

CS100: Introduction to Computer Science

Lecture 13: Image In HTML

Review: A simple Web page

a. The page encoded using HTML.

Tag indicating beginning of document	{	<html>
Preliminaries	{	<head>
		<title>demonstration page</title>
		</head>
Part of the page that will be displayed by browser	{	<body>
		<h1>My Web Page</h1>
		<p>Click here for another page.</p>
		</body>
Tag indicating end of document	}	</html>

Review: HTML editors

- n Any editors that can save a file as text file.
 - q Notepad, word (on Windows)
 - q Pico, Vi (on Unix or Linux)
- n Special editors
 - q Focus on code
 - n HTML kit, insert tags and check codes.
 - q Focus on the visual result, WYSIWYG editor ("What You See Is What You Get").
 - n Word, Netscape composer
 - q uses fonts, styles, paragraphs, and lists, and includes an integrated spelling checker.
 - n Dreamweaver
 - q Also supports other web technologies, such as JavaScript

Review: HTML

- n Style tags
 - q ...
- n Applying colors
 - q This text is Green
 - q 216 web-safe colors
- n List Elements
- n Links

Review: HTML

- n Tables
 - q <table>...</table>
- n Forms
 - q Form fields allow visitors to enter information
- n Frames
 - q Divide the screen into separate windows, each window contains one html document
- n Meta Tags
 - q Store information relevant to browsers or search engines

HTML Character Entities

- n Character entities for some characters that have a special meaning in HTML
 - q like the less than sign (<) that defines the start of an HTML tag.
 - q < or <
- n A character entity has three parts:
 - q an ampersand (&), an entity name or a # and an entity number, and
 - q finally a semicolon (;).

HTML Character Entities

The Most Common Character Entities:

Result	Description	Entity Name	Entity Number
	non-breaking space	 	
<	less than	<	<
>	greater than	>	>
&	ampersand	&	&
"	quotation mark	"	"
'	apostrophe (does not work in IE)	'	'

HTML

- n HTML background
 - q *White or image*
- n Images
 - q The two main image types on web pages: jpg and gif.
 - q ``

HTML Background

- n The **<body>** tag has two attributes where you can specify backgrounds.
- n The background can be a color or an image.
 - q If the image is smaller than the page, the image will repeat itself.
- n **Bgcolor**
 - q `<body bgcolor="#000000">`
 - q `<body bgcolor="rgb(0,0,0)">`
 - q `<body bgcolor="black">`
- n **Background**
 - q `<body background="index_files/mybackground.jpg">`
 - q `<body background="http://www.mtholyoke.edu/~xli/index_files/mybackground.jpg">`

HTML Background: how to choose your background?

- n Will the background image increase the loading time too much?
- n Will the background image look good with other images on the page?
- n Will the background image look good with the text colors on the page?
- n Will the background image look good when it is repeated on the page?
- n Will the background image take away the focus from the text?

HTML: align image within the text

- n `<p>An image in the text </p>`
- n Put image before, in the middle of or after the text.
- n Top alignment, middle alignment or bottom alignment

Images: Let the image float

- n Let an image float to the left or right of a paragraph.
- n `<p> A paragraph with an image.</p>`
- n The align attribute of the image is set to "left". The image will float to the left of this text.

Images: Make a hyperlink of an image

- n You can use an image as a link.
- n `<p> </p>`

Images: adjusting the size of an image on screen

- n You can make a picture larger or smaller by changing the values in the "height" and "width" attributes of the `` tag.
- n Examples:
 - q `<p></p>`
 - n `<p></p>`
- n The values are in pixels

Representing Images

- n Bit map techniques
- n Pixel: short for "picture element"
 - q 1 bit for 1 pixel
 - n A black and white image is encoded as a long string of bits representing rows of pixels in the image.
 - n The bit is 1 if the corresponding pixel is black, 0 otherwise.
 - q 8 bit for 1 pixel
 - n For white and black photos, allows a variety of shades of grayness to be represented.
 - q 3 bytes for 1 pixel
 - n For color images. **RGB encoding**, 1 byte for the intensity of each color
 - n Red(255, 0, 0), Green(0, 255, 0), Blue(0, 0, 255)

Questions:

- n How many colors can be represented using RGB encoding?
- n If an image has 1024 x 1024 pixels, how many bytes are needed to represent the image?

