PennApps Ruby Workshop

Justin Kim

What does this do?

```
3.times do
  print 'Hello, world!'
end
```

Why Ruby?

Optimized for programmer happiness

Used for Ruby on Rails, an extremely popular web framework

Outline

1. Intro to Ruby
2. Intro to the Web and MVC
3. Ruby on Rails

Installing Ruby

- Use Ruby Version Manager (RVM) to manage and install Ruby versions
  - Use this even if you plan on just using one version
- We will be using version 2.3.1
- When you have trouble remembering what methods do, use Ruby Docs

Printing in Ruby

- You can print a value with three different commands `print`, `puts`, and `p`
  - `print` outputs the value and returns nil
  - `puts` outputs the value with a newline and returns nil
  - p both outputs and returns the value
    - I'll be using this in my examples since it also formats output better
- I will denote output with #=>

```
p 'hello world' #=> "hello world"
```

Running Ruby

- Use a REPL (Read-Execute-Print-Loop) with the `irb` command in terminal
- Execute .rb files with the `ruby` command: `ruby file.rb`

Methods

- Parentheses around arguments can be omitted if unambiguous
- Methods have implicit returns

```ruby
def hi
  'hello, there'
end

def hello(name)
  puts "hello, #{name}"
end

puts hi #=> "hello, there"
hello('Matz') #=> "hello, Matz"
hello 'DHH' #=> "hello, DHH"
```

Creating a Class

- Use the `class` and `end` keywords
- A class can be instantiated with the `new` method
- It is convention to write class names in PascalCase

```
class Student
end
student = Student.new
p student #=> #<Student:0x007ff7989d44b8>
```

Instance Methods

Methods defined in a class are instance methods by default

```
class Student
  def greet
    puts 'hi'
  end
end
student = Student.new
student.greet #=> "hi“
```

Constructors

If a method is named `initialize`, then it will be executed when the class is instantiated

```
class Student
  def initialize
    puts 'hi'
  end
end
Student.new #=> "hi"
```

Inheritance

- Classes can inherit from another class with the < operator
  - Simply place it after the class declaration and name the class
- Thus, a class can gain all of its parent class's methods, both public and private

```
class Bird
end
class Penguin < Bird
end
p Penguin.superclass #=> "Bird"
```

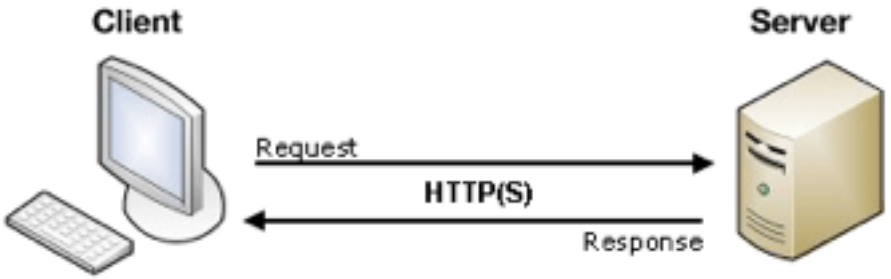
Installing Gems

- Ruby libraries are called gems
- The command to install them is `gem install gem_name`
  - When installed, the gem is installed in the current Ruby version's gem directory
- To use a gem, pass the name of the gem as a string to the `require` method at the top of the file (e.g. `require 'pry'`)

The Web

HTTP

- Stands for Hypertext Transfer Protocol
- A **client** (e.g. web browser, phone, computer, etc.) sends a **request** to a **server**
- The **server** receives this **request** and sends back a **response**
- This **response** is usually a web page (i.e. HTML with accompanying files) or data, usually in XML or JSON



HTTP Verbs

- The five most common types of HTTP requests are:
  - GET
  - POST
  - PUT/PATCH
  - DELETE

GET Request

- This is usually the default type of request sent
  - When you enter a URL or click a link, a GET request is sent for the web page
  - When a web page updates, it probably sent a GET request behind the scenes to get the new data
- It should only be used to *get* something

POST Request

- This should be used to *send* data from the client to the server
- While you can technically use GET requests to send data as well, you should absolutely use POST requests if you're sending data
  - It's much more robust and secure
- This is the default type of request sent when submitting a form (e.g. log in)

