CGT 141/CPT 141 Lecture 4 Wk 2
Media Design and Development

Web Design Issues

- There are no absolutes!
  - It is not like formatting a Word document…everything can change from browser to browser or platform to platform
- Must learn to "variably design" and to design for flexibility
- Typography Issues
  - Size
  - Font type (Family)
  - Serif vs. Sans Serif
  - Availability
    - Design around standard machine fonts or
    - Create a bitmap of the text or
    - Use font embedding

Working with Images

- Two types:
  - Raster: composed of picture elements (pixels); "digital painting"
    - Programs like Adobe Photoshop and Corel PhotoPaint
  - Vector: composed of objects (points, lines, arcs, polygons); "digital drawing"
    - Programs like Adobe Illustrator, Macromedia FreeHand, and CorelDraw!
- Predominance of images on the web are raster; although technologies like Macromedia Flash are quickly changing this. Thus, we will not directly deal with vector imaging on the web in this course (other courses devoted to this).

- There are three attributes of raster graphics:
  - Resolution – number of pixels per inch in an image
    - Describes the visual clarity of the image from the output device
    - Some monitors are "72" dpi and some are "96" dpi
      - Really doesn't matter with images for display on screen
      - In this fashion, dpi is synonymous with ppi
    - dpi and ppi are primarily used for printing and scanning
      - For example, a 600 dpi is capable of printing 600 dots (pixels) in a line one inch long.
        - Thus, a 600 x 600 dpi printer can print 360,000 dots (pixels) per square inch
      - So, if you want to be able to download and print an image at a high resolution, then use a high dpi, otherwise, it does not really matter.
    - All you have to do is adjust the dpi and the width & height dimensions such that the file size what you are looking for… Another way to look at it, adjust the width & height to the exact pixels you desire on the web page, then adjust the dpi to suit your file size limitations.
      - Just watch your FILE SIZE!! – keep it low

- In this class, we will always deal directly with the dimensions of an image in pixels. i.e.: an image is 144 ppi or 144 dpi
    - If it is 2 inches at 144 ppi, then 2 x 144 = 288 pixels
- Stretching an image
    - Silly putty analogy
    - Don't display a 200x200 image at 400x400 – looks terrible

- Color depth – number of bits available for describing a single pixel
    - Number of distinct colors that can be represented by a piece of hardware or software.
    - Often referred to as bit depth because color depth refers to the number of bits that can be used to describe a single pixel.
    - Describes the color fidelity of an image
    - 32-bit = 2^{32} colors = 4.29 billion colors (true color)
    - 24-bit = 2^{24} colors = 16.7 million colors
        - 24-bit is also often called "true color" or RGB color
        - "True Color" refers to any graphics device or software that uses at least 24-bit color to represent a single dot (pixel)
    - 16-bit = 2^{16} colors = 64,000 colors
    - 8-bit = 2^{8} colors = 256 colors
        - 8-bit is often called "indexed color" or "palletized color"

- File size – based on size, resolution and bit depth (for UNcompressed files)
    - Raw calculation:
        - File Size = ((Resolution)^{2} * Width" * Height" * Bit Depth) / 8,192
    - Does not take into account file compression

    - Example A:
        - Given an image that is 2" wide by 3" high, having a bit depth of 24-bit, and a resolution of 72 PPI, what would the resulting file size be?
            - (Resolution)^{2} = $(72)^{2}$ = 5,184
            - Width" = 2"
            - Height" = 3"
            - Bit Depth = 24-bit
            - (5,184 * 2 * 3 * 24) = 746,496
            - 746,496 / 8,192 = 91.125 KB
            - *Answer:* 91.125 KB

- Example B:
  - Given an image that is 4” wide by 6” high, having a bit depth of 8-bit, and a resolution of 150 PPI, what would the resulting file size be?
    - $(\text{Resolution})^2 = (150)^2 = 22{,}500$
    - Width” = 4”
    - Height” = 6”
    - Bit Depth = 8-bit
    - (22,500 * 4 * 6 * 8) = 4,320,000
    - 4,320,000 / 8,192 = 527.34 KB
    - *Answer:* 527.34 KB

