CS 2033

Multimedia & Communications II

LECTURE 9 – MODERN WEBSITE FEATURES

Modern features

- Websites can be modernized with cool effects and features.
- What are common features of professional modern websites?
- Think about both functionality and aesthetics as we look at examples of modern sites.

Modern features

- http://www.thebeet.ca/
- https://www.skyzone.com/ca-toronto
- https://nasaprospect.com/

Modern features

- Parallax effect
- Scrollfire
- Accessibility
- Responsive
- And others

Modern features

- **Parallax effect**
  - Elements moving at different rates to create the illusion of depth.
- **Scrollfire**
  - Elements transition in as user approaches them.
  - Track section in navigation bar as you scroll.

Modern features

- **Accessibility**
  - Allowing people with disabilities or impairments to use the website.
- **Responsive**
  - Display nicely on any platform, device, and screen size.

Parallax

- Parallax is a great aesthetic feature that creates the illusion of depth (3D) in the website.
- Produced by different rates of motion as we scroll up and down.
- For example, text moves at a different rate than the background image behind it.

Parallax

- By default, everything moves at the same rate as the user's scrolling.
- We want to change that!
- There are different kinds of parallax.
- The simplest is no movement on the background while the foreground moves with the scrolling.
- This simple form uses just CSS.

Parallax

- Add an image to an element using the CSS background-image style.
- The background-attachment style indicates whether the image scrolls.

-
  ```
  .myclass {
      width:100%; height:300px;
      background-image: url('sky.jpg');
      background-attachment: fixed;
  }
  ```

Parallax

- We can enhance this by including motion on both the background and foreground elements.
- This requires JS so that we can access the elements and change their positions dynamically.
- This form of parallax is more elegant than the pure CSS form.

Parallax

- There's another event listener that helps with this!
  - onscroll – triggers as the user scrolls up or down the site
- Note there are many ways to scroll with different sized jumps:
  - Mousewheel
  - Up/Down keys, PgUp/PgDn keys
  - Clicking or dragging the scrollbar

Parallax

- Add onscroll listener to the body.
- Retrieve the current scroll position in pixels using window.scrollY.
  - This value starts at 0 from the top and increases per pixel scrolled.
- Now we can use this value to calculate the elements' positions.
- How do we calculate this?

Parallax

- Linear equations work well.
  - y = mx + b
  - x: scroll position (independent)
  - y: image position (dependent)
  - m: amount of change (slope)
  - b: position when x=0 (y-intercept)
- m and b are the parameters.

Parallax

- Let's start with b. Remember b is the position when x=0 (no scrolling).
- Thus, b must be where we want the element to start by default.
- i.e. if we use CSS to position an element at 50px from the top, then b in our linear equation must also be 50px.

Parallax

- The m parameter is the rate of movement of our element.
- m=1 means no movement.
- m<1 means up movement.
- m>1 means down movement.
- Values are typically around 0-1.
- Play with it until it looks good!

Parallax

- For that type of parallax, we used JS to change the CSS margin-top or top or other position property.
- An alternative option is to change the background-position of the background layer/element.
- This property doesn't change the position of any element, but rather where the image begins.

Parallax

- Samples:
  - CSS Parallax
  - Enhanced JS Parallax
  - Jumpy (Bad) Parallax
  - https://www.csd.uwo.ca/courses/CS2033b/samples/lec9/

Scrollfire

- Scrollfire is another feature based on scrolling, as its name suggests.
- This is when elements appear or change as you scroll into specific ranges.
- Common form is applying an entry transition on an element that triggers as you scroll near it.

Scrollfire

- For example, have an image in your website that starts hidden and appears as you approach it.
- In some cases, it may cause an existing image to grow or slide over when you enter a specific range.
- Sample: https://www.csd.uwo.ca/courses/CS2033b/samples/lec9/

Scrollfire

- Navigation bars use derivatives of this to change their placement or "stickyness" depending on the scroll.
- Some also highlight the current section name as you scroll through.
- Example:
  - Highlight Section Example

Scrollfire

- Like parallax, we start with an onscroll listener and retrieve the scroll position in the event handler.
- Rather than calculating a position, use conditionals to check the range of the scroll.
- Change classes or individual styles depending on the range.

Scrollfire

- Making the element visible isn't that appealing on its own.
- Often there is a smooth transition, like a fade-in or slide-in, which looks nicer than a sudden appearance.
  - Remember the transition property we learned previously.

Accessibility

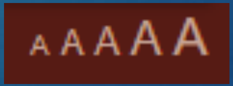
- Websites are expected to be accessible by everyone, including those with disabilities.
- For example, those with colour blindness or limited hand control should be able to use websites.
- Standards have been put in place to ensure sites are fully accessible.

Accessibility

- Blind users depend on screen readers to read the content of websites aloud.
- Deaf users depend on text transcriptions of audio/video.
- Other disabilities may mean other tools or appliances are required.

