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mfeniseycopes Clarify reasoning for using locals 15c24af 28 days ago

2 contributors

161 lines (119 sloc) 4.64 KB Raw Blame History

Partials

Views can get really long and complicated. Just like you break up long methods into smaller ones, we break up views into smaller bits, called partials. Like small methods, partials are often reusable in different views, so they also help us keep our code DRY.

Naming Partials

To render a partial as part of a view, you use the `render` method within the view:

```
<h1>Page title</h1>

<p>
  Here's some content for you
</p>

<!-- insert standard footer -->
<%= render "footer" %>
```

This will render a template named `_footer.html.erb` and insert the rendered content at this point within the view. Note the leading underscore character: partials are named with a leading underscore to distinguish them from regular views, even though they are referred to without the underscore. This holds true even when you're pulling in a partial from another folder:

```
<%= render "shared/footer" %>
```

That code will pull in the partial from `app/views/shared/_footer.html.erb`.

Using Partials to Simplify Views

One way to use partials is to treat them as the equivalent of subroutines: as a way to move details out of a view so that you can grasp what's going on more easily. For example, you might have a view that looked like this:

```
<%= render "shared/ad_banner" %>

<h1>Products</h1>

<p>Here are a few of our fine products:</p>
...
```

```
<%= render "shared/footer" %>
```

Here, the `_ad_banner.html.erb` and `_footer.html.erb` partials could contain content that is shared among many pages in your application. You don't need to see the details of these sections when you're concentrating on a particular page.

Passing Local Variables

Like methods, you can also pass local variables into partials, making them even more powerful and flexible. For example, you can use this technique to reduce duplication between new and edit pages, while still keeping a bit of distinct content:

```
<!-- app/views/user/new.html.erb -->
<%= render "form", user: @user, action: :new %>

<!-- app/views/user/edit.html.erb -->
<%= render "form", user: @user, action: :edit %>

<!-- app/views/user/_form.html.erb -->
<!-- Is this a new user to create, or an existing one to edit? -->
<% action_url = (action == :new) ? users_url : user_url(user) %>

<form action="<%= action_url %>" method="post">
  <% if action == :edit %>
    <input type="hidden" name="_method" value="patch">
  <% end %>
  <!-- inputs go here... -->
</form>
```

Rendering objects

It is typical to have to render model objects often. Here's the long way:

```
<% @cats.each do |cat| %>
  <%= render "cat", cat: cat %>
<% end %>
```

There is a shorthand for this:

```
<% @cats.each do |cat| %>
  <%= render cat %>
<% end %>
```

Rails will look at the `cat` value, see it is a `Cat` model object, and will look for a `_cat.html.erb` partial template to use. It will then render the template, setting a variable named `cat` inside the partial, so that you can use a more semantically meaningful name within:

```
<!-- app/views/shared/_cat.html.erb -->
<ul>
  <li>Name: <%= cat.name %></li>
  <li>Age: <%= cat.age %></li>
</ul>
```

How do you think it knows to set the `cat` variable? The same way it decides the partial to render: it looks at the class name of the model object, and uses that.

Rendering Collections

As seen above, partials are very useful in rendering collections. Just like there is a shortcut to render a model object, you can also easily render an array of model objects:

```
<%= render @cats %>
```

Rails will render the `_cat.html.erb` partial once for each item, setting the `cat` local variable as before.

Hints

Pass locals, don't use instance variables

Partials, like regular views, have access to controller instance variables. You could do the following:

```
<!-- app/views/user/new.html.erb -->
<!-- controller has set `@user` -->
<%= render "form" %>

<!-- app/views/user/_form.html.erb -->
<!-- Is this a new user to create, or an existing one to edit? -->
<% action_url = @user.persisted? ? user_url(@user) : users_url %>

<form action="<%= action_url %>" method="post">
  <% if @user.persisted? %>
    <input type="hidden" name="_method" value="put">
  <% end %>
  <!-- inputs go here... -->
</form>
```

However convenient it may seem to just use instance variables when creating partials, remember that we want to make partials flexible and non-reliant on sources of data defined outside of their scope. This also simplifies our debugging process. Failing to provide a required instance variable can produce confusing errors, rather than the unambiguous `"no local variable defined"` error raised when a local variable is undefined.

