

Programming Languages for Web Applications

Responsive Design LESS and SCSS Bootstrap

Announcements

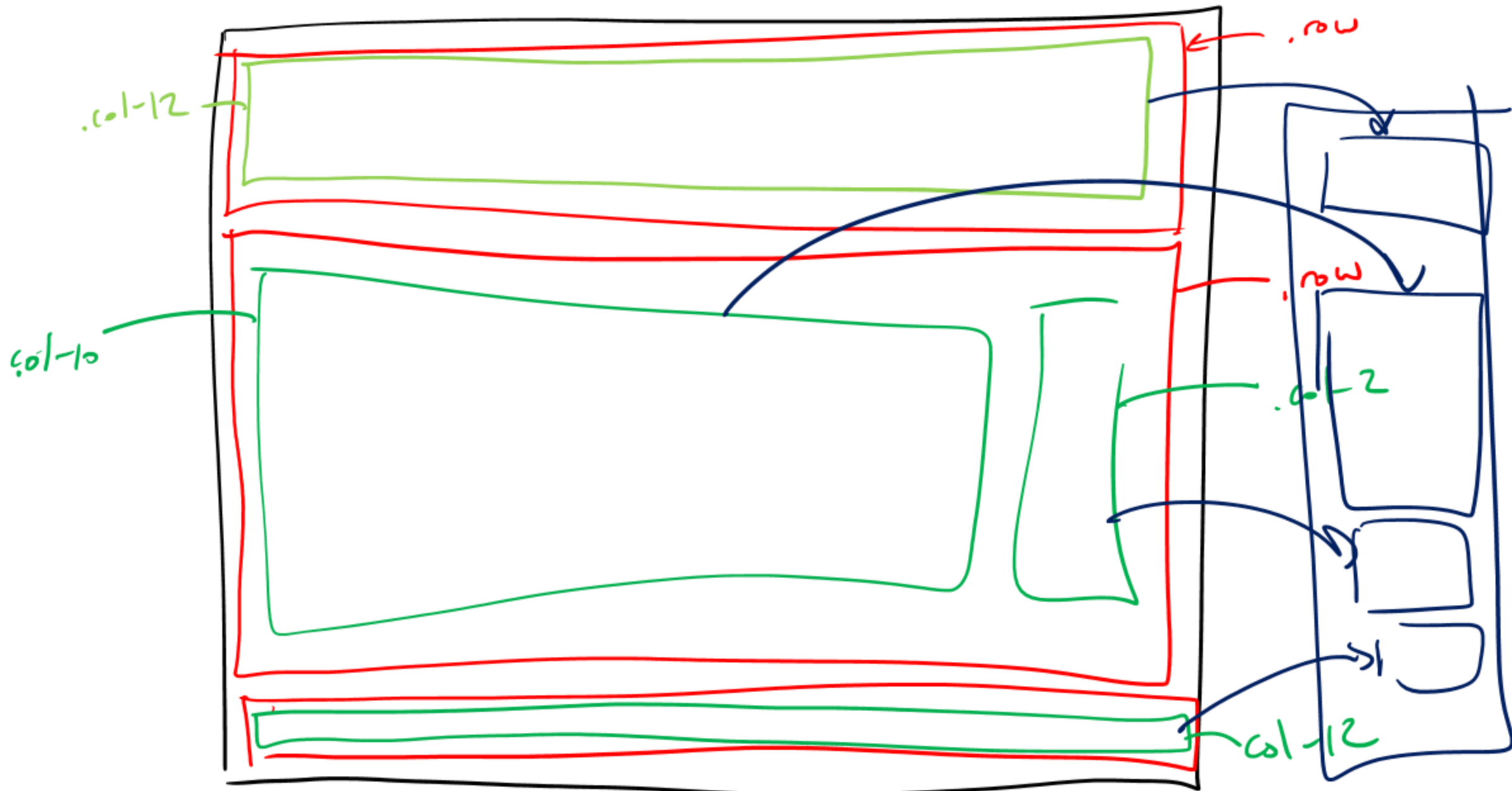
- Homework 2 due tonight
- Homework 3 available today
- Office hours:
 - Prof Hott: Mondays 3-5p, Tuesdays 2-3p
 - TA Office Hours: Posted on course website

