

# Web Development 2

Day 2

# Agenda

- Responsive images
- Lab time

# Images for the Web

# Web Image Formats

- Image formats supported all modern browsers
  - JPG (JPEG)
  - PNG
  - GIF
  - SVG (not supported in IE8)
- Image formats with select browser support
  - WebP
    - Supported by Edge, Chrome, Firefox, Opera
    - Not supported by Safari

# JPEG

- Extension: jpg
- Joint Photographic Experts Group
- Lossy compressed format
  - Good quality with smaller file sizes
- No easy alpha transparency channel support without some web dev tricks
  - Here is one solution:  
<https://w3.eleqtriq.com/2014/08/applying-alpha-channels-to-jpgs/>
- Used for:
  - Photo realistic images



# PNG

- Extension: png
- Portable Network Graphic
- Lossless format
  - High quality
  - File sizes can be large if using the 24-bit version
- Support for alpha transparency
- Used for:
  - Icons
  - logos



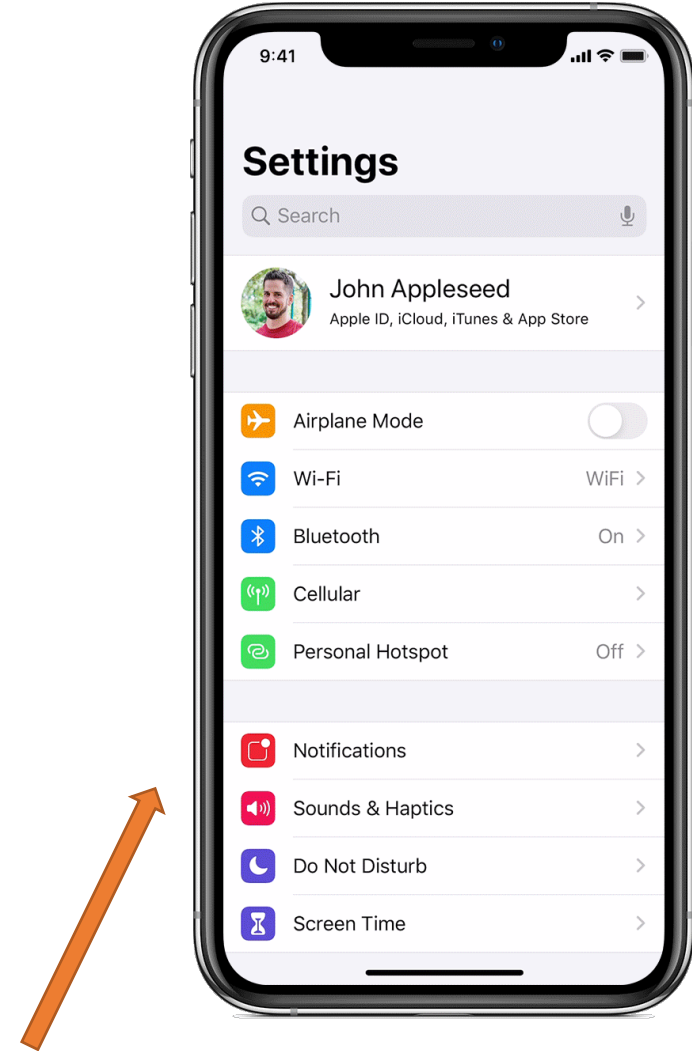
Instagram logo from: <https://www.freepnglogos.com/images/instagram-logo-png-2426.html>

# GIF

- Extension: gif
- Graphics Interchange Format
- 256 total colours chosen from a 24-bit RGB color space<sup>1</sup>
- Alpha transparency support
- Animation support (animated GIFs)
- Used for:
  - Silly internet memes
  - Demos and tutorials

