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# Responsive Web Design



# Agenda

- **Definition and Components**
- **Steps to have a responsive web page**
- **Mobile first**
- **Frameworks & Grid Systems**
- **Hands-on**



# Responsive Web Design

## Definition and Components



# Responsive Web Design

- **Responsive web design** is the practice of building a website suitable to work on every device and every screen size, no matter how large or small, mobile or desktop.
- The term was coined by Ethan Marcotte in 2009 in [A List Apart](#)
- Ways of delivering content on multiple resolutions:
  - **Mobile-specific website** - but then there were tablets, and phablets
  - **Adaptive web design** - multiple fixed width layouts
  - **Responsive web design** - *respond* to the size of the browser at *any given point* (multiple fluid grid layouts)

# RWD Components

- **3 main components:**
  - **Media queries**
  - **Flexible grid-based layout**
  - **Flexible media**

# Media Queries

- = simple filters that provide the ability to specify different styles for individual browser and device circumstances (e.g., the width of the viewport or device orientation)
- [Syntax](#)
- How to use a media query:

```
<link rel="stylesheet" type="text/css" href="screen.css" media="screen">  
<link rel="stylesheet" type="text/css" href="print.css" media="print">
```

```
@media (min-width: 700px) { ... }  
@media (min-width: 700px) and (orientation: landscape) { ... }  
@media tv and (min-width: 700px) and (orientation: landscape) {...}
```

# Media Queries

- **Open Discussion:** How should the code be organized?
  - Split by the media query
  - Split by the component



# Flexible Layout

- = a layout that is built with a flexible grid, capable of dynamically resizing to any width
- **Grid system** = a structure that allows for content to be stacked both vertically and horizontally in a consistent and easily manageable way
  - defines the maximum amount of columns per row
  - popular choice: 12 (it is divisible by 1, 2, 3, 4, and 6)
- Flexible grids are built using relative length units (percentages, ems)
- The relative lengths are used to declare common grid property values such as width, (min-width, max-width), margin, or padding



# Grid System ([link](#))

HOME PAGE		TODAY'S PAPER	VIDEO	MOST POPULAR	U.S. Edition ▼	Log In   Register Now		Hide GridFox 						
<h1>The New York Times</h1> <p>Saturday, January 12, 2013 Last Update: 1:20 PM ET</p>														
<input type="text"/>					Follow Us     Personalize Your Weather									
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# Flexible Media

- **Problem:** As the viewport grows larger the contained image/video grows wider as well, which means that it needs to grow taller as well.
- **Solution:**
  - Use **max-width: 100%** instead of **width**
  - Use **height: auto** to preserve the aspect ratio

```
img, video, canvas {  
    max-width: 100%;  
    height: auto;  
}
```

- **Flexible Embedded Media**



# Steps to Have a Responsive Web Page



# Steps to Have a Responsive Web Page

- **Step 1: Set the Viewport**

- Use the **meta viewport tag** to **control the width and scaling of the browser's viewport**
- Include **width=device-width** to **match the screen's width in device-independent pixels**
- Include **initial-scale=1** to **establish a 1:1 relationship between CSS pixels and device-independent pixels**
- **Ensure your page is accessible by not disabling user scaling**

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

# Steps to Have a Responsive Web Page

- **Step 2: Size Content to the Viewport**
  - Do not use large fixed width elements
  - Content should not rely on a particular viewport width to render well
  - Use CSS media queries to apply different styling for small and large screens
- **Dos and don'ts:**
  - Throw out the Pixels and embrace the % and EM units
  - Don't use images displayed at a width wider than the viewport (this could cause the viewport to scroll horizontally)
  - Beware of using large absolute positioning values that may cause the element to fall outside the viewport on small screens



# Steps to Have a Responsive Web Page

- **Step 3: Use CSS media queries for responsiveness**
  - Use media queries to apply styles based on device characteristics
  - Use min-width over min-device-width to ensure the broadest experience
  - Use relative sizes for elements to avoid breaking layout

min-width	Rules applied for any browser width greater than the value defined in the query.
max-width	Rules applied for any browser width less than the value defined in the query.
min-height	Rules applied for any browser height greater than the value defined in the query.
max-height	Rules applied for any browser height less than the value defined in the query.
orientation=portrait	Rules applied for any browser where the height is greater than or equal to the width.
orientation=landscape	Rules for any browser where the width is greater than the height.

