HTML5 and CSS3 Introductory Second Edition

Unit G

Inserting and Working with Images

Objectives

- Evaluate image file types
- Insert images
- Insert a background image
- Mark images as figures
- Create a figure caption
- Use images as links



Objectives (continued)

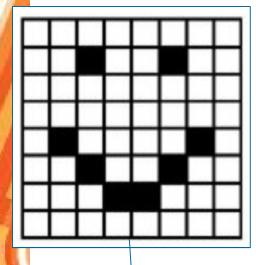
- Create an image map
- Define additional hotspots
- Add a favicon and touch icons



Evaluate Image File Types

- Images can be added to a web page by linking to a separate file
- Different image file types:
 - Bitmap image: represented as a grid of dots of specified colors
 - e.g., JPG, GIF, and PNG
 - Vector graphic: encoded as geometric shapes
 - e.g., SVG

Bitmap Images (storing images on a computer)



PICTURE

- Used on cameras, phones, online
- Laid out in grid format
- A pixel (Picture Element)
- Zoom too far (gets poor quality)

How is the image formed?

These bitmap are made-up of a matrix of individual dots, also known as pixels, which all have their own color.

Bitmap







Vector Graphics

- Created in graphics packages like DrawPlus, PhotoShop and Illustrator

 Advantage: less space on your computer. It can be scaled down without losing any quality—perfect for logo

Which one to use? Bitmap or vector graphics.



- Common file formats:
 - JPG (JPEG): optimized for many colors
 - photographs
 - ➢ GIF: optimized for areas with defined borders, few colors
 - Line drawings
 - Supports transparent pixels
 - PNG: allows user to specify opacity level for areas
 - SVG: no decrease in quality when scaled



- Bitmap should be created and formatted with its use on web in mind
- Pronounced as "bump", "B-M-P" or simply a "bitmap image".
- File extension is .bmp
- JPEG/GIF (also bitmaps) formats use image compression.
 - Created and displayed at set
 - 1. resolution
 - 2. size



Resolution: how close dots should be in the output

- Measured in dots per inch (dpi)
- High resolution = more detail, large file size

Calculate number of pixels in an image:

2048×1536 = 3,145,728 pixels or **3.1** megapixels



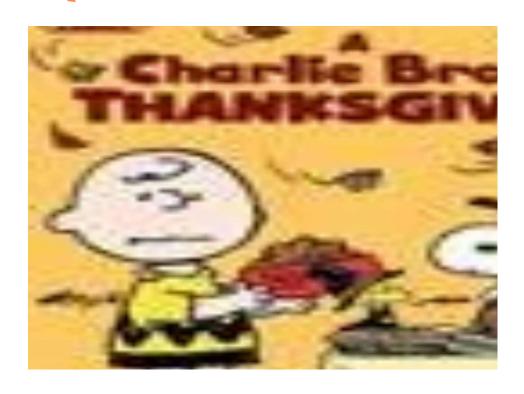
- Size: length and width of image
 - Pixels: individual dots that make up the image
 - Bitmaps display optimally at native size
 - Scaling affects download time and image quality



Familiar?



Adjusting the size of low pixels shows low quality image.





Class Activities

Think whether it is possible to maintain the image quality while changing only the size OR resolution of an image. Can they maintain the image quality by changing both the size and the resolution of the image?

Insert Images

- img element: used to add an image to HTML document
 - One-sided element
 - Includes two attributes:
 - src: path and filename to the image file
 - alt: text to display if image is unavailable

Demo Example

http://98.129.169.21:82/mcastro/insert_image_alt.html

```
<!DOCTYPE html>
<html>
<html>
<body>
<h2>Spectacular Scenery</h2>
 If the image is found, it displays the image.
<img src="images/mountain.jpg" alt="Nice View" style="width:304px;height:228px;">
<br/>
<br/>
<h2>Spectacular Scenery</h2>
<h2>Spectacular Scenery</h2>
 If the image is NOT found, it displays the "alt" means alternate text.
The alternate text is "I can't find the nice view."
<img src="mountain.jpg" alt="Can't Nice View" style="width:304px;height:228px;">
</body>
</html>
```

Image was not found so it displays the alternate.

