New Perspectives on Creating Web Pages with HTML

Creating a Multimedia Web Page

Tutorial Objectives

- Work with external and embedded multimedia files
- Learn about the principles of sound and video clips
- Work with the **<embed>** tag to enhance a Web page with sound and video
- Provide tags for browsers that do not support embedded objects

Tutorial Objectives Continued

- Learn how to create a background sound with Internet Explorer
- Use the **<applet>** tag to add a Java applet to a Web page
- Create a scrolling marquee with the **<marquee>** tag

Working with Multimedia

- One of the most important and useful features of the World Wide Web is the ability to present information through the use of sound and video.
- One of the primary goals when using multimedia is to create media clips that are compact in size without sacrificing quality.
- When creating Web pages that include multimedia elements, you have to consider several factors, not the least of which is the issue of **bandwidth**.

Bandwidth

- **Bandwidth** is a measure of the amount of data that can be sent through a communications circuit each second.
  - bandwidth values range from slow connections, such as phone lines, which can transfer data at a rate of 58.6 kbps to high speed direct network connections capable of transferring data at several megabytes per second
- Large sound and video files cause the most trouble for users with low-bandwidth connections.

External Media

- With **external media**, the sound or video file is accessed through a hypertext link.
- Using an external file, users can choose to retrieve the multimedia clip.
  - useful in situations where a user has a low-bandwidth connection and wants the choice of whether or not to download a large multimedia file
- External media is intended for users with low-bandwidth Internet connections i.e. phone lines.

Inline and Embedded Media

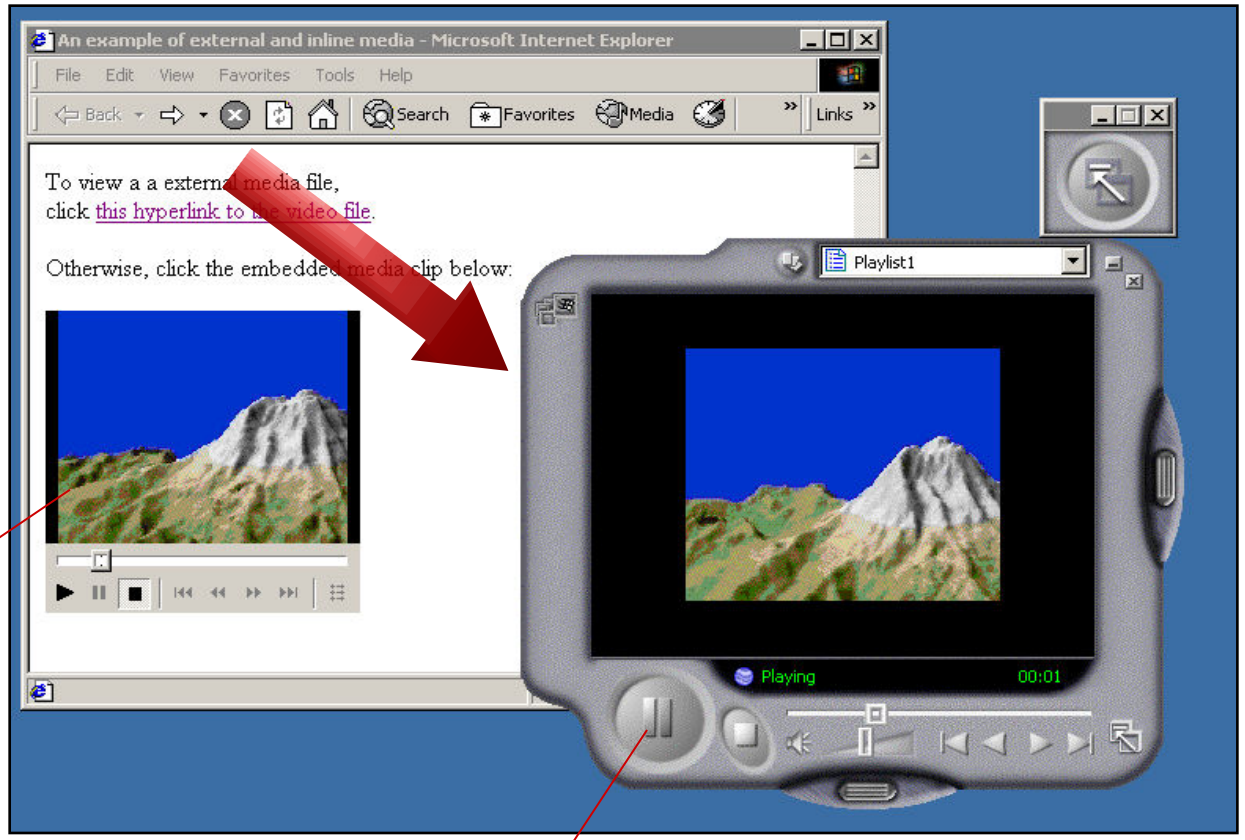
- **Inline media** clips are placed into the Web page itself as embedded objects.
  - a downside of using inline media is that the user is forced to wait for the clip to be retrieved by the browser
  - inline media is intended for users with access to the Web page using a high-speed connection
- An **embedded media** clip works like an inline image and can be played within the Web page itself.

Streaming Audio and Video

- Another popular format for sound and video is "**streaming**" audio and video.
- A streaming media file is played as it is downloaded by the Web browser.
  - this means you don't have to wait before viewing the media clip
- There are several different streaming audio and video formats. The most popular streaming format for audio files is **NetShow**, **Stream Works**, and **RealAudio**, a companion product is RealVideo.

Inline and External Media

This figure shows multimedia can be added to a Web page in one of two ways: as external media or inline media.