1. <https://en.wikipedia.org/wiki/GIF>

iPhone image from: <https://support.apple.com/en-us/HT201320>

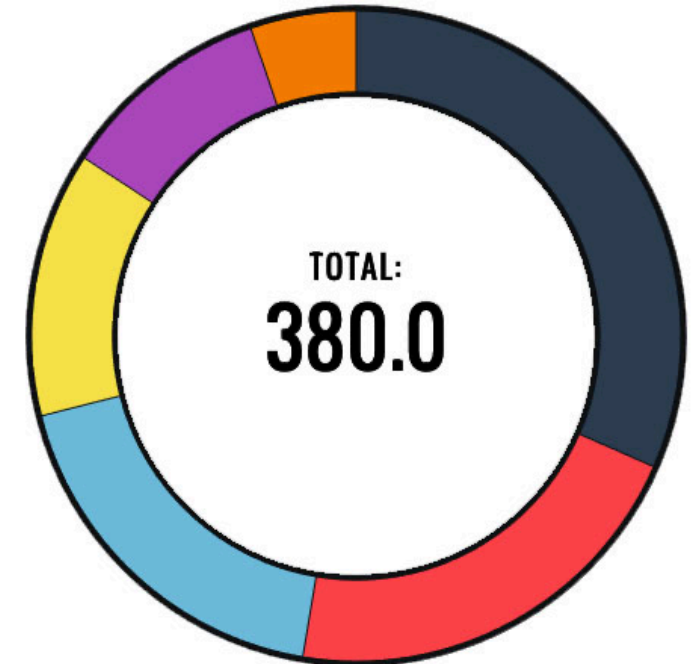


The above image is an animated GIF. If you want to see the animated version, then either view this presentation in Slide Show mode (you must be using PowerPoint) or visit: <https://support.apple.com/en-us/HT201320>



# SVG

- Extension: svg
- Vector based image format
  - Vector images use math and geometry to generate graphics vs pixels (bitmapped image formats)
- Scalable
  - No need to provide small, medium & large version for mobile responsive web sites
- Interactive
  - SVG use a markup language similar to HTML and SVG tags can be manipulated by CSS and JS if you embed SVG code directly into the HTML page
- Can be included on a web page via various methods
  - See this web site for details: <https://www.sitepoint.com/add-svg-to-web-page/>
- Used for:
  - Infographics
  - Logos
  - Icons



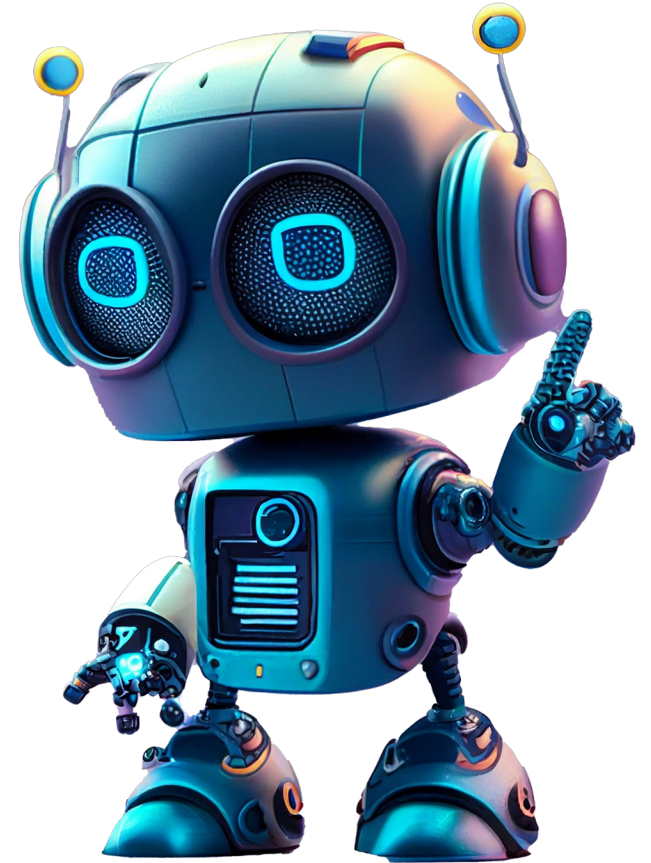
# WebP

- Extension: webp
- Lossy and lossless support
- Alpha transparency support
- Animation support
- Not supported in Internet Explorer



# AVIF

- Extension: avif
- Lossy and lossless support
- Alpha transparency support
- Animation support
- Not supported in Edge\* and Internet Explorer
  - \*AVIF support can be enabled with a flag in Edge, but only use this for testing. You should not expect your users to enable a browser flag.