If the image is found, it displays the image



Spectacular Scenery

If the image is NOT found, it displays the "alt" means alternate text. The alternate text is "I can't find the nice view." Can't Nice View



Insert Images (Default Display)

HTML Block and Inline Elements

- The default display value for most elements is block or inline. An image tag is one of the InLine elements, not Block Elements.
- Block-level elements: div, h1-h6, p, form
- InLine-Level elements: span, a, img
- NOTE: The difference between <div>
 and is that div is block while
 span is InLine element.



InLine vs Block Demo

http://98.129.169.21:82/mcastro/insert_inline_vs_block_elements.html

Spectacular Scenery (I'm an InLine Tag)

If the image is found, it displays the image. If it's not found, it displays the alternate text.

IMG tag is an "InLine" element. An inline element does not start on a new line and only takes up as much width as necessary.

SEE THE IMAGE. You see them SIDE BY SIDE because it DOES not start a new line, but it only takes as much as width as necessary.



Can't Nice View

DIV is a block, while IMG is an InLine





Insert Images (continued)

- Width and height attributes:
 - Not required
 - Can be used to specify the native dimensions of an image
 - Allow a visual user agent to maintain blank space preserving the layout of the web page
 - > Always in pixels, no need to specify units

```
<img src="prof.gif" alt="Hehehe" width="42" height="42">
```

Width and height are always in pixels.

Insert Images (continued)

img elements and display

NOTE: The width attribute specifies the width of an image, in pixels.



Text-Baseline

http://98.129.169.21:82/mcastro/image_text_baseline.html

A paragraph of text is aligned with the bottom of the text, known as the text baseline.

I'm on a text base-line. (DEFAULT)



image with a default alignment.

I'm NOT on a text base-line.





image with a text-top alignment.

I'm NOT on a text base-line.



image with a text-bottom alignment.



Recommended height/width





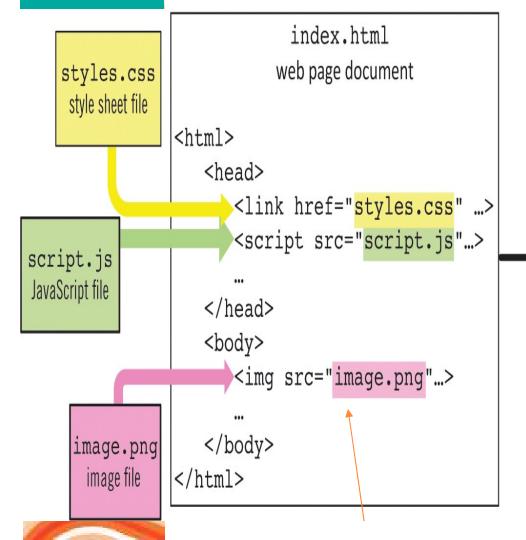
It is recommended to use the height and width attributes of the img element to specify the native dimensions of an image. This ensures that if a user agent cannot display the image, it can still maintain a corresponding amount of white space and thus preserve the layout of the web page.

```
img {
  float: left;
  width: 80px;
  height: 80px;
}
```

CSS.

An image with a height and a width of 80 pixels.

