Using Audio & Video

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1

Using Audio & Video

Outline

- Using audio & video
- Common Media Types for Audio
- Common Media Types for Video
- Video Codecs
- Audio Codecs
- Adding audio and video
- The object & param elements
- The embed element
- The iframe element
- HTML5 audio & video elements

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2

Using Audio & Video

- **HTML5** provides new **audio** and **video** elements that makes it easier to use
- We need to be familiar with various media types and codes that are used for **audio** and **video**
- We need to know what media types and encoders work with browsers

3

Common Media Types for Audio

- Common media types for audio are

Type	Description
MP3	MPEG-1 Audio Layer 3, which is commonly known as MP3, is one of the most widely-used media types for audio.
AAC	Advanced Audio Coding or AAC is the format that Apple uses to deliver audio for its iTunes store. AAC was originally designed to deliver better quality audio than MP3.
Ogg	Usually found with the .ogg extension. Ogg is an open-source, open-standard media type currently supported natively by Firefox 3.5+, Chrome 4+, and Opera 10.5+. The audio stream of an ogg media type is technically referred to as Vorbis.
WMA	Windows Media Audio or WMA are usually found with the .wma extension. The audio stream of an ASF media type is typically Windows Media Audio.

4

Common Media Types for Video

Type	Description
MPEG-4	Commonly found with either an .mp4 or .m4v extension. The MPEG-4 media type is loosely based on Apple's QuickTime (.mov) media type. Although movie trailers on Apple's website are still delivered in the older QuickTime .mov media type, iTunes uses the newer MPEG-4 media type for delivering video.
Flash Video	Commonly found with either the .flv or .f4v extension. Flash Video, developed by Adobe, is currently the most common media type for delivering video on the web. At this writing, YouTube delivers its video using this format.
Ogg	Usually found with the .ogg extension. Ogg is an open-source, open-standard media type currently supported natively by Firefox 3.5 and above, Chrome 4 and above, and Opera 10.5 and above. The video stream of an ogg media type is technically referred to as Theora.
WebM	A relatively new file format which is usually found with the .webm extension. WebM is currently supported natively by Chrome, Firefox, and Opera, and Adobe has recently announced that future releases of Flash will also support WebM video.
ASF	The Advanced Systems Format is commonly found with the .asf extension. ASF is a Microsoft proprietary media type and is specifically meant for streaming media. The video stream of an ASF media type is typically Windows Media Video (WMV).
AVI	Audio Video Interleave is commonly found with the .avi extension and is another Microsoft proprietary media type. It is one of the oldest media types and was introduced in 1992 when computer-based video was largely a hope for the future.

Video Codecs

- A **codec** (derived from **CO**mpressor/**DEC**ompressor or **C**oder/**DEC**oder) is a software component that is used to code and decode the algorithms that are used for a media types
- Although there are dozens of codes for videos, the three most common are **H.264**, **Theora** and **VP8**

Codec	Description
`H.264`	Developed by the MPEG group in 1993. The goal of the Movie Picture Experts Group (MPEG) was to provide a single "all inclusive" codec that would support low bandwidth, low-CPU devices (think mobile phones); and high bandwidth, high-CPU devices (think your computer); and everything in between.
`Theora`	Theora is a royalty free codec which can produce video streams that can be embedded in virtually any format. Theora is typically mentioned in the same breath as Ogg.
`VP8`	Originally developed by On2 Technologies (recently acquired by Google), VP8 is an open-source, royalty-free encoder.