# Steps to Have a Responsive Web Page

- **Step 4: Choose Breakpoints Based on Content**
  - Create breakpoints based on content, never on specific devices, products, or brands
  - Design for the **smallest mobile device first**; then progressively enhance the experience as more screen real estate becomes available
  - Keep lines of text to a maximum of around 70 or 80 characters
- **Demo: Look at the breakpoints in Developer Tools**

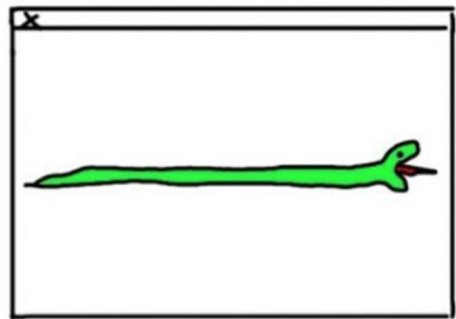
# Mobile First





# Mobile First

```
.product-img {  
  width: 100%;  
}  
  
@media screen and (min-width: 700px) {  
  .product-img {  
    width: 50%;  
    float: left;  
  }  
}
```

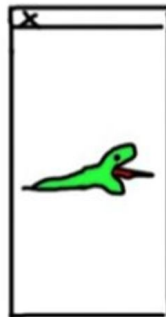


if a snake was responsive would it be

like this

or

like this?



# Progressive enhancement vs graceful degradation

## Graceful Degradation



## Progressive Enhancement



# Hands-on

- **Create a responsive HTML page**
- **Remember to:**
  - **Set the viewport**
  - **Use media queries (start small!)**
  - **Define breakpoints**

# Frameworks & Grid Systems



# Grid System ([link](#))

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<p>The New York Times </p>								

# Grid Systems

- Primary components: **rows** and **columns**
- Steps to implement a grid system:
  - Reset the border model: set the **box-sizing** property to **border-box** for both rows and columns
  - Clear floats on rows
  - Define columns
  - **Create gutters:** defining paddings within each column or using a *percentage-based left margin for each column (e.g., 1.6%)*
  - Calculate column widths
    - max amount of columns per row: 12
    - need to fulfill that amount for every row, regardless of how many columns you really want (2 columns: 2 elements of 6 columns width)

# Grid Systems

- Calculating column widths

- Width of a **single** column:  $scw = (100 - (m * (mc - 1))) / mc$

- $m$  = margin (1.6%)

- $mc$  = maximum columns (12)

- Width of the other columns:  $cw = (scw * cs) + (m * (cs - 1))$

- $cs$  = column span (1-12)

- $m$  = margin

- Plugging in the numbers,  $scw = 6.866666666667\%$

- **Mobile first**: only institute the column widths until the viewport reaches a minimum width of x pixels

# Frameworks & Grid Systems

- [\(Twitter\) Bootstrap](#)
- [Foundation](#)
- [Skeleton](#)





## Hands-on

- Include [\(Twitter\) Bootstrap](#) in your page
- Update it to respect Bootstrap's grid system, keeping in mind that it should still be responsive
- Bootstrap Grid Documentation:  
<https://getbootstrap.com/docs/4.0/layout/grid/>

# Homework

- Include [\(Twitter\) Bootstrap](#) in your blog
- Use it to make your blog responsive
- Use the grid system it has



# Readings & Tutorials

- Ethan Marcotte's article in A List Apart: <https://alistapart.com/article/responsive-web-design>
- <https://developers.google.com/web/fundamentals/design-and-ui/responsive/>
- <https://developers.google.com/web/fundamentals/design-and-ui/responsive/patterns>
- <https://css-tricks.com/the-difference-between-responsive-and-adaptive-design/>
- <http://johnpolacek.github.io/scrolldeck.js/decks/responsive/>
- <https://responsivedesign.is/guidelines/>
- <http://learn.shayhowe.com/advanced-html-css/responsive-web-design/>
- <https://css-tricks.com/rundown-of-handling-flexible-media/>
- Great book: <https://resilientwebdesign.com/>