# Image Optimization for the Web

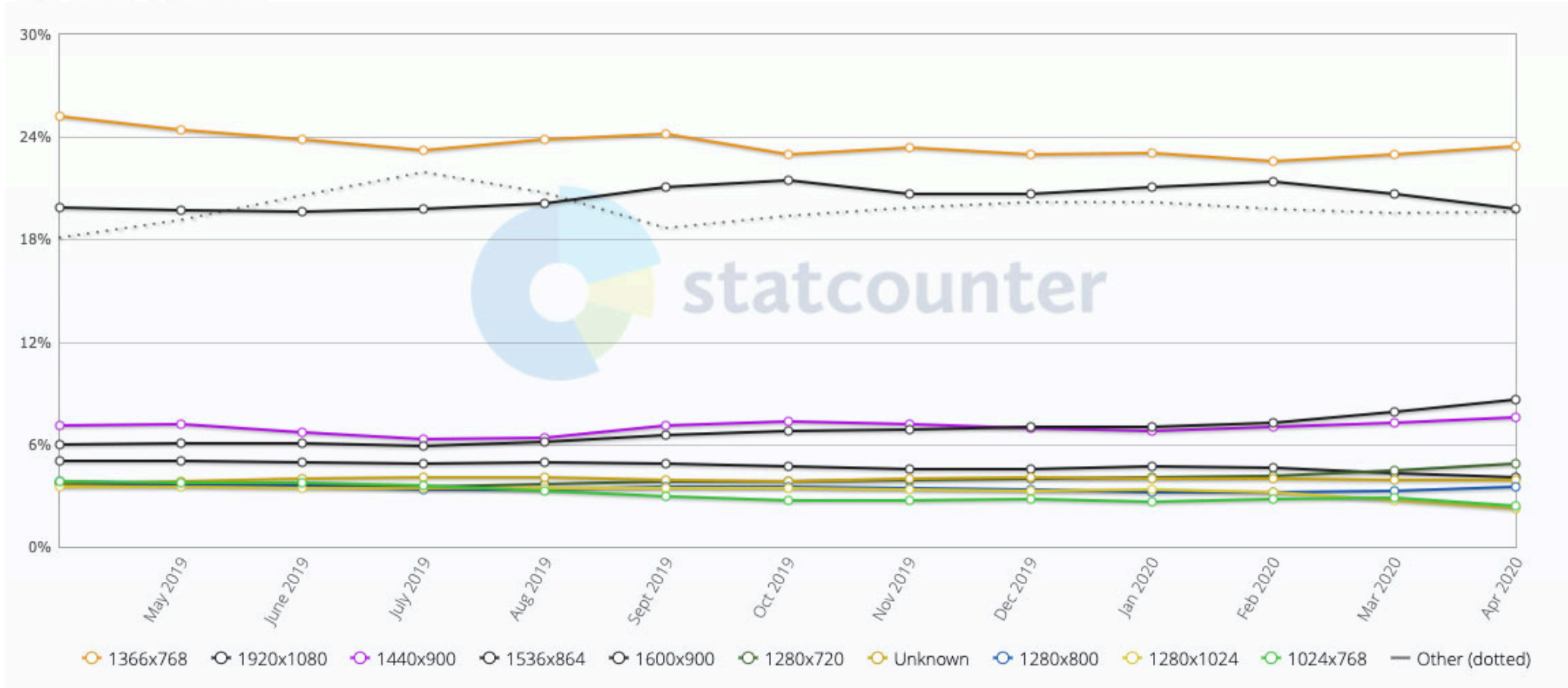
# Why Optimize Your Images

- Images from a camera or your smart phone are too large in both file size and image dimension terms for the web
- The web is a relatively low-resolution medium
  - No need to serve massive images for most web sites
- Serving large images slows your web site down