Compressing Images

- n GIF: (Graphic Interchange Format)
 - q Dictionary encoding system
 - q Reducing the number of colors assigned to 256
 - q The red-green-blue combination for each of these colors is encoded using 3 bytes
 - q 256 encodings stored in a table (palette)
 - q Each pixel can be represented by a single byte whose value indicates which of the 256 palette entries represents the pixel's color.
 - q Lossy compression system

More about GIF

- n The GIF format
 - q Excellent at compressing areas of images with large areas of the same color
 - q The main option for putting animation online
 - q GIF files support a maximum of 256 colors
 - q Used for logos, line drawings and icons.

Compressing Images

- n JPEG: (Joint Photographic Expert Group)
 - q Several methods of image compression.
 - q JPEG compression analyzes images in blocks of 8X8 pixels in size and selectively reduces the detail within each block.
 - q Compresses color images by a factor of at least 10, often as much as 30 without noticeable loss of quality.

More about JPEG

- n The JPEG format
 - q The internal compression algorithm of the JPEG format, throws out information
 - n Once you lower the quality of an image, and save it, the extra data cannot be regained.
 - n So be sure to save the original.
 - q JPEG files support 16.7 million colors
 - q Used on photographic images, and images which do not look as good with only 256 colors.

Questions:

- n How many colors can be represented using RGB encoding? ($256 \times 256 \times 256 = 16.7 \text{ M}$)
- n If an image has 1024 x 1024 pixels, how many bytes are needed to represent the image? (3MB)
- n How many bytes are needed for the image if using GIF format?
- n How many bytes are needed for the image if using JPEG format?

Image Size and File Size

- n **Image size:**
 - q The number of pixels in the image.
 - q Identified by the width and height of the image as well as the total number of pixels in the image.
 - q A 2048X1536 or a 3.1 Megapixel image
 - n The image is 2048 pixels wide and 1536 pixels high, contains 3,145,728 pixels
- n **File size:**
 - q Number of bytes to store the image
 - q Can reduce the file size by **compressing** the image
 - q Can choose to store your image as a JPEG file and choose the amount of compression you want before saving the image.

What does image resolution mean?

- n Image resolution is the fineness of detail you can see in an image
- n Usually measured in pixels per inch (ppi-used when referencing screen images) or dots per inch (dpi-used in printing because printers print dots).
- n A computer monitor has a finite number of **pixels per inch (72)** available.
 - q A 72-dpi image will look exactly the same as a 3000 dpi image on the screen.
 - q For printing, 300 pixels per inch might be appropriate, but
 - q For screen display in a web browser 72 pixels per inch is better and requires far less transmission time.

Resize An Image -- Example

- n An image of 2048x1536 pixels. If the resolution is 300 pixels/inch,
 - q then the **document (print) size** of the image is 6.827 inches x 5.12 inches.
 - q File size of the image is 761KB (JPEG format)
- n If we keep the document size and set the resolution as 150 pixels/inch,
 - q The revised image will have 1024 x 768 pixels.
 - q The file size is probably 190KB.
- n What if we change the resolution to 72 pixels/inch?

Photoshop Elements: tools to edit images

- n Crop the image
 - q Cut off the unwanted parts.
- n Resize the image
 - q Reduce the number of pixels by changing resolution
- n Save files as GIF or JPEG
- n Create images using Photoshop elements
 - q Build a button and insert text.

Photoshop Elements: tools to edit images

- n Change the background of a picture
 - q Select one item in a picture, move it around or add it to another picture.
 - q
- n Deal with imperfections in images (like drops in a picture)
 - q The "Dust & Scratches" filter works by blurring adjacent pixels together.
 - q Apply it on certain regions to keep the detail in other regions.

Questions:

- n What is the image size of an image?
- n What is the file size of an image?
- n What is the document size of an image?
- n What is image resolution?

More Questions:

- n What is the difference between GIF and JPEG?
- n When you enlarge the size of an image on the screen (in your web page), will it increase the loading time for a web browser?
- n Explore Photoshop Elements for the tools to modify/improve your image (**LAB2**).

Announcements:

- n **Lab2 this week (Wednesday/Thursday)**
 - q Modify pictures with Photoshop Elements and insert images in web pages
- n Next Lecture: Perl (Monday April 2nd)
- n **No class on Wednesday (March 28th)**