

# DIG 4104C: WEB DESIGN WORKSHOP

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Lecture 10: Implementing audio, video, and  
other multimedia

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# Outline

- Audio file types and how to obtain them
- Video file types and how to obtain them
- Historical perspective
  - Helper Applications and Plug-ins
  - Previous methods in accessing audio and video
  - Streaming Media
- Modern HTML5 elements
  - Configure audio and video on a web page with
- Copyright issues
- Accessibility Issues

# Objectives

- Expand student knowledge of the formats and applications of audio and video on the web
- Give historical perspective of past integrations of audio and video online
- Expose students to the features of audio and video elements in HTML5
- Discuss copyright and intellectual property concerns using audio and video
- Discuss accessibility concerns and compliance

# At the end of this lecture, you should be able to.....

- Discuss the historical methods used to integrate audio and video
- Integrate audio and video into web projects
- Discuss accessibility concerns
- Discuss intellectual property and copyright as it pertains to audio and video

# AUDIO AND VIDEO

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What exactly are we talking about?

# Audio and video

- Audio and video come in many files types
- They have evolved over time and have many legacy formats
- What are the most popular formats and what are they used for?

# Audio File Types

File Type	Definition
.wav	Wave File (by Microsoft)
.aiff	Audio Interchange File Format (by Mac)
.mid	Musical Instrument Digital Interface (MIDI). to recreate a musical sound, small file size, limited # of types of sounds that can be reproduced
.au	Sun UNIX sound file. old one – 8-bit samples
.mp3	MPEG-1 Audio Layer-3 advanced compression – 1/12 the size of the original podcasts typically use the MP3 audio file format
ogg	Ogg-Vorbis newer audio compression that is comparable to mp3 open source , not patented and free to use
.mp4 .m4a	MPEG-4 Audio format is supported by QuickTime, iTunes, and iPods

# Obtaining Audio Files

- Audio files can be obtained from various sources:
  - Record your own sounds or music
    - A sound recorded at 8 bit resolution will have a smaller file size than a sound recorded using 16 bit resolution (music CD quality)
  - Download sounds or music from a free site
  - Record music in MP3 format
    - Commercial music can only be copied for personal use and not for publishing to the Web.
    - Contact the owner of the copyright to request permission to use the music.
  - Purchase sounds or music.
  - There are some ethical issues related to using sounds and music created by others.
    - Be certain to only publish sounds or music that you have either created yourself or have obtained the rights (sometimes called a license) to publish.



# Video File Types

File Type	Definition
.mov	Quicktime format widely used on the Macintosh and Windows platforms A file begins to play before the entire file is downloaded, giving the effect of streaming video while others format files must be downloaded first
.avi	Microsoft Audio Video Interleaved The original standard for PCs
.wmv	Windows Media File. The Windows Media Player supports this file format
.mpg	MPEG (Motion Picture Experts Group) used on the Macintosh and Windows platforms
.flv	Flash Video File
.m4v and .mp4 (MPEG-4)	format supported by Quicktime, iTunes and iPods, and other devices
.3gp (3GPP Multimedia File)	based on MPEG-4, it is a standard for delivery of multimedia over 3rd generation, high-speed wireless networks

# Video File Types

File Type	Definition
.ogv or .ogg	Ogg Theora - open-source video file format, that uses the Theora codec
..webm	open media format sponsored by Google; uses the VP8 video codec (open video format, free) and Vorbis audio codec

# Obtaining Video Files

- Video files can be obtained from various sources:
  - Record your own
    - Digital Camcorder
    - Webcam
    - Copy video tapes using a video capture card
  - Edit using Adobe Premiere, Movie Maker, Apple Quicktime, etc.
  - Download from a site for a fee
  - Purchase a DVD of stock videos
- There are some ethical issues related to using videos created by others.
  - Be certain to only publish videos that you have either created yourself or have obtained the rights (sometimes called a license) to publish.

# LET'S LOOK BACK

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Know your history or be destined to repeat it!