Accessibility

- **Text content**
  - Have no or minimal text in images.
  - Screen readers read text but cannot read text inside images.
  - Keep the text organized and use proper spelling and grammar.
  - Have fonts clear to read or an option to change font size.



Accessibility

- **Alt text**
  - Alternate text is what shows up when an image doesn't load.
  - Screen readers also read this.
  - This is good practice in general – but now even more so!

Accessibility

- **Clear colours**
  - Colour blindness is common, affecting nearly 5% of people.
  - Use crisp colours with high contrast (i.e. black text on white background or vice versa).
  - Be careful with colour-coding the text in your website.

Accessibility

- **Overlaid text**
  - Text overlaid on an image must be entirely high contrast.
  - This is difficult when images have many varying colours/shades.
  - Use outline or shadows or an intermediate coloured panel to split the background and foreground.

Accessibility

- **Audio**
  - If you have audio, transcribe it to text and provide the text in a file.
- **Video**
  - If you have videos, provide closed captioning at least as an available option for deaf viewers.

https://www.w3.org/standards/webdesign/accessibility

https://www.smashingmagazine.com/2016/06/improving-color-accessibility-for-color-blind-users/

Responsive

- 20 years ago, there wasn't much variety in computer screen sizes.
- It is the opposite today. Screens come in a wide range of sizes from small phones to TV screens hooked up to computers.
- Websites need to look good across all different screens and platforms.

Responsive

- This is responsive web design.
- Creating a website now takes more thought and effort than it did 20 years ago.
- However, technologies have improved to help with this process.
- Before we look at them, let's talk about common screen sizes.

Responsive

Responsive

- Suggested screen size ranges (not every device conforms to these ranges)
  - Phones: <= 640px
  - Tablets: 641px to 1007px
  - Monitors: >= 1008px
- This is a good guide for responsive web design.

https://docs.microsoft.com/en-us/windows/uwp/design/layout/screen-sizes-and-breakpoints-for-responsive-design

Responsive

- Now we know the ranges, but how do we design a site around them?
- Different CSS rule-sets!
- We have a banner 1200px wide. It can be full size on a monitor but smaller (i.e. 300px) on mobile.
- % values adapt to window but it's not always feasible or preferable to use a %-based size.

Responsive

- In addition to small screens, we have to consider users on a large screen but a small browser window.
- This isn't a major issue but we need to be aware of it for responsiveness.
- For the most part, this can be handled the same way screen sizes are handled.

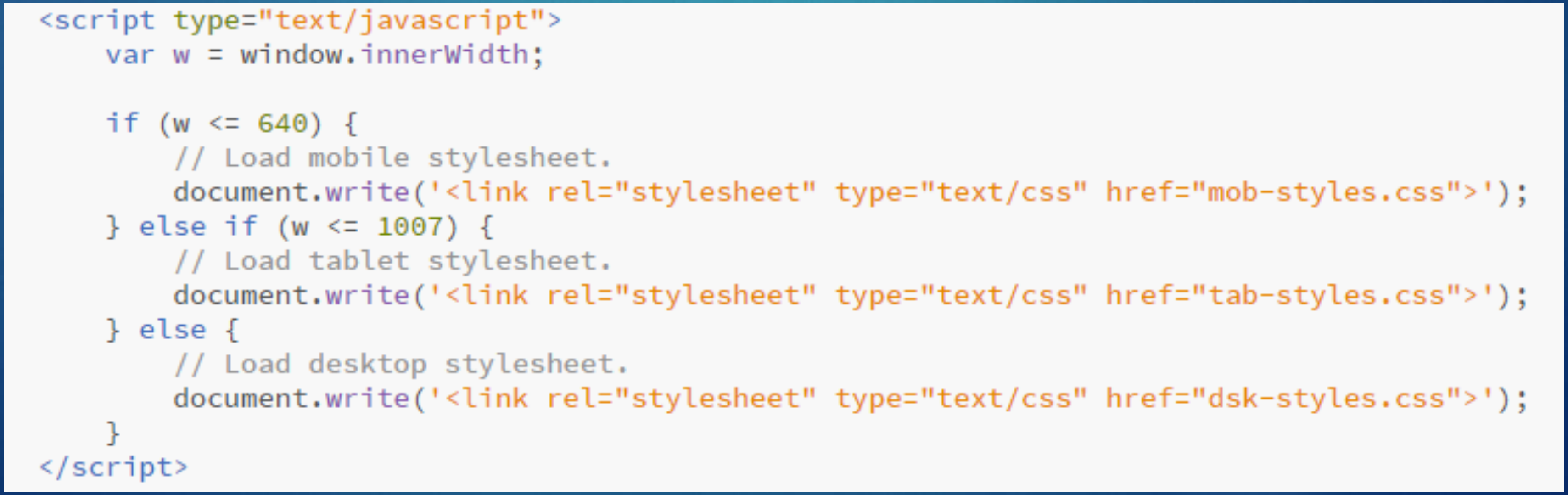
Responsive

- A basic approach is to use JS to get the browser size and load the CSS accordingly.
- var w = window.innerWidth;

-
  ```
  if (w < 320) {
      // Load mobile CSS
  } else if (w < 800) {
      // Load tablet CSS
  } …
  ```

