Security

Juan “Harek” Urrios
@xharekx33

Securing an app

Apps contain resources that can be accessed by many users. Unless we secure our app, they will able to access all of them with no restriction whatsoever.

Sometimes we might want to allow that (in our public parts of the site) but for the most part we will want to control access to our app, through authentication and authorization.

It is your responsibility to properly secure your app.

What is “authentication”

The process of determining whether someone or something is who/what it claims to be.

Authentication deals with establishing WHO you are.

IRON HACK

@xharekx33

What is “authorization”

The process of determining if someone has the permission to perform an action or access a certain resource.

Authorization deals with WHAT you can do and see, once WHO you are it’s been established through authentication.

How to authenticate someone?

In the real world you use IDs, driver licenses, legal documents or certificates to identify people.

In apps we ask for usernames and passwords, provide methods for users to sign in and out and store their sessions.

IRON HACK

Let’s get started

Let’s clone the repo for our Taskly app:

https://github.com/xharekx33/taskly_ironhack.git

```
$ git clone https://github.com/xharekx33/taskly_ironhack.git
$ cd taskly_ironhack
$ bundle install
$ rake db:migrate
$ rake db:seed
$ rails s
```

IRON HACK

@xharekx33

What needs to change in our app?

If you go to `http://localhost:3000/users` or `http://localhost:3000/tasks` you'll see that anyone can see, edit and destroy all users and tasks.

We are going to:

- Make sure users can only see, edit and delete their own tasks.
- Make sure users can only see and edit their own information.

Adding a secure Password

User users only have a name and an email. For authentication to work they'll need to have a secure password. That means that the actual password will not be stored in the database. A hashed version of it will be saved instead.

A hashed password is the result of applying an irreversible hash function to the actual password. It will be then be said that the password has been encrypted

Adding the bcrypt gem

Open your Gemfile and uncomment the the line with the bcrypt gem.
Run `bundle install`

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```
#Gemfile

...
# Use ActiveModel has_secure_password
gem 'bcrypt', '~> 3.1.7'
...
```

@xharekx33

What does the bcrypt gem do?

It is the Ruby binding for the OpenBSD bcrypt() password hashing algorithm that we will use to encrypt passwords in our app.

By design, the bcrypt algorithm produces a salted hash, that is; it adds an extra string of random characters to each password (called “salt”) before encrypting them, to protect from dictionary attacks and rainbow table attacks.

Add the has_secure_password method

Include the `has_secure_password` method in your User model

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```ruby
# /app/models/user.rb

class User < ActiveRecord::Base
...
    has_secure_password
...
```

What does has_secure_password do?

When included in a model the `has_secure_password` method adds:

- The ability to save a hashed `password_digest` attribute to the database
- A pair of virtual attributes: `password` and `password_confirmation`
- Presence validations on create for these, and it also validates that they match
- An authenticate method that returns the user when the password is correct (and false otherwise)

The only requirement `has_secure_password` has to work is that the model needs to have an attribute called `password_digest`

IRON HACK

Add a password_digest

Create a new migration to add the `password_digest` attribute.
Run `rake db:migrate`

```
$ rails g migration add_password_digest_to_users
password_digest:string

$ rake db:migrate
```

Strong parameters

Add `:password` and `:password_confirmation` to the list of permitted fields in our Users controller

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```ruby
# /app/controllers/users_controller.rb

private
  def user_params
    params.require(:user).permit(
      :name, :email, :password, :password_confirmation)
  end
```

Add password validation

Add validations for our `:password` attribute in our User model.

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```ruby
# /app/models/user.rb

class User < ActiveRecord::Base
...
  validates :email, presence: true, length: { maximum: 255 },
                    format: { with: VALID_EMAIL_REGEX },
                    uniqueness: { case_sensitive: false }
  validates :password, presence: true, length: { minimum: 8 }
...
```

IRON HACK

@xharekx33

Update the signup form

Add the `:password` and `:password_confirmation` fields to the signup form.

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```
# /app/views/users/_form.html.erb
...
  <div class="field">
    <%= f.label :email %><br><%= f.text_field :email %>
  </div>
  <div class="field">
    <%= f.label :password %><br><%= f.password_field :password %>
  </div>
  <div class="field">
    <%= f.label :password_confirmation %><br><%= f.password_field :
password_confirmation %>
  </div>
...
```

IRON HACK

@xharekx33

Create a new user

Go to the signup page and create a new user. Open `rails console` and check it was all saved correctly.