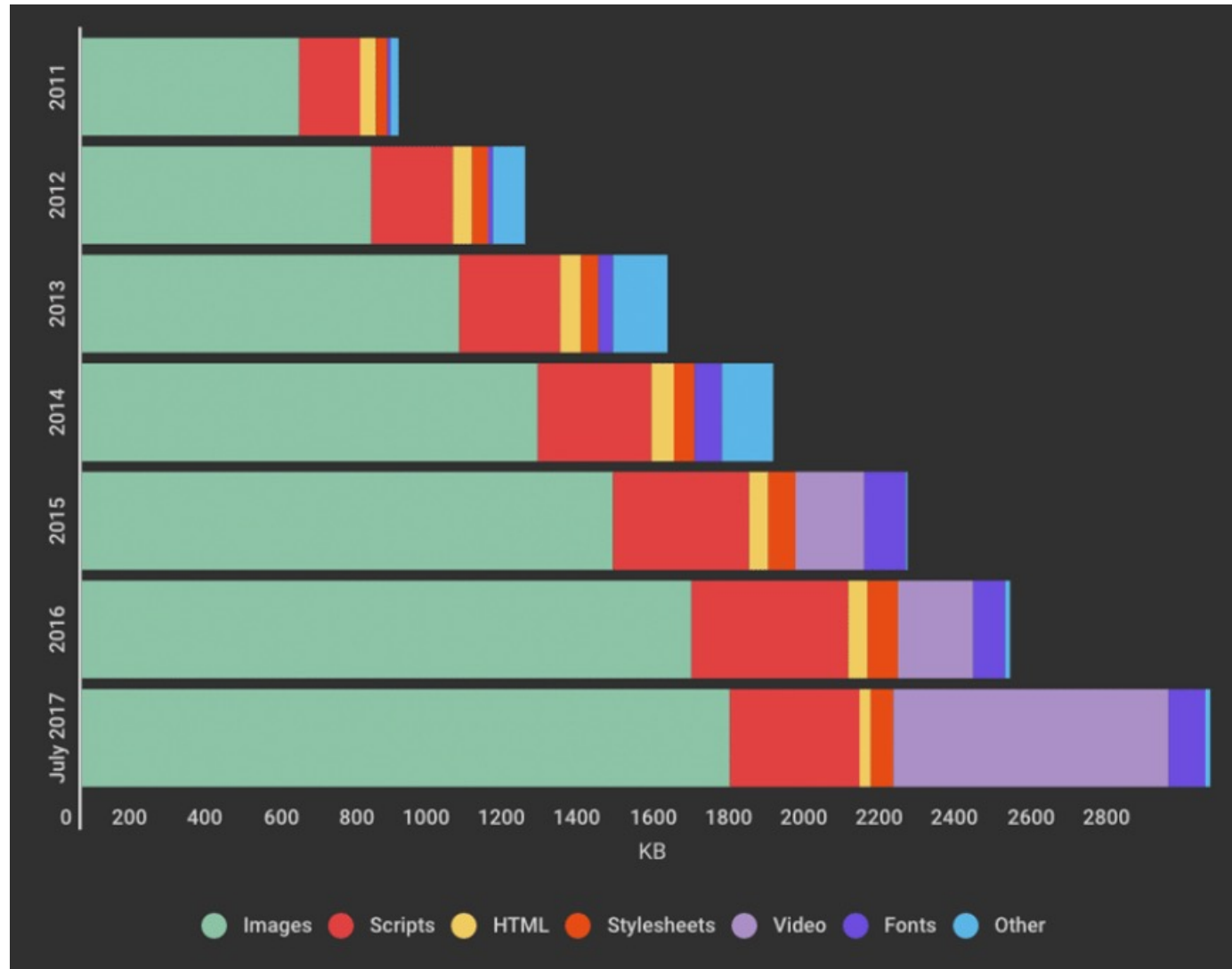
# Desktop Screen Sizes

## Desktop Screen Resolution Stats Worldwide

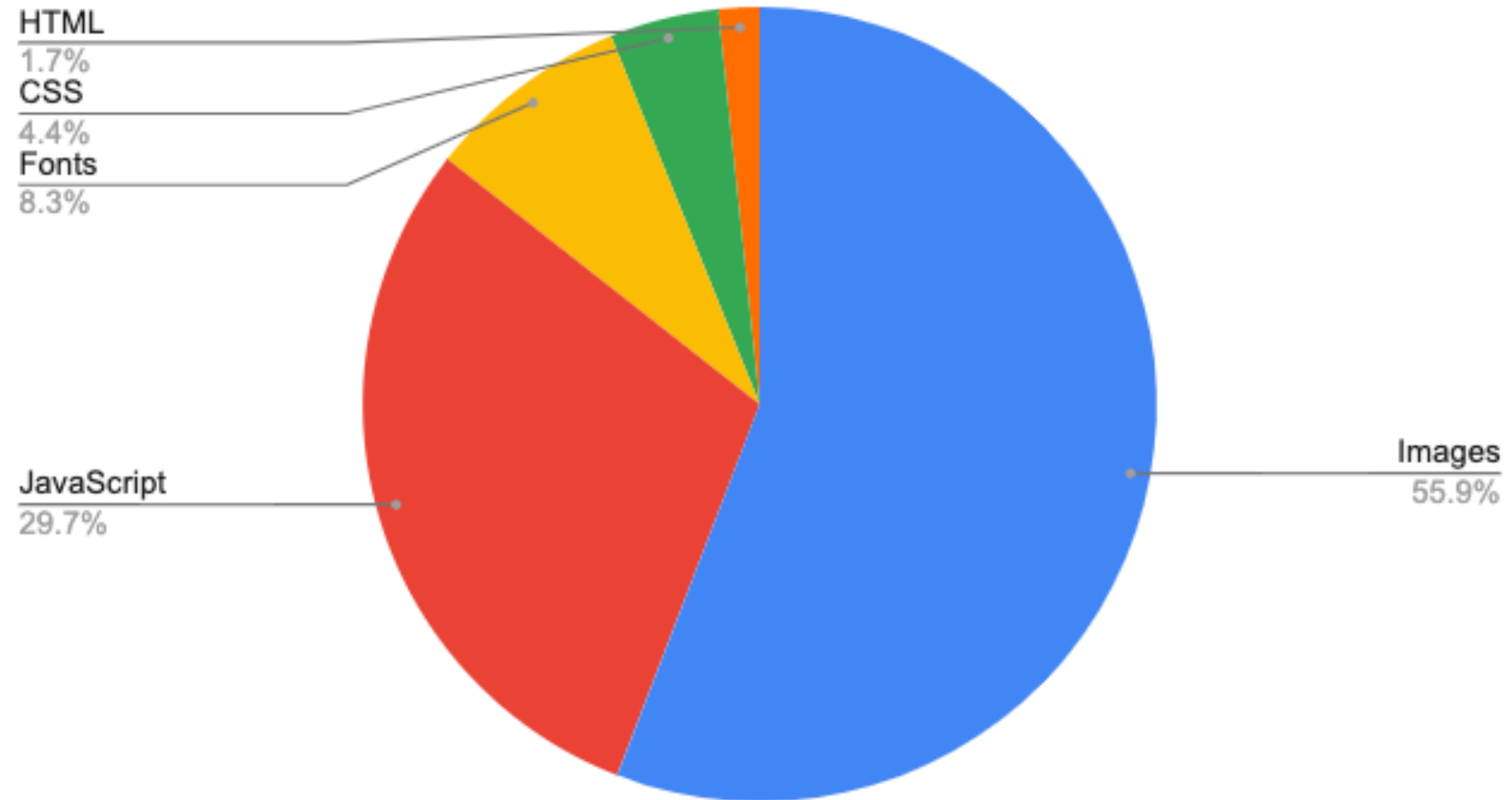
Apr 2019 - Apr 2020



# Average Web Page Weight (size in KB)



# Page Weight by Resource Type



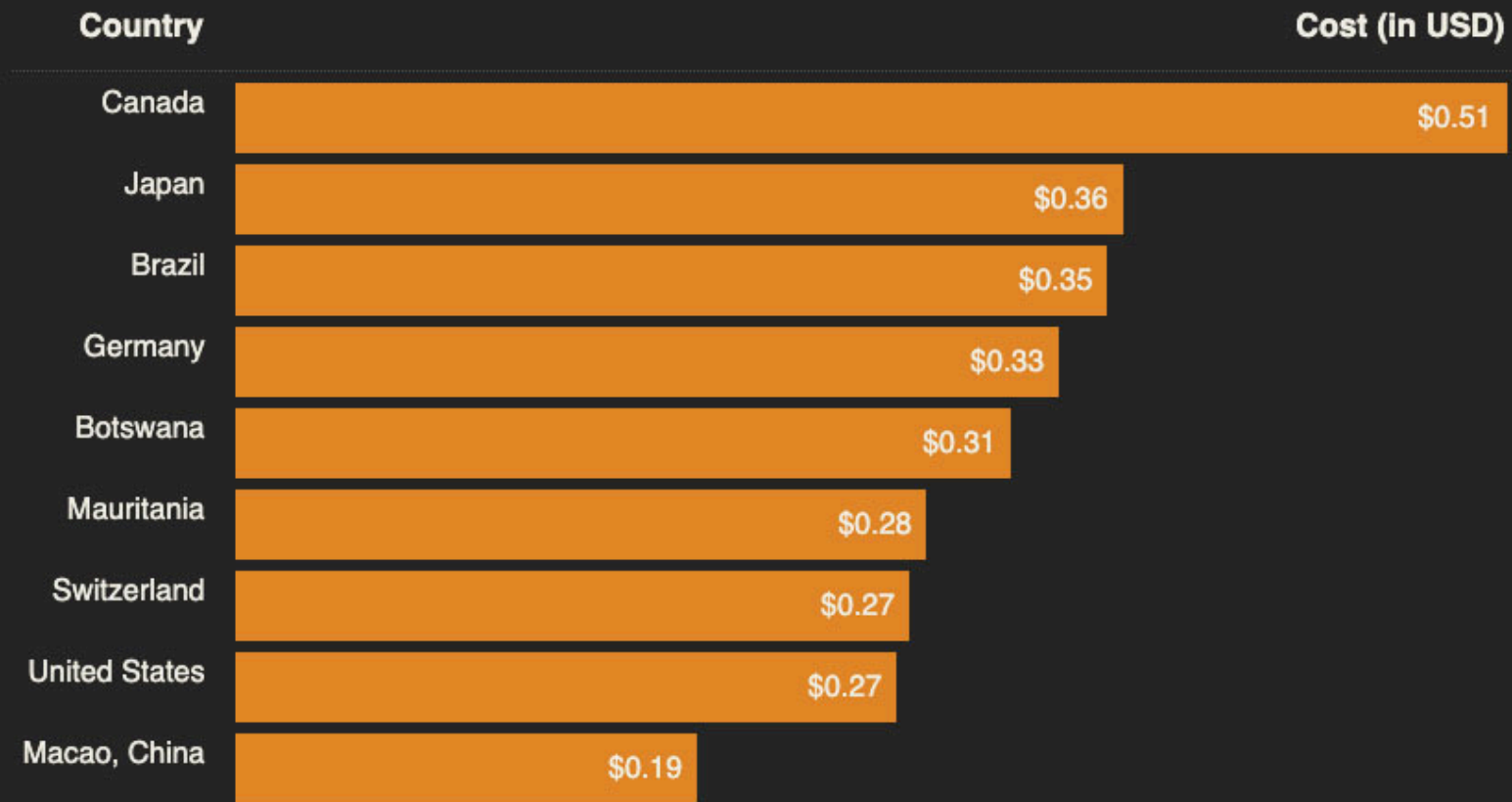


# What Does My Site Cost

- Larger web page weights equals potentially higher server costs for you and