

Multimedia

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File formats

- some differ in features (animation, 5.1 stereo, transparency)
- many multimedia formats use **compression** to reduce file size
 - compression algorithms are also called **codecs** (list)
 - some compression algorithms are "lossless", others are "lossy"
- some formats are patented (unusable in free software)
- some formats are **encrypted** to protect information inside
 - Digital Rights Management (DRM) restricts what user can do with file
 - can be broken: DVD (DeCSS), HD DVD (09f911029d74e35bd84156c5635688c0)
- some formats are **streaming** (can play while downloading)

- comparisons of formats: audio/video containers

Image file formats

- JPEG : uses "lossy compression"; small file size; good for photos
- GIF : 256 colors; LZW run-length encoding lossless compression
 - allows **transparency** (can see behind parts of image)
 - possible to create animated GIFs
- PNG : free format created to avoid patent and color issues in GIF format; lossless compression, transparency
- others: TIFF, BMP
- image format comparisons: text, photo, PNG

Raster and vector graphics

- the image formats on the previous slide are **raster** or **bitmap** formats
 - they describe the pixels that should be drawn on the screen
- vector graphics formats such as SVG describe shapes/lines rather than pixels
 - advantage: infinite precision; good for zooming, printing
 - disadvantage: not supported on all platforms; computationally expensive



Audio file formats

- MP3 : uses lossy compression that eliminates inaudible sounds
 - AAC : Apple's iTunes audio file format
 - WMA / ASF: Microsoft Windows Media Audio format
 - OGG : Linux hippie audio/video format
 - RA / RM / RAM : Real Audio format
 - other formats: WAV (MS), AU (Sun), AIFF / SND (Apple), FLAC
 - Sequenced Music: MID, MOD
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- comparison of formats

Video file formats

- MPEG : Motion Picture standard video format
 - DVDs are encoded using MPEG-2
 - HD DVDs are often compressed with MPEG-4 (H.264) codec
 - MOV : Apple's QuickTime movie format
 - WMV / ASF : Microsoft's Windows Media Video format
 - AVI : classic Microsoft video format that can be encoded in many ways
 - SWF / FLC : Macromedia Flash multimedia format
 - RV : Real Video format
-
- comparisons of formats: 1, 2

Flash

- format for graphics, video, audio developed by Macromedia/Adobe
- widely used for many reasons:
 - supported in most major platforms/browsers
 - lightweight
 - can produce impressive interactive animated content
- downside: proprietary; editing software costs money (viewer is free)
- examples: Duck Hunt, Homestar Runner

Linking to multimedia files

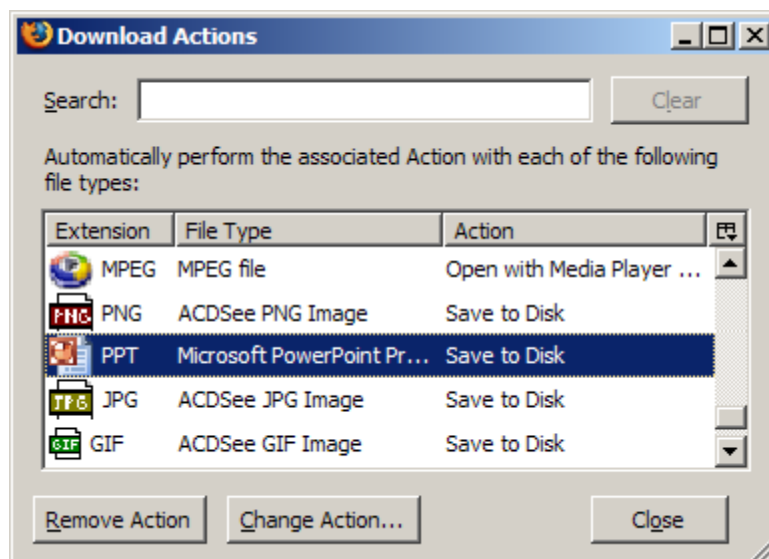
```
<a href="video.avi">My video</a>
```

