# Web Performance Optimization

Make sure to post to your cohorts forum if you have any questions!

**Need help getting started?**

* Find an answer to your question in the [Udacity FAQ](https://www.udacity.com/faq)
* Learn about different parts of the Classroom in [Udacity Introduction](https://www.udacity.com/wiki/udacityintroduction)

Contents

* 1 [Course Resources](https://www.udacity.com/wiki/ud884-nd#course-resources)
  + 1.1 [Additional Reading](https://www.udacity.com/wiki/ud884-nd#additional-reading)
  + 1.2 [Downloadable Materials](https://www.udacity.com/wiki/ud884-nd#downloadable-materials)
  + 1.3 [Critical Rendering Path Overview](https://www.udacity.com/wiki/ud884-nd#critical-rendering-path-overview)
  + 1.4 [Optimization Tips and Tricks](https://www.udacity.com/wiki/ud884-nd#optimization-tips-and-tricks)
  + 1.5 [The Portfolio Project](https://www.udacity.com/wiki/ud884-nd#the-portfolio-project)
  + 1.6 [Using GitHub](https://www.udacity.com/wiki/ud884-nd#using-github)
  + 1.7 [Customization with Bootstrap](https://www.udacity.com/wiki/ud884-nd#customization-with-bootstrap)
  + 1.8 [Sample Portfolios](https://www.udacity.com/wiki/ud884-nd#sample-portfolios)
* 2 [Course Syllabus](https://www.udacity.com/wiki/ud884-nd#course-syllabus)
  + 2.1 [Lesson 0: Getting Up and Running](https://www.udacity.com/wiki/ud884-nd#lesson-0-getting-up-and-running)
  + 2.2 [Lesson 1: The Critical Rendering Path](https://www.udacity.com/wiki/ud884-nd#lesson-1-the-critical-rendering-path)
  + 2.3 [Lesson 2: Optimizing the CRP](https://www.udacity.com/wiki/ud884-nd#lesson-2-optimizing-the-crp)

## Course Resources

### Additional Reading

* [Web Fundamentals](https://developers.google.com/web/fundamentals/)
* [PageSpeed Insights Rules and Recommendations](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/page-speed-rules-and-recommendations.html)

### Downloadable Materials

Here are all of the videos from the course, zipped and saved as .mp4 files.

* [Lesson 0 - Getting Up and Running](http://video.udacity-data.com/zip/ud884/Lesson_0_-_Getting_Up_and_Running.zip)
* [Lesson 1 - The Critical Rendering Path](http://video.udacity-data.com/zip/ud884/Lesson_1_-_The_Critical_Rendering_Path.zip)
* [Lesson 2 - Optimizing the CRP](http://video.udacity-data.com/zip/ud884/Lesson_2_-_Optimizing_the_CRP.zip)

### Critical Rendering Path Overview

* [The Critical Rendering Path](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/)
* [Constructing the DOM](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/constructing-the-object-model#document-object-model-dom)
* [Constructing the CSSOM](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/constructing-the-object-model#css-object-model-cssom)
* [Constructing the Render Tree, running Layout and Paint](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/render-tree-construction)

### Optimization Tips and Tricks

* [Optimizing Performance](https://developers.google.com/web/fundamentals/performance/)
* [WebPageTest](http://www.webpagetest.org/). WebPageTest is an invaluable resource for performance [analysis](https://sites.google.com/a/webpagetest.org/docs/using-webpagetest/quick-start-quide).
* [Analyzing the Critical Rendering Path](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/analyzing-crp.html)
* [Optimizing the Critical Rendering Path](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/optimizing-critical-rendering-path.html)
* [Avoiding Rendering Blocking CSS](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/render-blocking-css.html)
* [Optimizing JavaScript](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/adding-interactivity-with-javascript.html)
* [Measuring with Navigation Timing](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/measure-crp.html). We didn't cover the Navigation Timing API in the first two lessons but it's an incredibly useful tool for automated page profiling. I highly recommend reading.
* [The fewer the downloads, the better](https://developers.google.com/web/fundamentals/performance/optimizing-content-efficiency/eliminate-downloads.html)
* [Reduce the size of text](https://developers.google.com/web/fundamentals/performance/optimizing-content-efficiency/optimize-encoding-and-transfer.html)
* [Optimize images](https://developers.google.com/web/fundamentals/performance/optimizing-content-efficiency/image-optimization.html)
* [HTTP caching](https://developers.google.com/web/fundamentals/performance/optimizing-content-efficiency/http-caching.html)
* If you want to share a Timeline with a link like [this](http://www.webpagetest.org/chrome/timeline.php?test=140619_HM_VQP&run=1), the easiest way to do it is with [WebPageTest](http://www.webpagetest.org/):
  1. Read [this](http://www.webpagetest.org/forums/showthread.php?tid=10990) how-to.
  2. What the how-to doesn't tell you is that next to the "Timeline" link in the WebPageTest summary page, you'll see an option to "view". That's a link to an online version of the Timeline. Share the link here!