Templates

As we've discussed, controllers cause templates to be rendered by calling the `render` method. But how are templates structured? Answer: with HTML and ERB (and love!).

ERB (embedded Ruby)

Templates consist of HTML, but they are augmented with Ruby code. ERB templates are pretty simple:

- `<% ruby_code_here %>` executes Ruby code that does not return anything. For example, conditions, loops or blocks.
- `<%= %>` is used when you want to embed the return value into the template. i.e. Something that will actually show up in the HTML.

For example:

```
<b>Names of all the people</b>
<ul>
  <% ["Tom", "Dick", "Harry"].each do |name| %>
    <li>
      Name: <%= name %>
    </li>
  <% end %>
</ul>
```

The loop is setup in regular embedding tags `<% %>` and the name is written using the output embedding tag `<%= %>`. Output functions like `print` or `puts` won't work with ERB templates. So this would be wrong:

```
<!-- WRONG -->
Hi, Mr. <% puts "Frodo" %>
```

It's important to note that the ERB is simply helping construct HTML server-side. When the view is finished rendering, it will be pure HTML and it is the pure HTML when it is sent out to the user. Your user will never know you are using ERB.

Commenting out ERB

Say you want to comment out some broken Ruby code in your ERB file that's throwing an error:

```
<!-- <%= my_broken_ruby_code %> -->
```

Even though you wrap the embedded Ruby in an HTML comment, the Ruby code will still be evaluated (and inserted as the body of the comment). If the code was erroring out previously, it will still be run and will still cause errors.

To stop the code from running, simply add a `#`. So:

```
<%#= my_broken_ruby_code %>
```

The `%#` means to not evaluate the embedded Ruby. The '=' is dangling.

Power User Atom Shortcuts

In a `.html.erb` file, type `=` followed by `Tab` to get `<%= %>`. Type `-` followed by `Tab` to get `<% %>`.

Instance variables

Controllers make data available to the view layer by setting instance variables. It may seem a bit silly that this is the mechanism by which data is shared since instance variables are all about keeping private data, but that's how Rails does it. When the view is rendered, it copies over the instance variables of the controller so that the view has access to the variables; the view cannot otherwise get access to the controller or its methods.

Let's give a full example:

```
# app/controllers/products_controller.rb
class ProductsController < ActionController::Base
  def index
    # get an array of all products, make it available to view
    @products = Product.all
    render :index
  end
end
```

```
<!-- app/views/products/index.html.erb -->
<h1>All the products!</h1>
<ul>
  <% @products.each do |product| %>
    <li>
      <%= product.name %>
    </li>
  <% end %>
</ul>
```

It is good practice to make all your database queries inside the controller, setting the results to instance variables. Never make database queries in your views; it can make it harder to find hidden performance issues caused by unintended queries.

`link_to` and `button_to`

To help us generate HTML, we may use helper methods. We'll talk about writing our own helpers in a later chapter, but first we'll talk about the two most commonly used helper methods provided by Rails.

You may have seen `link_to` around before; it generates the HTML code for a link. Here's a few uses:

```
<%= link_to "Cat Pictures", "http://cashcats.biz" %>
<a href="http://cashcats.biz">Cat Pictures</a> <!-- output -->

<%= link_to "New Comment", new_comment_url %>
<a href="<%= new_comment_url %>">New Comment</a> <!-- equivalent to the above code -->
<a href="www.example.com/comments/new">New Comment</a> <!-- output -->
```

When a user clicks on an anchor tag, a `GET` request is issued. If you want to issue a `POST`, `PATCH`, or `DELETE` request, you can use a button and specify the method:

```
<%= button_to "Delete comment", comment_url(@comment), method: :delete %>
<form action="<%= comment_url %>"  method="POST"> <!-- equivalent to the above -->
  <input type="hidden" value="delete" name="_method" />
  <input type="submit" value="Delete comment" />
</form>
```

Technically you can specify the `:method` attribute for `link_to`, but you should reserve `a` tags for GET requests. We'll talk about why later. If you want to issue a `POST` / `PATCH` / `DELETE`, use a button.

Do not rely on these helper methods blindly. Always look at the HTML they generate. You should be able to write the same HTML yourself, if necessary. You'll have to when we start doing JS and React.

