
FROM employee emp
LEFT JOIN employee mng
ON emp.manager_id=mng.employee_id
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
emp.employee_id,
emp.name AS employee
[,…]
FROM employee emp
LEFT JOIN employee mng
ON emp.manager_id=mng.employee_id
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
emp.employee_id,
emp.name AS employee,
mng.name AS manager
FROM employee emp
LEFT JOIN employee mng
ON emp.manager_id=mng.employee_id
```

Challenge

Find all the pairs of films with the same length!

title text	title text	length smallint
MUSCLE BRIGHT	SOLDIERS EVOLUTION	185
MUSCLE BRIGHT	HOME PITY	185
MUSCLE BRIGHT	DARN FORRESTER	185
MUSCLE BRIGHT	GANGS PRIDE	185
MUSCLE BRIGHT	POND SEATTLE	185

title text	title text	length smallint
SATURN NAME	SATURN NAME	192

CROSS JOIN

Cartesian product

All combinations of rows

CROSS JOIN

letter
A
B

number
1
2
3

number	letter
1	A
2	A
3	A
1	B
2	B
3	B

CROSS JOIN

Cartesian product

All combinations of **rows**

CROSS JOIN

letter
A
B

number
1
1
3

number	letter
1	A
1	A
3	A
1	B
1	B
3	B

CROSS JOIN

```
SELECT
t1.column1,
t2.column1
FROM table1 t1
CROSS JOIN table2 t2
```

NATURAL JOIN

Just like a normal JOIN

Automatically joins using columns with the same column name

```
SELECT
*
FROM payment
NATURAL LEFT JOIN customer
```

NATURAL JOIN

Just like a normal JOIN

Automatically joins using columns with the same column name

```
SELECT
*
FROM payment
NATURAL INNER JOIN customer
```

Self-join

employee_id integer	employee character varying (50)	manager character varying (50)	manager_id integer
1	Liam Smith	[null]	[null]
2	Oliver Brown	Liam Smith	1

```
SELECT
emp.employee_id,
emp.name AS employee
[,…]
FROM employee emp
LEFT JOIN employee mng
ON emp.manager_id=mng.employee_id
```

CROSS JOIN

Cartesian product

All combinations of **rows**

CROSS JOIN

letter
A
B

number
1
1
3

number	letter
1	A
1	A
3	A
1	B
1	B
3	B