Internet Programming I

Chapter 2
Web Development Using HTML

Chere L. (M. Tech) and Biruk G. (MSc.)
Lecturer, Dept. of Software Eng.

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Objectives

After success completion of the chapter you will be able to:

- Identify the core web development technologies
- Understand the HTML document structure and contents models.
- Identify and use HTML elements and attributes
- Build website using HTML

Lesson 4
HTML Elements
(Multimedia Elements)

Outline

- Working with Multimedia
  - Image map
  - Picture element
  - Source element
  - Audio element
  - Video element
  - The <track> element

2. Creating Image Map

- An image map is an image with clickable areas

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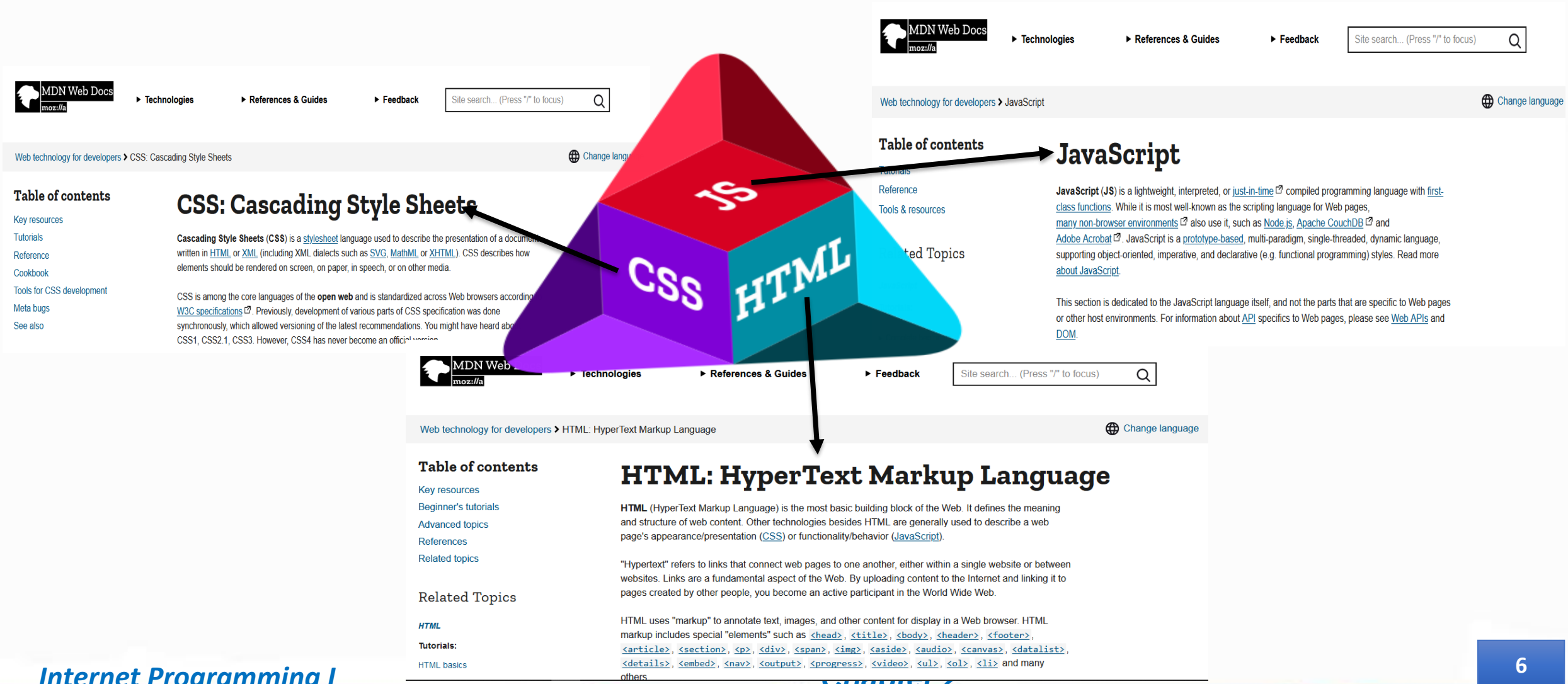

