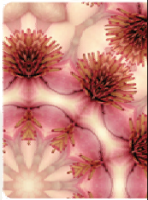


HTML and XHTML
2nd Edition

Tutorial 7

Working with Multimedia



New Perspectives on HTML and XHTML, Comprehensive

Objectives

- Explore various multimedia applications on the Web
- Learn about sound file formats and properties
- Embed a sound clip
- Work with object parameters
- Work with ActiveX objects
- Insert IE conditional comments

New Perspectives on HTML and XHTML, Comprehensive 2

Objectives

- Learn about video file formats and properties
- Embed a video clip
- Work with the embed element
- Nest embedded objects
- Explore the history of Java
- Embed a Java applet
- Work with applet parameters

New Perspectives on HTML and XHTML, Comprehensive 3

Introducing Multimedia

- **Bandwidth** is a measure of the amount of data that can be sent through a communication pipeline each second.
 - Consider bandwidth when working with multimedia on a Web site

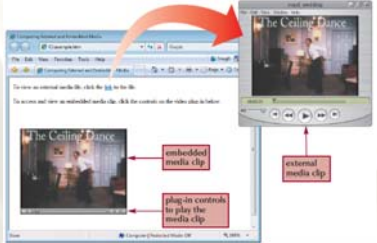
New Perspectives on HTML and XHTML, Comprehensive 4

Introducing Multimedia

- Multimedia can be added to a Web page two different ways:
 - **External media:** media file accessed through a link
 - Useful for a low bandwidth
 - **Embedded media:** placed within a Web page as an embedded object

New Perspectives on HTML and XHTML, Comprehensive 5

Introducing Multimedia



New Perspectives on HTML and XHTML, Comprehensive 6

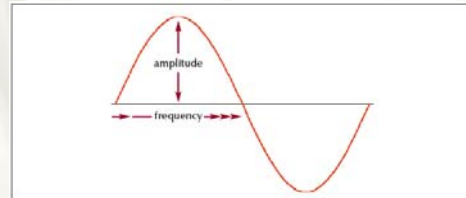
Exploring Digital Audio

- Every sound wave is composed of two components:
 - **Amplitude**- the height of the wave
 - Relates to sound's volume
 - **Frequency**- the speed at which the sound wave moves
 - Relates to sound's pitch

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Exploring Digital Audio



New Perspectives on HTML and XHTML, Comprehensive

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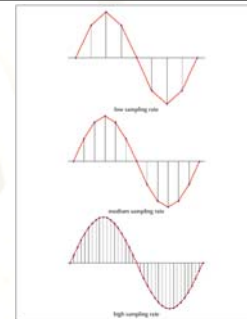
Exploring Digital Audio

- You hear sounds as a continuously varying signal
- Must be converted to digital format to store as a computer file
- **Digital** recording measures the sound's amplitude at discrete moments in time
 - Each measurement is called a **sample**
 - Samples per second taken is called the **sampling rate**

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Exploring Digital Audio



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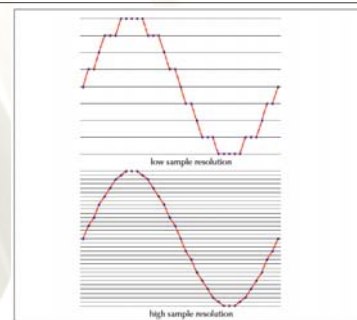
Exploring Digital Audio

- **Sampling resolution** (also called **bit depth**) indicates the precision in measuring the sound within each sample.
 - 8-bit
 - 16-bit
 - 32-bit

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Exploring Digital Audio



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Exploring Digital Audio

- There are different sound file formats used for different operating systems.
- Different file formats provide varying levels of sound quality and **file compression**.

