COMP 307
Principles of Web Development

Contents

Elements
Environments

MCGILL UNIVERSITY

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Lecture 10

Unit 3 – Frontend Design

Dynamic Website (Part A)

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Class Outline

- Elements of responsive design
- Responsive vs Liquid
- DIY Methods

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Readings

- Full Stack Developer
  - Chapters 4, 6 and 8
- Internet Resources
  - https://www.w3schools.com/html/html_responsive.asp
  - https://www.toptal.com/designers/responsive/responsive-design-best-practices

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What are Dynamic Websites?

- Two Forms
  - <u>Responsive Design</u>
    How should the layout of the website change for different types of screens or for windows that vary in size?
    (Part A)
  - <u>Generated Content Design</u>
    Software the automatically creates webpages programmatically.
    (Part B)

This lecture focuses on Responsive Design.

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Elements of responsive design

Dynamic Website (Part A)

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What is Responsive Design?

- Using HTML, CSS and JS to automatically resize and reformat a website to look good on any device and window size
  - PC
  - Mobile
  - Tablet
  - Other specialty device

This is different from "interactive web pages", which respond to events, like mouseover.

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What is Responsive Design?

- Responsive Design comes in two forms:
  - Responsive Design Proper
    Using the concept of a **viewport** to classify different screen sizes and attach each classification to a custom layout. **Benefits**: Exactly what you want. **Drawbacks**: More coding.
  - Liquid Design
    Using the **natural** reorganization flow of the browser (or library) to automatically cascade the webpage elements following a strategy. **Benefits**: Very little coding. **Drawbacks**: May not result in what I wanted.

Liquid Layout

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Auto Scaling

Using percentages in CSS:

```
<style>
       body {
           font-family: sans-serif; line-height: 1.5; padding: 0 16px;
       }
       article {
           width: 66%;
           float: left;
       }
       aside {
           width: 33%;
           float: right;
       }
</style>
```

When in a row, important to sum to 100%

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Using percentages

In HTML the % value permits the tag to auto adjust its size:

- `<img src="img_girl.jpg" style="width:100%;">`
  - Infinite scaling in both width and height based on viewport limits
- `<img src="img_girl.jpg" style="max-width:100%; height:auto;“>`
  - Height maxes out at image’s pixel height

Auto Scaling

See Example 1 & 2 Liquid

Let’s break this down

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Basics of Responsive

Define the “viewport”

Replaces browser default behavior with device specifications:

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

- width = readjusts max width to be device screen resolution
- initial-scale = zoom

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“vw” = Viewport Width

Define sizes based on the viewport:

```
<h1 style="font-size:10vw">Hello World</h1>
```

Automatically scales

1vw = 1% viewport width

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The Media Query

(Entire webpage)

Define multiple style sheets depending on the screen size:

```
<style>
  .left, .right {
     float: left;
     width: 20%; /* The width is 20%, by default */
  }

  .main {
     float: left;
     width: 60%; /* The width is 60%, by default */
  }

  /* Use a media query to add a breakpoint at 800px: */
  @media screen and (max-width: 800px) {
     .left, .main, .right {
        width: 100%;
      /* The width is 100%, when the viewport is 800px or smaller */
     }
  }
</style>
```

default

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<picture> tag media control

(Micro Control)

Permits you to define image sizes for different screen resolutions:

```
<html><body>
  <picture>

    <source media="(min-width:800px)" srcset="img_pink_flowers.jpg">

    <source media="(min-width:600px)" srcset="img_white_flowers.jpg">

    <img src="img_orange_flowers.jpg" alt="Flowers" style="width:auto;">

  </picture>
</body></html>
```

- Organge flowers below 600px
- White flowers below 800px
- Pink flower above 800px
- Can specify max-width as well

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<video> tag media control

(Micro Control)

Permits you to define video sizes for different screen resolutions:

```
<html><head>
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<style>
  video {
    max-width: 100%; // compare with width: 100%;
    height: auto;
  }
</style>
</head>
<body>
  <video width="400" controls>
    <source src="mov_bbb.mp4" type="video/mp4">
    <source src="mov_bbb.ogg" type="video/ogg">
    Your browser does not support HTML5 video.
  </video>
</body></html>
```

https://developer.mozilla.org/en-US/docs/Web/HTML/Element/video

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Examples

https://www.w3schools.com/html/tryit.asp?filename=tryhtml_responsive_media_query3

https://www.w3schools.com/howto/tryit.asp?filename=tryhow_css_sidebar_responsive

Let’s break this down

Other useful examples

- https://www.w3schools.com/css/tryit.asp?filename=tryresponsive_mediaquery_breakpoints
  Exploring Media Query Sizes
- https://www.w3schools.com/css/tryit.asp?filename=trycss_mediaqueries_hide
  Hiding elements on smaller screens
- https://www.w3schools.com/css/tryit.asp?filename=trycss_mediaqueries_fontsize
  Changing the font size on smaller screens