Audio Codecs

- Although there are dozens of codes for audio, the **FIVE** most common are listed in the table below

Codec	Description
AAC	AAC is one of the most common media types and is also the encoding standard for the media type. It is currently used on all Apple products, as well as Nintendo's DSi and Wii, Sony's Playstation 3 and Portable, as well as several mobile devices including phones powered by Sony Ericsson, Nokia, Android, and WebOS.
FLAC	Free Lossless Audio Codec (FLAC) is a free, open-source codec that has seen its popularity increase over the years due in large part to its high compression ratio. Audio files that uses FLAC can have their file sizes reduced by up to 60%.
MP3	MPEG-1 Audio Layer 3, commonly known as MP3, is one of the most widely-used media types for audio.
Vorbis	Typically packaged within the .ogg extension and commonly referred to as Ogg Vorbis. Vorbis is a free, open source format that is supported natively by most popular Linux installations as well as the newer editions of Chrome, Firefox, and Opera browsers.
WMA	Windows Media Audio (WMA) is usually found with the .wma extension. The audio stream of an ASF media type is typically Windows Media Audio.

7

Adding Audio & Video

- When we use the **<object>** element we can control the appearance and operation of the media player
- If we don't specify the **MIME** type, the file will be opened in the browser's default media player
- If we don't want to display the interface for the media player, we can omit the **width** and **height** attributes
- Some browsers require a **param** element that specifies the URL for the media file
- The **object** element is still in use. However, it is slowly declining as **HTML5** provides new **audio** and **video** elements

8

The object & param Elements

- The **<object>** and **<param>** elements and their a

Element	Description
object	Embeds a media file into a web page.
param	Provides parameters to the media player that's used to open a file.

Attributes of the object element

Attribute	Description
type	The MIME type of the file.
data	The URL of the file.
width	The width of the file or the media player that's used.
height	The height of the file or the media player that's used.

Attributes of the param element

Attribute	Description
name	The name of the parameter. Each media player has its own parameters.
value	The value of the parameter.

9

The object & param Elements

- The **<object>** and **<param>** elements and their attributes

An object element for playing a Flash file

```
<object type="application/x-shockwave-flash"
        data="media/sjv_anniversary.swf" width="400" height="150">
    <param name="autoplay" value="true">
</object>
```

Adobe Flash Player is no longer supported

10

The embed Element

- The **<embed>** element can also be used.
- When we use embed element, we code all parameters as attributes
- Supported by all major browsers and now included in the **HTML5** specification
- Easier to code and works better when compared to object element
- Using an embed element is a good way to display YouTube videos within the web page

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11

The embed Element

- The <embed> element attributes are

Attribute	Description
type	The MIME type of the file to be played.
src	The URL of the file to be played.
width	The width of the file or the media player that's used.
height	The height of the file or the media player that's used.

An embed element for playing an MP3 file

```
<embed type="audio/mpeg"
       src="media/sjv_welcome.mp3"
       width="300" height="25"
       autoplay="true">
```

An embed element that plays a YouTube video

```
<emb
```

Adobe Flash Player is no longer supported

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12

The iframe Element

- The **<iframe>** element can also be used.
- When we use **iframe** element, we use the **src** attribute to specify the URL besides set the **width** and **height**
- Supported by all major browsers and now included in the **HTML5** specification
- Easier to code and works better when compared to object/embed element
- Using an **iframe** element is a good way to display YouTube videos within the web page

13

The iframe Element

```
<body>
<h1>Using iframe element</h1>
<p>
Top programming languages to learn in 2022
</p>
<iframe width="683" height="384"
        src="https://www.youtube.com/embed/9U684GbFST4"
        title="Top 5 Programming Languages in 2022 to Get a Job"
        frameborder="0"
        allow="accelerometer; autoplay; clipboard-write; encrypted-me
        allowfullscreen>
</iframe>
</body>
```

14

HTML5 audio & video Elements

- The **<audio>** and **<video>** elements play the various media types within the browser
- To make the media work on all browsers, we need to add one more **source** element for each of the required media types
- Using an **iframe** element is a good way to display YouTube videos within the web page

15

HTML5 audio & video Elements

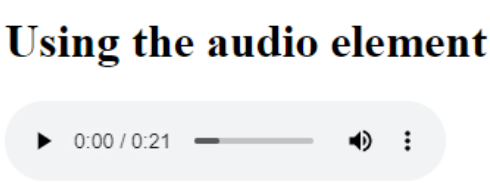
- The attributes for audio and video elements