Gridding System

- Consider the page as a grid: rows and columns
 - We will determine how many rows we need for our design
 - Divide the page into 12 columns
 - Each row will have 12 equal-width columns
- Encode these in CSS rules
 - Uses classes to denote columns and column spans
 - .col-4 is a block element that spans 4 columns
 - .col-12 is a block element that spans 12 columns
 - .row is a block element that spans 12 columns



100% width



Designing for Specific Screen Sizes

- Use `@media` queries to provide layout instructions to browser based on screen size (and type)

- only
- not

- all - any type
- screen
- print
- speech

- max-width
- min-width
- defined in pixels
- check responsive design mode

```
@media only screen and (max-width: 768px) {  
    .col-4 { width: 100%; }  
}
```

Flexbox

- CSS3 Web Layout Model
 - W3C Candidate Recommendation
 - <https://www.w3.org/TR/css-flexbox-1/>
- One-Dimensional layout – rows or columns
 - Items flex / expand or shrink to fit space
 - Supports wrapping based on screen size (responsive)

Flexbox

- Set display to flex on container element

```
#container { display: flex; }
```

- Two directions for display (row vs column)

```
#container { flex-direction: row; }
```

<https://mdn.github.io/learning-area/css/css-layout/flexbox/flexbox0.html>
<https://mdn.github.io/learning-area/css/css-layout/flexbox/flexbox-wrap0.html>

Flexbox

- Set the inner elements to determine their flex width or *basis*

```
.flexitem { flex-basis: 200px; }
```

```
.flexitem { flex-basis: 25%; }
```

- Set grow and shrink factor for inner elements

```
.flexitem { flex-grow: 1; flex-shrink: 1; }
```

- Grow/shrink factor determines how much space past flex basis all elements of row will take up

<https://mdn.github.io/learning-area/css/css-layout/flexbox/flexbox0.html>
<https://mdn.github.io/learning-area/css/css-layout/flexbox/flexbox-wrap0.html>

Flexbox

- Set wrapping on container to allow flex items to flow

```
#container { flex-wrap: wrap; }
```

- Browser will determine best way to flow based on screen size

<https://mdn.github.io/learning-area/css/css-layout/flexbox/flexbox0.html>
<https://mdn.github.io/learning-area/css/css-layout/flexbox/flexbox-wrap0.html>

CSS Frameworks and Extensions

LESS, SCSS/SASS, Bootstrap

SASS



- Syntactically Awesome Style Sheets (SASS) - 2006
 - Original syntax: indented syntax - uses indentation like python
 - Sassy CSS (SCSS) - uses curly braces like CSS
- Implemented in Ruby (original), now Dart
- CSS-like language that compiles to CSS
- Download and install to compile SASS to CSS

```
npm install -g sass
```

NodeJS
JavaScript Runtime
npm package manager

SASS Features

- Variables (\$)
- Nesting
- Loops
- Mixins – similar to functions
- Inheritance
- Mathematical operators

<https://sass-lang.com/guide>



LESS

- Leaner Style Sheets (LESS) - 2009
- Implemented in Ruby (original), now JavaScript
- CSS-like language that compiles to CSS
- Influenced by SASS, Influenced SCSS
- Download and install to compile (production)

```
npm install -g less
```

- Use in browser (development)

```
<link rel="stylesheet/less" type="text/css" href="styles.less" />  
<script src="https://cdn.jsdelivr.net/npm/less" ></script>
```

LESS Features

- CSS is valid LESS
- Variables (@)
- Nesting (including nesting @media queries)
- Mixins – including a class name as a property, also like functions
- Functions
- Mathematical operators

<https://lesscss.org/#overview>

Bootstrap



- Free and open-source front-end CSS framework
 - Pre-defined CSS styles to use when designing our pages
 - Many class selectors. We must add classes to our HTML elements.
 - Optional JavaScript to improve usability and add functionality
- Origins: Twitter Blueprint (developers Mark Otto, Jacob Thornton)
- Released as Bootstrap (open source): August 19, 2011
- Current version: Bootstrap 5.3 (September 14, 2021)
- <https://getbootstrap.com/>