CSCI-UA-4-005

Intro to Web Design + Computer Principles

Responsive Design: Day 1

Professor Emily Zhao
M/W 12:30PM – 1:45PM

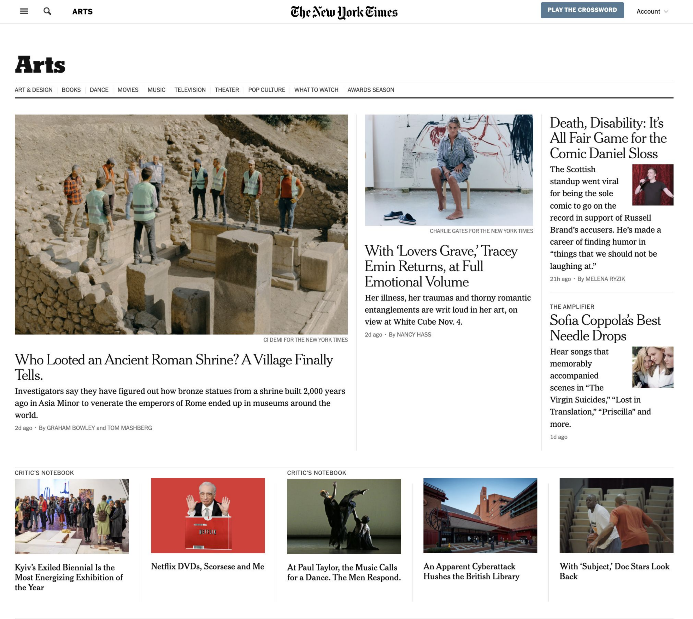
Agenda

- Responsive Design
  - Mobile-first approach
  - `px` vs `rem`
  - Media Queries
  - Responsive Images
- Assignment #7 Introduction

Responsive Design

Responsive Design

The goal of responsive design is to create a user-friendly experience regardless of whether the website is accessed on a desktop computer, laptop, tablet, smartphone, or any other device with a web browser.



Arts

CI DEMI FOR THE NEW YORK TIMES

Who Looted an Ancient Roman Shrine? A Village Finally Tells.

Investigators say they have figured out how bronze statues from a shrine built 2,000 years ago in Asia Minor to venerate the emperors of Rome ended up in museums around the world.

2d ago · By GRAHAM BOWLEY and TOM MASHBERG

CHARLIE GATES FOR THE NEW YORK TIMES

With 'Lovers Grave,' Tracey Emin Returns, at Full Emotional Volume

Her illness, her traumas and thorny romantic entanglements are writ loud in her art, on view at White Cube Nov. 4.

2d ago · By NANCY HASS

Death, Disability: It's All Fair Game for the Comic Daniel Sloss

The Scottish standup went viral for being the sole comic to go on the record in support of Russell Brand's accusers. He's made a career of finding humor in "things that we should not be laughing at."

21h ago · By MELENA RYZIK

THE AMPLIFIER

Sofia Coppola's Best Needle Drops

Hear songs that memorably accompanied scenes in "The Virgin Suicides," "Lost in Translation," "Priscilla" and more.

1d ago

CRITIC'S NOTEBOOK

Kyiv's Exiled Biennial Is the Most Energizing Exhibition of the Year

Netflix DVDs, Scorsese and Me

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At Paul Taylor, the Music Calls for a Dance. The Men Respond.

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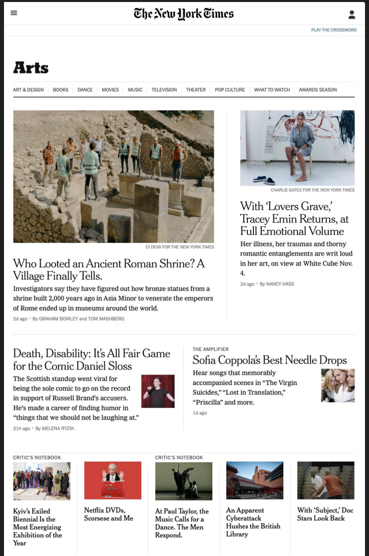
With 'Subject,' Doc Stars Look Back