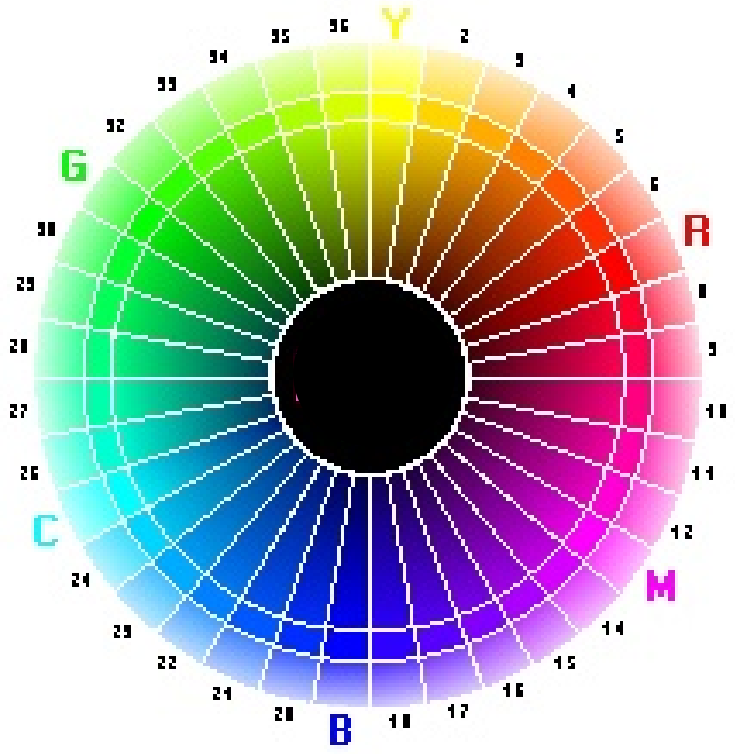
- Example C:
  - Given an image that is 1050 pixel wide by 450 pixels high, having a bit depth of 24-bit and a resolution of 150 PPI, what would the resulting file size be?
    - $(\text{Resolution})^2 = (150)^2 = 22{,}500$
    - Width” = 1050 pixels / 150 PPI = 7”
    - Height” = 450 pixels / 150 PPI = 3”
    - Bit Depth = 24-bit
    - (22,500 * 7 * 3 * 24) = 11,340,000
    - 11,340,000 / 8,192 = 1384.277 KB
    - 1384.277 KB / 1024 = 1.35 MB
    - *Answer:* 1.35 MB

- Why 8,192?
  - Dividing by 8,192 puts our answer in terms of KB instead of bits. KB is more common and easier to deal with than a large number of bits.
  - 8 bits = 1 Byte
    - 1024 Bytes = 1 KiloByte
    - 1 KB * 1024 Bytes * 8 bits = 8,192 bits

Preparing images for the Web

- Must be proper format: GIF, JPG (JPEG/JFIF) or PNG
- Must be sized correctly
  - Always size down
- Must be correct color depth for format
  - GIF – 8-bit
  - JPG – 24-bit

The Color Wheel



Hex to RGB

- Using the color wheel above we can make a relationship between Hex values and colors on the color wheel.
    - #0000FF equates to Blue
    - #00FF00 equates to Green
    - #FF0000 equates to Red
    - #FFFF00 equates to Yellow, because it falls between Red and Green
    - #FF00FF equates to Magenta, because it falls between Red and Blue
    - #00FFFF equates to Cyan, because it falls between Green and Blue
- The easiest way to check these values for accuracy, as well as learn more about them, is to open up an image editing software such as Photoshop and try entering hexadecimal numbers.

How Can Images Be Used?

- As a simple inline graphic <img /> – how we will use them in Exercise 3
- As a link (<img /> & <a>)
- As an imagemap [image with hotspots] (<img /> and <map>/<area>)
- As spacing devices (<img />) – see this in a later exercise.

The <img /> tag

- General form:
  -
  - src – the image file (more on that in a minute)
  - alt – alternative text to show if images are turned off, or if user is browsing in a non-visual user agent
  - height and width
    - Defines the “blank” area to be allotted to the image prior to load
    - Not to be used for image sizing; size the image to the proper size in an image editor
  - valign – vertical alignment of content in relation to surrounding content
  - align – horizontal alignment of content in relation to surrounding content
  - hspace & vspace – amount of space around image
    - Value is split in half applied to either side of the image
- More about the source specification:
  - May be absolute path or relative path
  - Absolute sources:
    - Sources relative to the root web domain
      - A complete URL to an image on the same server (wasted typing)
      - A complete URL to an image on another server
  - Relative sources:
    - Sources relative to the HTML file the image is embedded in
      - If file exists in same directory, just put file name:
        -
      - If file exists deeper in file structure, put folder (from current .html file position):
        - If image file is inside a directory named images, “beneath” current HTML file:
          -
        - If image file is inside a directory named images, inside a directory named anotherfolder, beneath current HTML file:
          -
      - If file exists higher in the file structure, use ../ (carryover from DOS and UNIX), use ../ to traverse directories.
        - If image file is one-level up in the directory structure:
          -
        - If image file is two-levels up in the directory structure:
          -
        - If the image file is two-levels up in the directory structure, and in a folder named images:
          -

- Can also use what are known as aliased roots
    - Aliased roots are set up on the server that function as a root location.
    - Permit developers to truncate image references as well as anchors (link structures)
    - The actual directory that is set up as an aliased directory can reside anywhere in the server structure.
    - If images folder is aliased directory:
        -
        - Note foreslash in from of images directory name.