PUT/PATCH Request

- This should be used to *update* something on the server
- Technically, you can use a POST request to update as well, but it is convention to use a PUT or PATCH request
- The main difference between a PUT request and a PATCH request:
  - A PUT request is used to update an entire record
  - A PATCH request is only used to update part of it

DELETE Request

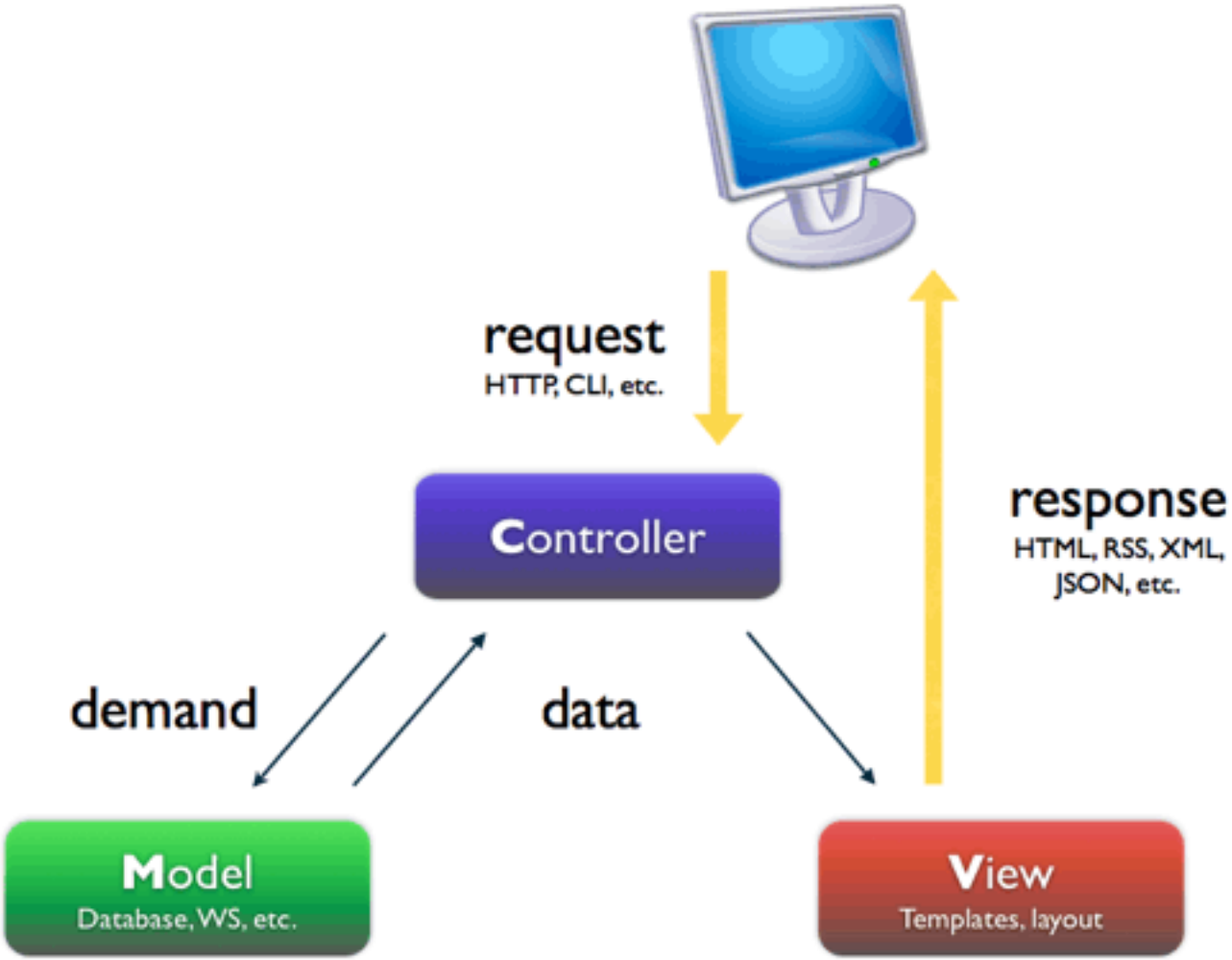
- This should be used to *delete* something on the server
- Technically, you can use a POST request to delete as well, but it is convention to use a DELETE request