Exploring Digital Audio

Format	Description
AIFF/AIFC	Audio Interchange File Format. 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 <i>mu-law</i> format. One of the oldest sound formats, it is primarily used on BSD workstations. AU sound files have 8-bit sample resolution, use a sampling rate of 8 kHz, and are recorded in mono.
MIDI	Musical Instrument 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.
MP3	The most popular format for downloading and storing music, MP3 compresses sound files to roughly one-tenth the size of uncompressed files while maintaining good audio quality.
RealAudio	A 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 WAV 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 is the standard audio format for Windows PCs and is commonly used for storing uncompressed CD-quality sound files. In its uncompressed format, a WAV file will require about 10 megabytes per minute of sound; however, compression algorithms are available to reduce the file size.
WMA	Windows Media Audio is a proprietary audio format developed by Microsoft to compete with MP3s, offering near or better levels of compression than MP3s.

Working with Embedded Objects

- An **embedded object** is any media clip, file, program, or other object that can be run or viewed from within a Web page.
 - Browsers need the appropriate **plug-ins** to run embedded objects

Working with Embedded Objects

- Embed objects using the object element
- The **MIME types** identify the type of data contained in the file

Format	File Extension	MIME Type
AIFC	aifc	audio/x-aiff
AIFF	aif	audio/x-aiff
AIF	aif	audio/x-aiff
AU	au	audio/basic
MIDI	mid	audio/midi
MID	mid	audio/midi
MP3	mp3	audio/mpeg
MP2	mp2	audio/mpeg
RealAudio	ra	audio/x-pn-realaudio
RealAudio	ram	audio/x-pn-realaudio
SND	snd	audio/basic
WAV	wav	audio/wav
WAV	wav	audio/x-wav

Working with Embedded Objects

```

<div class="boxContent">
  <h2>Listen Up</h2>
  <p style="text-align: center;">
    <object data="cverture.mp3" type="audio/mpeg">
  </p>
  <p>The music for <i>royal wedding</i> was composed by Burton Lane, who is best known for his work in <i>Finian's Rainbow</i> (1947) and his Grammy Award-winning <i>On a Clear Day You Can See Forever</i> (1965). Lane's greatest musical accomplishment may very well be his discovery of an 11-year-old singing phenom named Frances Gumm, whom the world now knows better as Judy Garland.</p>
</div>
    
```

Working with Embedded Objects

- Use the width and height attributes to determine the object's width and height

Plug-in	Width	Description	Image
QuickTime Player	13px	Displays only the play button.	
	33px	Adds the popup menu button.	
	49px	Adds a volume control.	
	74px	Adds a progress bar.	
	106px	Adds fast-forward and reverse buttons.	
	150px	Extends the length of the progress bar.	
Windows Media Player	42px	Displays only the play button.	
	66px	Adds the stop button.	
	164px	Adds fast-forward and reverse buttons.	
	279px	Adds a volume control.	

Working with Embedded Objects

- **Parameters** define the appearance and behavior of embedded objects
- The `src` parameter is common to most plug-ins for embedded sounds

```
<object attributes>
  <param name="src" value="overture.mp3" />
</object>
```

Working with Embedded Objects

Plug-in	Parameter	Description	Value(s)
QuickTime Player	autoplay	Starts playing the clip automatically when the page loads.	true false
	bgcolor	Sets the background color for the space allotted to the object.	Embedded color name
	controller	Specifies whether or not to show the object controls.	true false
	endtime	Specifies the time in the clip at which playback ends.	Minutes
	href	Specifies a page to load when the user clicks on the object.	url
	loop	Plays the clip in a continuous loop, forward, backward, or both (indubious).	true false backward forward
	src	The source of the clip.	url
	starttime	Specifies the time in the clip at which playback begins.	Minutes
	volume	Sets the initial audio volume.	0 - 255
	Windows Media Player	autoplay	Starts playing the clip automatically when the page loads.
filename		The source of the clip.	url
hide		Specifies whether or not the clip should be initially visible.	true false
selectionstart		Specifies the time in the clip at which playback begins.	seconds
selectionstop		Specifies the time in the clip at which playback ends.	seconds
stopcount		Specifies the number of times the clip will play.	Integer
showcontrols		Specifies whether or not to show the object controls.	true false
volume		Sets the initial audio volume.	-10,000 - 0

Working with ActiveX Components

- **ActiveX** is a technology that allows components to run from within a variety of Windows programs
- Only designed for Windows
- ActiveX objects are referred to as ActiveX controls
- Each ActiveX control is identified by a **class id**
- **cab** or **cabinet files** automatically install the necessary software on the user's computer

