

HTML5 and CSS3 Complete

Second Edition

Unit P

Testing and Improving Performance

Objectives

- Assess performance
- Plan usability tests
- Perform browser tests
- Test page loading speed

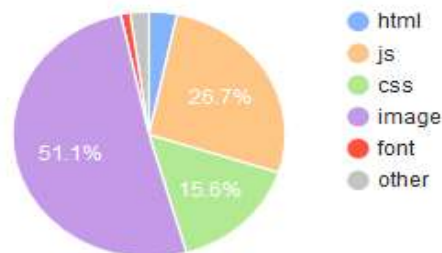
Objectives (continued)

- Incorporate a spritesheet
- Optimize images
- Reduce the size of CSS files
- Customize modernizr.js

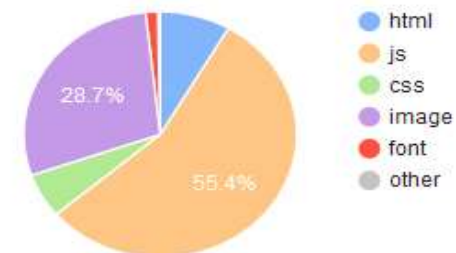
Assess Performance

- **Performance:** how quickly published site loads and responds to user interaction over the Internet
 - Can't control user's connection speed
 - Can identify bottlenecks by testing
 - Can optimize code
- Quick Test:
<http://www.webpagetest.org/>

Requests



Bytes



Assess Performance (continued)

- Two factors impact loading time:
 - Size of embedded/linked files
 - minified: result of automated process that removes characters not needed by browsers
 - HTML, CSS, and JavaScript files can be minified
 - Common minification techniques:
 - Removing whitespace, shortening variable names, and replacing verbose functions with shorter, more concise functions.

Minification Technique

- HTML Minification – generates minified version of the open website.

<https://developers.google.com/speed/pagespeed/insights/>

- CSS Minification – less likely to change

<https://cssminifier.com/>

- JavaScript Minification – efficient copy of JavaScript

“Closure Compiler”

```
/*
  Lakeland Reeds Bed and Breakfast style sheet
  Filename: styles.css
  Author:
  Date:
  HTML5 and CSS3 Illustrated Unit P, Lessons
*/

/* reset styles */
html {
  font-size: 16px;
}
```

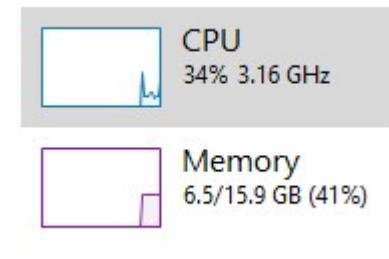
Original CSS code, which includes comments, spaces, and line breaks

Minified version of the CSS code on the left, with comments, spaces, and line breaks removed

```
html{font-size:16px}a,article,body,div,fieldset,figcaption,figure,footer,form,header,h1,h2,h3,img,input,label,legend,li,nav,p,section,textarea,ul{border:0;padding:0;margin:0}img{max-width:100%;height:auto;width:auto}ul{list-style-type:none}body{margin:0 auto;font-family:Arial,Helvetica,sans-serif}p{line-height:1.4em;font-size:1.3em}a:link{color:#000}a:visited{color:#888}p.skipnavigationa{position:absolute;left:-10000px}p.skipnavigationa:focus{color:ivory;background-
```

Benefits of Minification

1. Load content faster
2. Less bandwidth costs
3. See lower resource usage



Assess Performance (continued)

- Two factors impact loading time:
 - Size of embedded/linked files
 - optimized: result of process that compresses image files
 - TIPS:
 - IMG Compress Images - will load faster and decrease the amount of space used to store that size
 - Set Image Resolution to 72dpi – quality will not diminish
 - Optimize GIF, JPG, PNG files – can use graphic optimization tools.

Assess Performance (continued)

- Two factors impact loading time:
 - Size of embedded/linked files
 - orphaned styles: style rules based on selectors that don't apply to any elements
 - remove to reduce file size

Note: You don't have to pay any web service or search for an addon, you already have this in Google Chrome under F12

(Inspector)->Audits->Remove unused CSS rules

Assess Performance (continued)

- Two factors impact loading time:
 - Size of embedded/linked files
 - custom build: version of library containing only features your site uses
 - Every byte matters for mobile connections



Progressive
Web App



Performance



Accessibility



Best
Practices

Assess Performance (continued)

- Two factors impact loading time (cont'd):
 - **Number of HTTP Requests**
 - Browsers limit number of simultaneous requests
 - Combine files of same type to reduce download time
 - Spritesheet: single image file containing all decorative images in a web page – several images put into a single page.
 - Reduce several request
 - Demo: spritesheet.html, sprite.gif