# History

- The history of multimedia on the web is intertwined with the history of web technologies
- Limitations of technology early on necessitated “creative” solutions for those that wanted to express themselves beyond text and simple images
- Some of these solutions are still around in legacy systems and will crop up from time to time when you are modernizing client's sites and you should be well versed on them.

# It all started with “Helper Applications” & “Plug-ins”

- **Helper Application**
  - A program that can be designated to handle a particular file type (such as .wav or .mpg) to allow the user to view or otherwise utilize the special file.
  - The helper application runs in a separate window from the browser.
- **Plug-In**
  - A more common method
  - Plug-ins run right in the browser window so that media objects can be integrated directly into the web page.
- **Issues:**
  - Some visitors did not have the applications, plug-ins, or file types associated with incorrect plug-ins or were using low bandwidth

# Historically Popular Plug-ins

- Real Player
- Windows Media Player
- Apple Quicktime
- Adobe Reader
- Adobe Macromedia
- Flash Player
- Shockwave

# Sound on a Web Page before HTML5

- Methods:
- 1. Link to the sound
  - `<a href="ringing.wav" title="Hear a telephone ring.">telephone ringing</a>`
    - When you click on the link, the plug-in for .wav files that is installed on the computer will display
- 2. Embed the sound
  - You can embed the sound in a page and optionally display a control panel for the sound
    - The `<embed>` tag
      - Not part of the W3C standard but commonly used
    - The `<object>` tag
      - is W3C standard but not well supported by browsers



# Access to audio files

- Hyperlink?
- `<a href="music.mp3" title="Music">Download Some Music!</a>`
- Limitations?

# Access to Audio

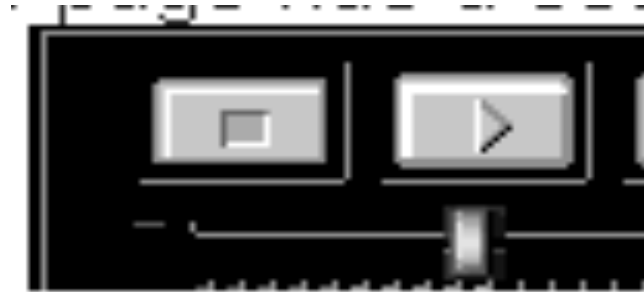
- Self-contained `<embed>` tag?
  - The embed tag (Was not part of the W3C standard but commonly used)
  - Attributes
    - src
    - controls (specific)
    - align
    - width
    - height
    - autostart
    - loop
    - Hidden



```
<embed src="music.wav" autostart="false" controls="smallconsole"
height="25" width="100" />
```

# Access to Audio

- The object tag? The <object> tag was W3C standard but was not well supported by browsers. A container tag <object> was used to place Java applets, sound and other media
- Attributes:
  - data
  - type
  - width
  - height
  - autostart
  - loop
  - hidden



```
<object data="catch.wav " autostart="false" height="50" width="100"  
type="audio/wav" >  
<param name="src" value="catch.wav" /></object>
```

# Access to Audio

- XHTML: Using `<object>` & `<param />` tags to embed audio

```
<object data="soundloop.mp3" height="50" width="100" type="audio/mpeg"
title="Music Sound Loop">
  <param name="src" value="soundloop.mp3" />
  <param name="controller" value="true" />
  <param name="autoplay" value="false" />
</object>
```



# Access to Audio

- Background Sound? (AKA World's most annoying feature of Internet Explorer)
- Internet Explorer supports the <bgsound> tag.
  - This tag is was not supported by other
- Use the <embed> tag to configure a background sound on a web page (IE used): :

```
<embed src="catch.wav" autostart="true" hidden="true" loop="true" />
```

# Access to Video

- Link to the video
  - `<a href="fido.mpg" title="Video of dog">Fido! (Caution: long video download)</a>`
- Compare link to the sound
  - `<a href="ringing.wav" title="Hear a telephone ring.">telephone ringing</a>`