Working with ActiveX Components

ActiveX Control	Class ID
Flash Shockwave Player	D27CDB6E-AE6D-11cf-9688-44453540000
QuickTime Player	02BF25D5-8C17-4B23-8C80-D3488ABDDC68
RealAudio Player	CFCDAAD3-8BE4-11cf-8B4B-0020AFBCCFA
Windows Media Player	6BF52A52-394A-11d3-B153-00C04F79FAA6
Java applet	8AD9C840-044E-11D1-B3E9-00805F499D93

```
<object data="overture.mp3" type="audio/mpeg"
  classid="clsid:02BF25D5-8C17-4B23-8C80-D3488ABDDC68"
  codebase="http://www.apple.com/qtactivex/qtplugin.cab"
  width="280" height="25">
  <param name="src" value="overture.mp3" />
  <param name="autoplay" value="false" />
  <param name="autostart" value="false" />
  <param name="controller" value="true" />
  <param name="showcontrols" value="true" />
</object>
```

IE Conditional Comments

Internet Explorer will run the code for the ActiveX QuickTime component

```
<!--[if IE]><!-->
<object data="overture.mp3" type="audio/mpeg"
  classid="clsid:02BF25D5-8C17-4B23-8C80-D3488ABDDC68"
  codebase="http://www.apple.com/qtactivex/qtplugin.cab"
  width="280" height="25">
<!--[endif]><!-->
```

Non-IE browsers will run the standard code for the embedded MP3 sound clip

```
<!--[if !IE]><!-->
<object data="overture.mp3" type="audio/mpeg"
  classid="clsid:02BF25D5-8C17-4B23-8C80-D3488ABDDC68"
  codebase="http://www.apple.com/qtactivex/qtplugin.cab"
  width="280" height="25">
<!--[endif]><!-->
```

Creating Background Sound

- The parameters for Windows Media Player to create a hidden clip that starts automatically are:

```
<param name="autostart" value="true" />
<param name="showcontrols" value="false" />
```

- You can also use the `bgsound` element

```
<bgsound src="url" balance="value" loop="value" volume="value" />
```

Exploring Digital Video

- Digital video adds a visual element to a Web page as well as provides information
- Video files are composed of a series of single images called **frames**
- The number of frames shown in a period of time is the **frame rate**

Exploring Digital Video

- Reducing the frame rate reduces the size of your file
 - This is one way to control file size of video files
- **Data rate** is the amount of data that has to be processed by the video player each second to play the video clip

Exploring Digital Video

Format	Flavours Extension	MIME Type	Description
AVI	avi	video/avi	Audio/Video Interleaved. AVI is a common video file format developed by Microsoft for use with Windows. It is not always possible to play AVI files on non-Windows computers unless special software has been installed on the computer.
Flash Video	flv	video/flv	FLV is a proprietary file format developed by Adobe to deliver video over the Internet using the popular Adobe Flash Player. It is the preferred file format for online video sites such as YouTube and Google Video.
H.263	mpeg, mpeg2	video/mpeg	Having a frame rate of 15 frames per second, H.263 is a high compression of the video file, resulting in a smaller file size. H.263 files have good support across various browsers and operating systems but tend to be much larger than flash videos.
QuickTime	mov	video/quicktime	QuickTime is a video format developed by Apple Computer for Windows and Macintosh computers. Like MPEG, QuickTime employs a compression algorithm that can result in smaller files. QuickTime files require QuickTime Player, available for other Windows and Macintosh.
RealMedia	rm, rmx	application/vnd.rn-realmedia	RealPlayer is a video format developed by RealNetworks for streaming live video over the Internet at both low and high bandwidths. It uses a variety of data-compression techniques and requires the installation of the RealPlayer media player.
Shockwave Flash	swf	application/x-shockwave-flash	SWF is a proprietary file format developed by Adobe to deliver rich media and vector graphics on the Web. An SWF file can contain embedded video, audio, interactive scripts, and control buttons. SWF files can be played using Adobe Flash Player either as a browser plug-in or a stand-alone player.
Windows Media	wmv	video/x-ms-wmv	Developed by Microsoft, WMV is a popular video file used for creating streaming videos on the Web. The WMV format offers good compression and playback, but is primarily designed for Windows users.