potentially higher bandwidth costs for both you and your users

# What Does My Site Cost

<https://bcit.ca> weighs 4.17MB. Here's what that costs around the globe.



# Image Sizes (w x h) Rough Guide

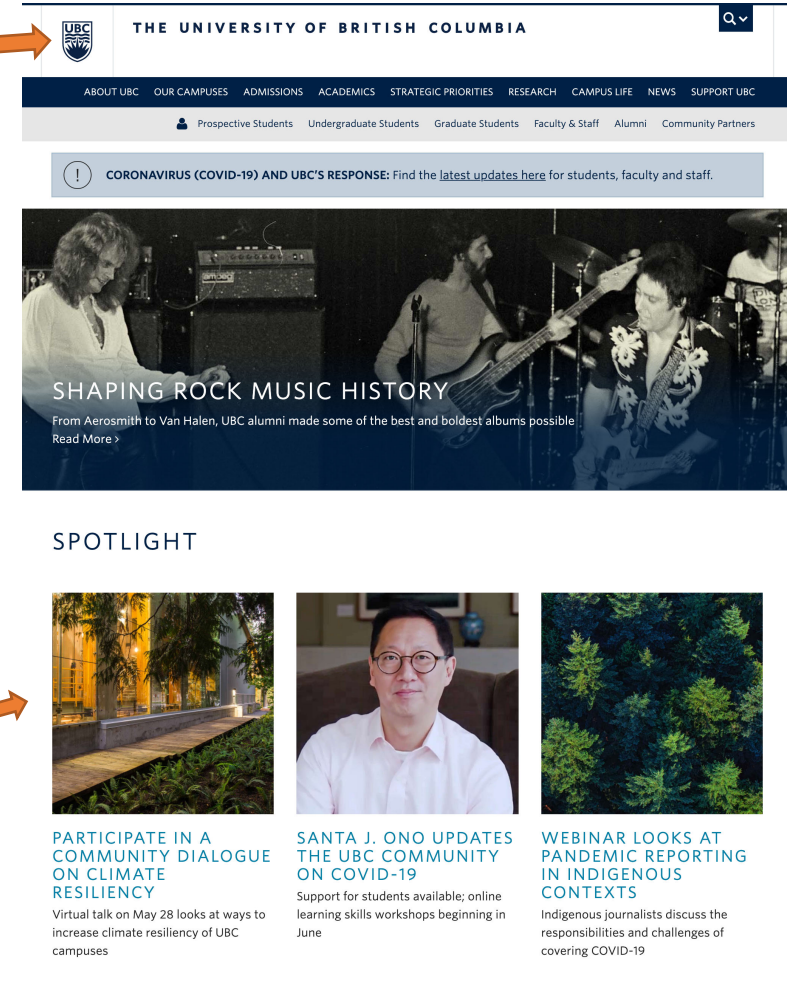
- Image sizes for web pages will change depending on the following criteria:
  - Design
  - User devices
  - User bandwidth
- No single file size will work on all web pages, it really depends on each individual web page's requirements
- With that said, the next slide will give you some rough starting points for images sizes for common images found on the web

# Image Sizes (w x h) Rough Guide

Logo images can be roughly sized to between 100 – 400 pixels in width

Full bleed banner images can be roughly resized to between 1500 – 2500 pixels in width