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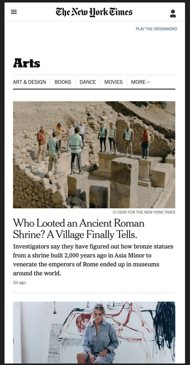

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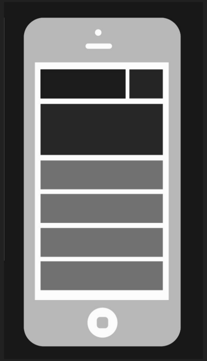
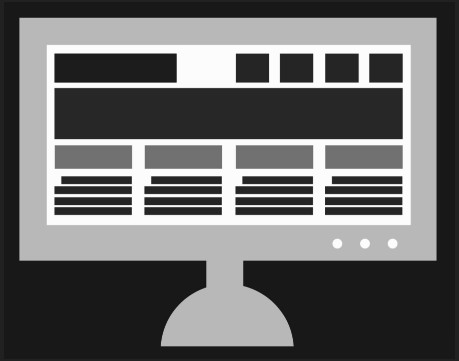
2d ago

Foundations of Responsive Design

- Mobile-First Approach
- Relative Units
- Media Queries
- Flexible Layouts
- Flexible Images





* Mobile-First

— Content-first
— Essential functionality
— Lifestyle/news-focused

Desktop

— Traditional
— Feature-rich
— Office-based

* *more and more recommended in a mobile-centric world*

Units of Length

There are two types of length units in CSS:

- `absolute`
- `relative`

Alternative specifications:

- `auto` (browser calculates length)
- `inherit` (from the parent element)

Units of Length

ABSOLUTE

`px`

RELATIVE

`%`

`em`

`rem`

For styling related to fonts, `%` and `em` are equal can be used interchangeably

For non-font-related elements, `%` is relative to parent container while `em` is related to font-size

Stands for "root em",

relative to the font size of the root element (usually the `<html>` element)

Media Queries

Media queries are a fundamental part of responsive web design, allowing you to create websites that adapt and respond to different screen sizes and devices.

They are a CSS feature that enables you to apply styles and layout changes based on the characteristics of the user's device, such as screen width, height, orientation, and more.

Media queries make it possible to create a single website that looks and functions well on various devices, from large desktop monitors to small smartphones.

CSS Rule Set

```
body {
  background-color: cyan;
}
```

CSS Rule Set with a Media Query

```
@media (min-width: 480px) {
    body {
        background-color: yellow;
    }
}
```

Common Conditions

- `width` and `height`: You can set conditions based on the width and height of the device's screen.
- `min-width` and `max-width`: Specify a range of screen widths.
- `orientation`: Adjust styles based on the device's orientation (landscape or portrait).
- `device-pixel-ratio`: Target high-resolution screens (e.g., Retina displays).
- `aspect-ratio`: Set styles based on the aspect ratio of the screen.
- `color`: Detect whether the device supports color or is grayscale.

Media Type

Media types describe the general category of a device. Except when using the not or only logical operators, the media type is optional and the `all` type will be implied.

- `all`: Suitable for all devices
- `print`: Intended for paged material and documents viewed on a screen in print preview mode
- `screen`: Intended primarily for screens
- `speech`: Intended for speech synthesizers

Logical Operators

The logical operators `not`, `and`, and `only` can be used to compose a complex media query. You can also combine multiple media queries into a single rule by separating them with commas.