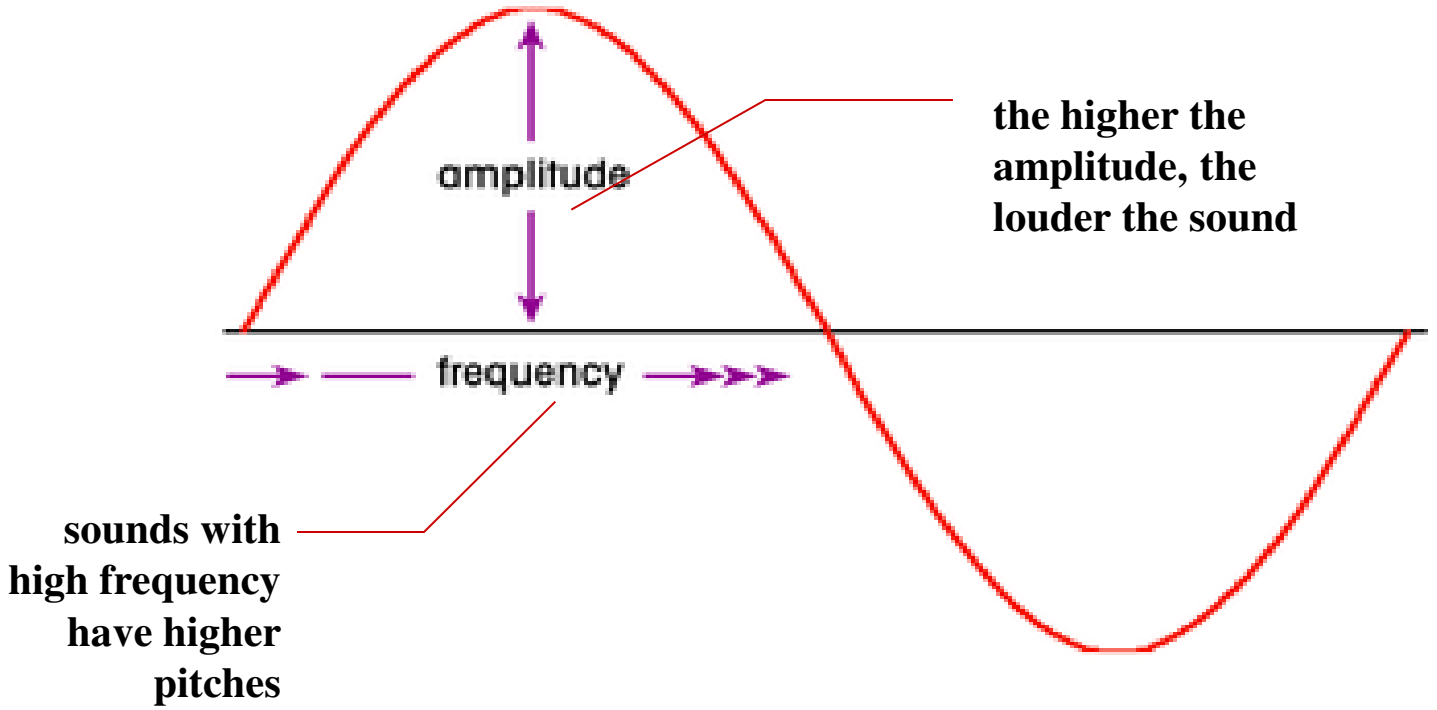


Understanding Sound Files

- Convert sound from the analog form we hear with our ears to the digital form that is stored in files on our computers.
- There are two components to the sound wave: **amplitude** and **frequency**.
  - the ***amplitude*** is the height of the sound wave, and it relates to the loudness of the sound
  - the ***frequency*** is the speed at which the sound wave moves, and it relates to the sound pitch

A Simple Sound Wave

This figure shows there are two components to the sound wave: amplitude and frequency.



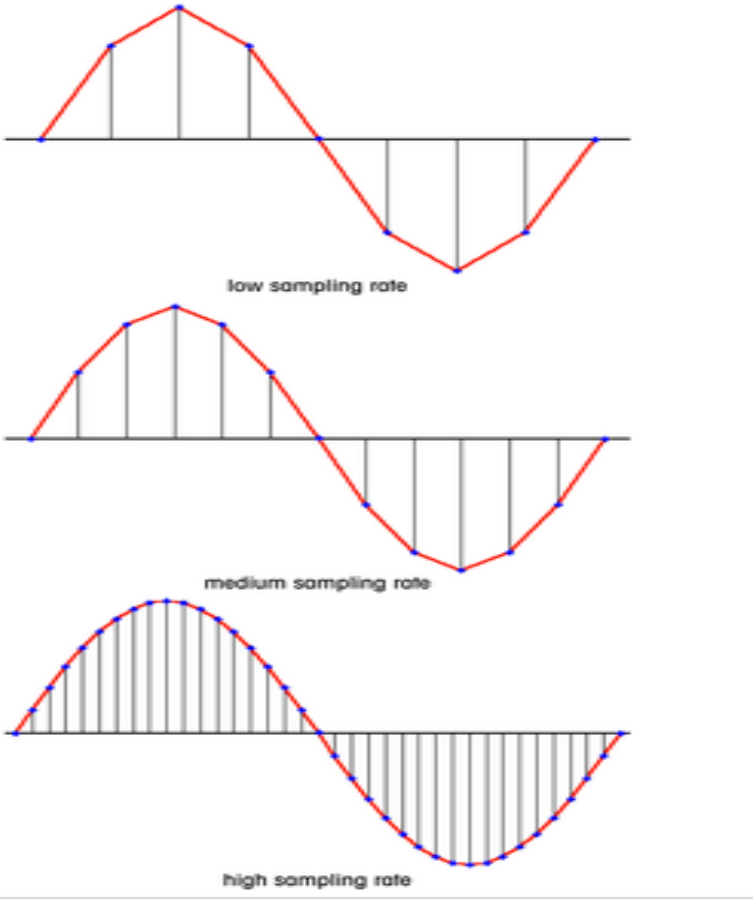
Sampling Rate

- A sound wave is a continuous function.
- To convert it to a form that can be stored as a digital sound file, your computer must record measurements of the sound at discrete moments in time.
  - each measurement is called a **sample**
  - the number of samples taken per second is called the **sampling rate**, which is measured in kilohertz (KHz)
  - the most commonly used sampling rates are 11 KHz, 22 KHz, and 44KHz

Approximating a Sound Wave with Different Sampling Rates

This figure shows a higher sampling rate means that more samples are taken per second, resulting in a digital sound that more closely matches the analog sound.

The trade-off in increasing the sampling rate is that it increases the size of the sound file.

