

Database Theory

**Any homework
questions?**

Database Theory

What is a database?

- A collection of organized data - typically in tables
- Each table is meant to model real-life objects
- A DBMS or database management system is an interface to deal with the data itself

Database types

- Oracle
- Sybase
- MySQL
- PostgreSQL
- SQLite

Ruby + Databases

- Ruby applications use a variety of databases
 - <3s:
 - PostgreSQL
 - SQLite
- Ruby uses a special system called an ORM to interact with the database

What's an ORM?

- Stands for Object-relational mapping
- Create a “virtual object database”
- Makes interacting with database objects easy

ActiveRecord

- ActiveRecord is an ORM
- You could use DataMapper - but ActiveRecord is standard with Rails
- It makes using a database fun!

Database Tables

- A table is used to store information
- It contains columns
- It has a primary key - a unique ID - for each row
- It is related to other tables
- What are some examples of tables and columns you can think of?

Understanding Relationships

- Database tables are related to each other in certain ways
- There are many ways they can be related to each other

One to one

- A row in a table is associated with only one row in another table
- A user has one spouse (hopefully)
- user has spouse_id, spouse has user_id

One to many

- A row in a table can be associated with one or more rows in another table
- A hotel can have many rooms, but a room can only belong to one hotel
- Rooms have a `hotel_id`

Many to many

- One or more rows in a table are associated with one or more rows in another table
- Customers can purchase many products, products can be purchased by many customers
- Through - done through a “join” table, each row has a customer id and a product id

Exercises

- Draw out the tables, columns, and relationships for the following scenarios:
 - Online store
 - Facebook-like website
 - Forum

ActiveRecord

- To use ActiveRecord in your Sinatra project:
- `gem 'activerecord'`
- `gem 'sinatra-activerecord'`
- `gem 'sqlite3'`
- `gem 'rake'`

Rakefile

- Time for a new project file: Rakefile
- The rakefile contains tasks for your app to complete, run using the rake command
- `require 'sinatra/activerecord/rake'`
- `require './your_app'`

Creating Migrations

- A migration is used to create or update tables in your database
- To generate one, type in:
 - `rake db:create_migration NAME=create_users`
- To edit it, go to the `db/migrate` folder

Working with Migrations

- Up is the action on migrate

```
create_table :users do |t|  
  t.string :name  
end
```

- Down is used to revert the last action

Types

- :binary
- :boolean
- :date
- :datetime
- :decimal
- :float
- :integer
- :primary_key (created by def)
- :string
- :text

Examples

```
change_table :products do |t|
```

```
  t.remove :description, :name
```

```
  t.string :part_number
```

```
  t.index :part_number
```

```
  t.rename :upccode, :upc_code
```

```
end
```

Examples: create table

```
create_table :products do |t|  
  t.string :name, :null => false  
end
```