MVC

- Stands for Model-View-Controller
- Every community has different definitions and conventions for MVC
  - Ignore the conventions of other communities when writing Ruby
- Convention over configuration

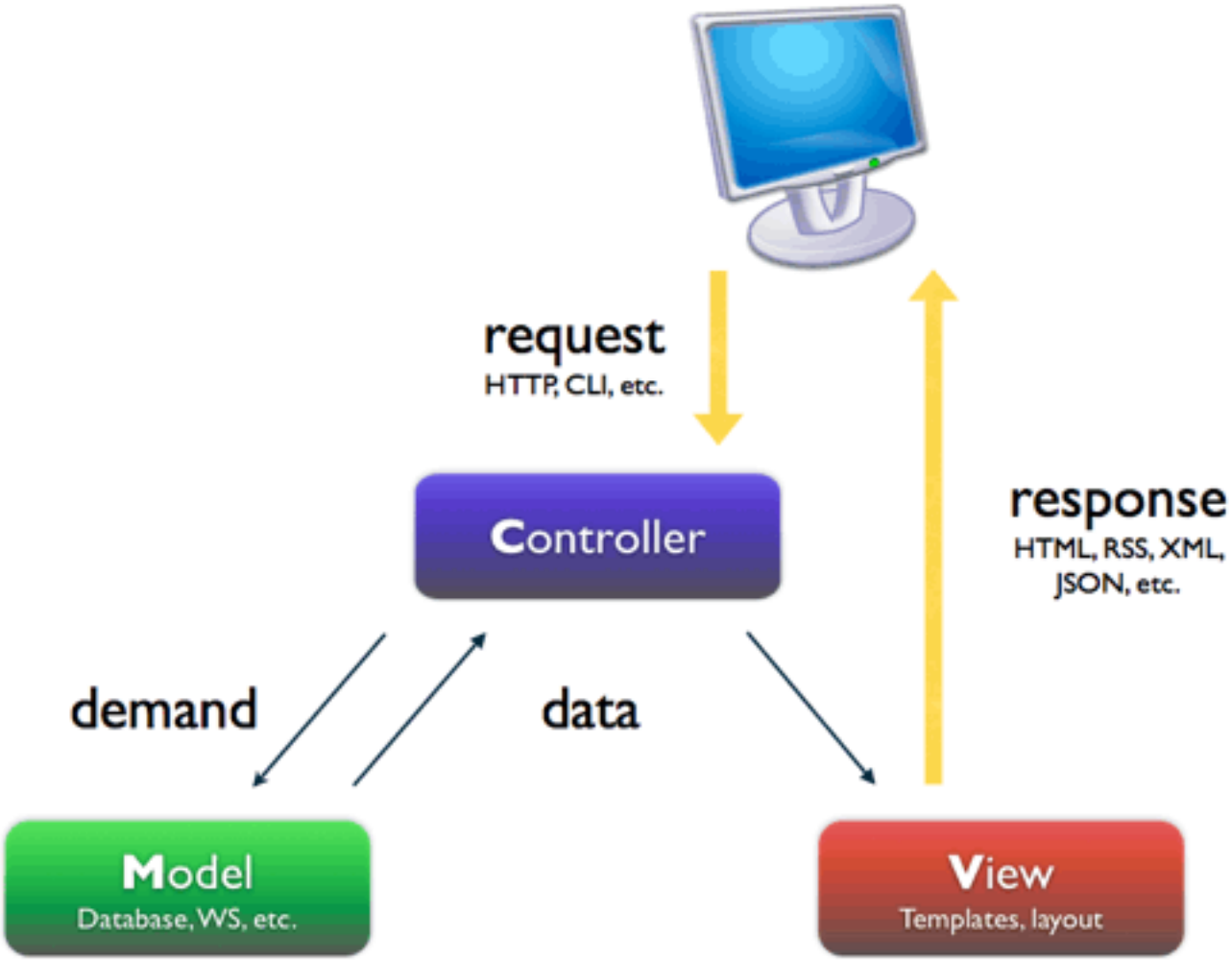
View

- The view is the layer of the application that the user will see
  - It is typically comprised of .html.erb files
  - It should have minimal logic in it
  - It can access instance variables defined in the controller
- The corresponding view files should be in a subdirectory of `views` named for the plural form of the corresponding model


request
HTTP, CLI, etc.
Controller
response
HTML, RSS, XML,
JSON, etc.
demand
data
Model
Database, WS, etc.
View
Templates, layout