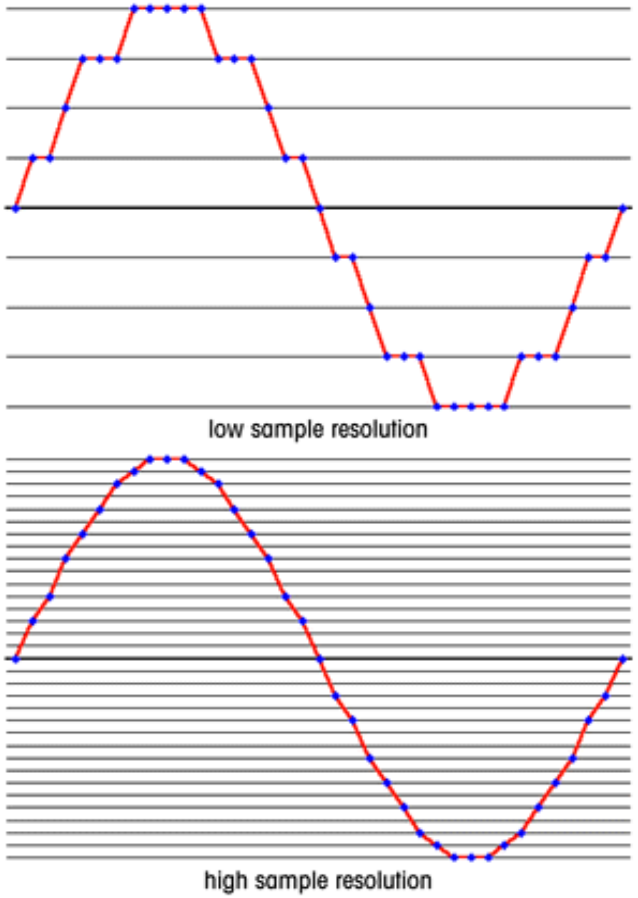


Sample Resolution

- A second factor in converting a sound to a digital form is the **sample resolution**.
- Sample resolution indicates the precision in measuring the sound within each sample.
- There are three commonly used sample resolution values 8-bit, 16-bit, and 32-bit.
- For most applications, saving sound files at the 16-bit resolution provides a good balance of sound quality and file size.

Approximating a Sound Wave at Different Sample Resolutions

This figure shows increasing the sample resolution creates a digital sound file that represents the analog sound in greater detail but, once again, results in a larger file.



Channel Size

- A final choice is to determine the number of channels to use.
- Typically, the choice is between **stereo** or **monaural** (mono) sound.
- In some special situations you may want to add extra channels.
- Stereo is a richer sound than mono, however, it doubles the size of the sound file.

Sampling Rate and Sample Resolution as Related to Sound Quality

This figure shows how sampling rate, sample resolution, and channel size relate to sound quality in terms of everyday objects.

TITLE	URL	DESCRIPTION
CoolEdit	http://www.syntrillium.com	Sound editing software for Windows
Shareware Music Machine	http://www.hitsquad.com/smm/	Links to audio software on the Web
Sonic Control	http://www.soniccontrol.com/	Links to audio software on the Web
The Sonic Spot	http://www.sonicspot.com	Links to audio software on the Web

Your telephone provides the poorest sound quality, and this is a reflection of the low sampling rate and sample resolution as well as the monaural sound. A CD or DAT player provides much higher sound quality at a higher sampling rate and sample resolution. These players also support stereo sound, and in some cases, additional sound channels.

Sound Files

- To create a sound file, a sound card, speakers, and microphone, and sound-editing software are needed.
- There are several sound editors available on the Web that allows you to:
  - modify the sampling rate, sample resolution, and number of channels
  - to add special sound effects, remove noise, and give you the ability to copy and paste sounds from one sound file to another

Sound Editing Software on the Web

This figure lists some of the sound editors available on the Web.

TITLE	URL	DESCRIPTION
CoolEdit	http://www.syntrillium.com	Sound editing software for Windows
Shareware Music Machine	http://www.hitsquad.com/smm/	Links to audio software on the Web
Sonic Control	http://www.soniccontrol.com/	Links to audio software on the Web
The Sonic Spot	http://www.sonicspot.com	Links to audio software on the Web

Sound File Formats

- Several different **sound formats** are in use on the Web.
- The various formats are used by different operating systems and provide varying levels of sound quality and sound compression.
  - **sound compression** is the ability to reduce the size of the digital sound file

Sound File Formats

This figure lists some of the sound file formats.

FORMAT	DESCRIPTION
AIFF/AIFC	Audio Interchange File Format. Sound files with this format usually have an .aiff or .aif filename extension. AIFF was developed by Apple for use on the Macintosh operating system. AIFF sound files can be either 8 bit or 16 bit, can be mono or stereo, and can be recorded at several different sampling rates.
AU	Also called μlaw (mu-law) format. Sound files with this format usually have an .au filename extension. One of the oldest sound formats, it is primarily used on UNIX workstations. AU sound files have 8-bit sample resolutions, use a sampling rate of 8 KHz, and are recorded in mono.
MIDI	Musical Digital Interface. MIDI files cannot be used for general sound recording like other sound formats, but are limited to synthesizers and music files. The MIDI format represents sound by recording each note's pitch, length, and volume. MIDI files tend to be much smaller in size than other sound formats.
MPEG	Moving Pictures Expert Group. A format primarily used for video clips, though occasionally MPEGS are used for audio files. MPEG files are usually small due to the MPEG file compression algorithm. Because of their small size, MPEGs are most often used for transferring whole music recordings. The most recent MPEG standard is MP3.
RealAudio	Another popular sound format on the Web, RealAudio files are designed for real-time playing over low- to high-bandwidth connections. RealAudio files tend to be much smaller than AU or VAV files, but the sound quality is usually not as good.
SND	The SND format is used primarily on the Macintosh operating system for creating system sounds. This format is not widely supported on the Web.
WAV	WAV sound files were developed for the Windows operating system and are one of the most common sound formats on the Web. WAV files can be recorded in 8-bit or 16-bit sample resolutions, in stereo or mono, and under a wide range of sampling rates. WAV sound files usually have the .wav filename extension.

Sound File Formats

- **WAV** is one of the most common sound formats on the Web.
- For Macintosh systems, consider using either **AIFF** or **SND** files.
- Web sites designed primarily for UNIX workstations often use the **AU** sound format.

MP3 Format

- The most common sound file format on the Web is **MP3.**
  - a version of the MPEG format that compresses audio files with minor impact on sound quality
- The MP3 format uses an open standard.
  - allowing for greater innovation from developers creating MP3-related software
- MP3 has no security features, making it easier for users to share MP3 files and to attach them to e-mail messages.
- MP3 `is readily available in portable music players and car stereos.
- Users can convert their MP3 files into WAV format files and burn them onto CDs.

MPEG Format

- For larger sound files, such as recordings of complete songs or even concerts, **MPEG** is the preferred sound format.
- The MPEG format has the ability to greatly compress the size of the sound file.

Sound Formats

- Sound formats are generally classified into two types **nonstreaming** and **streaming**:
  - a **nonstreaming** sound format must be completely downloaded by the user before it can be played
  - **streaming media** is when media clips, including both sound and video, are processed in a steady and continuous stream as they are downloaded by the browser
- RealAudio, MP3, WAV, and most other sound formats can now be streamed

MIDI Format

- **MIDI (Musical Instrument Digital Interface)** is a standard for synthesizers and sound cards.
- MIDI reduces sound to a series of values that describe the pitch, length, and volume of each note.
- MIDI is a widely supported standard.
- MIDI files are much smaller than other sound formats.
- MIDI is limited to music and cannot be used for general sounds, such as speech.