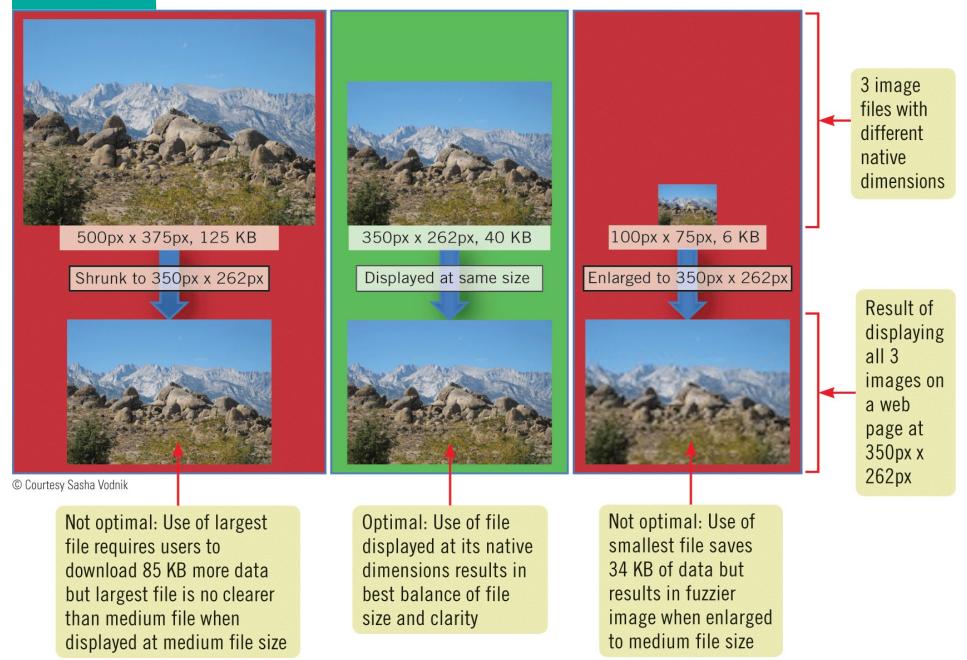
Linking Image, CSS, JavaScript





Relative Path

Image Size





Critical Thinking

Suppose that you are creating a website for an organization that wants the site to include a photo gallery containing hundreds of high resolution photographs. What would happen to the page download time if you include all the photographs on one page, in their native size and resolution? What can you do to change the download time of such a page?



Insert a Background Image

- Image can be background of web page or element
 - Specify path and filename as value for background property
 - Important to maintain contrast between background and text
 - Specify background color in case image not available or not supported

Insert a Background Image (continued)

 Code for background color and image

```
/* main content */
article {
    background-color property name changed to background
    to serve as fallback for declaration that follows
    padding: 1 *tem;
    background: #7eccec;
    background: url("images/lake.jpg");

background declaration added for background:

background image
```

Nested div element has a background color of ivory to provide contrast for text



Background image repeated vertically and horizontally to cover entire article element

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Demo

http://98.129.169.21:82/mcastro/background_image_no_repeat.html

```
<! DOCTYPE html>
    -<html>
    -<head>
    =<style>
      body {
          background: #00ff00 url("images/earth.jpg") no-repeat fixed center;
          background-color: green;
     -</style>
10
     -</head>
    cbody>
      <h1>Hello Earth!!! ....NO Repeat Center</h1>
13
     </body>
14
     L</html>
15
```





Insert a Background Image (continued)

- Tiling: displaying images repeatedly
 - Used by user agents to fill screen space
- Examples of syntax of background property:
 - background: url("url goes here")
 - background-color



Insert a Background Image Tiling Demo (continued)

http://98.129.169.21:82/mcastro/background_image_tiles.html



Background Property

property	specifies
background-attachment	whether a background image scrolls with document content (scroll, the default), scrolls only with element content (local), or does not scroll (fixed)
background-blend-mode	how overlapping background images blend with each other and with background color, using one or more keywords
background-clip	whether a background image extends only behind element content (content-box), up to the inner edge of the border (padding-box), or to the outer edge of the border (border-box, the default)
background-color	a background color using a color keyword or a hex, RGB, RGBa, HSL, or HSLa value
background-image	an image file to use as the background for an element with the syntax url("path/filename")
background-origin	whether a background image starts only behind element content (content-box), at the inner edge of the border (padding-box), or at the outer edge of the border (border-box, the default)
background-position	the position within an element of the edges of a background image using a combination of values and keywords
background-repeat	whether a background image is repeated horizontally, vertically, both, or neither, using one or more keywords
background-size	the size of a background image with keywords, lengths, or percentages
background	values for one or more properties related to background listed in a specific order

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Mark Images as Figures <figure>

- figure element: used to mark images that add information to a web page
 - Semantic element
 - Enables user agent to link figure element contents to another location without affecting information conveyed
- Mark as a figure if the page would be complete even if the figure is not shown



Mark Images as Figures (continued)

Code for fig and img elements

```
<h3 id="reed">Reed Room</h3>
39
                <figure>
                   <img src="images/reed.jpg" width="370" height="392" alt="a carpeted room</pre>
                   with a high sloping ceiling, two small bright windows, and a two-person
                   bed with a bedside table and lamp on each side">
                </figure>
                This first-floor room looks out over the reeds on the edge of the lake and
                the water beyond. 
                1 gueen bed and 1 twin bed.
                <h3 id="sun">Sun Room</h3>
                <figure>
                   <img src="images/sun.ipg" width="370" height="278" alt="room with a</pre>
50
                   hardwood floor, bright windows on two sides, and a two-person bed with a
                   bedside table and lamp on each side">
                </figure>
53
                With windows on three sides, the sunlight in this second-floor room
                supports a large selection of houseplants.
                1 full bed.
                <h3 id="tree">Treehouse</h3>
                <figure>
                   <imq src="images/tree.jpg" width="370" height="247" alt="a large room with</pre>
                   a hardwood floor, a tall window overlooking trees, a two-person bed with a
                   single bedside table, and a padded chair next to the window">
51
                </figure>
                A winding staircase takes you to your own private getaway at the top of
```



