Responsive Design for Web Applications

SWEN-444
What is the Problem?

- Mobile web access is ubiquitous
- We know that one interface design does not fit all screens for optimal user interaction
- So why not make designs flexible to dynamically match the screen environment?
- The solution is responsive web design
  - Other names – fluid design, elastic layout, rubber layout, liquid design, adaptive layout, cross-device design, flexible design
- Responsive design not always the best solution
  - Some designs may have device dependencies (e.g., GPS)
Web App vs. Native App?

- **Web App**
  - Develop once, lower support costs
  - Cross device platform support
  - Dependent on a network connection
  - May be functional limitations

- **Native app**
  - More expensive to develop and support
  - Not portable
  - Better performance
  - Use local hardware
  - Better UX?
  - App store distribution

- **Hybrid app?** Native app accesses website data
Responsive Web Design

• Create a single website that works effectively on the desktop as well as mobile devices
• Mobile browsing users may have different needs from desktop users
• Responsive web sites reorganize themselves automatically according to the device viewing them
  • Desktops/laptops get the full experience – video, images, animation
  • Smartphones get a simplified experience that works quickly – app-like
  • Tablets – something in between
Responsive Web Design

• Truly responsive design methodology is more than altering the layout based on viewport* size
• Invert the process of web design
  • Design for the smallest viewport first
  • Progressively enhance the design and content for larger viewports
  • Versus starting with the desktop and scaling down
• Can you find an example site with responsive design?
  • http://socialdriver.com/2015/05/28/25-best-responsive-web-design-2015/

* Viewport is display area versus physical screen size
Responsive Design Example

http://www.andthewinnerisnt.com/

Check out the CSS File – look for @media
Responsive Web Design Guidelines

• Group similar devices by screen size to establish target size “breakpoints” for design
  • Don’t target specific devices and models
• Optimize the UX – automatically adjust to screen viewport size and orientation
Responsive Web Design Guidelines (cont.)

• Adaptive layouts – e.g., large menu bar on the desktop, dropdown menu on smartphone

• Customize the amount and type of content – larger screens can support more text and other media types

• Adapt websites for accessibility
Fluid Grids

• Proportional versus fixed table based layouts
• Scale the layout to match the screen dimensions
• Determine the scaling factor for each layout element
  • Pick a reference screen context resolution (e.g., 960 pixels)
  • Measure the dimensions of each element in that context
  • Compute the percent of layout required for each element – the scaling factor
• Apply the scaling factor when displaying the element in each screen context
Design Techniques

- The use of CSS3 and HTML5 encoding is recommended
  - Stick to standard markup
- Gotcha – cross browser compatibility and/or obsolescence
- Graceful degradation – design for modern browsers but assure a useful experience on older browsers
- Progressive enhancement – start with standard markup for all browsers and enhance the experience for more capable browsers – recommended

- Modernizr – open source JavaScript library that feature tests a browser’s capabilities
- Polyfill – downloadable code that provides capabilities missing from the native browser (e.g., HTML5 features)
Cascading Style Sheet (CSS) Media Types

• Specify how a document is to be presented on different media; e.g., screen vs. print
  • Unique properties to a media type
  • Shared properties with different values per media type; e.g., font size

• The @media rule
  • Specifies target media type
  • All following style sheet rules apply to that media type

```
@media print {
  body { font-size: 10pt }
}
@media screen {
  body { font-size: 13px }
}
@media screen, print {
  body { line-height: 1.2 }
}
```

http://www.w3.org/TR/CSS2/media.html#at-media-rule
CSS Media Types

• CSS3 media query – query “screen” as media type with screen properties such as size and resolution
  • Substitute different layout commands or a tailored CSS file if those screen properties supported
  • Scale to match device screen resolution and size
  • Transform screen layout – e.g., number of columns of content
  • Adjust object size such as for links (Fitt’s Law)
  • Adjust typography – e.g., font size, line width and length
CSS Media Query Example

@Media rule. What happens?

body {
  background-color: grey;
}
@media screen and (max-width: 960px) {
  body {
    background-color: red;
  }
}
@media screen and (max-width: 768px) {
  body {
    background-color: orange;
  }
}
@media screen and (max-width: 550px) {
  body {
    background-color: yellow;
  }
}
@media screen and (max-width: 320px) {
  body {
    background-color: green;
  }
}
CSS Media Queries for Popular Form Factors

**Smartphones**
*Portrait and Landscape*
@media only screen and (min-device-width : 320px) and (max-device-width : 480px) { ... }

**Landscape**
@media only screen and (min-width : 321px) { ... }

**Portrait**
@media only screen and (max-width : 320px) { ... }

**Tablets, Surfaces, iPads**
*Portrait and landscape*
@media only screen and (min-device-width : 768px) and (max-device-width : 1024px) { ... }

**Landscape**
@media only screen and (min-device-width : 768px) and (max-device-width : 1024px) and (orientation : landscape) { ... }

**Portrait**
@media only screen and (min-device-width : 768px) and (max-device-width : 1024px) and (orientation : portrait) { ... }

**Desktops, laptops, larger screens**
@media only screen and (min-width : 1224px) { ... }

**Large screen**
@media only screen and (min-width : 1824px) { ... }
References

• Marcotte, Ethan (May 25, 2010). "Responsive web design". A List Apart

• Foster, Aidan. http://responsive.design.ca/blog/responsive-web-design-what-is-it-and-why-should-i-care

• Frain, Ben, Responsive Web Design with HTML5 and CSS3 (eBook)