

CS 110

Lab 4: Responsive Design with Media Queries

Overview

In this lab, you will learn about responsive web design using CSS media queries. You'll understand how to make web pages adapt to different screen sizes and orientations, making them mobile-friendly and accessible across various devices. The lab will focus on modifying a simple webpage layout to respond to different viewport sizes using media queries.

Instructions

1. Download the Starter Files

Download the following files from Canvas and save them to your lab4 folder:

- responsive_design.html
- media_queries.css

2. Understanding the Starter Code

HTML Structure (responsive_design.html)

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>CSS Media Queries</title>
  <link rel="stylesheet" href="style.css">
</head>
<body>
  <header>
    <h1>Header</h1>
    <nav><h2>Nav</h2></nav>
  </header>
  <main>
    <h2>Main</h2>
  </main>
  <footer>
    <h2>Footer</h2>
  </footer>
</body>
</html>
```

```
</footer>
</body>
</html>
```

The HTML file contains: - A header section with navigation - A main content area - A footer section

Important Note about Viewport Meta Tag:

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">
```

This meta tag is crucial for responsive design because: - It tells mobile browsers to set the viewport width to the device's width - Sets the initial zoom level to 1.0 (no zoom) - Without this tag, mobile devices might try to show the desktop version scaled down - This ensures your media queries will work as intended on mobile devices

Base CSS Styles (style.css)

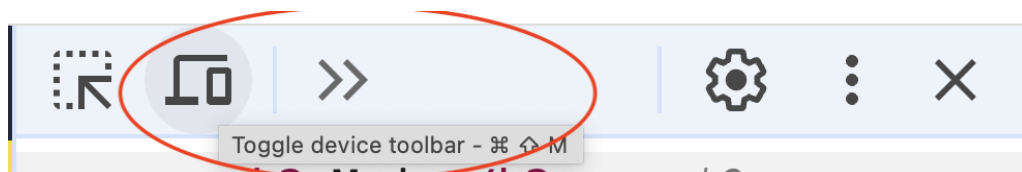
The initial CSS includes: -

- Reset styles for consistent rendering
- General styles for the page layout
- Font and color settings
- Flexbox setup for the layout

3. Using Chrome DevTools for Testing

Before adding media queries, learn how to test responsive designs:

1. Open Chrome DevTools (Right-click > Inspect or Press F12)
2. Click the "Toggle Device Toolbar" button (Ctrl+Shift+M)



3. Try different preset devices:
 - Click the devices dropdown at the top
 - Common presets include:
 - iPhone SE (375×667)
 - iPhone 12 Pro (390×844)
 - iPad Air (820×1180)
 - Galaxy S20 Ultra (412×915)

4. Use Responsive mode:

- Select “Responsive” from the devices dropdown
- Drag the edges to see how layout changes at different widths
- Common breakpoints to test:
 - Mobile: 320px-480px
 - Tablet: 481px-768px
 - Laptop: 769px-1024px
 - Desktop: 1025px and larger

4. Adding Media Queries

We'll add media queries for different screen sizes. After each step, test the changes using Chrome DevTools.

Step 1: Small Screens (576px) and smaller

```
/* || SMALL */
@media screen and (max-width: 576px) {
  body {
    background-color: green;
    background-image: radial-gradient(whitesmoke, green)
  }
  nav {
    display: none;
  }
}
```

Test in DevTools:

1. Make the viewport narrower than 576px
2. Slowly widen it past 576px
3. Observe the background color change
4. Notice how the nav disappears.

Step 2: Medium Screens (768px) and smaller

```
/* || MEDIUM */
@media screen and (min-width: 576px) {
  body {
    background-color: gold;
    background-image: radial-gradient(whitesmoke, gold)
  }
}
```

Test this change:

1. Make viewport wider than 576px

2. Notice the new background color
3. Try resizing between 576px and 768px.

Test the changes after adding each step after this.

Step 3: Large Screens (768px+)

```
/* || LARGE */
@media screen and (min-width: 768px) {
  body {
    background-color: firebrick;
    background-image: radial-gradient(whitesmoke, firebrick)
  }
}
```

Step 4: Extra Large Screens (992px+)

```
/* || XL */
@media screen and (min-width: 992px) {
  body {
    background-color: rebeccapurple;
    background-image: radial-gradient(whitesmoke, rebeccapurple)
  }
}
```

Step 5: Landscape Mode for Mobile

```
/* || MOBILE DEVICE LANDSCAPE */
@media screen and (max-height: 425px) and (min-aspect-ratio: 7/4) {
  body {
    background-color: dodgerblue;
    background-image: radial-gradient(whitesmoke, dodgerblue)
  }
  h1, h2 {
    font-size: 1.5rem;
  }
  nav {
    display: none;
  }
}
```

This query targets:

- Screens with height less than 425px
- Aspect ratio wider than 7:4 (typical for landscape phones)

5. Testing and Validation

1. Test your responsive design:
 - Use Chrome DevTools to test all breakpoints
 - Check the layout in portrait and landscape orientations
 - Verify transitions between breakpoints are smooth
 - Test with different preset device sizes
2. Validate your code:
 - Use W3C HTML Validator (https://validator.w3.org/#validate_by_upload)
 - Use W3C CSS Validator (https://jigsaw.w3.org/css-validator/#validate_by_upload)
 - Fix any validation errors

Submission

1. Verify all media queries work correctly
2. Test on multiple device sizes in Chrome DevTools
3. Validate both HTML and CSS files
4. Zip the following files:
 - responsive_design.html
 - media_queries.css
5. Submit the zip file to Canvas