Often you want to send some parameters along with the request; for instance, you want to make a `POST` request to create a new `Comment`, passing in the comment's text, submitter name, etc. To do this, we want to create an HTML form; we'll learn how to do this in a later chapter.

When it suffices to send parameters in the query string, recall from the routing chapter that you can do this like so: `xyz_url(key: :value)`.

See the URLHelper docs for more info on `link_to` and `button_to`.

Resources

- URLHelper docs

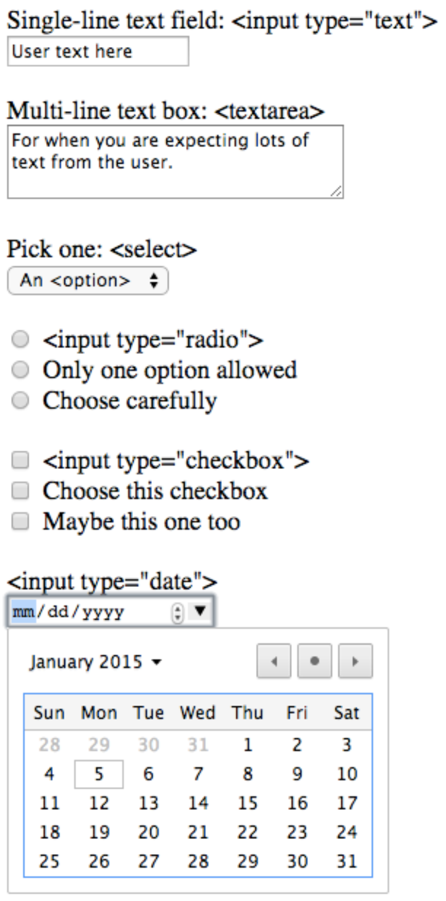
HTML Forms: Basics

`form` and `submit`

Forms are a major part of most applications. Your user's deepest interactions with your application are through forms.

An HTML form allows a user to fill out fields. Common form elements include:

- Single-line text fields (`text`)
- Multi-line text boxes (`textarea`)
- Drop-down select boxes (`select` and `option`)
- Radio buttons (`radio`)
- Check boxes (`checkbox`)
- Date selectors (`date`)



A form's input tags are wrapped in a `form` tag. The form should present a button (an `input` tag with `type=submit`). When the user clicks the `submit` button, the browser will package up the input data, put it in the body of a request, and send it to the server:

```
<form action="http://99cats.com/cats" method="post">
  <!-- input elements -->

  <input type="submit" value="Create cat">
</form>
```

The `form` tag's `action` attribute contains the URL to which the form data should be sent, the `method` attribute describes the HTTP method that should be used. A typical form will POST the data; GET forms are typically only used for search forms, which will merely request data to be fetched.

`text` input type

The most common type of input is a single-line text field. A `text` input tag presents a single line of text input for the user to submit:

```
<form action="http://99cats.com/cats" method="post">
  <input type="text" name="cat[first_name]">
  <input type="text" name="cat[last_name]">

  <input type="submit" value="Create cat">
</form>
```

HTML's `form` and Rails' `params`

Rails Parameter Conventions

As you've seen in the previous sections, values from forms can be at the top level of the `params` hash or nested in another hash. For example in a standard `create` action for a Person model, `params[:person]` would usually be a hash of all the attributes for the person to create. The `params` hash can also contain arrays, arrays of hashes and so on.

Fundamentally, HTML forms don't know about any sort of structured data, all they generate is name–value pairs, where pairs are just plain strings. The arrays and hashes you see in your application are the result of some parameter naming conventions that Rails uses.

TIP: You may find you can try out examples in this section faster by using the console to directly invoke Rack's parameter parser. For example:

```
Rack::Utils.parse_nested_query("name=fred&phone=0123456789")
# => {"name"=>"fred", "phone"=>"0123456789"}
```

Basic Structures: Hash

The two basic structures are arrays and hashes. Hashes mirror the syntax used for accessing the value in `params`. For example if a form contains

```
<input id="person_name" name="person[name]" type="text" value="Henry">
```

the `params` hash will contain

```
{'person' => {'name' => 'Henry'}}
```

and `params[:person][:name]` will retrieve the submitted value in the controller.

