A Very Interesting Number

The mathematician G. H. Hardy once remarked to the mathematician Srinivasa Ramanujan...

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];
```

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 "ferret" , 4 , 10 union
select "parrot" , 2 , 6 union
select "penguin" , 2 , 10 union
select "t-rex" , 2 , 12000;
select max(legs) from animals;
```

```
animals:
<table>
<thead>
<tr>
<th>kind</th>
<th>legs</th>
<th>weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>dog</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>cat</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>ferret</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>parrot</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>penguin</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>t-rex</td>
<td>2</td>
<td>12000</td>
</tr>
</tbody>
</table>
```

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

```
max(legs) (Demo)
```

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

```
animals:
<table>
<thead>
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</thead>
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</tbody>
</table>
```

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

```
select min(kind), kind from animals;
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```
select max(kind), kind from animals;
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```
select avg(kind), kind from animals;
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</tr>
<tr>
<td>t-rex</td>
<td>2</td>
<td>12000</td>
</tr>
</tbody>
</table>
```

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.

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

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</tr>
</tbody>
</table>
```

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

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

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

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

```
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</tbody>
</table>
```

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

Discussion Question

What’s the maximum difference between leg count for two animals with the same weight?

Select Grammar

http://www.sqlite.org/lang_select.html