Thumbnail images can be roughly sized to between 200 – 800 pixels in width



# Image Editing Software

# Image Editing Desktop Software

- Photoshop
  - Industry standard image editor
  - Lots of powerful tools than can speed up image editing
  - Costs money
- GIMP
  - Free software
  - Provides most of the tools that a web developer would need to do simple image edits
  - Interface can be difficult to use
    - Try GIMPShop – a Photoshop UI skin for GIMP

# Vector Image Editing Desktop Software

- Illustrator
  - Industry standard vector image editor
  - Lots of powerful tools than can speed up vector image editing
  - Costs money
- Inkscape
  - Free software

# Browser Based Online Image Editors

- Photopea ( <https://www.photopea.com/> )
- Vectr ( <https://vectr.com/> )
  - Vector image editor



# Responsive Images

# Setting Max Width for All Images

- Most mobile responsive web sites have a fluid design
- With fluid widths, no one image size will work
- By default images expand beyond their containers if their natural width is wider than their container
- To prevent this behavior, set a “max-width” CSS property to “100%” on the image
  - Since this is so useful in responsive web development, we usually just set this on all images at the top of a stylesheet

# Responsive Images – Max Width Reset

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

# Max Width Not Set



By default images will expand beyond their parent container if they are too large to fit inside their parents container

Parent container width

# Max Width Set

## Responsive Images - max-width



### Article 01

Lorem ipsum dolor sit amet consectetur adipisicing elit. Eos hic sed cum ex, possimus veritatis aperiam accusamus fugit neque quia quae nam repellendus aliquam voluptatem? Excepturi cum officiis doloremque praesentium!

Sed, tempora. Ab adipisci voluptatibus similique, dicta aut consectetur nam, ipsum consequuntur ex autem ut eveniet nulla temporibus accusantium eos ratione aspernatur officiis eligendi atque ad fugit nisi laborum sit?

Image stays within the width of its container element because a CSS property value pair of “max-width: 100%” was set on the image

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

Parent container width

# Responsive Images

- Responsive web design is fantastic as it allows web developers to write one set of HTML/CSS and JS and serve it for all devices or various sizes from large desktops down to small mobile devices
- This creates a problem for images however as you could end up in a situation where you are serving a large banner image meant for desktop screens to a tiny mobile phone device
- Responsive images specification solves this by allowing your web page to serve different sized images to different devices

# Srcset, Sizes and Picture

- The responsive images spec provides a few ways to code mobile friendly images
- Each method has its own use case

# Srcset & Sizes

- Srcset & Sizes are new attributes for the standard image tag (<img>)
- Srcset & Sizes can also be used on the “source” tag within the picture (<picture>) element
- Srcset & Sizes provide additional information to the browser to help the browser choose the optimal image for the current device



# Srcset & Sizes

- The chart on the next slide shows all information that the browser needs to choose the correct image
- Note how the browser only knows half information to serve the optimal image
- Srcset & Sizes is designed to give the browser the missing information that it need to serve the optimal image

# Srcset & Sizes

Variables Needed to Serve the Optimal Image	Known by the Web Developer	Known by the Browser when Loading the Page
Viewport dimensions	No	Yes
Image size relative to the viewport	Yes	No
Screen density	No	Yes
Source files' dimensions	Yes	No

Chart modified from: <https://ericportis.com/posts/2014/srcset-sizes/>

# Srcset & Sizes

Variables Needed to Serve the Optimal Image	Known by the Web Developer	Known by the Browser when Loading the Page
Viewport dimensions	No	Yes
Image size relative to the viewport	Yes	<del>No</del> Yes, via sizes
Screen density	No	Yes
Source files' dimensions	Yes	<del>No</del> Yes, via srcset

# Srcset & Sizes Syntax

Srcset provides the browser with a list of images to choose from. The width descriptors (2400w) beside each image tell the browser how wide an image is in pixels using the “w” value.

**IMPORTANT:** The widths listed in the srcset attribute are not made up values. They must equal the true width of the image in pixels. You can find out the width of an image by getting info about the image file from your operating system.

