



# Extended Aggregation in SQL:1999

- The **cube** operation computes union of **group by**'s on every subset of the specified attributes

- E.g. consider the query

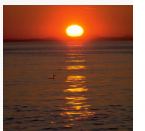
```
select item-name, color, size, sum(number)  
from sales  
group by cube(item-name, color, size)
```

This computes the union of eight different groupings of the *sales* relation:

```
{ (item-name, color, size), (item-name, color),  
  (item-name, size),      (color, size),  
  (item-name),          (color),  
  (size),              ( ) }
```

where ( ) denotes an empty **group by** list.

- For each grouping, the result contains the null value for attributes not present in the grouping.





# SQL Cube Example

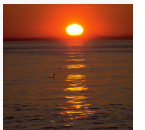
Type	Store	Number
Dog	Miami	12
Cat	Miami	18
Turtle	Tampa	4
Dog	Tampa	14
Cat	Naples	9
Dog	Naples	5
Turtle	Naples	1

Type	Store	Number
Cat	Miami	18
Cat	Naples	9
Cat	<b>NULL</b>	27
Dog	Miami	12
Dog	Tampa	14
Dog	Naples	5
Dog	<b>NULL</b>	31
Turtle	Tampa	4
Turtle	Naples	1
Turtle	<b>NULL</b>	5
<b>NULL</b>	Miami	30
<b>NULL</b>	Naples	15
<b>NULL</b>	Tampa	18
<b>NULL</b>	<b>NULL</b>	63

```
SELECT Type, Store, SUM(Number) as Number  
FROM Pets  
GROUP BY CUBE(type,store)
```

Generates summaries on (type, store), (type), (store), and ()

From: <http://databases.about.com/od/sql/l/aacuberollup.htm>





## Extended Aggregation (Cont.)

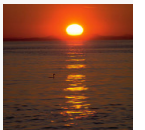
- The **rollup** construct generates union on every prefix of specified list of attributes
- E.g.

```
select item-name, color, size, sum(number)  
from sales  
group by rollup(item-name, color, size)
```

Generates union of four groupings:

```
{ (item-name, color, size), (item-name, color), (item-name), ( ) }
```

- Rollup can be used to generate aggregates at multiple levels of a hierarchy.





# SQL Rollup Example

Type	Store	Number
Dog	Miami	12
Cat	Miami	18
Turtle	Tampa	4
Dog	Tampa	14
Cat	Naples	9
Dog	Naples	5
Turtle	Naples	1

Type	Store	Number
Cat	Miami	18
Cat	Naples	9
Cat	<b>NULL</b>	27
Dog	Miami	12
Dog	Tampa	14
Dog	Naples	5
Dog	<b>NULL</b>	31
Turtle	Tampa	4
Turtle	Naples	1
Turtle	<b>NULL</b>	5
<b>NULL</b>	<b>NULL</b>	63

```
SELECT Type, Store, SUM(Number) as Number  
FROM Pets  
GROUP BY ROLLUP(type, store)
```

Generates summaries on (type, store), (type), and ()

From: <http://databases.about.com/od/sql/l/aacuberollup.htm>