<figure> demo

http://98.129.169.21:82/mcastro/figure.html



If the image is not found due to deletion or slow internet (throughput). It displays the text belo

Earth is the third planet from the Sun and the only object in the Universe known to harbor life





<figure> demo supports multiple images.

http://98.129.169.21:82/mcastro/figure_multiple_image









98.129.169.21:82/mcastro/figure_multiple_images.html

To see favorites here, select 🏚 then ☆, and drag to the Favorites Bar folder. Or in

Figure 1: Earth and Mars mages





<figure> demo Used to markup a poem.

http://98.129.169.21:82/mcastro/figure_poem.html



Depression is running through my head, These thoughts make me think of death, A darkness which blanks my mind, A walk through the graveyard, what can I find?....

Depression. By: Darren Harris

web.

Using someone's else images.

Be sure they always have permission to use any images they obtain for a website. Explain that even in their own images, if there are people in the images, they should be sure to have permission to post those images to the

All Images Volces Neve Eachs More Sattings Tods

walkpaor new darge return beauty not good morning One Berthday name thendaring remarks and particles and pa



Create a Figure Caption

- A figure caption provides context, explantion, or credit.
- A figure caption is different than alt text.
 - alt text should describe an image without adding additional information
 - Figure caption text can add information



Create a Figure Caption (continued)

 Use the figcaption element nested in a figure element as shown below

```
figcaption element nested within figure element to provide caption for sibling img element (ass="pullquote">

**Contentstart">

**Contentstart"

**Contentstart

**Contents
```

- title attribute specifies additional image information
 - Browsers display as floating text during mouse over or alt text when not specified

Figure With Caption < figcaption >

http://98.129.169.21:82/mcastro/figure_with_caption.html



```
<!DOCTYPE html>
-<html>
-<head>
 <!-- Just a figure -->
cbodv>
<fiqure>
   <img
   src="images/earth.jpg"
   alt="An awesome earth.">
 </figure>
 <q>>
 <!-- Figure with figcaption -->
<fiqure>
   <imag
   src="images/earth.jpg"
   alt="My wonderful world- earth.">
   <figcaption>Fig 1. Earthlings</figcaption>
 </figure>
 <q\><q>
 <!-- Figure with figcaption -->
<figure>
   <img
   src="earth.jpg"
   alt="My wonderful world- earth.">
   <figcaption>Fig 1. Earthlings</figcaption>
 </figure>
 <q\><q>
</body>
</html>
```



Clues



Use Images as Links

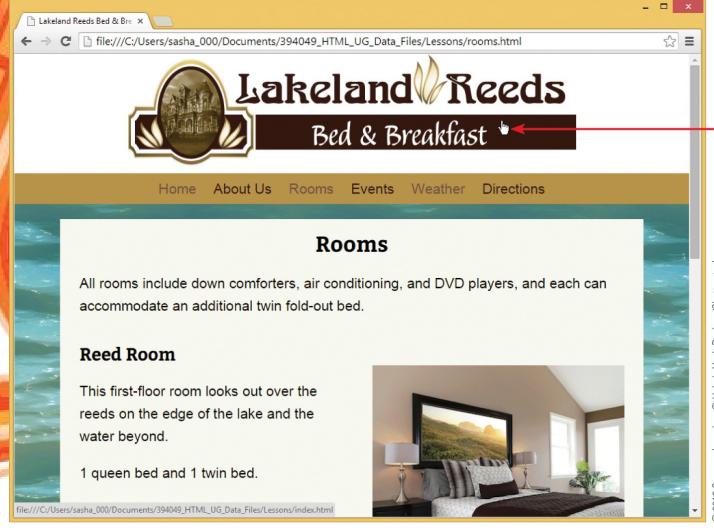
- Images can be used as links
 - Enclose img element within an a element
- Browsers typically add border around linked image to display link state
 - Use pseudo-classes to modify link state colors
 - Use CSS border property to remove the border