# Access to Video

- Due to file size and bandwidth limitations, video was a problem in the past:

## 1. Link to the video

```
<a href="sparky.mpg" title="Video of dog barking">Sparky!  
(Caution: long video download — 1.8 MB)</a>  
(A good practice was to include the file type and file size)
```

## 2. Embed the video

- Embed the video in a page and optionally display a control panel for the sound
- The `<embed>` tag

## 3. The `<object>` tag

- W3C standard but was not well supported by browsers

# <embed> tag

- The embed tag, same as audio.

```
<embed src="fido.mpg" autostart="false" width="160"  
height="120" />
```



# <object> tag

- The object tag, same as audio.

```
<object data="fido.mpg" type="video/mpeg" autostart="false" width="160"  
height="120" >A video displaying a dog barking.</object>
```

# Streaming Media

- A disadvantage to a regular audio or video file is that the web site visitor must wait for the entire file to download before beginning to experience it.
- 
- Streaming media corrects this problem
  - it begins to play almost immediately and
  - uses "buffering" to capture the next portion of the file download.

# Streaming Media

- 3 major components:
  - 1. Authoring – tools to format video and audio into a streaming format
  - 2. Distribution
  - 3. Playback

# Streaming Media Authoring

## 1. Authoring

- There are 2 components to every streaming media production:
  - the media file itself
  - the metafile
- The metafile (which means “file about a file”)
  - is a text file that contains a link to the streaming media file.
- Web developers that want to use streaming media code a link to the metafile (not the media file) in order not to be downloaded entirely instead of being streamed.

## 2. Distribution

- The web server needs software to handle the streaming media – such as checking connection speed and adjusting the stream to the available bandwidth.
- To use a streaming media file with a web page, 3 files must be uploaded to the web server:
  - the media file
  - the metafile
  - and the web page.

# 3. Streaming Media Playback

- Visitors whose browser was equipped with the Real, Windows Media, Quick Time Players plug-in will experience the streaming media.
- If the web site is using a server, the stream will be adjusted to the bandwidth available, otherwise a constant stream will be sent.

# HTML5 ELEMENTS

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Enough history! Now let us modernize!!!

# HTML5 Fixes the landscape

- Now HTML5 has primary elements for both audio and video
- `<audio>`
- `<video>`
- They simplify the inclusion of media!
- <http://www.w3.org/standards/webdesign/audiovideo>

