Aggregation

Discussion Question

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

Groups

Discussion Question

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

Selecting Groups

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

```
select [columns] from [table] group by [expression] [having [expression]]
```

A having clause filters the set of groups that are aggregated:

```
select [columns] from [table] group by [expression] having [expression]
```

Example: Big Game
Create Table and Drop Table

### Create Table

CREATE TABLE expression syntax:

```
CREATE TABLE expression
```

**Examples:**

- `CREATE TABLE numbers (n, note);`
- `CREATE TABLE numbers (n UNIQUE, note);`
- `CREATE TABLE numbers (n, note DEFAULT "No comment");`

### Drop Table

DROP TABLE expression syntax:

```
DROP TABLE expression
```

Modifying Tables

### Insert

For a table `t` with two columns...

- To insert into one column:
  
  ```
  INSERT INTO `t` (column) VALUES (value);
  ```

- To insert into both columns:
  
  ```
  INSERT INTO `t` VALUES (value0, value1);
  ```

### Update

Update sets all entries in certain columns to new values, just for some subset of rows.

### Delete

Delete removes some or all rows from a table.
A Program Vulnerable to a SQL Injection Attack

```
name = "Robert'\'); DROP TABLE Students; --"

cmd = "INSERT INTO Students VALUES ('" + name + '",' + name + ');"

db.executescript(cmd)
```

![Database Connections](https://xkcd.com/327/)

Casino Blackjack

Player:

Dealer:

![Casino Blackjack](Demo)