Aggregation

Announcements

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  select "t-rex"      , 2        , 12000;
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```

animals:

kind	legs	weight
dog	4	20
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t-rex	2	12000

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  select "penguin"    , 2        , 10           union
  select "t-rex"      , 2        , 12000;

select max(legs) from animals;
```

animals:

kind	legs	weight
dog	4	20
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  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
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```

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

max(legs)
4

(Demo)

animals:

kind	legs	weight
dog	4	20
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Mixing Aggregate Functions and Single Values

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create table animals as
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animals:

kind	legs	weight
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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
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animals:

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select max(weight), kind from animals;
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create table animals as
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animals:

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select max(weight), kind from animals;

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

```
create table animals as
  select "dog" as kind, 4 as legs, 20 as weight union
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select max(weight), kind from animals;
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```
select min(kind), kind from animals;
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```
select max(legs), kind from animals;
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```
select avg(weight), kind from animals;
```

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create table animals as
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(Demo)

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Discussion Question

What are all the kinds of animals that have the maximal number of legs?

Groups

Grouping Rows

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

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```
select [columns] from [table] group by [expression] having [expression];
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```
[expression] as [name], [expression] as [name], ...
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Rows in a table can be grouped, and aggregation is performed on each group

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

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

animals:

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legs=4

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animals:

	kind	legs	weight
legs=4	dog	4	20
	cat	4	10
	ferret	4	10
legs=2	parrot	2	6
	penguin	2	10
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select legs, max(weight) from animals group by legs;
```

legs	max(weight)
4	20
2	12000

legs=4

legs=2

animals:

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t-rex	2	12000

legs=4

legs=2

legs	max(weight)
4	20
2	12000

(Demo)

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

weight/legs=5

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animals:

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```

weight/legs=5

weight/legs=2

weight/legs=2

weight/legs=3

animals:

kind	legs	weight
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```

weight/legs=5
weight/legs=2
weight/legs=2
weight/legs=3
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animals:

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```

weight/legs=5
weight/legs=2
weight/legs=2
weight/legs=3
weight/legs=5
weight/legs=6000

animals:

kind	legs	weight
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```

weight/legs	count(*)
5	2
2	2

weight/legs=5
weight/legs=2
weight/legs=2
weight/legs=3
weight/legs=5
weight/legs=6000

animals:

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

weight/legs	count(*)
5	2
2	2

weight/legs=5
weight/legs=2
weight/legs=2
weight/legs=3
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weight/legs=6000

animals:

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```
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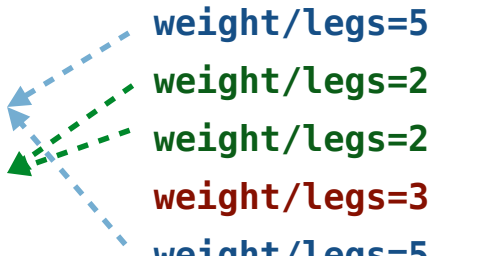
```

weight/legs	count(*)
5	2
2	2



animals:

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cat	4	10
ferret	4	10
parrot	2	6
penguin	2	10
t-rex	2	12000

Discussion Question

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