Sound Archives on the Web

Many sites on the Web maintain archives of sound clips that can be downloaded. This figure shows a few of these sites. Be aware that some sound clips have copyright restrictions.

TITLE	URL	DESCRIPTION
Broadcast.com	http://www.broadcast.com	A collection of live and archived recordings that use streaming media
Historic sound clips	http://www.webcorp.com/sounds/	Sound clips from historical figures and events in history
Index of sounds	http://www.sunsite.sut.ac.jp/multimed/sounds/	An archive of sound clips broken down into categories
MP3.com	http://www.mp3.com	Resource for news and information about MP3s, including links to MP3 archives
MSU Voice Library	http://www.lib.msu.edu/vincent/	Selections from the G. Robert Vincent Voice library at Michigan State University
Sound America	http://www.soundamerica.com	An archive of almost 30,000 sound clips broken down into categories

Linking to a Sound File

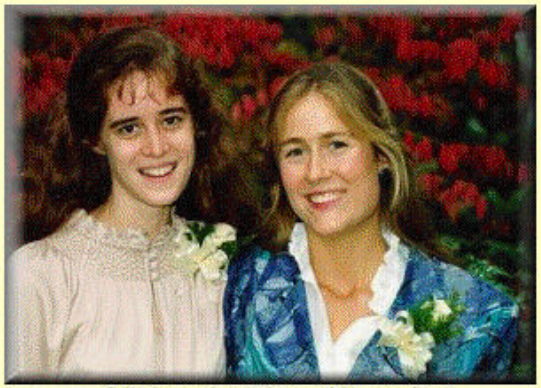
- Media clips tend to be large, it's a good idea to include information about their format and size in the Web page.
- When a browser encounters a link to an external file, it checks to see if there is a program installed to handle the file.
  - these programs are called **helper applications**, because they help the browser interpret and present the file
  - if the browser can not display the file, it might display an error message and prompt the user to download one from the Web

Playing a Multimedia Clip

This figure shows a hypertext link to a MP3 file.

If you are asked to choose whether to open the file or save it, choose to open the sound file. If you are asked to play the sound clip in its own window, you may do that as well.

Autumn Folk Festival



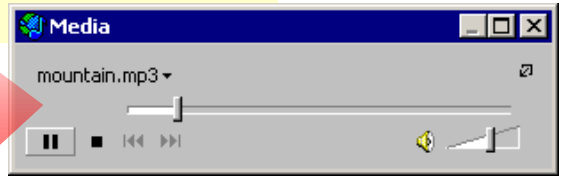
Folk singers, Joan Adams and Shannon Davis

From September 10th - 12th, come to Sunrise for the annual autumn folk festival. The Sunrise Festival is quickly becoming one of the Northwest's top folk events, with its intimate performances from world-famous troubadours. Camping spots are still available at Sunrise campground, but they're going fast.

In addition to the intimate song sharing in the campground every evening during the festival, there'll be workshops, great food and craft vendors. Call Maria Thompson at 555-9011 for camping information. Call Ted Cashman (555-8122) to sign up for one of the workshops.

Click below to listen to the sounds of *Adams & Davis* from last year's folk festival.

Wild Mountain Thyme Full Clip (342K - MP3)
Wild Mountain Thyme Partial Clip (211K - WAV)
Wild Mountain Thyme Partial Clip (211K - AU)



Embedding a Sound File

- A **sound clip** placed directly into a Web page is one example of an embedded object.
- An **embedded object** is any media clip, file, program, or other object that can be run or viewed from within the Web page.
- To use embedded objects, the browser must support them and must have access to the appropriate plug-in applications.

Plug-ins

- **Plug-ins** are programs that enable the browser to work with an embedded object.
- When a browser encounters an embedded object, it loads the appropriate plug-in plus any controls needed to manipulate the object.
  - for example, a sound file plug-in might place controls on the Web page that enable the user to play the sound clip, pause it, rewind it, or change the volume
- Plug-ins require users to download and install additional software before being able to view the Web page.

Plug-ins Continued

- There are many plug-ins available for embedded sound clips:
  - Netscape provides the LiveAudio and Winamp media player
  - Internet Explorer provides the ActiveMovie media player and the Windows Media player
  - third-party plug-ins can be used, such as RealPlayer

Using the <embed> Tag

- To embed a sound clip into a Web page, use the **<embed>** tag.
- The syntax of the **<embed>** tag is:

```
<embed src="URL" width="value" height="value"
  align="value" autostart="startvalue">
```

  - ***URL*** is the filename and location of the embedded object
  - ***height*** and ***width*** attributes define the size of the embedded object on the Web page
  - ***align*** attribute defines how text wraps around the embedded clip
  - ***autostart*** attribute is used to determine whether or not the browser starts the embedded clip automatically when the Web page is loaded

Embedding a Sound File and Browsers

- Netscape supports the **`border`**, **`vspace`**, and **`hspace`** attributes, Internet Explorer does not.
- The **`<embed>`** clip is not part of the HTML 4.01 specifications.
- Major browsers support the **`<embed>`** clip.

Inserting an Embedded Sound Clip

This figure shows how to insert an embedded sound clip.

```
<p>Listen to the sounds of <i>Adams & Davis</i> from last year's festival:</p>
<blockquote>
   <embed src="mountain.mp3" width="145" height="60" autostart="false">
</blockquote>

<!--- ARTICLE ABOUT THE MOUNT RAINIER INTERACTIVE MAP --->
<h2><img src="mrim.jpg" align="left" hspace="5" vspace="1">
Visitors Prepare to Meet MRIM</h2>
```

embedded sound clip

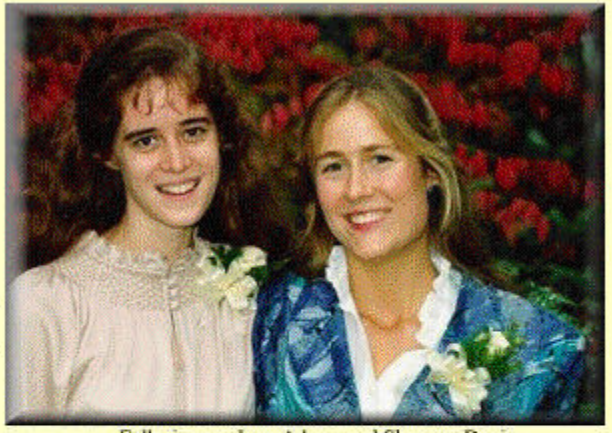
width and height of sound clip controls

sound clip does not play automatically

Playing an Embedded Sound Clip

If you do not see any controls for the sound clip on the Web page, it may be because the browser does not support embedded objects.