### The Portfolio Project

You can find the portfolio GitHub repo [here](https://github.com/udacity/frontend-nanodegree-mobile-portfolio) and a live version of Cameron's portfolio [here](http://cameronwp.github.com/udportfolio).

### Using GitHub

If you are not familiar with Git and GitHub, the [GitHub help pages](https://help.github.com/) are a great place to start. In particular, check out the following guides: [setup Git](https://help.github.com/articles/set-up-git), [fork a repo](https://help.github.com/articles/fork-a-repo), [hosting with GitHub Pages](https://pages.github.com/), and the [references section](https://help.github.com/articles/what-are-other-good-resources-for-learning-git-and-github) to learn more.

### Customization with Bootstrap

The portfolio was built on Twitter's [Bootstrap](http://getbootstrap.com/) framework. All custom styles are in dist/css/portfolio.css in the portfolio repo.

* [Bootstrap's CSS Classes](http://getbootstrap.com/css/)
* [Bootstrap's Components](http://getbootstrap.com/components/)

### Sample Portfolios

Feeling uninspired about your portfolio? Here's a list of cool portfolios I found after a few minutes of Googling.

* [A great discussion about portfolios on reddit](http://www.reddit.com/r/webdev/comments/280qkr/would_anybody_like_to_post_their_portfolio_site/)
* <http://ianlunn.co.uk/>
* <http://www.adhamdannaway.com/portfolio>
* <http://www.timboelaars.nl/>
* <http://futoryan.prosite.com/>
* <http://playonpixels.prosite.com/21591/projects>
* <http://colintrenter.prosite.com/>
* <http://calebmorris.prosite.com/>
* <http://www.cullywright.com/>
* <http://yourjustlucky.com/>
* <http://nicoledominguez.com/portfolio/>
* <http://www.roxannecook.com/>
* <http://www.84colors.com/portfolio.html>

## Course Syllabus

### Lesson 0: Getting Up and Running

You can’t optimize what you can’t measure, so in this lesson you’ll learn how to open Chrome Developer Tools to measure the performance of mobile and desktop websites.

### Lesson 1: The Critical Rendering Path

Optimizing any website’s performance requires a strong understanding of how browsers build websites from HTML, CSS and JavaScript. You’ll start by breaking down the Critical Rendering Path - the steps the browser has to take to render a page.

### Lesson 2: Optimizing the CRP

You’ll explore easy HTML, CSS and JavaScript optimizations with significant performance implications, some of which are as simple as adding a single attribute to an HTML tag! Along the way, you’ll be developing the skills to help you diagnose opportunities for optimizations.

**Instructor Notes**

The PageSpeed score of 90 is for index.html (both Mobile and Desktop scores should be at least 90).

The frame rate of 60fps should be obtained for the pizza page (views/pizza.html). The file you need to study and change is views/js/main.js.

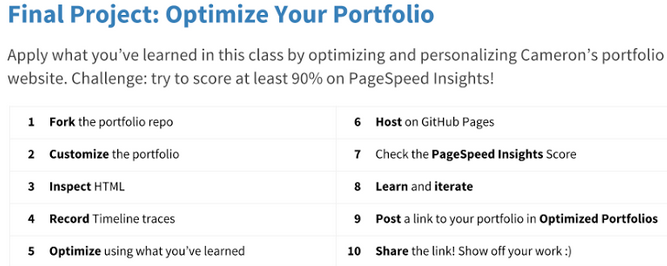
Comments should be present in main.js to indicate the optimizations done for the Pizzas page.

Please do not forget to update the README file and make sure you outline all of your optimizations done in main.js for the pizzas page.

It's recommended to not measure performance in a virtualized environment. We recommend you measure your FPS performance in your native operating system.

Below is a picture of what the target timeline should look like. Evaluators will focus their attention on the timeline rather than the FPS meter due to varying hardware factors that may affect FPS.

[Target Timeline](http://i.imgur.com/cI6zwUo.jpg)



## Instructor Notes

[*Link to Optimized Portfolios forum discussion for mobile users*](http://forums.udacity.com/questions/100195399/optimized-portfolios#ud884)

You can find the portfolio GitHub repo [here](https://github.com/cameronwp/udportfolio) and a live version of Cameron's portfolio [here](http://cameronwp.github.com/udportfolio).

### Using GitHub

If you are not familiar with Git and GitHub, the [GitHub help pages](https://help.github.com/) are a great place to start. In particular, check out the following guides: [setup Git](https://help.github.com/articles/set-up-git), [fork a repo](https://help.github.com/articles/fork-a-repo), [hosting with GitHub Pages](https://pages.github.com/), and the [references section](https://help.github.com/articles/what-are-other-good-resources-for-learning-git-and-github) to learn more.

Check out the [course materials page](https://www.udacity.com/wiki/ud884) for project tips, tricks and inspiration.