```
$ rails console
Loading development environment (Rails 4.2.3)
2.0.0-p598 :001 > User.last
  User Load (0.1ms)  SELECT  "users".* FROM "users"  ORDER BY "users"."
id" DESC LIMIT 1
 => #<User id: 6, name: "Harek", email: "xharekx33@gmail.com",
created_at: "2015-08-12 01:41:56", updated_at: "2015-08-12 01:41:56",
password_digest: "$2a$10$/YzTNK43q0Zua.OjL4srUO0dVDGUX4eecRSLF/xVSQ8...">
2.0.0-p598 :002 >
```

IRON HACK

@xharekx33

Delicious cookies: Sessions

A “cookie” is small piece of data sent from a website and stored in the user’s browser.

In Rails, sessions store bits of data in a cookie, which means you access the data in it until the cookie expires or until you clear it.

HTTP is a stateless protocol. Sessions make it stateful.

Using sessions we can remember a user’s identity from page to page.

Login & logout

Using sessions we'll give users the ability to login and logout from our app so we don't have to constantly ask for their password.

When the user logs in we'll create a session to save the user id in a cookie and we will destroy the session when the user logs out.

This way we can easily check our authenticated user's identity in every page.

IRON HACK

Sessions controller

We'll create a new `sessions controller` to handle our /login and /logout routes, that will match its new, create and destroy actions

```
$ rails g controller Sessions new create destroy
      create  app/controllers/sessions_controller.rb
      route  get 'sessions/destroy'
      route  get 'sessions/create'
      route  get 'sessions/new'
      invoke  erb
      create    app/views/sessions
      create    app/views/sessions/new.html.erb
      create    app/views/sessions/create.html.erb
      create    app/views/sessions/destroy.html.erb
```

Login and logout routes

Add the necessary routes for our sessions controller actions

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

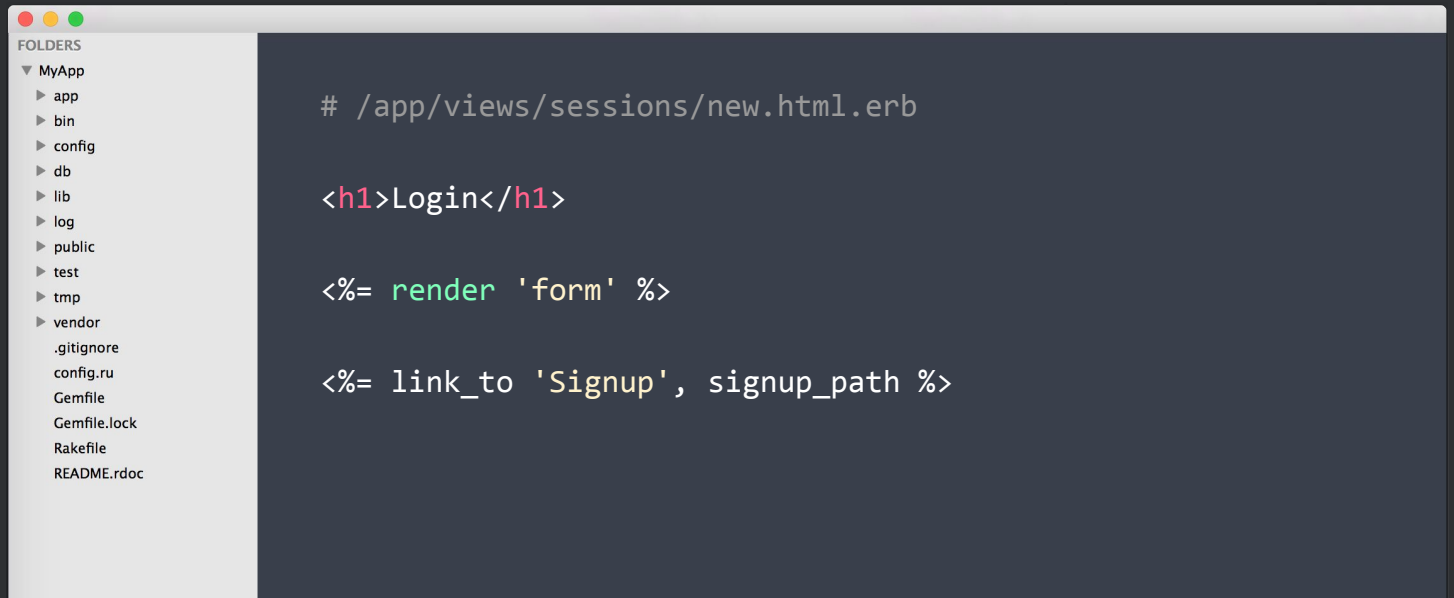
```ruby
# /config/routes.rb