Autumn Folk Festival



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In addition to the intimate song sharing in the campground every evening during the festival, there'll be workshops, great food and craft vendors. Call Maria Thompson at 555-9011 for camping information. Call Ted Cashman (555-8122) to sign up for one of the workshops.

Listen to the sounds of *Adams & Davis* from last year's festival:

embedded sound clip and controls (your controls may differ)

Using the <bgsound> Tag

- With version 3.0, Internet Explorer introduced a tag for playing background sounds on a Web page.
- The syntax of the **<bgsound>** tag is:

```
<bgsound src="URL" balance="value"
  loop="value" volume="value">
```

  - ***URL*** is the filename and location of the sound file
  - ***balance*** attribute defines how the sound should be balanced between the computer's left and right speakers
  - ***loop*** attribute defines how many times the sound clip is played in the background
  - ***volume*** attribute indicates the volume of the background sound

Using the <bgsound> Tag Continued

- **Background sound** displays no control or object on a Web page.
- A user cannot stop the background sound from playing, pause it, or rewind it.
- The **<bgsound>** tag should be used with caution.
- The **<bgsound>** tag is not supported by Netscape.
- To insert a background sound clip with Netscape, use the following HTML tag:

```
<embed src="file" width="0" height="0"
  autostart="true">
```

Working with Video Files

- Displaying video is one of the most popular uses of the Web.
- Video files can be exciting and provide lots of information.
- Video files can be very large and difficult to work with.
- Use a video capture board to record images from a camcorder, television, or VCR.
- To create video clips use computer animation software.
- Creating a video file can be a time-consuming process.

Video-Editing Software

This figure shows some of the video editors you can use to create and work with video files.

TITLE	URL	OPERATING SYSTEM
Main Actor	http://www.mainconcept.com/	Windows
MMStudio	http://www.lerstad.com/	Windows
Quick Editor	http://www.shareware.com	Macintosh
VideoFramer	http://www.flickerfree.com/	Windows
VideoStudio	http://www.ulead.com/	Windows

Frame Rates

- A video file is composed of frames, where each **frame** represents a single image.
- When a video file is played, each frame is shown in sequence, giving the illusion of motion.
- The number of frames shown in each unit of time is called the **frame rate** and is expressed as frames per second (fps).
- Working with the frame rate is one way to control the size and quality of a video file.
- Another way of controlling the size of the video file is by compressing each frame.

An Example of Frame Rates

- For comparison, VHS videotape renders video at the speed of 30 fps, and video files that match this frame rate are usually quite large.
- You can reduce the frame rate to reduce the size of the file, this does not slow down the video; instead it:
  - reduces the number of frames shown each second
  - reduces the total number of frames in the file
    - for example, instead of using 30 frames in one second of video, you might be using only 15, which the overall duration of the video clip remains the same, but the size of the file is reduced

Codecs

- The technique of **compressing** and **decompressing** video frames is called a **codec** (for compression/decompression).
- There are many different codecs, each with its own advantages and disadvantages.
- A video editor usually allows you to choose the codec for a video file.
- The size of a video file can be reduced by reducing the size of the video frames.
- Changing the video from color to grayscale can also reduce the size of a video file.

Video File Formats

- Video on the Web typically appears in one of five formats:
  - ASF
  - AVI
  - MPEG
  - QuickTime
  - RealVideo

Video File Formats

This figure describes the five formats of video on the Web.

FORMAT	DESCRIPTION
ASF	Advanced Streaming Format. Developed by Microsoft to eventually replace the AVI video format, ASF employs streaming media technology to provide live video over low- and high-bandwidth connections.
AVI	Audio Video Interleave. AVI is the standard video format for Windows. AVI files can have a resolution no larger than 320 × 240 pixels with a frame rate no faster than 30 fps, which means that AVI files cannot be used for full-screen, full-motion video. However, AVI files require no special hardware, making AVI one of the standard video formats for the Web.
MPEG	Moving Pictures Group. The MPEG format allows for high compression of the video file, resulting in smaller files sizes. There are two MPEG formats: MPEG-1 and MPEG-2. MPEG-1 files have a maximum resolution of 352 × 240 pixels at 30 fps. MPEG-2 files can be displayed at a maximum resolution of 1280 × 720 pixels with a frame rate of 60 fps, making MPEG-2 files appropriate for full-screen, full-motion video. Special software is required to create and play MPEG files.
QuickTime	Developed by Apple Computer for the Macintosh, QuickTime movies can also be played in Windows if the user has installed the proper software and drivers (available free from *http://www.quicktime.apple.com*.) Because of its popular support, QuickTime is also a Web standard for video files.
RealVideo	Developed by RealNetworks, RealVideo uses streaming media technology to provide live video over low- and high-bandwidth connections. Video quality is usually poorer than what can be achieved using nonstreaming video.

Linking to a Video File

- Use the same procedure to link to a video clip as used to link to a sound clip.
- Include information about the size of each video file, so that users can determine whether or not they want to retrieve the clip.

Linking to a Video File Continued

- A sample code for linking to **mrim.avi** and **mrim.mov** video files is:

```
<p>Preview a clip from the Mount Rainier
  Interactive Map.</p>
<blockquote>
  <a href="mrim.avi">Summit Flyby (187K -
  AVI)</a><br>
  <a href="mrim.mov>Summit Flyby (215K -
  QuickTime)</a>
</blockquote>
```

