SICP

God's Programming Book

Lecture-27 Aggregation

Aggregation

Slides Adapted from cs61a of UC Berkeley

Aggregation

Aggregate Functions

So far, all SQL expressions have referred to the values in a single row at a time

```
select [columns] from [table] where [expression] order by [expression];
```

[expression] as [name], [expression] as [name], ...

An aggregate function in the [columns] clause computes a value from a group of rows

```
create table animals as
  select "dog" as kind, 4 as legs, 20 as weight union
  select "cat"        , 4        , 10           union
  select "ferret"     , 4        , 10           union
  select "parrot"     , 2        , 6            union
  select "penguin"    , 2        , 10           union
  select "t-rex"      , 2        , 12000;
```

```
select max(legs) from animals;
```

max(legs)
4

animals:

kind	legs	weight
dog	4	20
cat	4	10
ferret	4	10
parrot	2	6
penguin	2	10
t-rex	2	12000

Mixing Aggregate Functions and Single Values

An aggregate function also selects some row in the table to supply the values of columns that are not aggregated. In the case of max or min, this row is that of the max or min value. Otherwise, it is arbitrary.

```
select max(weight), kind from animals;
```

```
select min(kind), kind from animals;
```

```
select max(legs), kind from animals;
```

```
select avg(weight), kind from animals;
```

```
create table animals as
  select "dog" as kind, 4 as legs, 20 as weight union
  select "cat"        , 4        , 10           union
  select "ferret"     , 4        , 10           union
  select "parrot"     , 2        , 6            union
  select "penguin"    , 2        , 10           union
  select "t-rex"      , 2        , 12000;
```

animals:

kind	legs	weight
dog	4	20
cat	4	10
ferret	4	10
parrot	2	6
penguin	2	10
t-rex	2	12000

Groups

Grouping Rows

Rows in a table can be grouped, and aggregation is performed on each group

```
[expression] as [name], [expression] as [name], ...
select [columns] from [table] group by [expression] having [expression];
```

The number of groups is the number of unique values of an expression

```
select legs, max(weight) from animals group by legs;
```

animals:

kind	legs	weight
dog	4	20
cat	4	10
ferret	4	10
parrot	2	6
penguin	2	10
t-rex	2	12000

legs=4

legs=2

legs	max(weight)
4	20
2	12000

Selecting Groups

Rows in a table can be grouped, and aggregation is performed on each group

```
[expression] as [name], [expression] as [name], ...
select [columns] from [table] group by [expression] having [expression];
```

A having clause filters the set of groups that are aggregated

```
select weight/legs, count(*) from animals group by weight/legs having count(*)>1;
```

weight/legs	count(*)
5	2
2	2

animals:

kind	legs	weight
dog	4	20
cat	4	10
ferret	4	10
parrot	2	6
penguin	2	10
t-rex	2	12000

Thanks for Listening