Firefox



Chrome



Explorer



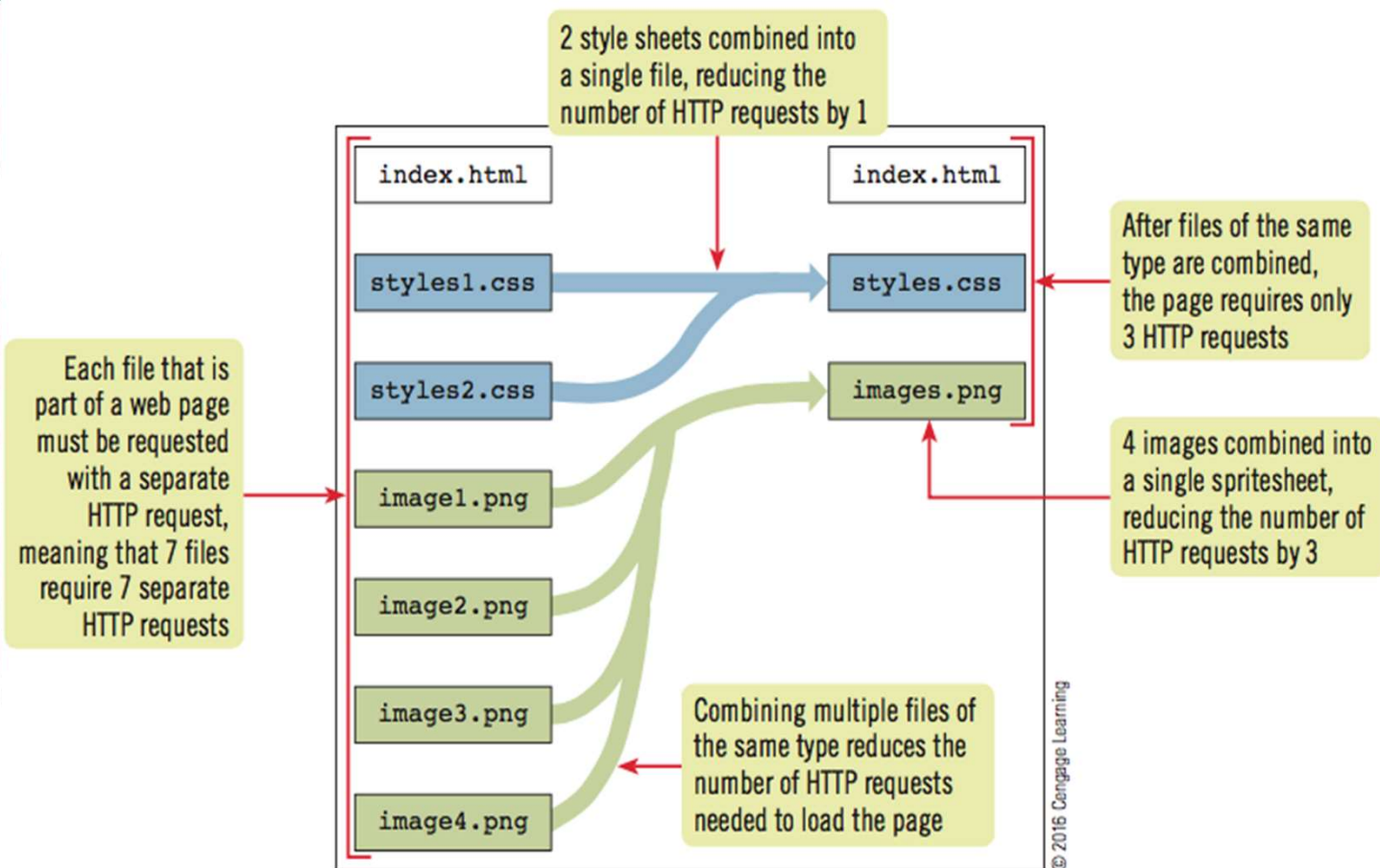
Opera



Safari

Assess Performance (continued)

- Reducing HTTP requests by combining files:



Plan Usability Tests

- Best way to test usability is to collect feedback from site's users
- Important to:
 - Collect feedback from likely users
 - Identify questions you want all testers to answer
 - Create a script to use consistently throughout the process

Plan Usability Tests (continued)

- A usability test

A professional testing facility may allow observers to watch the test from behind mirrored glass

The person conducting the test is generally in the room with the user and positioned to be able to see what the user does



The user sits at a computer and attempts to complete the tasks requested by the person conducting the test