Hashes can be nested as many levels as required, for example:

```
<input id="person_address_city" name="person[address][city]" type="text" value="New York">
```

will result in the `params` hash being

```
{'person' => {'address' => {'city' => 'New York'}}}
```

Basic Structures: Arrays

Normally Rails ignores duplicate parameter names. For instance, if your form contains:

```
<input type="hidden" name="key" value="value1">
<input type="hidden" name="key" value="value2">
```

then on submission, the browser will send:

```
key=value1&key=value2
```

When Rails goes to parse this, it will return:

```
{ "key" => "value2" }
```

The last value wins. Rails overwrites any prior values. Note that Rails is the one which does this: the browser is happy to upload multiple values for the same name.

When you want Rails to build an array, you append an empty set of square brackets to the name:

```
<input name="person[phone_numbers][]" type="text" value="555-123-4567">
<input name="person[phone_numbers][]" type="text" value="555-765-4321">
<input name="person[phone_numbers][]" type="text" value="555-135-2468">
```

Rails will parse the uploaded params as:

```
{ "person" => {
    "phone_numbers" => [
      "555-123-4567",
      "555-765-4321",
      "555-135-2468"
    ]
  }
}
```

Rule 2.5: No arrays of hashes

You can't create arrays of hashes:

```
<input name="persons[][phone_number]" type="text" value="555-123-4567">
<input name="persons[][phone_number]" type="text" value="555-765-4321">
<input name="persons[][phone_number]" type="text" value="555-135-2468">
```

You want:

```
{ "persons" => [
    { "phone_number" => "555-123-4567" },
    { "phone_number" => "555-765-4321" },
    { "phone_number" => "555-135-2468" }
  ]
}
```

But this won't work. For whatever reason, Rails won't let you do this. Instead, there's a hack:

```
<input name="persons[0][phone_number]" type="text" value="555-123-4567">
<input name="persons[1][phone_number]" type="text" value="555-765-4321">
```

```
<input name="persons[2][phone_number]" type="text" value="555-135-2468">
```

Which Rails translates as:

```
{ "persons" => {
    "0" => { "phone_number" => "555-123-4567" },
    "1" => { "phone_number" => "555-765-4321" },
    "2" => { "phone_number" => "555-135-2468" }
  }
}
```

When we read about nested forms (forms which create more than one object), we will have occasion to use this trick.

Debugging Rails

Congratulations, you can write a Rails application! Now it's important to learn how to debug Rails applications well.

Before we start

Bugs happen. Don't be afraid of trying something because you are scared it might not work. Part of being a programmer is givng your crazy ideas a shot to see if they work. That is why you have Git at your disposal; remember to use Git as a safety net that WILL save you if you ever mess up really badly.

Google is your friend

When it comes to Rails, chances are that someone has asked the exact same question as you before. StackOverflow will generally have a question related to yours on it. Be sure to get into the habit of googling when something goes wrong or you don't know something. Your TA is always happy to help, but when you leave AppAcademy, your TA won't be there for you. Part of being a good developer is knowing how to find the answers yourself.

Byebug

Models are tucked away from you and aren't openly exposed through a UI like views and controllers. This may make it a little more difficult at times to work out if something is going wrong in your model. However, this is where error messages will become your friend. Look out for things that relate to your models such as:

- Unknown attribute XYZ
- Undefined method ABC for XYZ

Models behave fairly similarly to classes that you would have written in the first few weeks of App Academy. Why? Because they are classes themselves, just with extra Rails functionality built into them.

Therefore to debug them, we make use of our good friend: `byebug`.

Add `gem 'byebug'` to your `Gemfile` and `bundle install`.

If you need a refresher on byebug and debugging, be sure to have a look over the previous reading.

You can also type

```
(byebug) help
```

inside of byebug to get a list of commands that are available for use.

Better Errors

NB: The latest version of `better_errors` requires ruby 2+. If your ruby version is not up to snuff upgrade with these instructions.

So now you can debug your models like a pro, but that's only 1/3 of the battle. Being able to debug your controllers is a crucial skill and one that you should make sure that you are comfortable with.

It's important that you can realize when something is going wrong in your controller, for example maybe an object isn't being created properly from your params or you aren't being sent the right params in the first place.