Rails.application.routes.draw do
  get '/login', to: 'sessions#new'
  post '/login', to: 'sessions#create'
  delete 'logout', to: 'sessions#destroy'
...
```

IRON HACK

@xharekx33

Sessions new view

The view in `app/views/sessions/new.html.erb` will be similar to the one for creating new users



@xharekx33

Login form

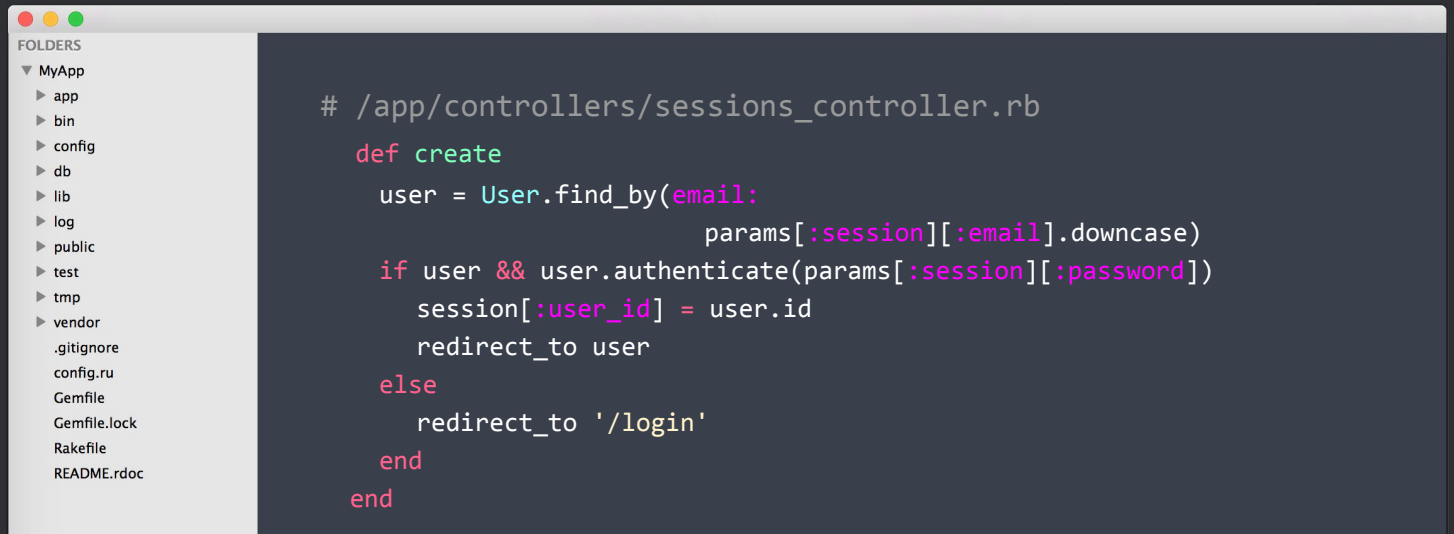
The form partial in `app/views/sessions/_form.html.erb` will be similar to the one for creating new users, but will only include :email and : password fields

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```
# /app/views/sessions/_form.html.erb
<%= form_for(:session, url: login_path) do |f| %>
...
  <div class="field">
      <%= f.label :email %><br>
      <%= f.text_field :email %>
  </div>
   <div class="field">
      <%= f.label :password %><br>
      <%= f.password_field :password %>
  </div>
```

Sessions controller: create

Fill in the `create` action in the sessions controller so it creates the cookie with the user_id in the session if the password is correct and redirects to the login form if it isnt.