Responsive

- To load a CSS file from within the JS conditionals, use the HTML line to load a CSS file within the JS function document.write()
- Be careful with your quotations!



```
<script type="text/javascript">
    var w = window.innerWidth;

    if (w <= 640) {
        // Load mobile stylesheet.
        document.write('<link rel="stylesheet" type="text/css" href="mob-styles.css">');
    } else if (w <= 1007) {
        // Load tablet stylesheet.
        document.write('<link rel="stylesheet" type="text/css" href="tab-styles.css">');
    } else {
        // Load desktop stylesheet.
        document.write('<link rel="stylesheet" type="text/css" href="dsk-styles.css">');
    }
</script>
```

Responsive

- This way is a bit clunky.
- Some potential problems with loading stylesheets this way.
  - **Disabled JavaScript** – would result in no styles or only default styles loaded
  - **Resizing browser** – loads files at initial window size
  - **A lot of code** – consider separate pages (similar to internal CSS issues)

Responsive

- CSS includes media queries which allow us to specify which files load depending on the screen size (or other properties) without using JS.
- Add media queries as attributes within the HTML <link> tag for loading the CSS files.

Responsive

- <link rel="stylesheet" href="styles.css" media="(max-width: 640px)">
- Set the min-width and/or max-width that apply to this stylesheet.
- You may also specify the screen's orientation (landscape for wider or portrait for taller).

Responsive

- The CSS media queries also provide a third way for us to make our sites responsive.
- In this approach, we load the CSS files the way we did before, without any media queries in the HTML.
- Instead, media queries are within the stylesheet(s).

Responsive

- These media queries contain rule-sets that apply to the specified screen properties.

-
  ```
  @media (min-width: 641px) {
      p, .title {
          color:red;
          width:300px;
      }
  }
  ```

Responsive

- Both media query options are better than the JavaScript option.
- The option in the HTML forces you to keep separate, organized files.
- The option in the stylesheets allows for more freedom with files. This is both a blessing and a curse.
  - Too much freedom can result in disorganized code.

Responsive

- Now we know the methods of creating different rule-sets for the different screen size ranges.
- The next step is figuring out how the site should actually look on each of the screens.
- Which elements can stay the same and which have to change?

Responsive

- **Column structure**
  - 1 column is best on small screens
  - 2 columns could fit on tablets
  - Resize your columns accordingly
  - If you have 3 columns across a normal screen, make them wider on mobiles so they become single columns.

Responsive

- **Navigation menu**
  - Navigation menus should become vertical on smaller screens.
  - These often get added to an expandable list that can be toggled open and closed.
  - Use JS to switch between open and closed classes on clicking a button.
  - Example

Responsive

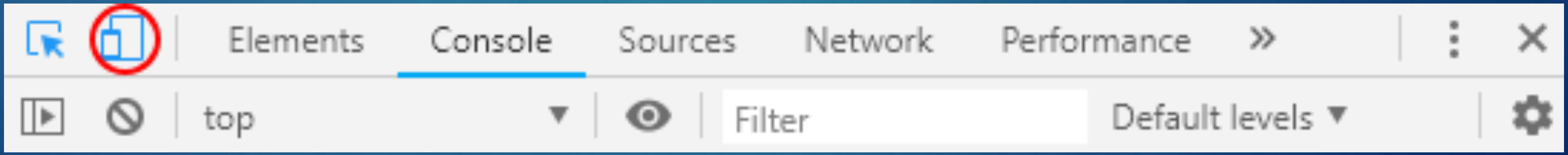
- **Fonts**
  - Titles or headers with very large font might not fit on a mobile screen.
  - Make those font sizes smaller and/or change the unit type.
  - Units vw and vh are relative to window size (similar to %) so they may be helpful for responsiveness.

Responsive

- Test the site on various screen sizes.
- If your site is on a live server, open it from different devices if available.
- If it's only stored on your computer or you don't have access to other devices, there are some ways to test it on your own computer.

Responsive

- Resize your browser.
  - Simulate a smaller screen by resizing your browser big and small.
- Use the Chrome screen emulator.
  - Click the three dots, More tools, Developer Tools, then click the little icon of the phone and tablet.



Responsive

- Chrome screen emulator (cont'd)
  - This toggles the device mode in which you can select a specific device or free responsive mode.
  - Several device specs are provided so you can test on those sizes.
  - The "Responsive" mode allows you to resize the emulator freely.

Responsive

- Use other emulators.
  - https://bluetree.ai/screenfly/
  - This only works for online sites but it also has many device emulators.

Responsive

- Don't just test the site at a couple stationary sizes.
- Resize the window back and forth and make sure the site looks fine at all sizes as you resize.
- Tip: it may help to change the background colour for each device during testing phases (remove it when finished).