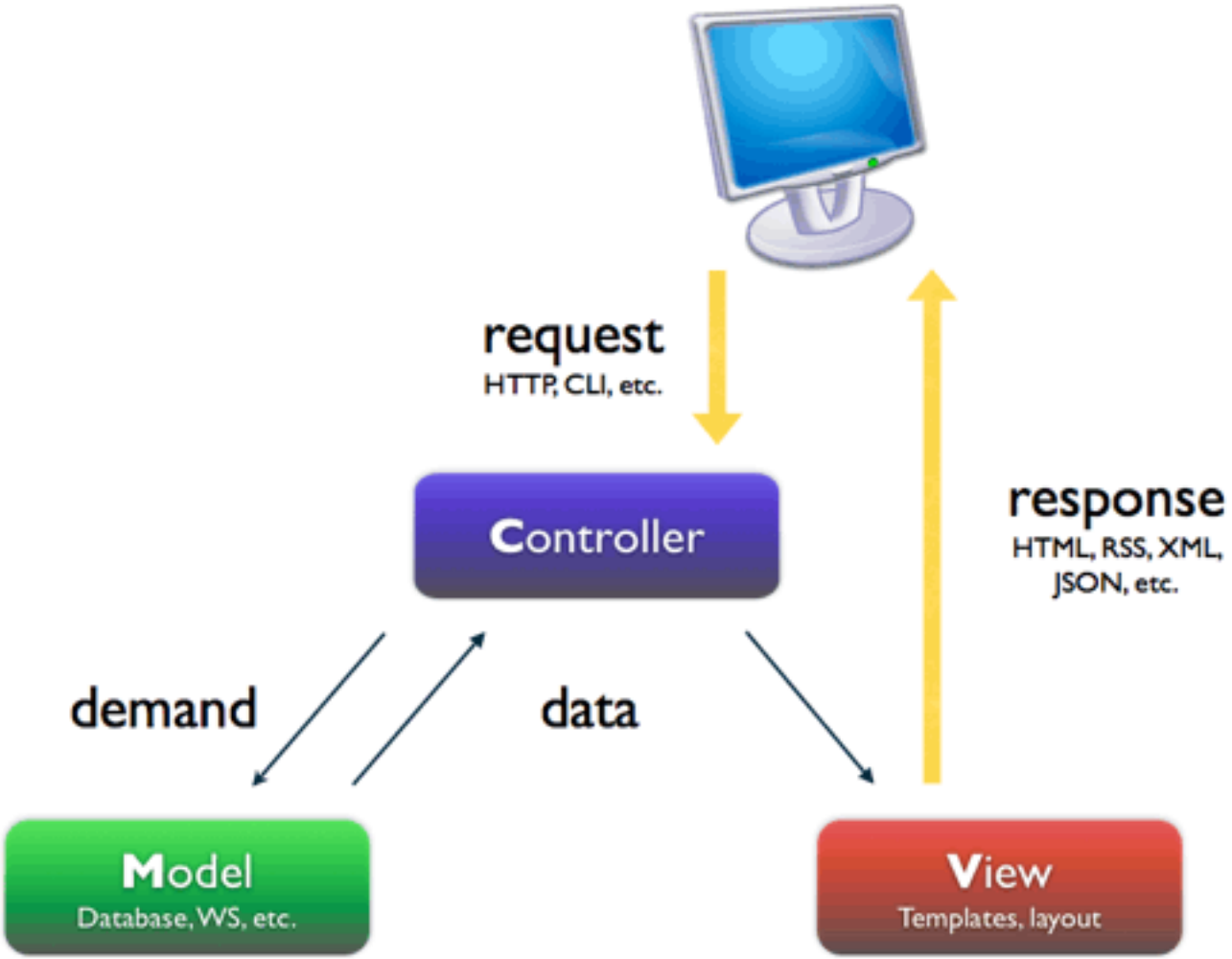
Controller

- The controller is the layer of the application that handles HTTP requests
  - It should pass off as much logic to the model as possible
  - It can define instance variables for the view to use
- This layer of the application should be the most static out of the three
- The naming convention is the plural form of the corresponding model with `Controller` (e.g. `UsersController`)


request
HTTP, CLI, etc.
Controller
response
HTML, RSS, XML,
JSON, etc.
demand
data
Model
Database, WS, etc.
View
Templates, layout