Cont'd

- **Image map** is defined by the **<map>** element with **<area>** elements
- The idea is to be able to perform different actions depending on where in the image you click.
- It is an *inline element* and belongs to the *phrasing content* ----> *Flow content* model.
- The **<map>** tag has one required attribute called name that gives the map a name so that it can be referenced.
- The name attribute must:
  - *Has a non-empty value with no space characters*
  - *Has a unique value – two map element in the same document not allowed to have the same name.*

How Does it image map Works?

- The image is inserted using the <img> tag.
  - Here the <img> element is different from other images because it require a usemap attribute
- Usemap attribute
  - Its value starts with a # followed by the name of the image map.
  - Used to create a relationship between the image and the image map.
- Then, the <map> element is used to create an image map, and is linked to the image by using the required name attribute.
- Then, the clickable areas are defined and added using an <area> element.

Cont'd

Example 1:

```
<h2>Image Maps</h2>
<p>Click on the computer, the phone, or the cup of coffee
   to go to a new page and read more about the topic:</p>

<img src="https://www.w3schools.com/html/workplace.jpg"
     alt="Workplace" usemap="#workmap"
     width="400" height="379">

<map name="workmap">
  <area shape="rect" coords="34,44,270,350"
        alt="Computer" href="computer.htm">
  <area shape="rect" coords="290,172,333,250"
        alt="Phone" href="phone.htm">
  <area shape="circle" coords="337,300,44"
        alt="Cup of coffee" href="coffee.htm">
</map>
```

The map and area elements

Click on the computer, the phone, or the cup of coffee to go to a new page and read more about the topic:

The <area> element

- It defines an area inside an image map that has predefined clickable areas.
- Allows **geometric areas** on an image to be associated with **hypertext link**.
- Used only within a <map> element.
- It is defined with (required) attributes shape and coords.
  - *Shape attribute - specifies the shape of the clickable area such as rectangle, circle, square, and polygon.*
  - *Coords attribute - defines the coordinates of areas inside the image.*

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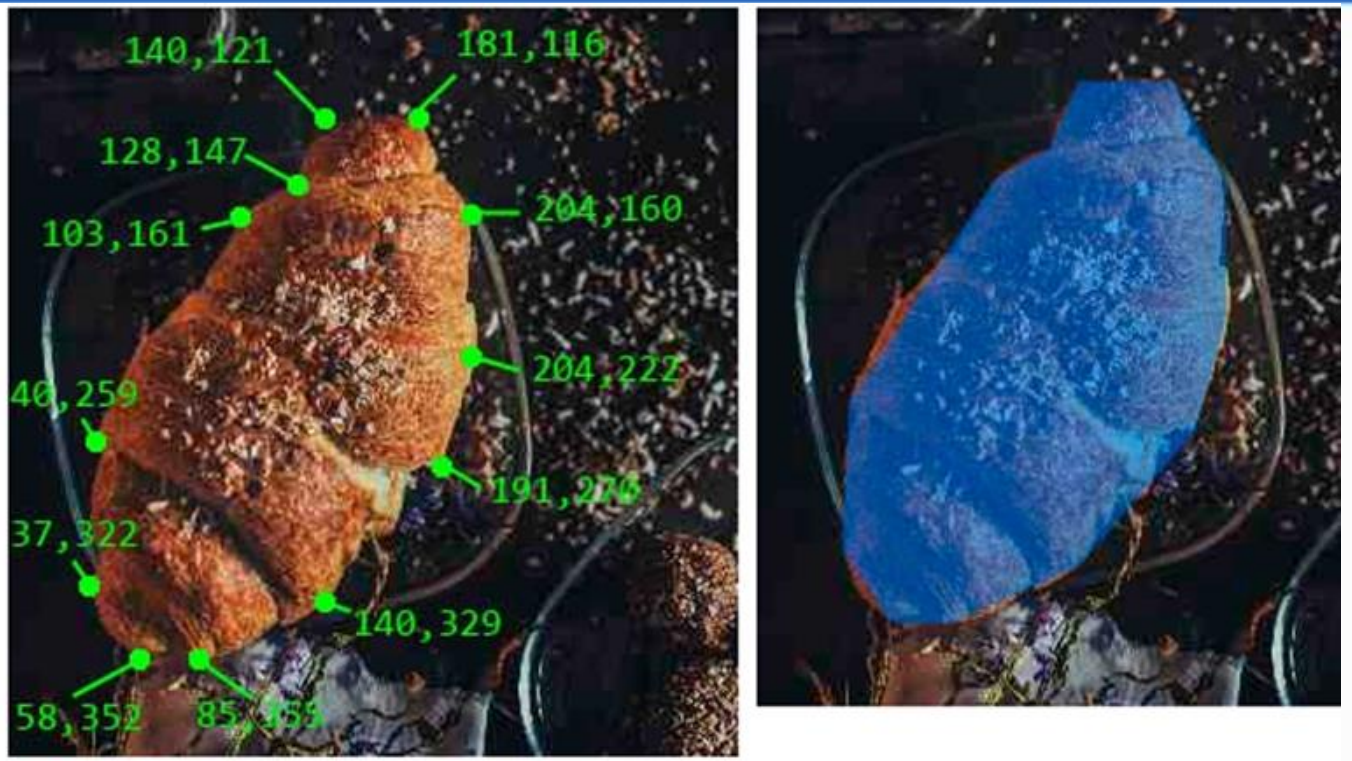
How coordinate works?