Perform Browser Tests

- Helps ensure :
 - Web pages are not published that display obvious errors
 - Pages are not published that don't work as expected for some audience members
- Majority of users are likely to be using Windows
 - Important to ensure Windows system access for testing, as well as iOS and Android devices

Perform Browser Tests (continued)

- Icon missing on web page

The layout for each page includes an icon before the nav bar link for the current page



On aboutus.html, the icon is missing before the nav bar link



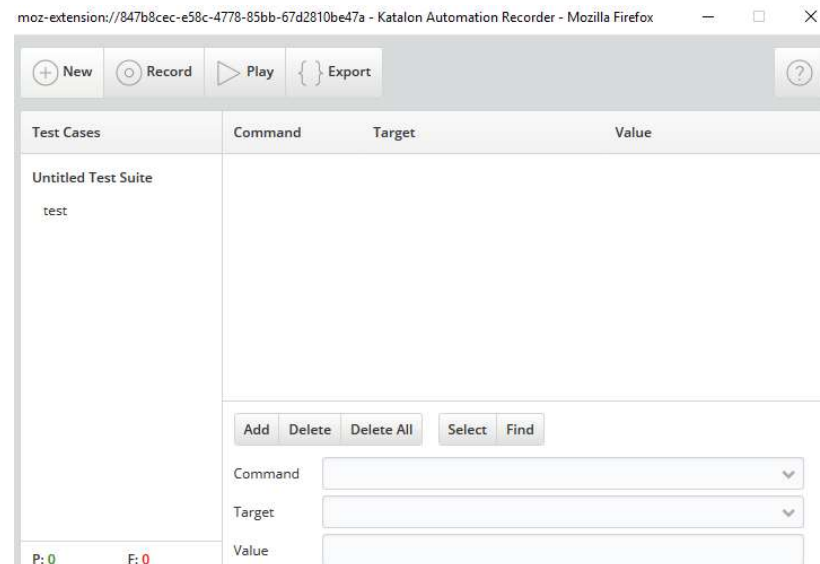
Automated Testing Demo

Unit P



Note: Use automated Test Suite: available in FF <http://www.seleniumhq.org/>

DEMO



Note: Don't waste your time testing them several times manually. Available tools come to the rescue. We use this a lot a work on the front end.



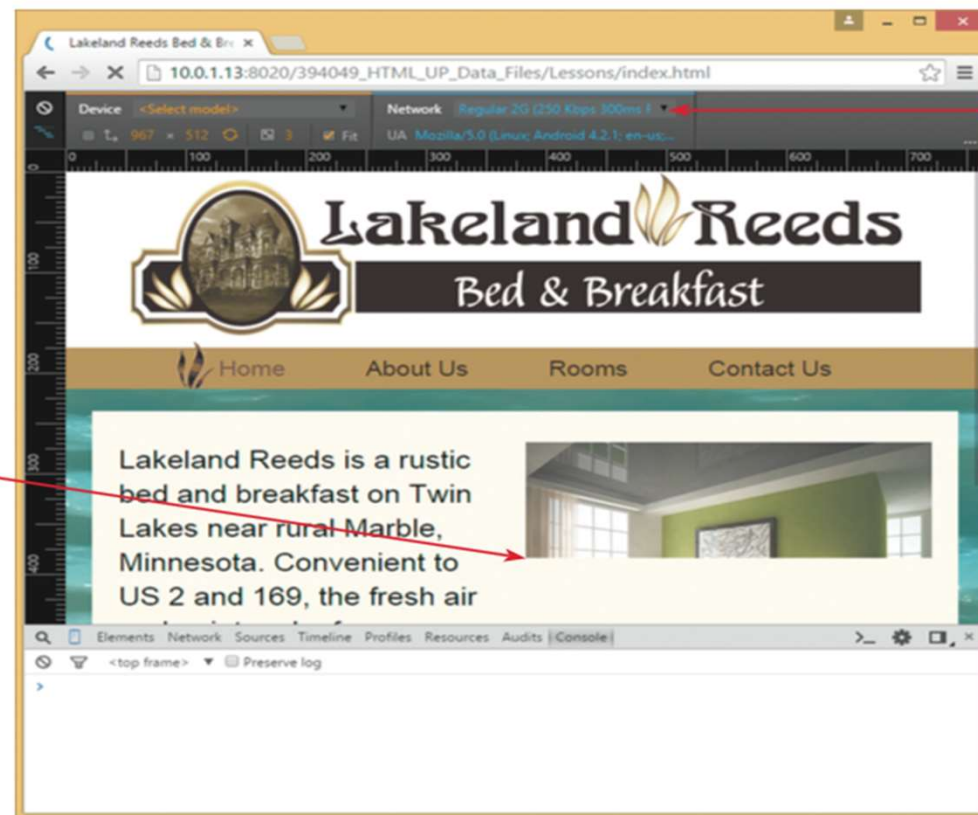
Test Page Loading Speed

Unit P

- Optimizing load time
 - Improves experience of users
 - Helps avoid users becoming impatient with site
- Chrome Device Mode
 - Includes utility to simulate web page loading at different connection speeds