**DO NOT MAKE THESE NUMBERS UP!!!**

```

```

Sizes gives the browser information about how much width an image will take up relative to the browser width at various screen sizes

**WARNING!!!**

**DO NOT MAKE UP IMAGE WIDTHS  
WHEN USING SRCSET!!!!!!**

**WARNING!!!**

# Testing Srcset & Sizes

- Be aware that Chrome will not load smaller images if the larger image has already loaded
- This can be frustrating if you are testing your responsive images code
- To get around this, you can resize your web site down, clear the cache and re-fresh the browser, or do a hard re-fresh (CTRL+F5 on Windows and CMD+SHIFT+R on Mac) after you re-size your browser down to mobile screen sizes
- Firefox will load smaller images regardless...So it is a bit easier to test your srcset and sizes code in Firefox

# Picture Element

- The picture element is an HTML element
- Allows you to serve different images at specified browser sizes via a source element with a media attribute
- Used for:
  - Art directing images
    - Serving different crops of the same image to different devices
  - Not serving an image at certain screen sizes
  - Provide image fallbacks to browsers that do not support certain modern image formats

# Picture Element Syntax

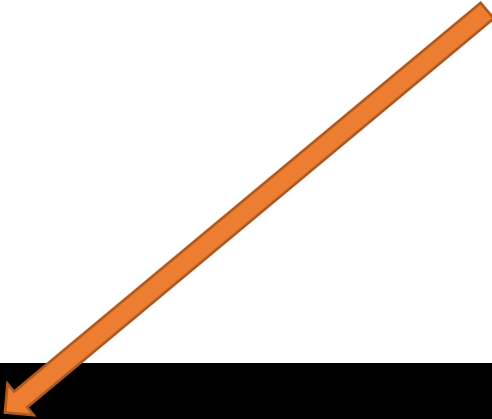
```
<picture>
  <source srcset="images/vancouver-skyline-winter-retina.jpg 1600w,
                 images/vancouver-skyline-winter-large.jpg 801w"
          sizes="(max-width: 960px) calc(100vw - 40px), 920px"
          media="(max-width: 600px)">
  
</picture>
```



# Picture Element Syntax

Source element tells the browser to load a certain image at a certain screen width. The media attribute tells the browser when to load the image listed in the srcset attribute.

You can have more than one source element.



```
<picture>
  <source srcset="images/vancouver-skyline-winter-retina.jpg 1600w,
                images/vancouver-skyline-winter-large.jpg 801w"
          sizes="(max-width: 960px) calc(100vw - 40px), 920px"
          media="(max-width: 600px)">
  
</picture>
```

# Picture Element Syntax

```
<picture>
  <source srcset="images/vancouver-skyline-winter-retina.jpg 1600w,
                images/vancouver-skyline-winter-large.jpg 801w"
          sizes="(max-width: 960px) calc(100vw - 40px), 920px"
          media="(max-width: 600px)">
  
</picture>
```

The “img” element will load if none of the source elements media conditions match.

The “img” element is also used as a fallback for older browsers that do not support the picture element.

# Images and Copyright

- I am not a lawyer. The advice on the next two slides constitutes only my everyday man opinion on the rules of copyright in Canada
- If you want to be 100% sure about the use of an image or other media, then ask for professional legal advice from a lawyer or stick with images and media in the public domain, pay for the license to use an image or use images and media that you create

# Images and Copyright

- Most images created in the past 100 years are covered by copyright by default unless the creator explicitly put them in the public domain
  - In Canada the general rule is, a work (in this case graphics and images) falls into the public domain 50 years after the death of its creator
- Older imagery, drawings/photographs from the 19<sup>th</sup>, 18<sup>th</sup> etc... centuries are probably in the public domain and are generally free to use
- For school projects you can use most images that are **freely** available on the web (not behind a paywall) as long as the use of the images or graphics are for educational purposes and are not widely distributed and you provide attribution to the source or creator of the work
- For client work or commercial work you must have permission to use a graphic or image from another creator on most commercial web sites, unless the graphic or image is in the public domain

# Where to Get Free Images Legally

- Unsplash ( <https://unsplash.com/> )
  - Consists of photos donated by photographers for use by others
- Pixabay ( <https://pixabay.com/> )
- CC Search ( <https://ccsearch.creativecommons.org/> )
  - Searches the web for images that are creative commons licensed
  - Some CC licenses will require you to provide attribution
  - Some CC license do not permit uses in commercial projects
- Google Images with a filter by license
  - Click on “Tools” and then “Usage Rights” and select a usage you need
  - Always double check the usage rights to be sure
- Wikimedia Commons ( [https://commons.wikimedia.org/wiki/Main\\_Page](https://commons.wikimedia.org/wiki/Main_Page) )
  - Double check the image license before using

# Purchasing Stock Images

- Purchasing licenses to stock images is an inexpensive way to get legal high-quality images for a commercial web site
- No need to purchase images for school projects. This list is provided for those that wish to do web development work professionally
- Stock image web sites:
  - iStock ( <https://www.istockphoto.com/ca> )
  - Adobe Stock\* ( <https://stock.adobe.com/ca/> )
    - \*You may have access to this resource as part of your BCIT Adobe CC subscription
  - Storyblocks ( <https://www.storyblocks.com/> )