Use Images as Links (continued)

 Examples of code for creating an img element as a link

Opening and closing <a> tags enclose tag

```
Opening and closing <a> tags enclose <img> tag e
```



Pointer changes to pointing hand over logo image, indicating that the image is a link

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Create an Image Map

- An <u>image map</u> is HTML code associated with an image that specifies one or more shapes using sets of coordinates and provides a link target for each shape
- Each linked shape is known as a hotspot
- Shape values can be rect, poly, or circle



Create an Image Map (continued)

- Coordinates are measured from the top-left corner
- Use third-party software to generate the coordinates, i.e., http://imagemapgenerator.dariodomi.de/#
- Code for rect shape in an image map

```
usemap attribute of attribute of img element specifies name value of map element to use as image map element to use as image map

usemap attribute of class="imagemap">

img element specifies name value of map element to use as image map

usemap "#roomsmap">

map element contains one or more area elements for hotspots

map name="roomsmap">

area element with shape value of rect creates a rectangular hotspot

area element with shape value of rect creates a rectangular hotspot
```

Demo Image Map



Coordinates are measured from the top and left edges of the image. It's common to generate area elements using design software that outputs the code based on the shapes you draw.

http://imagemap-generator.dariodomi.de/#

DEMO site:

http://98.129.169.21:82/mcastro/image_map_demo_html

```
Click on the parts of the globe to access government website.
<img src="images/earth.jpg" width="300" height="300" alt="Government Website" usemap="#governmentmap">
<img src="images/earth.jpg" width="300" height="300" alt="Government Website" usemap="#governmentmap">
<i!-- Use http://imagemap-generator.dariodomi.de/# to generate coordinate-->
cmap name="governmentmap">
<area shape="reot" coords="54,45,102,66" alt="Canada" href="https://www.usa.gov/">
<area shape="reot" coords="46,71,101,107" alt="United States" href="https://www.usa.gov/">
<area shape="reot" coords="46,71,101,107" alt="United States" href="https://www.usa.gov/">
<area shape="circle" shape="poly" coords="111,199,166,207,131,220,139,196" href="https://www.argentina.gob.ar/">
<area shape="poly" coords="50,113,79,139,96,111" alt="Mexico" href="https://www.gob.mx/presidencia/en">
```



Class Activities

Name examples of when an image map would be an asset to a web page. What type of image would benefit from an image map? Why? What type of image would be less like to benefit from an image map? Why?



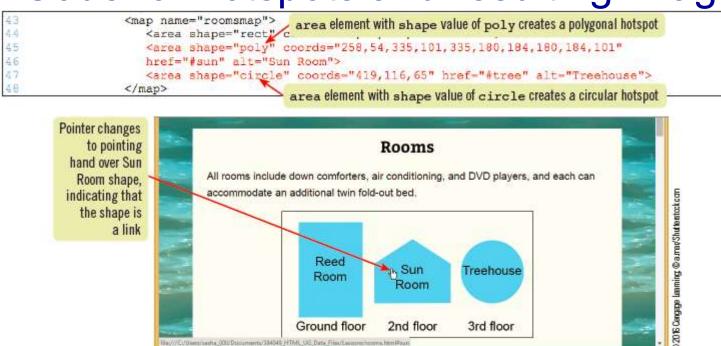
Define Additional Hotspots

- rect coordinates based on top-left corner and bottom-right corner of shape
- poly coordinates based on each vertices in the shape
- circle coordinates based on center point and radius of the circle



Define Additional Hotspots (continued)

Code for hotspots and resulting image



- 1. Rectangle: Set coordinates for the top left corner and the bottom right corner for the coords attribute.
- 2. Circle: specify a value of circle for the shape attribute and then specify the coordinates for the center point followed by the radius for the coords attribute.
- 3. Polygon: the specify a value of poly for the shape attribute and then specify the coordinates for each of the shape's vertices for the coords attribute.

Class Activities

Using a graphic design program versus map generator software. What are the advantages of each? What are the disadvantages?: Why would they use one over the other?.



