



# Preparing Images for the Web

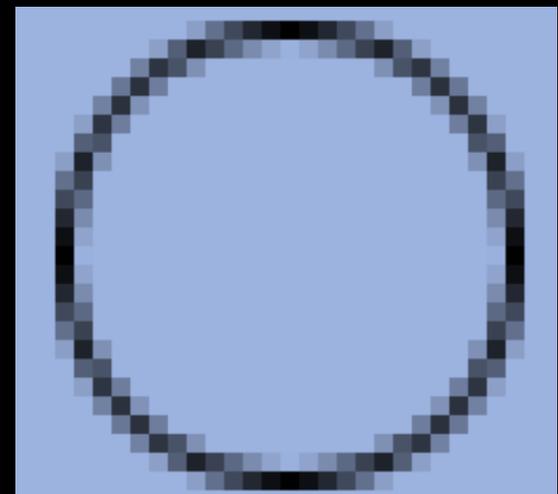
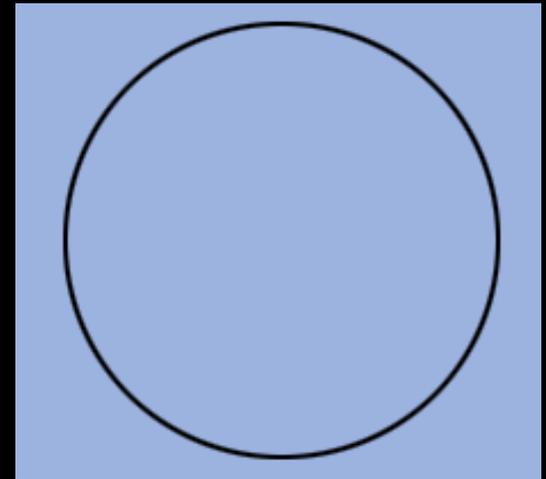
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# Vector & Raster

- ◆ What is the difference?
- ◆ Which is best for Web graphics?
- ◆ How can you tell the difference?

# Vector or Bitmap

- ◆ **Vector graphics** is the use of geometrical primitives such as points, lines, curves, and polygons to represent images in computer graphics
- ◆ **Bitmap** or raster graphics is the representation of images as a collection of pixels or dots



# Vector Graphics

- ◆ Vector Graphics Creation and Editing Software
  - ◆ Illustrator .ai
  - ◆ Corel Draw .cdr
  - ◆ Freehand .fh#
  - ◆ CAD Files .dwg
  - ◆ EPS Encapsulated Postscript .eps
  - ◆ PDF .pdf

# Raster Graphics

- ◆ Raster Creation and Editing Software
  - ◆ Photoshop .psd
  - ◆ Fireworks .png
  - ◆ ImageReady .psd
  - ◆ Corel PhotoPaint
  - ◆ Paintshop Pro .psp
- ◆ Common Raster Image File Extensions
  - .gif, .jpg, .png, .bmp, .tif

# Characteristics

## Scaling:

- ◆ **Raster** graphics cannot be scaled to a higher resolution without loss of apparent quality
- ◆ **Vector** graphics easily scale to the quality of the device on which they are rendered without distortion

# Characteristics

## Visual Usage:

- ◆ **Raster** graphics are more practical than vector graphics for photographs and photo-realistic images
- ◆ **Vector** graphics are often more practical for typesetting or graphic design

# Characteristics

## Web Usage:

- ◆ **Vector** file formats (most) are NOT viewable in a browser without a plug-in.
  - ◆ Example: the SVG file format created in Flash needs the Flash Player
- ◆ **Raster** graphics are easily used on the Web due to the pixel based display of computer monitors.

# Vector or Raster?



# Vector or Raster?



# Raster it is!

- ◆ **Raster** art wins in the Web world as the image type of choice
- ◆ **Raster** art is easily displayed
- ◆ **Raster** art is easily compressed and edited
- ◆ **Raster** art is easily found in clip art sites

**Let's think in PIXELS!**

# Thinking in Pixels

- ◆ think of a pixel as the smallest possible area of color in an on-screen image, and the basic unit of measure
- ◆ A pixel also has color depth
  - ◆ The number of bits used to represent the color of a single pixel in a bitmapped image
  - ◆ 1-bit color ( $2^1 = 2$  colors) 2-bit color ( $2^2 = 4$  colors)
  - ◆ 4-bit color ( $2^4 = 16$  colors)
  - ◆ 8-bit color ( $2^8 = 256$  colors) Standard for GIF, more colors visible through "dithering"

# Thinking in Pixels

- ◆ this illustration shows a portion of the image enlarged to show pixel detail



# Thinking in Pixels: File Size

- ◆ Increases with the number of pixels in the image, and the color depth of the pixels.
- ◆ The more rows and columns, the greater the image resolution and the greater the file size
  - ◆ 300dpi image at 256 colors
  - ◆  $H \times W \times \text{DPI} \times \text{Color Depth} = \text{approximate uncompressed file size}$
- ◆ Each pixel increases in size as the color depth is increased
  - ◆ An 8-bit pixel (1 byte) can store 256 colors and a 24-bit pixel (3 bytes) can store 16 million colors.