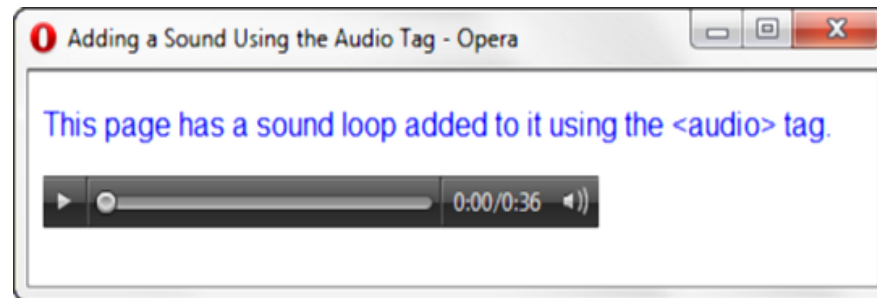


# HTML5 Audio & Source Elements

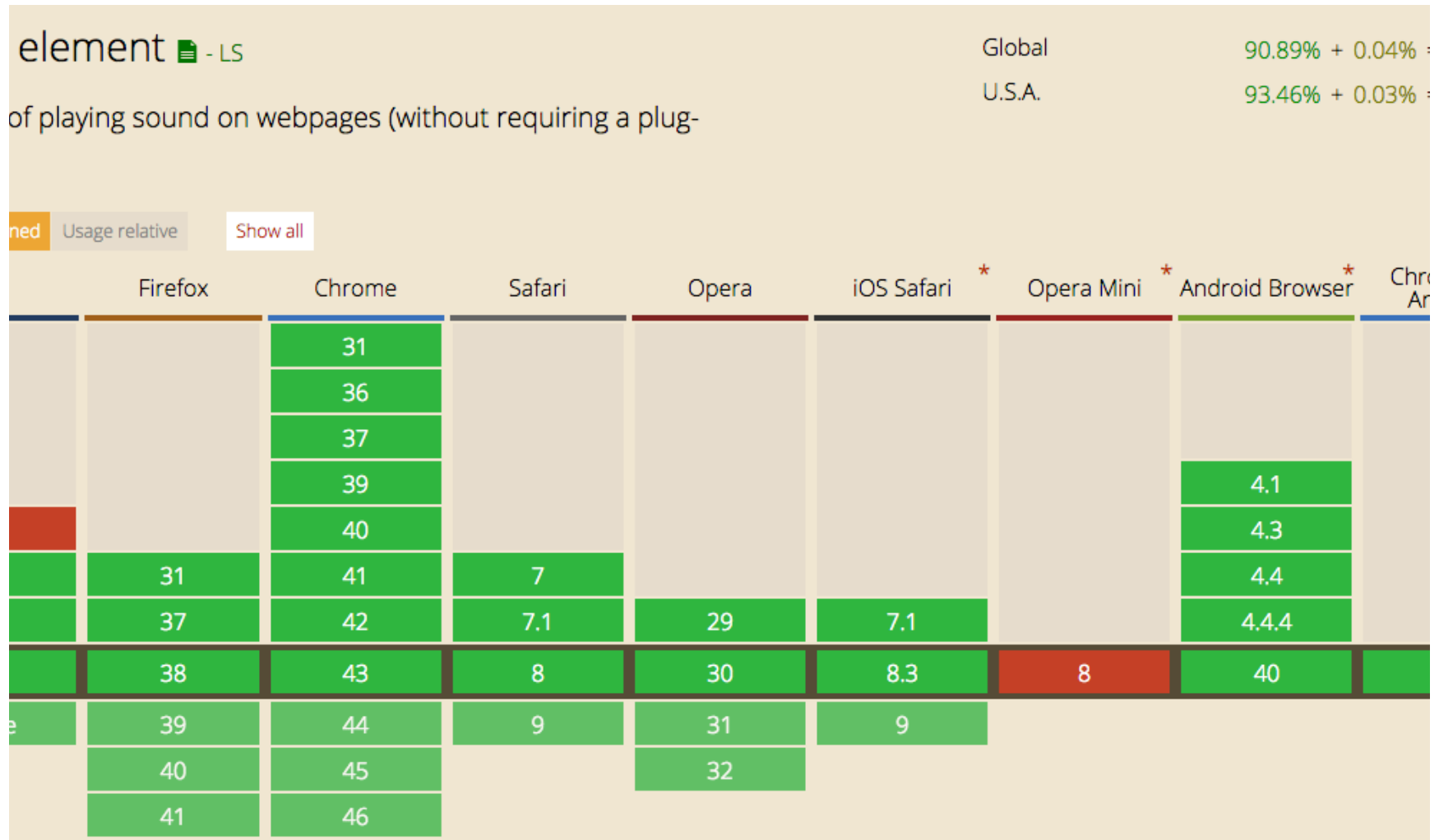
- The <audio> element
  - Optional attributes:
    - src
    - type
    - autoplay
    - controls
    - loop
    - preload
    - title
- Supply multiple versions of the audio b/c the browser support of different codecs (the algorithms used to compress the media)

# HTML5 Audio

```
<audio controls="controls">  
<source src="soundloop.mp3" type="audio/mpeg">  
<source src="soundloop.ogg" type="audio/ogg">  
<a href="soundloop.mp3">Download the Audio File</a> (MP3)  
</audio>
```