Insert a Favicon (short for favorite icon)

- Favicon: icon associated with web page in the address bar and on bookmarks
 - > 16 x 16 pixels
 - Saved in .ico format
- To specify for all pages of website, place in root folder for the site
- To specify for individual page use link element



Insert a Favicon and Touch Icons (continued)

- Touch icon: displayed on users screen when user creates a shortcut on a mobile device
- Characteristics of favicons and touch icons shown below

platform	format	dimensions	link tag	
desktop (all)	.ico (all browsers) .png (all browsers except IE10 and earlier)	16px × 16px (standard resolution) 32px × 32px (high resolution) 48px × 48px (Taskbar)	<pre><link href="images/favicon.ico" rel="shortcut icon"/></pre>	
Apple iOS	.png	180px × 180px	<pre><link href="images/apple-touch-icon.png" rel="apple-touch-icon"/></pre>	©2016 Cangage Leaming
Google Android	.png	192px × 192px	<pre><link href="images/android.png" rel="icon" sizes="192x192"/></pre>	



Insert a Favicon and Touch Icons (continued)

Code for favicon and resulting page

Customized favicon from favicon.ico file







Insert a Favicon and Touch Icons (continued)

Code and examples of touch icons

https://www.favicon-generator.org/ to generate different icons/images.

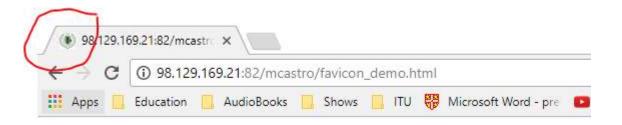






Demo

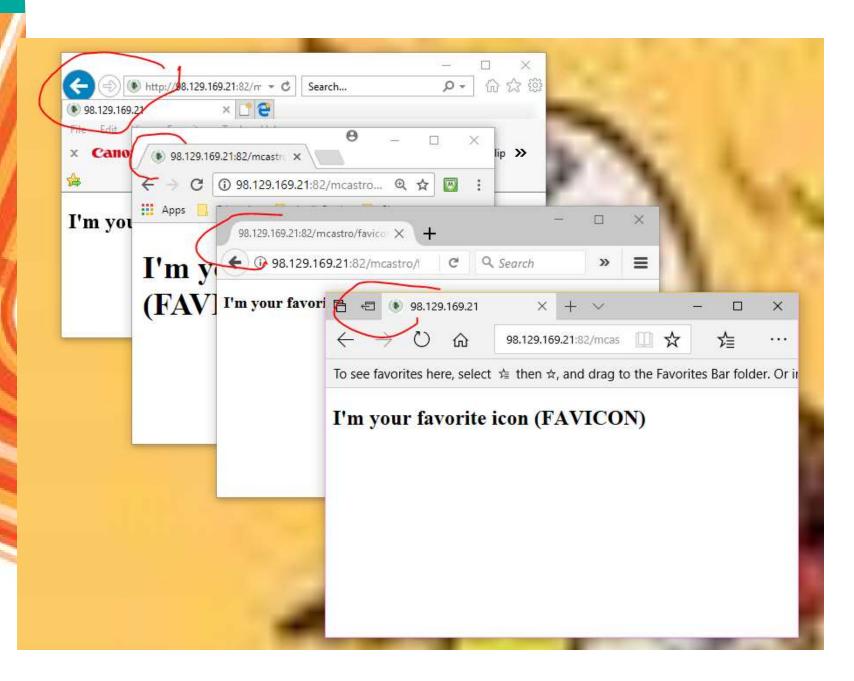
http://98.129.169.21:82/mcastro/favicon_demo.html



I'm your favorite icon (FAVICON)

- 1. You can use any images.
- 2. Notice the size 16x16.
- 3. Images can be stored anywhere (locally/remotely)
- 4. Use https://www.favicon-generator.org/ to generate different format of images including favicon.

Browser Supports





Summary

- Bitmap images: represented as grid of dots of specified colors
- Vector graphic: encoded as geometric shapes
- Quality of image is determined by resolution and size
- Image types include JPEG, PNG, GIF, and SVG

Summary (continued)

- Use one sided img element to insert image
 - Uses src and alt attributes
- background element used to insert a background image, which browsers tile by default
- figure element: used to mark images that add information to web page

Summary (continued)

- figcaption element can be used to include figure caption, figcaption element is nested within a figure element
- title attribute can also be used to provide additional information about an image
- Images can be used as links when enclosed in an a element

Summary (continued)

- Image maps can be used to link shapes (called hotspots) in an image to different targets
- Favicon is an icon associated with web page and is displayed in the address bar
- Touch icons displayed when a user saves a shortcut to a mobile device