HTML

- browser has a list of default applications to associate with each file type
- if it has an associated app, it will run it
- some file types are displayed within the browser using **plugins**
- if it doesn't know what to do, it will just download the file
- try it yourself: MPG, MOV, WMV, RM, SWF, WAV, MID

File types and browser plugins

- **plugin**: helper app launched within the browser to view certain file types
 - examples: Flash player, QuickTime, Windows Media Player, Acrobat Reader, Java
- about:plugins URL will show you list of plugins in Firefox
- enter preferences, then choose Content, File Types, Manage...
 - can change which app/plugin will be used to open particular file types



Embedded objects: <object>

```
<object data="video.avi" type="video/avi"></object>
```

HTML

- replaces previous, non-standard embed element
- attributes: archive, classid, codebase, codetype, **data**, declare, **height**, name, standby, **type**, usemap, **width**
- type attribute specifies file's MIME type
- IE6 requires non-standard classid attribute to specify which plugin to use (list)

Parameters: <param>

```
<object id="slider1" width="100" height="50">  
  <param name="BorderStyle" value="thick" />  
  <param name="MousePointer" value="hourglass" />  
  <param name="Enabled" value="true" />  
  <param name="Min" value="0" />  
  <param name="Max" value="10" />  
</object>
```

HTML

- indicates a parameter to be passed to the embedded object
- required name and value attributes tell the object what parameter this is and what value it should have

Embedding Audio Files

```
<object type="MIME type" data="fileURL"></object>
```

HTML

```
<object type="audio/wav" data="yoda.wav"></object>
```

HTML

```
<object type="audio/mpeg" data="particle_man.mp3"></object>
```

HTML

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- the above examples will embed a 0x0 (invisible) player to play the sound files
 - you may want to add width and height attributes if you want to see the player

Embedding YouTube video

```
<object width="width" height="height"
  type="application/x-shockwave-flash"
  data="videoURL">
  <param name="wmode" value="transparent" />
  parameters
</object>
```

HTML

```
<object width="425" height="350"
  type="application/x-shockwave-flash"
  data="http://www.youtube.com/v/eKgPY1adc0A">
  <param name="wmode" value="transparent" />
</object>
```

HTML

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- this code, unlike the code on YouTube's pages, is XHTML-compliant

Embedding QuickTime Video

```
<object width="width" height="height"
  type="video/quicktime"
  data="fileURL">
  parameters
</object>
```

HTML

```
<object width="320" height="240"
  type="video/quicktime"
  data="examples/multimedia/win98.mov">
  <param name="autoplay" value="true">
  <param name="controller" value="true">
</object>
```

HTML

- optional autoplay parameter can be set to true
- optional controller parameter can enable/disable onscreen play controls

Embedding Real Video

```
<object width="width" height="height"
  type="application/vnd.rn-realmedia"
  data="fileURL">
  parameters
</object>
```

HTML

```
<object width="320" height="240"
  type="application/vnd.rn-realmedia"
  data="examples/multimedia/flintstones.rm">
  <param name="autostart" value="true" />
</object>
```

HTML

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- optional autostart, loop parameters can be true or false
 - optional controls parameter can be PlayButton, PositionSlider, ...
 - more info

Embedding Windows Media

```
<object width="width" height="height" type="video/x-ms-wmv"
  data="fileURL">
  parameters
</object>
```

HTML

```
<object width="320" height="240"
  type="application/vnd.rn-realmedia"
  data="examples/multimedia/flintstones.rm">
  <param name="autostart" value="true" />
</object>
```

HTML

DOM and multimedia

```
// plays the multimedia file of the given type
var object = document.createElement("object");
object.type = "MIME type";
object.data = "url";
...
document.getElementById("id").appendChild(object);
```

JS

- multimedia files can be attached to the page by Javascript DOM code
- allows you to respond to user events by displaying a multimedia effect

DOM and multimedia example

```
// plays the multimedia file of the given type
var object = document.createElement("object");
object.type = "application/x-shockwave-flash";
object.data = "http://www.youtube.com/v/PZUTleBwiiw";
object.style.width = "425px";
object.style.height = "350px";

document.getElementById("videoarea").appendChild(object);
```

JS

- embeds a YouTube video in the page area called videoarea