- **Shape attribute** possible values

  circle, rect, poly, default



Cords attribute possible values

- x, y, r (circle) where x, y specify the center and r is the radius of circle
- Pair of x,y (rect) that specify the left, top, right, bottom coordinates of rectangle
- x1,y1,x2,y2,x3,y3,..(polygon) that the polygon vertices.

Note: *The easiest technique is using map coordinate generator*

Cont'd

Other <area> attributes

Attribute	Value(s)	Description
alt	Text	Alternative text to display if image can not be displayed
target	_self, _blank, _parent, _top	Specifies where to display the linked resource (current window, new window, the parent frame, full width in the original (same) window)
href	URL	Determine the hyperlink destination for the active (clickable) area.
hreflag	language_code	➢ The language of the linked resource. ➢ Must specified this attribute if you provide a value for the **href** attribute
download	File name	Indicates that the hyperlink will be used to download a resource
rel	alternate, author, help, next, bookmark, license, nofollow, noreferrer, prefetch, prev, search, tag	➢ Determine the relationship between the current document and the hyperlink ➢ Used if a value for the href attribute is provided.

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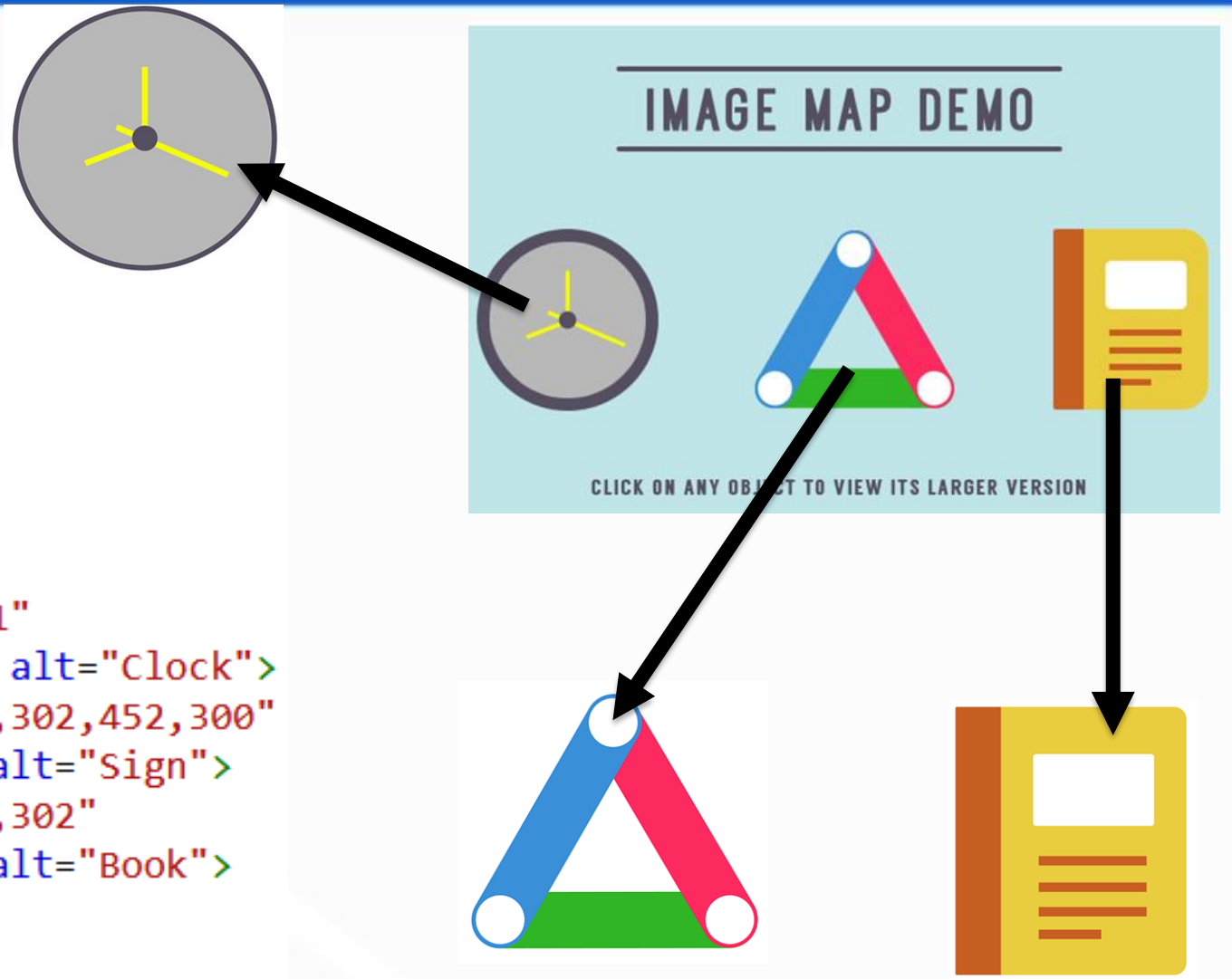
Example 2:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <title>Creating Image Maps in HTML</title>
</head>
<body>
    <img src="/examples/images/objects.png"
         usemap="#objects" alt="Objects">
    <map name="objects">
        <area shape="circle" coords="137,231,71"
              href="/examples/html/clock.html" alt="Clock">
        <area shape="poly" coords="363,146,273,302,452,300"