Model

- The model is the layer of the application with the crux of the logic
- It should be the main place where the database is accessed
- The naming convention is the singular form of the name


request
HTTP, CLI, etc.
Controller
response
HTML, RSS, XML,
JSON, etc.
demand
data
Model
Database, WS, etc.
View
Templates, layout

REST

- Stands for Representational State Transfer
  - A set of conventions to expose certain HTTP endpoints
- It is convenient for Create, Read, Update, Delete (CRUD) apps
- The below example is for a model representing movies

Path	Verb	Usage
/movies	GET	Show a list of movies
/movies/new	GET	Show form to create a new movie
/movies	POST	Create a new movie
/movies/:id	GET	Show a specific movie
/movies/:id/edit	GET	Show a form to update a movie
/movies/:id	PUT/PATCH	Update a movie
/movies/:id	DELETE	Delete a movie

Ruby on Rails

About Ruby on Rails

- Also called RoR or most commonly Rails
- It is a web framework, similar to Sinatra, but it has far more features and opinions
- We will use version 4.2.4
  - Note, Rails 5 recently came out

Making a Rails App

- After you `gem install rails`, run `rails new app_name`
- Rails will then create a directory of your Rails app with all the basic directories and files
- It will also `bundle install` all the default gems
- Check out the Rails documentation

Rails Commands

- `rails server` (or `rails s`) will start the Rails app
  - By default, the server uses WEBrick
  - To use other servers, put the server's gem in the Gemfile (Heroku recommends using `puma`)
- `rails console` (or `rails c`) will start the Rails console

Rails Generate

- `rails generate` (or `rails g`) will generate various files for you
- There are several different kinds of generators
- The most useful ones (for me at least) are `migration`, `model`, and `controller`
- `rails g scaffold` helped make Rails famous
  - Generates tests, controllers, views, routes, models, and migrations
  - It's too vanilla for actual use though

Rails Generate Syntax

- `rails g generator_name model_name`
- For `migration`, `model`, and `scaffold`, you can also specify attributes (the column titles)
  - `rails g generator_name model_name column1:type column2:type`
- For example, `rails g migration Item name:string price:float`
- For foreign keys, use the `references` type

Controller

- Each route is defined as methods according to its corresponding RESTful route
- By default, it will render the corresponding view file
  - You can render whatever view with the `render` method
  - `render :show` will render the model's `show.html.erb` page

Routes

- The routes are managed in the `config/routes.rb` file
- `resources :pluralized_model_name` generates all seven RESTful routes
- To define custom routes, use `http_verb 'route' => 'model_name#method'`
  - `get 'users/hello' => 'user#hello'` would connect the `hello` method in `UsersController` to a GET request to `users/hello`

Rails Directory

- Notice that most of this directory structure should be familiar to you
- The main directories not introduced to you yet are: `lib`, `log`, `test`, `tmp`, and `vendor`
- `test` contains test files, `log` contains error logs, and `tmp` contains temporary files
- `app/helpers` contains modules

Asset Pipeline

- Introduced in Rails 2011
- It is a way to load resources (i.e. images, javascripts, and stylesheets)
- It is comprised of the `app/assets`, `lib`, and `vendor` directories

What Should Go Where

- The custom code you write specific to your application should go in `app/assets`
- The custom code you write not specific to your application should go in `lib`
  - It's pretty rare to use this
- 3rd party libraries should go in `vendor`

Sprockets

- Sprockets is an asset packaging system
  - The stylesheet one can be found at `app/assets/stylesheets/application.css`
  - The javascript one can be found at `app/assets/javascripts/application.js`
- They are both loaded in the head tag
  - Notice how javascript files are loaded with `<%= javascript_include_tag %>`
  - stylesheet files are loaded with `<%= stylesheet_link_tag %>`

Sprocket Application Files

- To require a file, append an = to the beginning of the commenting delimiter (e.g. `//=` for javascript)
- `require_tree .` requires all files in the directory
  - I try not to use this because it loads the files in alphabetical order
  - the order usually matters for me
- Never write any javascript/css code directly in the application files
  - `require_self` will let you do this