In order to debug our controllers, we are going to start using these two gems:

```
# Gemfile
group :development do
  gem 'better_errors'
  gem 'binding_of_caller'
end

# It's important that these go in a development group. If you have
# these available in production mode, then when you launch your site,
# if an error occurs, users will have access to your code and be able
# to do things like User.destroy_all
```

Better Errors will make your error pages a lot nicer to read, you will be able to get stack traces as well as see useful information such as params. (Note that Better Errors causes issues with RSpec, and you should probably not use it during assessments.)

`binding_of_caller` gives you an interactive REPL inside the `better_errors` page. It's like a cross between the debugger and pry, except you can use it in the browser. This is very useful for inspecting values that you have assigned and testing your code as it runs.

Using `better_errors` and `binding_of_caller` is required. Always set this up. :-)

Using Better Errors

Better errors is going to open up whenever our code throws an exception of some sort. What happens if our code isn't throwing an error, but doesn't work the way that we want it to?

Well luckily our controllers have a method called `fail`. By typing fail in a controller, it basically pauses your code at that point and will open up better errors. EG:

```
# app/controllers/posts_controller.rb

class PostsController < ApplicationController
  def create
    @post = Post.new(params[:id])
    fail

    if @post.save
      redirect_to @post
    else
      flash[:errors] ||= []
      flash[:errors] << @post.errors.full_messages.to_sentence
      render :new
    end
  end
end
```

With this fail, our code will stop just after `@post = Post.new(params[:id])`, we can now do things like `p @post` and try to save it manually to see what's going wrong with our code.

Using `fail` is very useful and is something you should do often. It will allow you to step into your controller as it runs and make sure things like params are coming in correctly.

Useful things to do inside of a controller when debugging

- Check what the params are
- Try `@object.save`. If it returns false then call `@object.valid?` And check `@object.errors.full_messages`. This will allow you to see what validations are failing.
- Make sure things like `current_user` are working.
- Make sure instance variables are set correctly.
- Check that you have called `permit` on the params when building objects.
- Check that objects being built via associations are built correctly. EG: `current_user.posts.new(post_params)`

Validations II: Custom Validations

When the built-in validation helpers are not enough for your needs, you can write your own validation methods or validator classes.

Custom Methods

With validation methods, you can write your own methods to validate a model.

```
class Invoice < ActiveRecord::Base
  # validate tells the class to run these methods at validation time.
  validate :discount_cannot_be_greater_than_total_value

  private
  def discount_cannot_be_greater_than_total_value
    if discount > total_value
      errors[:discount] << "can't be greater than total value"
    end
  end
end
```

Note that the presence of an error is registered by adding a message to the `errors` hash. If no error messages are added, the validation is deemed to have passed. Note that the message does not mention the variable name; when you call `full_messages`, Rails will prefix the message with the attribute name for you.

`errors[:base]`

Sometimes an error is not specific to any one attribute. In this case, you add the error to `errors[:base]`. Since `errors[:base]` is an array, you can simply add a string to it and it will be used as an error message.

```
class Person < ActiveRecord::Base
  def a_method_used_for_validation_purposes
    errors[:base] << "This person is invalid because ..."
  end
end
```

Custom Validators

Custom validators are classes that extend `ActiveModel::EachValidator`. Prefer writing a custom validator class when you want to reuse validation logic for multiple models or multiple columns. Otherwise, it's simpler to use a validator method.

Your custom validator class must implement a `validate_each` method which takes three arguments: the record, the attribute name and its value.

```
# app/validators/email_validator.rb
class EmailValidator < ActiveModel::EachValidator
  CRAZY_EMAIL_REGEX = /\A([^@\s]+)@((?:[-a-z0-9]+\.)+[a-z]{2,})\z/i

  def validate_each(record, attribute_name, value)
    unless value =~ CRAZY_EMAIL_REGEX
      # we can use `EachValidator#options` to access custom options
      # passed to the validator.
      message = options[:message] || "is not an email"
      record.errors[attribute_name] << message
    end
  end
end

# app/models/person.rb
class Person < ActiveRecord::Base
  # Rails knows `:email` means `EmailValidator`.
  validates :email, :presence => true, :email => true
  # not required, but must also be an email
  validates :backup_email, :email => {:message => "isn't even valid"}
end
```

As shown in the example, you can also combine standard validations with your own custom validators.