              href="/examples/html/sign.html" alt="Sign">
        <area shape="rect" coords="520,160,641,302"
              href="/examples/html/book.html" alt="Book">
    </map>
</body>
</html>
```



3. The <picture> and <source> Element

The <picture>

- Unlike <img> tag, it offer alternative versions of an image for different display/device scenarios.
- Like **<img>** tag, it is also an ***inline element*** and the content categories are *embedded content ---> phrasing content ---> Flow content.*
- It nest a single <img> element and zero or more <source> elements
- The **<img> element** serves two purposes:
  - *It describes the size and other attributes of the image and its presentation.*
  - *It provides a fallback in case none of the offered <source> elements can provide a usable image.*
- Always specify the <img> element as the **last child** element of <picture> element

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The <source> Element

- It specifies **multiple media resources** for the *<picture>* element.
- It also used with the *<audio> element, and the <video> element.*
- It is an empty element (or void element) and also doesn't has content model
- Commonly used to offer the same media content in multiple file formats in order to provide compatibility with a broad range of browsers.

How <picture> and <source> elements work?

- The browser will consider each child <source> element and choose the best match among them.
- If no matches are found or the browser doesn't support the <picture> element then the URL of the <img> element specified in the src attribute is selected.

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Example 1:

- *Considered If none of the source match the view point then*

codeLAB Show Output