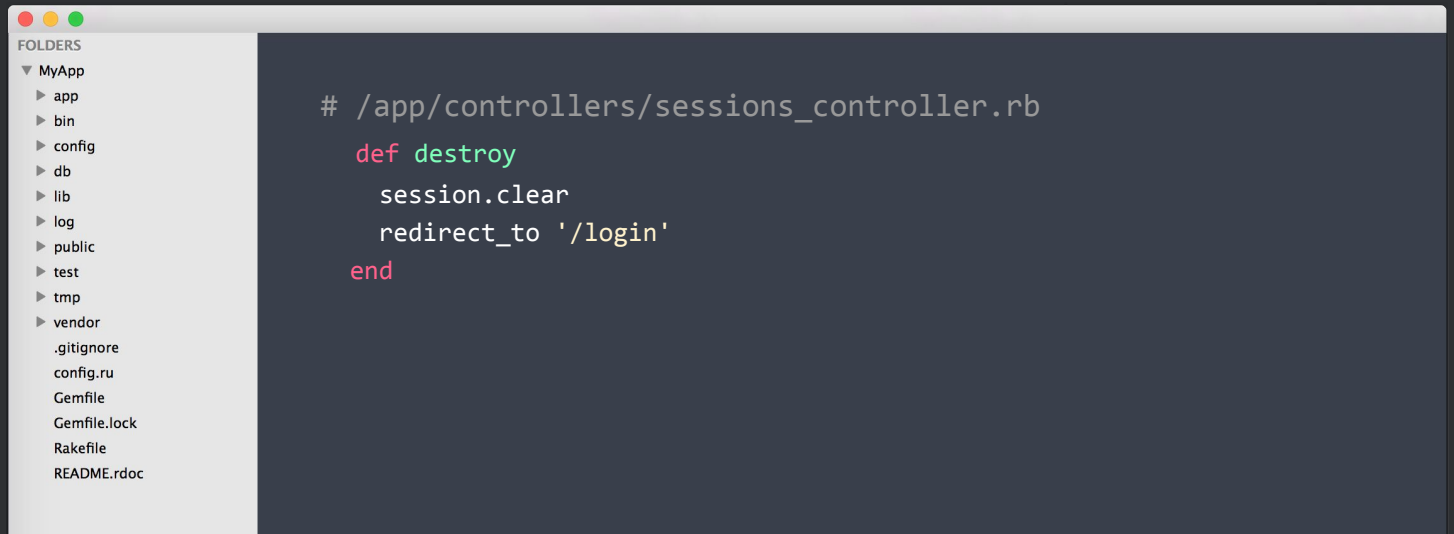

```ruby
# /app/controllers/sessions_controller.rb
  def create
    user = User.find_by(email:
                        params[:session][:email].downcase)
    if user && user.authenticate(params[:session][:password])
      session[:user_id] = user.id
      redirect_to user
    else
      redirect_to '/login'
    end
  end
```

IRON HACK

@xharekx33

Sessions controller: destroy

Fill in the `destroy` action in the sessions controller so it clears the user data saved in the session.



@xharekx33

Searching for the current user

Now that our users can log in, we should do something with their session data.

To avoid having to search for the current user with `session[:user_id]` we will extract that code into a `current_user` helper method so it's available for us to use anywhere in our application.

Add sessions helpers

We'll add helpers to check who the current user is and whether they're logged in

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```ruby
# /app/helpers/sessions_helper.rb
module SessionsHelper
  def current_user
    @current_user ||= User.find_by(id: session[:user_id])
  end

  def logged_in?
    !current_user.nil?
  end

end
```

Make session helpers available to controllers

Add it these to the application controller so controllers can use them too

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```ruby
# /app/controllers/application_controller.rb
class ApplicationController < ActionController::Base
  unless Rails.env.development?
    protect_from_forgery with: :exception
  end
  include SessionsHelper
  end
```

IRON HACK

@xharekx33

Add login and logout links

Now, using our view helpers, we can show the appropriate logout link to authenticated users, and signup and login links to anonymous users

FOLDERS
- MyApp
  - app
  - bin
  - config
  - db
  - lib
  - log
  - public
  - test
  - tmp
  - vendor
  - .gitignore
  - config.ru
  - Gemfile
  - Gemfile.lock
  - Rakefile
  - README.rdoc

```
# /app/views/layouts/application.html.erb
...
<body>
  <div id="top_bar">
    <% if logged_in? %>
      <p>Hello,  <%= current_user.name %> -
      <%= link_to 'Logout', logout_path, method: 'DELETE' %></p>
    <% else %>
      <p>
        <%= link_to 'Signup', signup_path %> |
        <%= link_to 'Login', login_path %>
      </p>
    <% end %>
  </div>
```

IRON HACK

@xharekx33

Give it a try

- Create a user in the signup page
- Use it to login
- Make sure the correct links are shown on the top bar

Exercise

- Change the Tasks controller index action so authenticated users are only able to list their own tasks.
- Make a before_action filter that checks if the current user is the owner of a task so users can only edit and delete their own tasks.
- Users should only be able to edit their own name, email and password. Users won't be able to delete other users
- Make all routes in the app are restricted to authenticated users except for the login and signup pages.
- Instead of using `session[:user_id]` use a more secure session token for the current_user helper