# Thinking in Pixels: File Size

- ◆ high resolution cameras=large image files
- ◆ range from hundreds of KB to many MB
  - ◆ depending on the camera resolution and the format used to save the images
  - ◆ Consider an image taken by an 8 MP camera
    - each of the pixels uses 3 bytes to record true color
    - the uncompressed image would occupy 24MB of memory

# Thinking in Pixels: Compression

## ◆ Lossy:

- ◆ compression takes advantage of the limitations of the human eye and discards information that would not be noticed by the user
  - file size is reduced as file compression is increased
  - image deterioration will eventually become noticeable

## ◆ Lossless:

- ◆ compresses the image data with no loss in image quality
  - results in larger files than the lossy algorithms

# Web Image Files

- ◆ Two most common raster image formats used on the Web
  - ◆ GIF
  - ◆ JPEG

# GIF Image Files

- ◆ **GIF (Graphic Interchange Format)**
  - limited to an 8-bit palette (256 colors)
  - GIF is best suited for storing simple graphic images with relatively few colors
  - Superior to JPEG in dealing with this simple graphics such as logos, headers, etc...
  - Not well fitted for photographic works and very rarely used for such
  - GIF also supports animation
  - The file format is now slowly being superseded by the PNG format for non-animated images

# JPG Image Files

- ◆ **JPEG (Joint Photographic Experts Group)**
  - ◆ image files are a lossy format.
  - ◆ filename extension is *JPG*, some may use *JPEG*
  - ◆ digital cameras save images in JPEG format, at different compression levels
  - ◆ supports full color and produces small file sizes
  - ◆ JPEG files do suffer generational degradation when repeatedly edited and saved
  - ◆ Photographic images are best stored in a lossless non-JPEG format if they will be re-edited in future
  - ◆ JPEG is also used as image compression algorithm in PDF files

# More Web Image Formats

## ◆ Other formats for special uses:

### ◆ **PNG**: portable network graphic

- does almost everything that the GIF format
- supports true color (16 million colors)
- excels when the image has large areas of uniform color
- Many older browsers do not yet support the format

### ◆ **SVG**: scalable vector graphic

- open standard developed by the [World Wide Web Consortium](#)
- versatile, scriptable and all-purpose vector format for the web and otherwise

# Images for the Web

- ◆ Use the Right File Format
  - ◆ GIF ?
  - ◆ JPG ?
- ◆ Image Optimization Techniques
  - ◆ Resize the image to fit your space
    - Insure fast downloading of page
    - Save server space with smaller images
  - ◆ Design for the Page and Content
  - ◆ Compress for Quality and Small File Size

# Use the Right File Type

- ◆ GIF images:
  - ◆ Art is more GRAPHIC than photographic
  - ◆ You want a transparent background
  - ◆ The image can be a few selected colors
  - ◆ You want to animate the image
- ◆ JPEG images:
  - ◆ The image is more PHOTOgraphic than graphic
  - ◆ The image has subtle color gradations
  - ◆ You don't need transparency or animation

GIF or JPG?



GIF or JPG?



# Images for the Web

- ◆ Usability and efficiency will help your customers!
- ◆ When creating images for your site:
  - ◆ Crop
  - ◆ Resize
  - ◆ Enhance
  - ◆ Optimize

# Crop Your Images

- ◆ Selecting the portion of the photograph or graphic you want to use, and cutting away the unnecessary leftovers.
- ◆ Cropping reduces file size
- ◆ Most photographs contain more than you need to effectively communicate your desired message
- ◆ Focus in on the portion you really want to show and get rid of the rest
- ◆ For a detailed description of the crop feature in your photo editing software, go to the help feature, locate the index option, and type in Crop.

# Crop Your Images



The subject is about reading to your kids... How can you focus on that topic by cropping?

# Crop Your Images



... tighten up and close in on the mom and children! Crop it!

# Crop Your Images



**This file is 214 KB**

You really only need one kid for your school locker article... what can you do?

# Crop Your Images



**This file is 32KB**

Zoom in on one kid sitting by the lockers. Crop it! You are saving file size and better illustrating the story.

# Resize and Crop for the Space



## Education & Children's Services

mi.gov

### Welcome to the Education & Children's Services Portal

Here you will find information on a wide variety of topics involving education and children's issues in Michigan. Information on this portal is compiled from a number of State of Michigan agencies. Individuals looking for specific agencies for information or questions should visit the respective agency Website.