Inserting Hypertext Links to Video Files

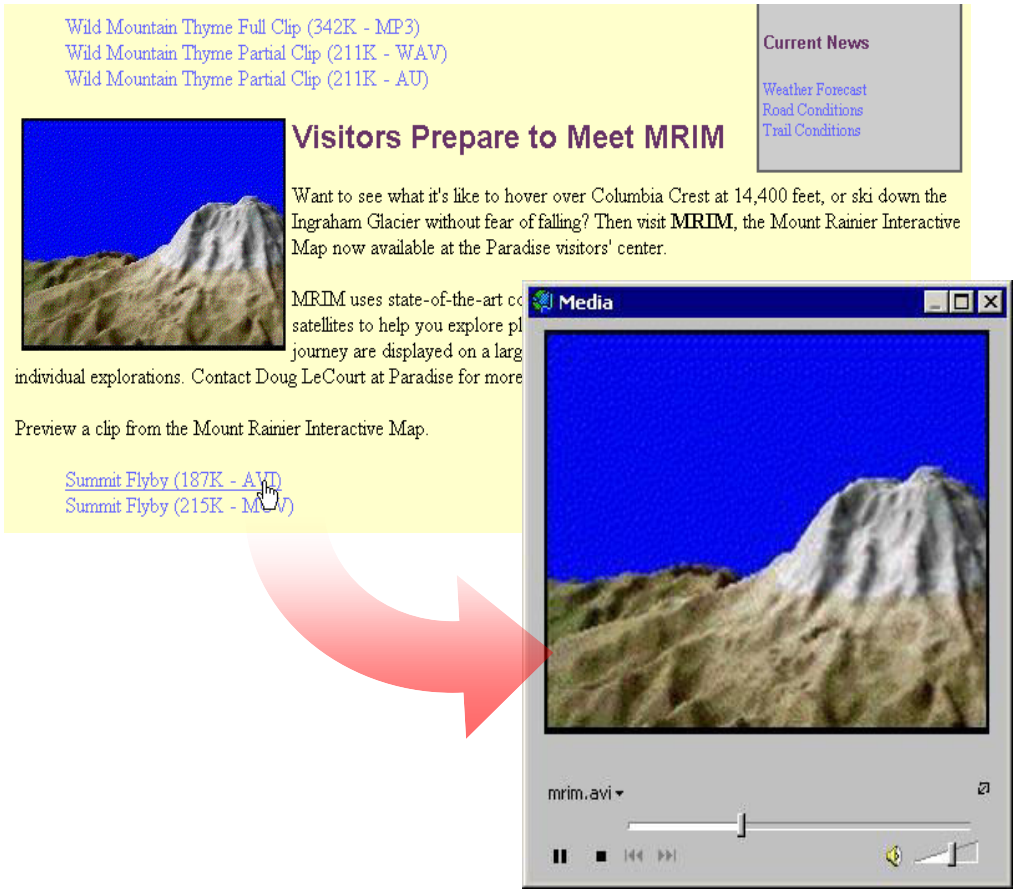
Both Internet Explorer and Netscape are capable of displaying AVI and MOV files directly within the browser without the use of plug-ins.

```
<p>MRIM uses state-of-the-art computer animation combined with
data from geological satellites to help you explore places you might
never visit on foot. The results of your journey are displayed on a
large screen monitor - perfect for group presentations or individual
explorations. Contact Doug LeCourt at Paradise for more information.</p>

<p>Preview a clip from the Mount Rainier Interactive Map.</p>
<blockquote>
   <a href="mrim.avi">Summit Flyby (142K - AVI)</a><br>
   <a href="mrim.mov">Summit Flyby (153K - MOV)</a>
</blockquote>

</body>
</html>
```

Playing a Video Clip

This figure shows a sample of how a user might access a video clip.

If you are asked to choose whether to open the file or save it, choose to open the video file.



Embedding a Video File

- To embed a video file, you can use the **<embed>** tag.
- Specify a source for the embedded video clip with the src attribute.
- Specify a size for the clip using the height and width attributes.
  - the object's height and width should be large enough to display any controls needed to operate the clip
  - typically, the size is determined by trial and error
- Use the **autostart** tag to specify whether or not to start the clip when the page is loaded.

Inserting an Embedded Video Clip

This figure shows how to insert an embedded video clip.

replace the inline image with an embedded clip

```
<!--- ARTICLE ABOUT THE MOUNT RAINIER INTERACTIVE MAP --->
<h2>
<embed src="mrim.avi" width="200" height="200" autostart="false" align="left" hspace="5">
Visitors Prepare to Meet MRIM</h2>

<p>Want to see what it's like to hover over Columbia Crest at 14,400 feet,
or ski down the Ingraham Glacier without fear of falling? Then visit
<b>MRIM</b>, the Mount Rainier Interactive Map now available at the
Paradise visitors' center.</p>
```

Playing an Embedded Video Clip

This figure shows a sample of an embedded video clip.

embedded video clip and controls (your controls may differ)

Using the <noembed> Tag

- Older browsers do not support embedded objects.
- The **<noembed>** tag provides a way to support older browsers that don't recognize the **<embed>** tag.
- The general syntax of the **<noembed>** tag is:

```
<embed attributes>
<noembed>
    HTML tags recognized by older browsers
</noembed>
```

- Older browsers will run whatever tags are entered between the **<noembed>** tags.

Using the `dynsrc` Attribute

- The **`dynsrc`** "**dynamic source**" attribute specifies a video clip that is associated with an inline image.
- For example, an inline image that was inserted using the following **`<img>`** tag:

```
<img src="file" align="right" hspace="5"
  vspace="1">
```

Can be replaced using this tag:

```
<img dynsrc="file" src="file" align="right"
  hspace="5" vspace="1">
```

- Using this tag allows you to display a GIF and JPEG image as a "**preview**" of the inline video clip.

The <img> Tag and dynsrc Attribute

- There are other attributes of the **<img>** tag that you can use along with the dynsrc attribute. These include:
  - ***controls*** attribute to specify whether to include VCR-like controls beneath the video clip
  - ***loop*** attribute to specify the number of times the video is played
  - ***start*** attribute to control how the video clip is started
- The dynsrc attribute and its associated attributes are supported only by Internet Explorer, supplement HTML code with the **<embed>** tag to allow other browsers to use the embedded video clip.

Introducing Java Applets

- Java computing language was developed to allow users to run programs from within their Web browsers rather than on the Web server.
- Each Java program is called an **applet**.
  - examples of Java applets are stock market tickers, games, animations, and other utilities.
- Unlike JavaScript, a Java applet is not inserted into your HTML file, but it is an external file that is downloaded and executed by the browser.
- The applet itself is displayed as an embedded object on a Web page in an **applet window**.

Java Applet Archives on the Web

**Many Java applets are available on the Web;
sometimes they are free and sometimes you have to pay for them.
This figure shows a list of a few of the more popular sources for Java applets.**

TITLE	URL
Applets from Sun	http://java.sun.com/applets/
Gamelan	http://www.gamelan.com/
Java Boutique	http://www.javaboutique.com/
Java Rating Service	http://www.jars.com/
Yahoo!'s list of Java applets	http://www.yahoo.com/Computers_and_Internet/Programming_Languages/Java/Applets/

Java Applet

- To write your own Java applet, you need **a Java Developer's Kit (JDK)**.
- There are commercial JDKs that provide easy-to-use graphical tools and menus to help create Java applets quickly and easily.
- JDK is similar to JavaScript, however, it is a more complicated, and powerful language.