Exploring Digital Video

- A **Shockwave Flash** or **swf** file contains the video, audio, animations, interactive scripts, program controls, and other features that provide real-time interactive animation

```
<object type="application/x-shockwave-flash"
  data="file.swf" width="value" height="value">
  <param name="movie" value="file.swf" />
  </object>
```

Exploring QuickTime Video

```
<p style="text-align: center;">
  <!--[[ IE]]-->
  <object data="rwdance.mov" type="video/quicktime"
    classid="clsid:026F2105-8C77-4021-8C80-036888000000"
    width="280" height="230">
  <!--[[ end]]-->
  <!--[[ IE]]-->
  <object data="rwdance.mov" type="video/quicktime"
    width="280" height="230">
    <param name="src" value="rwdance.mov" />
    <param name="autoplay" value="false" />
    <param name="controller" value="true" />
  </object>
</p>
```



Exploring Windows Media Player

```
<p style="text-align: center;">
  <!--[[ IE]]-->
  <object data="rwdance.wmv" type="video/x-ms-wm"
    classid="clsid:068522A2-394A-11D1-8033-000000000000"
    width="280" height="245">
  <!--[[ end]]-->
  <!--[[ IE]]-->
  <object data="rwdance.wmv" type="video/x-ms-wm"
    width="280" height="245">
    <!--[[ end]]-->
    <param name="url" value="rwdance.wmv" />
    <param name="autoplay" value="false" />
    <param name="showcontrols" value="true" />
  </object>
</p>
```



Introducing the embed Element

- To make your pages backward compatible, you can use the embed element along with the object tag to insert multimedia content

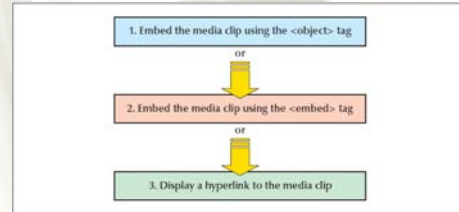
```
<embed src="file.swf" type="application/x-shockwave-flash"
pluginpage="http://www.macromedia.com/go/getflashplayer"
width="value" height="value">
</embed>

<embed src="file.mov" type="video/quicktime"
pluginpage="http://www.apple.com/quicktime/download"
width="value" height="value">
</embed>

<embed src="file.mmv" type="video/x-ms-mmv"
pluginpage="http://www.microsoft.com/Windows/MediaPlayer"
width="value" height="value">
</embed>
```

Nesting Embedded Objects

- Provide support for as many browser configurations as possible



Nesting Embedded Objects

display as an ActiveX control

display using the <embed> tag

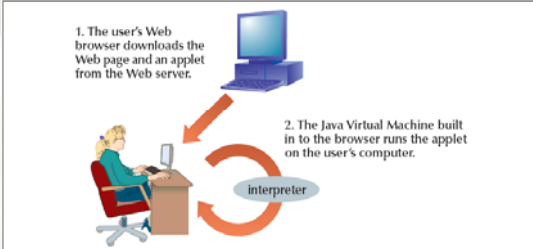
display as a hypertext link

```
<object data="video.mov" type="video/quicktime"
classid="clsid:00720c50-0000-0000-0000-000000000000"
codebase="http://www.apple.com/quicktime/qtplugin.cab"
width="300" height="200">
  <param name="src" value="video.mov" />
  <param name="autoplay" value="false" />
  <embed src="video.mov" type="video/quicktime"
pluginpage="http://www.apple.com/quicktime/download"
width="300" height="200" autoplay="false">
  Click to see href="video.mov#download" on the movie clip.
</embed>
</object>
```

Introducing Java

- Oak** was developed by Sun Microsystems as an operating system intended to be used by common appliances and devices
- Oak was renamed **Java** in 1995
- Each Java program works with a **Java Virtual Machine (JVM)**

Applets and Java Virtual Machines



Applets

- Applets** are displayed as embedded objects on a Web page in an **applet window**
- Several libraries of Java applets are available
- A Java program is stored in an executable file called a **class file**