- `and`: used for combining multiple media features together into a single media query, requiring each chained feature to return true for the entire query to be true
- `not`: used to negate a media query, returning true if the query would otherwise return false
- `only`: used to apply a style only if an entire query matches and is useful for preventing older browsers from applying selected styles

Combining Conditions

```
@media only screen and (min-width: 480px) {
    body {
        background-color: orange;
    }
}
```

Basic Stylesheet Linking

```
<link rel="stylesheet" href="styles.css">
```

Link with Media Query

```
<link rel="stylesheet" media="only screen and
(min-width: 640px)" href="tablet.css">
```

Viewport Meta Tag

To ensure that media queries work correctly on mobile devices, it's important to include the viewport meta tag in the HTML `<head>` section of your web pages. This tag helps control the initial scale and width of the viewport.

```
<meta name="viewport" content="width=device-width,
initial-scale=1">
```

Simple Media Query Demo

Breakpoints

PORTRAIT	Smartphone	480px	30rem *(if default font-size is 16px)*
	Tablet	768px	48rem *(if default font-size is 16px)*
LANDSCAPE	Notebook	1024px	64rem *(if default font-size is 16px)*
	Laptop	1200px	75rem *(if default font-size is 16px)*
	Desktop/TV	1200px+	

Revisiting NYC Website

Responsive Images

Responsive Images

- Responsive images refer to images that adapt and change based on the viewport size and device they are being displayed on.
- They are an important aspect of responsive web design, allowing images to look good and load fast across different screen sizes.
- Responsive images serve better images to clients and also improves website loading time.

srcset

- Srcset is an HTML image attribute that specifies the list of images to use in different browser situations.
- The browser will pick the most optimal image version, based on the screen size and resolution.

```
<img
   alt="image alt text"
   src="default url"
   srcset="
     url size,
     url size,
     url size
     "
/>
```

`srcset` + image density

- The more common way to to set include size information in the srcset attribute is to label each file by image density.
- You do this by putting 1x, 2x, 3x and so forth after the URL.

```
<img
  alt="flamingo in lake"
  src="flamingo1x.jpg"
  srcset="
    flamingo2x.jpg 2x,
    flamingo3x.jpg 3x,
    flamingo4x.jpg 4x,
    "
/>
```

`srcset` + image width

- The other way to inform the browser about the different sizes is to actually specify the image width in pixels.
- This gives the browser more information about the images, so it can make a better decision about which one to select.
- This is also good if your image versions aren’t in exact proportion to each other.

```
<img
   alt="flamingo in lake"
   src="flamingo1x.jpg"
   srcset="
     flamingo2x.jpg 800w,
     flamingo3x.jpg 1200w,
     flamingo4x.jpg 1600w,
     "
/>
```

`srcset`

- Srcset is an HTML image attribute that specifies the list of images to use in different browser situations.
- The browser will pick the most optimal image version, based on the screen size and resolution.

`sizes`

- Allows you to specify the layout width of the image for each of a list of media conditions
- Each condition is specified using the same conditional format used by media queries.

Using srcset and sizes

```html
<img
   alt="image alt text"
   src="medium.jpg"
   srcset="
     small.jpg 240w,
     medium.jpg 300w,
     large.jpg 720w
     "

  sizes="
     (min-width: 960px) 720px
  "

/>
```

srcset and sizes

```
<img
   alt="image alt text"
   src="medium.jpg"
   srcset="
     small.jpg 240w,
     medium.jpg 300w,
     large.jpg 720w
     "
  sizes="
     (min-width: 960px) 720px
  "
/>
```

All images require **alt** text

- Helps screen-reading tools describe images to visually impaired readers
- Try to be as descriptive as possible in your alt text
- Used by search engines to understand the content of image, improving your SEO (search engine optimization)

srcset and **sizes**

```
<img
   alt="image alt text"
   src="medium.jpg"
   srcset="
     small.jpg 240w,
     medium.jpg 300w,
     large.jpg 720w
     "
  sizes="
     (min-width: 960px) 720px
  "
/>
```

Specify the source of your image

Browsers that do not support **srcset** and **sizes** will fallback to **src**

srcset and sizes

```
<img
   alt="image alt text"
   src="medium.jpg"
   srcset="
     small.jpg 240w,
     medium.jpg 300w,
     large.jpg 720w
     "
  sizes="
     (min-width: 960px) 720px
  "
/>
```

In **srcset**, you specify a list of images in different sizes.

Behind the file name of each image you specify the width of the image in pixels (with **w** not **px**).