```
<!DOCTYPE html>
<html>
<head>
<meta name="viewport"
      content="width=device-width, initial-scale=1.0">
</head>
<body>
<h2>The picture Element</h2>
<picture>
  <source media="(min-width: 650px)"
          srcset="https://www.w3schools.com/html/img_food.jpg">
  <source media="(min-width: 465px)"
          srcset="https://www.w3schools.com/html/img_car.jpg">
  <img src="https://www.w3schools.com/html/img_girl.jpg"
       style="width:auto;">
</picture>
</body>
</html>
```

Share this example with Facebook, Twitter, Gmail. Please give us a Like, if you find it helpful.

Cont'd

The <source> attributes

Attribute	Value	Description
media	media_query	➢ media query of the resource's intended media ➢ Accepts any valid media query that would normally be defined in a CSS
sizes	media condition-length pairs	➢ Specifies list of media source sizes for different page layouts ➢ Each source size consists of a comma-separated list of media condition-length pairs. *E.g. sizes = "(max-height: 500px) 1000px"*
src	URL	➢ Required when <source> is used in <audio> and <video>. Specifies the URL of the media file
srcset	URL	➢ Required when <source> is used in <picture>. ➢ Specifies the URL of the image to use in different situations
type	MIME-type	Specifies the MIME-type of the resource

Cont'd

Example 2:

codeLAB Show Output

```
1  <!DOCTYPE html>
2  <html>
3  <head>
4  <meta name="viewport" content="width=device-width, initial-
   scale=1.0">
5  </head>
6  <body>
7
8  <h1>The picture element</h1>
9
10 <p>Resize the browser window to load different images.</p>
11
12 <picture>
13   <source media="(min-width:650px)"
   srcset="https://www.w3schools.com/tags/img_pink_flowers.jpg">
14   <source media="(min-width:465px)"
   srcset="https://www.w3schools.com/tags/img_white_flower.jpg">
15   <img src="https://www.w3schools.com/tags/img_orange_flowers.jpg"
   alt="Flowers" style="width:auto;">
16 </picture>
17
18 </body>
```

- *Considered If none of the source match the view point then*

Cont'd

Common use cases for <picture>

- **Bandwidth**
  - For small screen or device, it is not necessary to load a large image file.
  - By loading the most appropriate image for the viewer's display, the <picture> element allow s**aving bandwidth and speeding page load times** .
- **Format Support**
  - Some browsers or devices may not support all image formats.
  - With the <picture> element, you can add images of all formats, and let the browser to find the supported format
- **Art direction**
  - Cropping or modifying images for different media conditions.
  - E.g. loading a simpler version of image which has too many details, on smaller displays

5. Audio and Video Elements

- Before HTML5 there hasn't been a standard multimedia on web
- Most videos were shown through a plugin. However, not all browsers have the same plugins
- HTML5 features include native audio and video support without the need for Flash/a plugin.
- A standard way to include multimedia contents (video or audio) on web.
  - *The **<audio> tag -** embed sound content in web documents*
  - *The **<video> tag -** embed a media player which supports video playback.*
  - *The **<source> tag –** specify the source of media both for audio and video.*
- Both <audio> and <video> tags require the media controls.

Cont'd

- **Media Sources**
  - One or more media sources are represented using the src attribute and the <source> element.
- **Examples:**

```
<!DOCTYPE html>
<html>
<body>

<audio controls>
  <source src="horse.ogg" type="audio/ogg">
  <source src="horse.mp3" type="audio/mpeg">
Your browser does not support the audio element.
</audio>

</body>
</html>
```

```
<!DOCTYPE html>
<html>
<body>

<video width="320" height="240" controls>
  <source src="movie.mp4" type="video/mp4">
  <source src="movie.ogg" type="video/ogg">
  Your browser does not support the video tag.
</video>