Test Page Loading Speed (continued)

- Web page loading at simulated Regular 2G speed



Regular 2G
selected in
Network box

One or more of
the images may
take several
seconds to load
at simulated
Regular 2G
speed



Incorporate a Spritesheet

Unit P

- Create using image editing software to add multiple images to single, larger image
 - Results in spritesheet, with all smaller images side-by-side or in grid
 - Downloads in single HTTP request
- Specify as background image for multiple elements
 - Use CSS to control which part is shown

Incorporate a Spritesheet (continued)

- Using a spritesheet in a web page layout:

The spritesheet is a single image file containing multiple images (in this case, 2)

CSS declaration to set the spritesheet as the background image for the element

```
.current_page:before {  
  width: 60px;  
  height: 60px;  
  background-image: url("images/sprites.png");  
  background-position: -2px -2px;  
  ...  
}
```

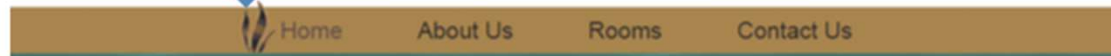
CSS declarations to set the element dimensions to the size of the relevant icon

CSS declarations ensure only the relevant portion of the image is visible



CSS declarations ensure that the non-relevant portions of the spritesheet are not visible

CSS declaration to set a point near the top left corner of the spritesheet as the starting point for the background image



Optimize Images

- Reduce size without affecting content
 - Reduce quality in a way humans can't perceive
 - Performed by specialized software

Optimize Images (continued)

- Results of image optimization on tinypng.com:



Reduce the Size of CSS Files

- Orphaned styles: style rules based on selectors that no longer apply to any elements on your web pages
- Removing orphaned styles:
 - Reduces amount of code to download
 - Shrinks download time
 - Makes it easier for other developers to work with

Reduce the Size of CSS Files (continued)

- Minifying removes unnecessary characters, which reduces file size
 - Result hard for humans to read
 - Makes no difference to user agent

Reduce the Size of CSS Files (continued)

- CSS minification tool at cssshrink.com:

IN 4131 bytes (1384 gzipped)

OUT 2732 bytes (1056 gzipped)

Pasted code

```
/*
Lakeland Reeds Bed and Breakfast style sheet
Filename: styles.css

Author:
Date:
HTML5 and CSS3 Illustrated Unit P, Lessons
*/

/* reset styles */
html {
  font-size: 16px;
}
```

Minified code; notice the comments are not included in the minified code

```
html{font-size:16px}a,article,body,div,fieldset,figcaption,figure,footer,form,header,h1,h2,h3,img,input,label,legend,li,nav,p,section,textarea,ul{border:0;padding:0;margin:0}img{max-width:100%;height:auto;width:auto}ul{list-style-type:none}body{margin:0 auto;font-family:Arial,Helvetica,sans-serif}p{line-height:1.4em;font-size:1.3em}a:link{color:#000}a:visited{color:#888}p.skipnavigation{a{position:absolute;left:-10000px}p.skipnavigation a:focus{color:ivory;background-
```

Formatted version of code for comparison

Pretty IN

```
/*
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Filename: styles.css

Author:
Date:
HTML5 and CSS3 Illustrated Unit P, Lessons
*/

/* reset styles */

html {
  font-size: 16px;
}
```

Formatted version of minified code for comparison with original version

Pretty OUT

```
html {
  font-size: 16px;
}

a, article, body, div, fieldset, figcaption, figure, footer, form, header, h1, h2, h3, img, input, label, legend, li, nav, p, section, textarea, ul {
  border: 0;
  padding: 0;
  margin: 0;
}

img {
  max-width: 100%;
}
```

Source: cssshrink.com



Summary

- Improving performance ensures your content is available as quickly as possible to users.
- The best way to test the usability of your site is by collecting feedback from the site's users.
- You should test your pages on the most common user agents for Windows, iOS, and Android.

Summary (continued)

- Testing your website at different connection speeds lets you see how quickly it might load for different users.
- Combining decorative images into a single spritesheet reduces the number of HTTP requests.
- Optimizing images reduces the size of downloads.

Summary (continued)

- Removing orphaned styles and minifying CSS files reduces the size of downloads.
- Creating a custom build of libraries like modernizr.js can further increase your site's download speed.