For example, **small.jpg 240w** means that this image is 240px wide.

srcset and sizes

```
<img
   alt="image alt text"
   src="medium.jpg"
   srcset="
     small.jpg 240w,
     medium.jpg 300w,
     large.jpg 720w
     "
  sizes="
     (min-width: 960px) 540px
  "
/>
```

With **sizes** you specify the size of the image and in which situation it must be displayed.

This is done by a combination of a media query and the width of the image.

srcset and sizes

```
<img
   alt="image alt text"
   src="medium.jpg"
   srcset="
     small.jpg 240w,
     medium.jpg 300w,
     large.jpg 720w
     "
  sizes="
     (min-width: 960px) 540px
  "
/>
```

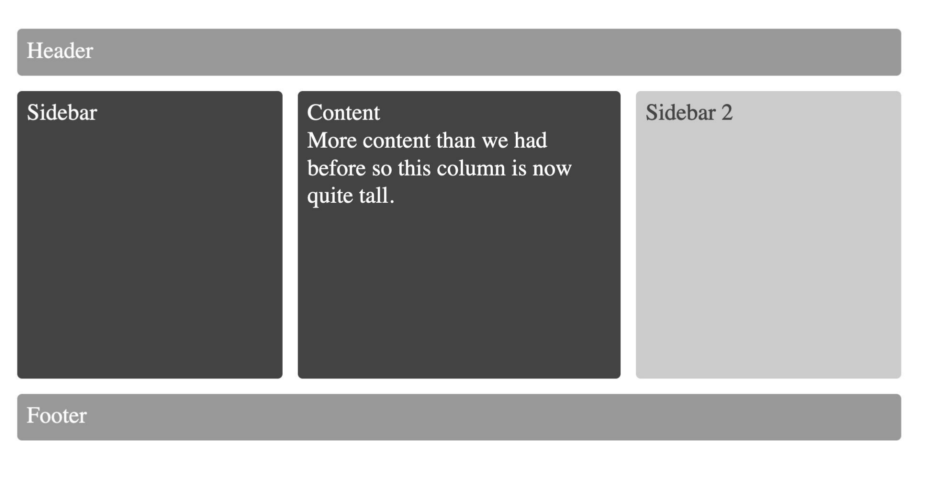
In this code, if *viewport width* equals 960px or greater, then show the image with the width of 540px.

Now you may notice that in our example of srcset there’s no image with a width of 540px. That’s not a problem. The browser will select the best image available upwards in size. In this case, large.jpg will be used with a width of 720px.

Responsive Grid Exercise

Make the grid website responsive to different browser widths:

Starter files can be found on the class website



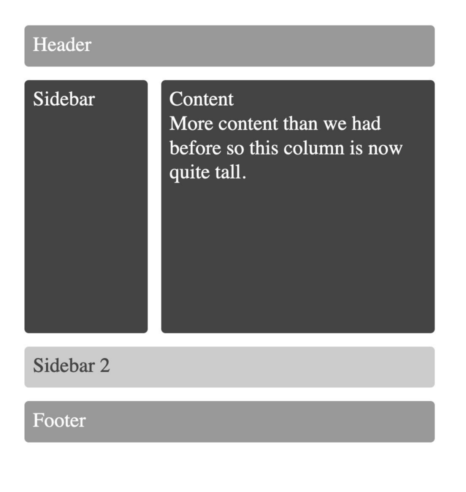
Header

Sidebar

Content
More content than we had before so this column is now quite tall.

Sidebar 2

Footer



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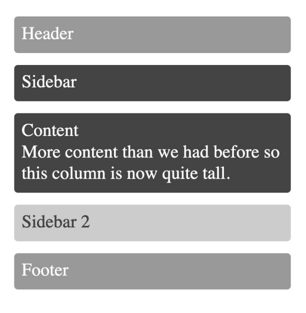

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Content
More content than we had before so this column is now quite tall.

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Homework

- Assignment #6 (due midnight)
- Assignment #7 (due next week)