</body>
</html>
```

Cont'd

Some attributes of <audio> and <video> elements

Attribute	Value	Description
autoplay	autoplay	A Boolean attribute: if specified, the audio/video will automatically begin playback as soon as it is ready
controls	controls	if specified, the controls displayed to allow the user to control audio/video playback, including volume, seeking, and pause/resume.
loop	loop	Audio/video will start over again, every time it is finished
muted	muted	A Boolean attribute that indicates whether the audio will be initially silenced. Its default value is false.
preload	non / auto / metadata	Enumerated attribute which intended to provide a hint to the browser what content is loaded before the media played.
height	*pixels*	*Sets the height of the video player*
width	*pixels*	*Sets the width of the video player*
poster	*URL*	*An image to be shown while the video is downloading, or until the user hits the play button*

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HTML Audio and Video Formats

- There are three supported video and audio formats.
- The browser support for the different formats is given below:

Browser	Video format			Audio format		
	MP4	WebM	Ogg	MP3	WAV	OGG
Edge	YES	YES	YES	YES	YES*	YES*
Chrome	YES	YES	YES	YES	YES	YES
Firefox	YES	YES	YES	YES	YES	YES
Safari	YES	YES	NO	YES	YES	NO
Opera	YES	YES	YES	YES	YES	YES

Cont'd

Example: HTML Video

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <title>Embedding Video into an HTML Page</title>
</head>
<body>
    <video controls="controls" src="/examples/video/shuttle.mp4">
        Your browser does not support the HTML5 Video element.
    </video>


  <p> A video with alternative sources. </p>
    <video controls="controls">
        <source src="/examples/video/shuttle.mp4" type="video/mp4">
        <source src="/examples/video/shuttle.ogv" type="video/ogg">
        Your browser does not support the HTML5 Video element.
    </video>
</body>
</html>
```