.class File

- After you write the code for a Java program, save the source code as a file with the four-letter extension **.java**.
- The file is changed, in a process called **compiling**, into an **executable file** that can run by itself without the JDK.
- The executable filename has the four-letter extension **.class** and is called a **.class file**.
- Some Java applets may require several .class files.
- A class file can be run only from within a Java interpreter.
- In most cases, the Java interpreter is the Web browser.

Working with the <applet> and <param> Tags

- Use the **<applet>** tag to insert the applet into a Web page.
- The **<applet>** tag identifies the **.class** file used by the applet and allows you to specify any parameters required by the applet.
- The general syntax of the **<applet>** tag is:

```
<applet code="file">
  <param>
  <param>
. . .
  <param>
</applet>
```

Working with the <applet> and <param> Tags

- ***file*** is the filename of the Java applet
- the **<param>** tags are used for any parameters required by the applet
- The syntax of the **<param>** tag is:

```
<param name="text" value="value">
```

  - ***name*** attribute identifies the name of the parameter required by the applet
  - ***value*** attribute is the value you'll give the parameter

Attributes of the <applet> Tag

This figure shows some of the other attributes supported by the <applet> tag.

PROPERTY	DESCRIPTION
ALT=*text*	A text string that is displayed in place of the applet before the browser has finished loading the applet
CODEBASE=*URL*	The location of the .class file, if different from the Web page
CODE=*filename*.class	The filename of the .class file
HEIGHT=*value*	The height of the embedded applet in pixels
HSPACE=*value*	The horizontal space between the embedded applet and the surrounding text, in pixels
NAME=*text*	The name of applet
VSPACE=*value*	The vertical space between the embedded applet and the surrounding text, in pixels
WIDTH=*value*	The width of the embedded applet in pixels

The `codebase` Attribute

- The **`codebase`** attribute runs an applet placed in a different location than the Web page.
- Placing applets in a central location allows you to maintain only one copy of each applet, rather than copies for each Web page.
- Makes it easier to manage collections of applets.
- Allows you to run someone else's Java applet from that person's Web server.
  - this practice is discouraged and, in some cases, is a violation of copyright laws
  - when using someone else's Java applet, first obtain permission and retrieve the .class file before placing on your Web server

Insert Other HTML Tags and Text

- Older browsers ignore the **<applet>** and **<param>** tags and instead display the text specified.
- New browsers that support Java applets ignore that text.
- Use HTML code to have the browsers display the applet, or if it's an older browser, the message to upgrade.

Parameters for Applets

This figure shows a list of some of the parameters for applets.

PARAMETER NAME	DESCRIPTION
BGCOLOR	The background color of the applet window, expressed as a color value
FADEZONE	The text in the applet window will fade in and out as it scrolls. This parameter sets the size of the area in which the text fades (in pixels).
TEXTCOLOR	The color value of the text in the applet window
FONT	The font used for the scrolling text in the applet window
TEXT*x*	Each line of text in the applet window requires a separate TEXT*x* parameter, where *x* is the line number. For example, the parameter TEXT1 sets the text for the first line in the applet window, TEXT2 sets the text for the second line in the applet window, and so forth.
URL	If the applet window is clicked, it will open the Web page specified in this URL parameter.
REPEAT	Specifies whether the text in the applet window is repeated. Setting this parameter's value to "yes" causes the text to scroll continuously.
SPEED	The speed at which the text scrolls, expressed in pixels per 1/100 of a second
VSPACE	The space between each line of text, in pixels
FONTSIZE	The point size of the text in the applet window

Values for the Creditroll Applet

This figure shows an example of parameters values used to display weather information.

PARAMETER NAME	PARAMETER VALUE
BGCOLOR	FFFFFF (white)
FADEZONE	20
TEXTCOLOR	663366 (dark purple)
FONT	ARIAL
TEXTx	TODAY'S WEATHER FORECAST TODAY...Partly sunny. TONIGHT...Partly cloudy. Showers with sleet. TUESDAY...Rain heavy at times. Snow likely. WEDNESDAY...Clearing. Click to view the Weather Page.
URL	http://www.nps.gov/mora/weather.htm
REPEAT	yes
SPEED	100
VSPACE	3
FONTSIZE	12

Inserting an Applet and Parameter Values

This figure shows how to insert an applet and parameter values for weather information.

With the large number of embedded objects and the Java applet, this Web page may take a while to load.

filename of Java applet

dimensions of Java applet

applet parameters

```
<!---WEATHER REPORT -->
<div class="weather">
<applet code="CreditRoll.class" width="400" height="60">
   <param name="BGCOLOR" value="FFFFFF">
   <param name="TEXTCOLOR" value="663366">
   <param name="FADEZONE" value="20">
   <param name="FONT" value="TIMES NEW ROMAN">
   <param name="TEXT1" value="TODAY'S WEATHER FORECAST">
   <param name="TEXT2" value=" ">
   <param name="TEXT3" value="TODAY...Partly sunny.">
   <param name="TEXT4" value="TONIGHT...Partly cloudy. Showers with sleet.">
   <param name="TEXT5" value="TUESDAY...Rain heavy at times. Snow likely.">
   <param name="TEXT6" value="WEDNESDAY...Clearing.">
   <param name="TEXT7" value=" ">
   <param name="TEXT8" value="Click to view the Weather Page.">
   <param name="URL" value="http://www.nps.gov/mora/weather.htm">
   <param name="REPEAT" value="yes">
   <param name="SPEED" value="100">
   <param name="VSPACE" value="3">
   <param name="FONTSIZE" value="12">
</applet>
</div>
<!---END OF REPORT --->
```

The Applet in Action

text fades as it leaves the applet window

t ext scrolls vertically

If the browser has trouble accessing the applet, check the `<applet>` and `<param>` tags for any errors or misspellings.

Using the Internet Explorer <marquee> Tag

- Use the **<marquee>** tag to create a theatre-style marquee.
- The general syntax of the **<marquee>** tag is:

```
<marquee attributes>Marquee
  Text</marquee>
```

  - ***Marquee Text*** is the text that appears in the marquee box
- The **<marquee>** tag is only supported by Internet Explorer.
- Browsers that do not support the **<marquee>** tag will simply display the entire marquee text without any scrolling.

Attributes of the <marquee> Tag

This figure describes some of the attributes of the <marquee> tag.