# Compatibility – HTML5 Audio



# Examples

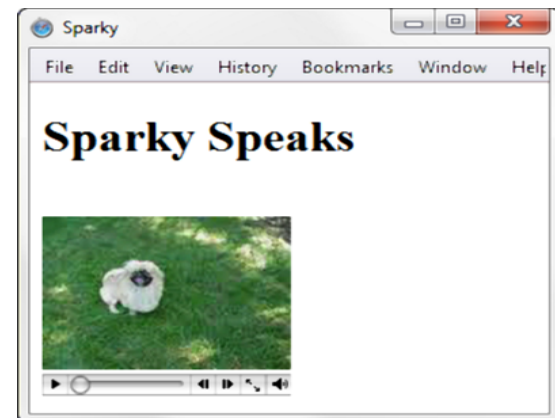
- <http://chromium.googlecode.com/svn/trunk/samples/audio/shiny-drum-machine.html>
- <http://www.jamwithchrome.com/>

# HTML5 Video & Source Elements

- The <video> element
  - Optional attributes:
    - src
    - type
    - autoplay
    - controls
    - height
    - width
    - loop
    - poster (an image to display if the browser cannot play)
    - preload
    - Title

# HTML5 Video Elements

```
<video controls="controls" poster="sparky.jpg"
      width="160" height="150">
  <source src="sparky.m4v" type="video/mp4">
  <source src="sparky.ogv" type="video/ogg">
  <a href="sparky.mov">Sparky the Dog</a> (.mov)
</video>
```



# Example

- <http://www.w3.org/2010/05/video/mediaevents.html>

# Copyright Issues and Media Files

- It is very easy to copy and download an image, audio, or video file from a web site.
- 
- It may be very tempting to reuse a file in one of your own projects, but that may not be ethical or lawful.
- Only publish web pages, images, and other media that you have personally created or have obtained the rights or license to use.
- If another individual has created an image, sound, video, or document that you believe would be useful on your own web site, ask permission to use the material instead of simply “grabbing” it.



# Copyright Issues and Media Files

- All work (web pages, images, sounds, videos, etc.) is copyrighted – even if there is no copyright symbol and date on the material.
- Be aware that there are times when students and educators can use portions of other's work and not be in violation of copyright law – this is called “fair use”.
- "Fair use" is use of a copyrighted work for purposes such as
  - criticism,
  - reporting,
  - teaching,
  - scholarship, or
  - research.

# Copyright Issues and Media Files

- Criteria used to determine “fair use”:
  - The use must be educational and not commercial
  - The nature of the work
  - The amount copied must be as small of a portion of the work as possible.
  - The copy does not impede (obstruct) the marketability of the original work.

# Multimedia & Accessibility

- **Required by ADA & 508 compliance:**
  - Provide alt(ernate) content
    - Text Transcript (for audio)
    - Captions (for video)
    - Printable PDF format
  - Provide links to plug-ins
  - Provide text descriptions and captions
  - Verify keyboard access and text description for Flash animation and Java applets
  - Check for screen flickering – no item that flashes > 3 times per sec to avoid seizures
  - Verify that the basic functionality works if JavaScript or unable to manipulate the mouse is disabled
  - If media is used for main navigation, provide plain text links

# Summary

- Introduced the HTML techniques used to place sound, video, and streaming media files on web pages.
- Discussed accessibility, usability, and copyright as they relate to media use on the Web.
- Introduced you to a number of technologies used to add interactivity to web pages.

# Discussion

- How would you use
  - Audio?
  - Video?
  - Other media?
- How would you avoid
  - Copyright issues?
  - Accessibility issues?

# Questions?



# References

- Crowther, R., & Lennon, J. (n.d.). HTML5 in action.
- Web Audio API (n.d.). Retrieved June 12, 2015, from <http://www.w3.org/TR/webaudio/>
- HTML Standard (n.d.). Retrieved June 12, 2015, from <https://html.spec.whatwg.org/multipage/embedded-content.html#the-video-element>
- Others embedded.