JS Nav Bar Example

https://www.w3schools.com/howto/tryit.asp?filename=tryhow_js_topnav

Let's break this down

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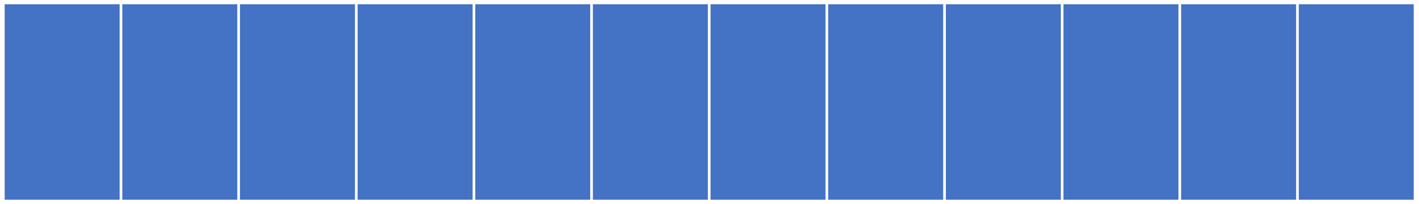
CSS Grid View

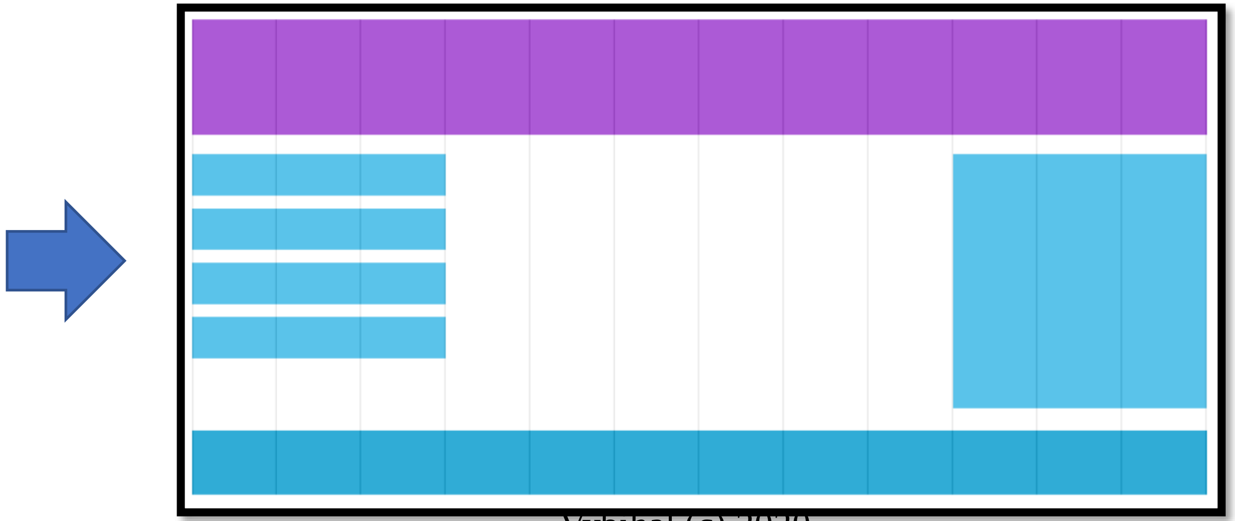
Dynamic Website (Part A)

What is Grid View

- A technique of laying out your webpage in a way that is flexible in relation to screen sizes
  - Design your page using the 12-column technique



Notice there are 12 columns in this page.



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Steps to create a Grid View

1. Make sure all measurements included

```
* { box-sizing: border-box; }
```

2. Define the 12 columns (100% / 12 = ?)

Classes:

```
.col-1 {width: 8.33%;}
.col-2 {width: 16.66%;}
.col-3 {width: 25%;}
.col-4 {width: 33.33%;}
.col-5 {width: 41.66%;}
.col-6 {width: 50%;}
.col-7 {width: 58.33%;}
.col-8 {width: 66.66%;}
.col-9 {width: 75%;}
.col-10 {width: 83.33%;}
.col-11 {width: 91.66%;}
.col-12 {width: 100%;}
```

Wrap each row in a <div class="">

3. The 12 columns need to float freely

```
[class*="col-"] {float: left; padding: 15px; border: 1px solid red;}
```

4. Since floating left can overlap…

```
.row::after {content: ""; clear: both; display: table;}
```

Example

https://www.w3schools.com/css/tryit.asp?filename=tryresponsive_col-s

Let’s break this down

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Question

Using Grid View, create a webpage with:

- A header
- 4 columns for desktop
- 2 columns for tablet
- 1 column for phone
- A footer

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Prepare for Next Class

- Assignments
  - Mini 5 given
  - Mini 4 due tonight
- Lab B
  - Lab B out Thursday, but TA will cover it after the break
- Do on your own
  - Try to build a simple page with CSS Grid from scratch