Attribute	Description
`src`	The URL of the file to be played.
`poster`	Supported only by the video element, this attribute provides the path to a static image to be displayed in place of the video file before it is played.
`preload`	One of three possible values that tell the browser whether to preload any data: none (the default), metadata (only preload metadata like dimensions and track list), or auto (preload the entire media file).
`autoplay`	Starts playing the media as soon as the web page is loaded in the browser.
`loop`	Causes the media to repeat playing when it reaches the end.
`muted`	Supported only by the video element, this attribute causes the video to begin playing (if autoplay is also coded) with the volume muted.
`controls`	Displays the default control toolbar underneath the audio or video being played.
`width`	Specifies the width of the media file to be played within the browser.
`height`	Specifies the height of the media file to be played within the browser.

16

Example - audio

```
<audio id="audioplayer" controls autoplay>
    <source src="media/sjv_welcome.ogg" type="audio/ogg">
    <source src="media/sjv_welcome.mp3" type="audio/mp3">
</audio>
```



17

HTML5 audio & video Elements

- The attributes of source element

Attribute	Description
`src`	The URL of the file to be played.
`type`	The MIME type of the file to be played, including the codec for video files, but the codec isn't needed for MPEG (MP4).

18

HTML5 audio & video Elements

- Code snippets

The easiest way to add a video or audio element

```
<video src="media/sjv_speakers_sampson.mp4"></video>
<audio src="media/sjv_welcome.mp3"></audio>
```

A video element for playing MPEG-4, Ogg (Theora), and WebM media types

```
<video id="videoplayer" width="480" height="270" controls autoplay>
    <source src="media/sjv_speakers_sampson.mp4">
    <source src="media/sjv_speakers_sampson.webm"
        type='video/webm; codecs="vp8, vorbis"'>
    <source src="media/sjv_speakers_sampson.ogv"
        type='video/ogg; codecs="theora, vorbis"'>
</video>
```

An audio element for playing MP3 and Ogg (Vorbis) media types

```
<audio id="audioplayer" controls autoplay>
    <source src="media/sjv_welcome.ogg" type="audio/ogg">
    <source src="media/sjv_welcome.mp3" type="audio/mp3">
</audio>
```

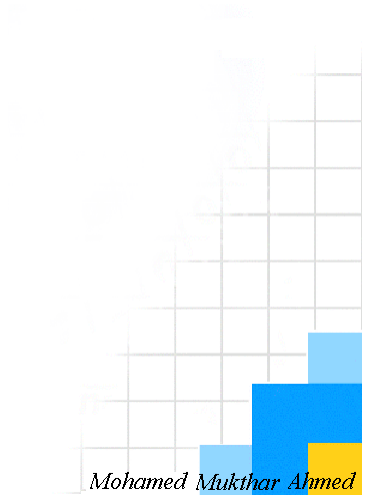

HTML5 audio & video Elements

- Code snippets

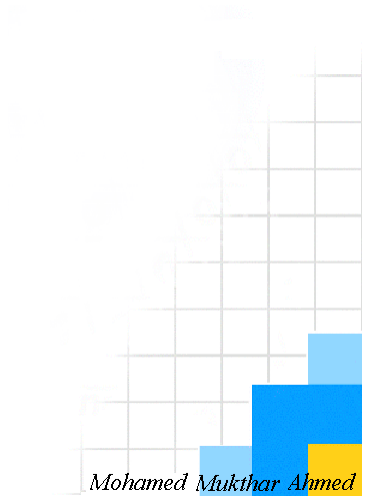
```
<video id="videoplayer" width="480" height="270" controls autoplay>
    <source src="media/sjv_speakers_sampson.mp4">

    <source src="media/sjv_speakers_sampson.webm"
            type='video/webm; codecs="vp8, vorbis"'>

    <source src="media/sjv_speakers_sampson.ogv"
            type='video/ogg; codecs="theora, vorbis"'>

</video>
```

Using the video element

Checking the video element



21



22