[Directory of agencies participating in Education & Children's Services Portal](#)



- [State Board of Education Approves Increased State High School Graduation Requirements](#)
- [Improving Outcomes for High School Students](#)
- [State Board Reviews Flanagan's Recommendations For State High School Graduation Requirements](#)

## Newsire

[State Board of Education Approves Increased State High School Graduation Requirements](#)

[Kelly DiPucchio's "Bed Hogs" Earns Top Honor as 2006 Michigan Reads! Preschool Book](#)

## Online Services

[Michigan Education Savings Program \(MESP\)](#)

[School Bond Loan Program Election](#)

# Resize

- ◆ Resizing your images to the size you need for the page layout reduces file size
- ◆ Do not load larger images and size them in the HTML.
- ◆ That does NOT reduce the file sizes or shorten load time OR improve quality
- ◆ If you need a 200 pixel x 300 pixel image, size it in an editing application before saving and uploading

# Enhance

- ◆ Image editing programs offer ways to improve the quality of your optimized image.
  - ◆ Sharpen
  - ◆ Unsharp mask
  - ◆ Color adjustment

# Enhance: Sharpen

- ◆ The Sharpen filters focus blurred images by increasing the contrast of adjacent pixels.
- ◆ Sharpen Edges filter sharpens only edges while preserving the overall smoothness of the image.
- ◆ Use this filter to sharpen edges without specifying an amount.

# Enhance: Sharpening



original



sharpened



overly sharpened

# Enhance: Color Adjustments



original



more cyan



midtones and  
shadows lightened

# Enhance: Unsharp Mask

- ◆ For professional color correction, use the Unsharp Mask filter to adjust the contrast of edge detail and produce a lighter and darker line on each side of the edge.
- ◆ This process emphasizes the edge and creates the illusion of a sharper image

# Enhance: Sharpening



# Optimization

- ◆ When preparing images for the web you need to compromise between image display quality and the file size of the image.
- ◆ Photoshop and ImageReady provide several controls for compressing the file size of an image while optimizing its online display quality.

# Optimization

- ◆ GIF: Reduce the bit depth in the image
  - ◆ GIFs can use a maximum of 256 colors, but many images can be displayed well using less colors.
- ◆ JPEG images: Blur the image slightly.
  - ◆ JPEG compression likes images with few details, subtle color gradations, and few hard edges.
- ◆ Use a graphics program that will let you preview different compression levels or color settings before you save the image.

# JPG



Save For Web - Powered By ImageReady

Original Optimized 2-Up 4-Up



0_parent.jpg"	JPEG 27.36K 11 sec @ 28.8 Kbps	100 quality
JPEG 3.131K 2 sec @ 28.8 Kbps	0 quality	JPEG 4.162K 2 sec @ 28.8 Kbps
		11 quality

The image shows a 'Save For Web' dialog box with four tabs: 'Original', 'Optimized', '2-Up', and '4-Up'. The '4-Up' tab is selected. The dialog displays four thumbnails of the image. The top-left thumbnail is labeled '0\_parent.jpg"'. The top-right thumbnail is labeled 'JPEG 27.36K 11 sec @ 28.8 Kbps' and '100 quality'. The bottom-left thumbnail is labeled 'JPEG 3.131K 2 sec @ 28.8 Kbps' and '0 quality'. The bottom-right thumbnail is labeled 'JPEG 4.162K 2 sec @ 28.8 Kbps' and '11 quality'. The bottom-right thumbnail is highlighted with a blue border.

# GIF



Save For Web - Powered By ImageReady

Original Optimized 2-Up 4-Up

	
0_parent.jpg"	GIF 29.73K 11 sec @ 28.8 Kbps
	0% dither Selective palette 256 colors
	
GIF 37.15K 14 sec @ 28.8 Kbps	100% dither Adaptive palette 256 colors
	GIF 16.3K 7 sec @ 28.8 Kbps
	100% dither Perceptual palette 32 colors

# Best Practices

- ◆ DO use JPG for photos and GIF for art
- ◆ NEVER enlarge an optimized image
- ◆ NEVER depend on HTML to reduce the height and width of an image
- ◆ DO resize your images to fit your space
- ◆ DO optimize for file size and quality
- ◆ DO crop for design and illustration

# Resources

- ◆ GIFbot Free Sample

<http://www.netmechanic.com/GIFBot/optimize-graphic.htm>

- ◆ Optimize Your Graphics for a Fast Loading Site

<http://www.accordmarketing.com/tid/archive/optimize.html>

# Resources

- ◆ Optimizing Your Images by Tim Ziegler  
<http://hotwired.lycos.com/webmonkey/99/15/index0a.html?tw=design>

## Photoshop Sites

- ◆ <http://www.planetphotoshop.com/>
- ◆ <http://www.adobe.com>

# Resources

## ◆ How to Prepare Images for the Web

Parts 1 - 2 - 3

<http://www.isitebuild.com/imageoptimization1.htm>

<http://www.isitebuild.com/imageoptimization2.htm>

<http://www.isitebuild.com/imageoptimization3.htm>

# Resources

- ◆ Optimize Your Web Images, Linda Weinman  
<http://www.adobe.com/web/tips/imgropt/main.html>
- ◆ Web Graphics 101  
<http://graphicdesign.about.com/library/weekly/aa012998i.htm>