Cont'd

Example: HTML Audio

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <title>Specify Alternate Sources for audio Element in
HTML</title>
</head>
<body>
  <p> A audio with single sources. </p>
  <audio controls="controls" src="/examples/audio/birds.mp3">
        Your browser does not support the HTML5 audio element.
    </audio>
  <br><br/>  <hr/>
  <p> A audio with alternative sources. </p>
    <audio controls="controls">
        <source src="/examples/audio/birds.mp3" type="audio/mpeg">
        <source src="/examples/audio/birds.ogg" type="audio/ogg">
        Your browser does not support the HTML5 audio element.
    </audio>
</body>
</html>
```

6. The <track> Element

- HTML <track> tag is used to define time-based text tracks for a media file.
- It must used as child element of <audio> and <video> elements.
- It is used to specify *subtitles, caption files or other files* containing text, that should be visible when the media is playing.
- Tracks are formatted in WebVTT format (.vtt files).
- **Example:**

Cont'd

- **The <track> tag-specific attributes**

Attribute	Value	Description
default	default	It specifies that the track should be enabled unless the user's preferences indicate that another track is more important.
kind	captions / chapters descriptions / metadata subtitles	It specifies that which type of text track you want to add.
label	text	It specifies the title of the text track.
src	URL	It defines the URL of the track file.
srclang	language_code	It defines the language of the track text content, such as English, Germany, etc.

6. The <track> Element

How to create WEBVTT file:

- In the text editor (notepad)
  1. Write *WEBVTT* as the first line in the editor
  2. Leave a blank line
  3. Specify the time duration in the proper format
     00:01.000 --> 00:04.000
  4. Enter and write your text which you want to add a subtitle or caption
     - Never drink liquid nitrogen.
  5. Repeat step 3 to 5 until you finish it.
  6. Save it using .vtt extension.

Example 1:

WEBVTT - This file has cues.

00:01:14.815 --> 00:01:18.114
- What?
- Where are we now?

00:01:18.171 --> 00:01:20.991
- This is big bat country.

00:01:21.058 --> 00:01:23.868
- [Bats Screeching]
- They won't get in your hair.
- They're after the bugs.

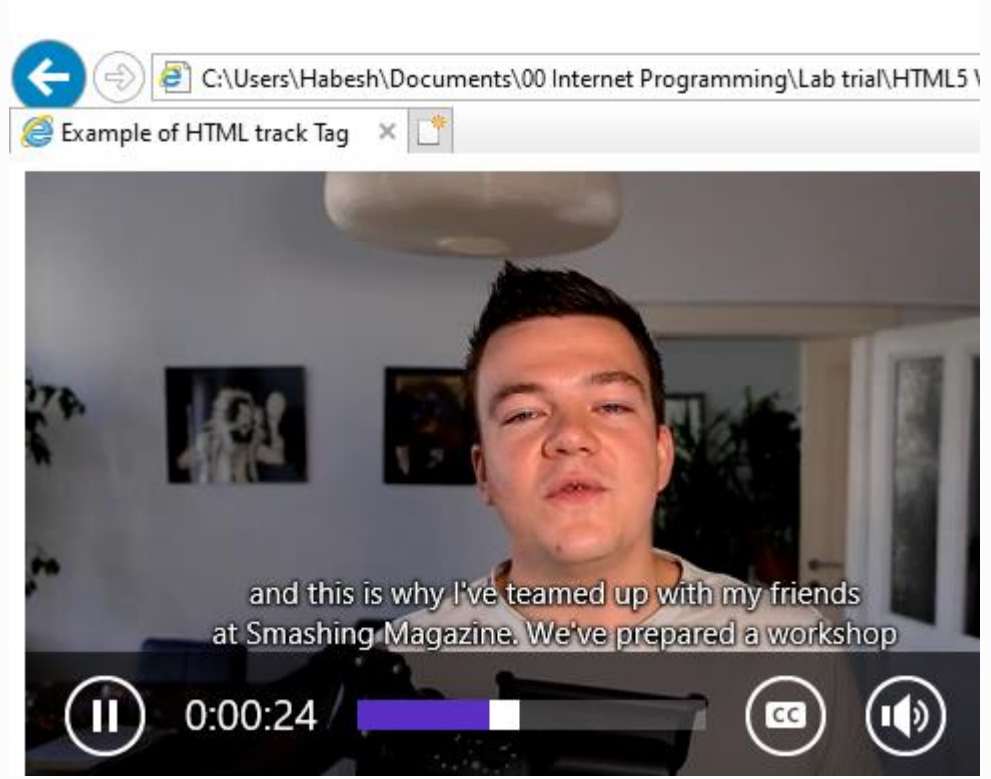
Note: For more details checkout - https://developer.mozilla.org/en-US/docs/Web/API/WebVTT_API

Cont'd

Example: video track

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>Example of HTML track Tag</title>
</head>
<body>
    <video src="workshop_promo.mp4"  controls>
      <track src="workshop_promo.vtt"
             kind="captions"
             label="English"
             srclang="en" default>
      <track src="workshop_promo_de.vtt"
             kind="subtitles"
             label="Deutsch"
             srclang="de">
      Sorry, your browser doesn't support embedded videos.
    </video>

</body>
</html>
```



Summary

- Image map is an image with clickable areas which created by <map> element.
- The <picture> element offer alternative versions of an image for different display/device scenarios.
- HTML5 introduces new <video> and <audio> elements for adding video and audio to web pages, but these are only supported in the latest browsers.
- HTML <track> tag is used to define time-based text tracks (specify subtitles, caption files or other files containing text) for a media file.
- The <track> tag must used as child element of <audio> and <video> elements.
- Browsers that support the HTML5 elements do not all support the same video and audio formats.

Reading Resources/Materials

Chapter 9:

- ✔ Jon Duckett; HTML and CSS Design and Build Websites, 2011 John Wiley & Sons, Inc., Indianapolis, Indiana

Chapter 2, 3, 4:

- ✔ Ian Devlin; HTML5 Multimedia: Develop and Design, 2012 Peachpit Press, f Pearson Education.

Thank You
For Your Attention!!