Attribute	Description
begin="*value*"	The time, in seconds, before beginning the marquee. The default is "0”.
behavior="*type*"	The text behavior within the container. The default value of "scroll" instructs the text to scroll across the container, "alternate" instructs the text to reverse its direction when it reaches the container's edge, and "slide” instructs the text to stop once it reaches the end of the container.
bgcolor="*color*"	The background color of the container
direction="*type*"	The direction of the text movement. Options are: "left", "right", "down", or "up). The default is "left".
end="*value*"	The time, in seconds, before ending the marquee.
height="*value*" width="*value*"	The height and width of the marquee container, in pixels
hspace="*value*" vspace="*value*"	The horizontal and vertical space around the marquee container, in pixels
loop="*value*"	The number of times the marquee plays. A value of "0" or "-1" instructs the marquee to play without stopping. The default is "-1".
scrollamount="*value*"	The distance, in pixels, that the text moves each time the marquee is redrawn. The default is "6".
scrolldelay="*value*"	The delay, in milliseconds, between subsequent drawings of the marquee. The default is "85".

Using the <marquee> Tag

- To control the appearance and size of the marquee, insert the following attributes into the **<marquee>** tag:

  bgcolor="color" width="value" height="value"

  - ***bgcolor*** attribute controls the background color of the marquee box
  - ***width*** and ***height*** attributes define the dimensions of the box
- To control the placement of the marquee with the surrounding text, use the attributes:

  hspace="value" vspace="value"

  - ***hspace*** and ***vspace*** attributes define the amount of horizontal and vertical space in pixels around the box

Using the <marquee> Tag Continued

- To control the behavior of text within the marquee, use the attributes:

  Behavior="type" direction="type" loop="value"

  - ***behavior*** is either "scroll" (to scroll the text across the box), "slide" (to slide the text across the box and stop), or "alternate" (to bounce the text back and forth across the box)
  - ***direction*** attribute defines the direction the text moves, is "left" (the default), "**right**", "**down**", or "**up**"
  - ***loop*** attribute determines how often the text moves across the box and is either an integer or "**infinite**"
- To control the speed of the text within the marquee, use the attributes:

  Scrollamount="value" scrolldelay="value"

  - ***scrollamount*** is the amount of space, in pixels, that the text moves each time it advances across the page
  - ***scrolldelay*** is the amount of time, in milliseconds, between text advances

Using the <marquee> Tag Continued

- Should restraint in using the **<marquee>** tag, because they can distract users from other elements on the Web page if used to often.
- A continuous marquee can quickly become a nuisance.

Using the <object> Tag

- The **<object>** tag is supported **ONLY** by Internet Explorer.
- There are four types of embedded objects that can exist on a Web page:
  - sound clips
  - video clips
  - applets
- In order to deal with these objects in a consistent way, HTML 4.0 introduced the **<object>** tag, which is used for any embedded object.

Using the <object> Tag Continued

- Netscape does not support the **<object>** tag through version 4.7.
- The general syntax for the **<object>** tag is:

```
<object data="URL" type="type" classid="URL"
  codebase="URL">
  <param parameter name and value>
  <param parameter name and value>
  . . .
  Text and tags that are displayed by browsers
  that don't support the <object> tag
</object>
```

Using the <object> Tag Continued

- ***data*** attribute is used to indicate the source of the data for the embedded object
- ***type*** attribute indicates the type of data to be embedded (enclosed in quotes)
- ***classid*** attribute identifies the class of object being embedded
- ***codebase*** attribute indicates the location of the source data, if it differs from the location of the Web page

Attributes of the <object> Tag

This figure shows a partial list of the attributes associated with the <object> tag..

PROPERTY	DESCRIPTION
ALIGN=*alignment*	The alignment of the embedded object with respect to the surrounding text
BORDER=*value*	The thickness of the border around the object, in pixels
HEIGHT=*value*	The height of the object, in pixels
HSPACE=*value*	The horizontal space between the object and the surrounding text, in pixels
NAME=*text*	The name of the object
STANDBY=*text*	Text to display while the browser is loading the object into the page
USEMAP=*map_name*	The name of an image map associated with the object (used for inline images only)
VSPACE=*value*	The vertical space between the object and the surrounding text, in pixels
WIDTH=*value*	The width of the object, in pixels

Specifying the Type Value

- The **type** attribute is expressed in terms of the MIME data type.
- The **MIME (Multipurpose Internet Mail Extension)** data type was developed to allow e-mail messages to include nontext objects i.e. sound and video files.
- MIME was adapted for use on the World Wide Web.
  - if a value is not specified for the type attribute, the Web browser may have difficulty rendering the Web page
  - if the browser doesn't support the MIME data type, it will not download the object from the Web server

Some Mime Data Types

This figure lists the MIME names for some of the objects embedded in Web pages.

IMAGE		AUDIO		VIDEOS	
TYPE	MIME NAME	TYPE	MIME NAME	TYPE	MIME NAME
GIF	image/gif	AIFF	audio/aiff	ASF	video/x-ms-af
JPG	image/jpeg	AU	audio/basic	AVI	video/m-msvideo
		MIDI	audio/mid	MPEG	video/mpeg
		MP3	audio/mpeg	QuickTime	video/quicktime
		WAV	audio/wav		

Specifying the `classid` Value

- The **classid** attribute provides information to the browser on how the object is to be implemented on the Web page.
- For inline images, sound files, and video files, you don't need to specify a value for the classid attribute.
- For Java applets, the classid attribute takes the place of the data attribute.
- The syntax for embedding a Java applet within the **<object> tag is:**

```
<object classid="java: filename">
  <param>
  <param>
  . . .
</object>
```

ActiveX

- ActiveX controls require the classid attribute along with the **<object>** tag to use them in a Web page.
- ActiveX controls can be inserted into a document with the following classid attribute value:

```
<object classid="clsid:class_identifier">
   <param>
   <param>
   . . .
</object>
```

  - ***class_identifier*** is a complex text string that identifies the ActiveX control for the browser
- ActiveX controls can add a lot to a Web page.
- Microsoft supports a large library of controls.

Nesting <object> Tags

- The **<object>** tag can be nested one **<object>** inside another.
  - this is useful in situations where you want to give the browser alternatives for displaying an embedded object
- The following code provides the browser with four options for playing a video clip:

```
<object data="mrim.mpg" type="video/mpeg">
  <object data="mrim.mov" type="video/quicktime">
   <object data="mrim.avi" type="video/x-msvideo">
          <img src="mrim.jpg">
   </object>
  </object>
</object>
```

More About The <object> Tag

- The **<object>** tag shows great promise for expanding the capability of HTML in handling embedded objects.
- HTML 4.01 deprecates the **<embed>** tag, preferring Web designers to use the **<object>** tag.
- It is recommended to wait for browser support to catch up with the **<object>** tag's potential before using it in Web pages.

Tutorial 10 Summary

- Introduced multimedia file types.
- Created links to sound files and embedded sound files into Web pages.
- Created and embedded a background sound.
- Worked with inline and external video clips.
- Introduced the three major video formats: QuickTime, AVI, and MPEG.