

Lecture 15

Structure and Content in the Presentation Layer: The HyperText Markup Language (HTML)



Where it all Begins - SGML

GML – Goldfarb, Mosher and Lorre, 1969

- Generalized markup that would work across computer systems using *tags*
- Concept of *validation* – how the tags can be used

SGML - Standard Generalized Markup Language, 1980

- ISO standard 1986



Markup concepts

Tags and elements

<tag_name>

Marked up content

</tag_name>

The characteristics defined by the tag are applied to the content of the element

Nested Elements

Elements can have other elements nested inside them, to any level of nesting.

- A 'child' element, begins and ends inside its 'parent'

```
<parent_tag>
```

```
  <child_tag>
```

```
    Marked up content
```

```
  </child_tag>
```

```
</parent_tag>
```



Nested element



Attributes

Attributes configure the tag in some way.

- Appear inside the opening tag, and consist of one or more name-value pairs
- *attribute_name="attribute_value"*

E.g.

- `<document language="fr">`
- `<document language='fr'>`
- `<document language="fr" type="manual">`



Well-Formedness

Balanced tags

```
<tag>...</tag>
```

Correct nesting

```
<parent_tag>  
  <child_tag>  
    ...  
  </child_tag>  
</parent_tag>
```

Document has a root element

Quoted attributes

```
<tag name="value">
```

HTML Documents

Text files with tags that mark up the content.

- They become web pages when they are made available on a web server and are rendered on the client machine using a web browser.

The browser uses the tags to manage the content. e.g. the paragraph tag

- `<p>some text in paragraph one ...</p>`
- `<p>some text in paragraph two ...</p>`



Creating an HTML Document

An HTML document with the minimum number of tags

- Not case sensitive.

```
<html>  
<head>  
  <title> The title of the web page </title>  
</head>  
<body> body content of the web page </body>  
</html>
```



Text Elements

```
<html>
<head>
  <title> Versions of HTML </title>
</head>
<body>
  <!-- File: Example3-1.htm -->
  <h1>Versions of HTML</h1>
  <h2>HTML 1.0</h2>
  <p>
```

The first version of HTML dates from 1991, and was developed by Tim Berners Lee. It was very different from the HTML we know today...

```
</p>
<h2>HTML 2.0</h2>
<p>
```

The second version of HTML, in 1996, was an attempt to standardise the language, which was being widely implemented by different vendors' web browsers...

```
</p>
</body>
</html>
```

HTML Document Type

Specifies the structural rules for an HTML document

- Can be used for validation (introduced later)

Add this document type definition to the top of the HTML (for the strict document type)

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"  
"http://www.w3.org/TR/html4/strict.dtd">
```

```
<!DOCTYPE html>
```

For HTML 5



Line Breaks and Rules

Empty elements (no end tag)

Line break tag

`
`

Horizontal rule tag

`<hr />`



Citations and Block Quotes

Have some semantics

- Structure, not format

The `<blockquote>` tag must contain other structural elements, not just text

```
<p>...
```

```
<cite> Tim Berners Lee </cite> is quoted as saying </p>
```

```
<blockquote>
```

```
<p>
```

```
If you use the original World Wide Web program, you never see a URL or have to deal with HTML. That was a surprise to me...that people were prepared to painstakingly write HTML.
```

```
</p>
```

```
</blockquote>
```

Subscript and Superscript

Useful for chemical and mathematical formulae

H_2O

- to represent H_2O (the chemical symbol for water)

$E = mc^2$

- to represent $E=mc^2$ (Einstein's formula for relativity)

HTML Character References

For special characters.

HTML character reference	Equivalent character	Meaning
<	<	Less than
>	>	Greater than
"	“	Quotation mark
&	&	Ampersand
 	(a space)	Non-breaking space
®	®	Registered trademark

Lists

Lists can present items of information in an easy-to-read format.

These lists are easy to format in HTML, and they may even be nested (lists of lists) to produce an outline format.

Lists are also handy for creating an index or table of contents to a series of documents or chapters.

HTML lists come in various formats:

- Unordered lists
- Ordered lists
- Definition lists



Unordered and Ordered Lists

The bullet list is called an unordered list (UL tag). List items are surrounded by `` tags

```
<ul>  
  <li> a list item </li>  
  <li> another list item </li>  
  ...  
</ul>
```

The ordered (numbered / lettered) list uses the OL and LI tags

```
<ol>  
  <li> the first list item </li>  
  <li> the second list item </li>  
  ...  
</ol>
```


Lists Can Be Nested

The nested list must appear as part of a list item element (tag)

```
<ul>
  <li> an item in the main list</li>
  <li> Here comes a nested list...
    <ol>
      <li> an item in the nested list</li>
      <li> another item in the nested list</li>
      ...
    </ol>
  </li>
  <li> another item in the main list</li>
  ...
</ul>
```

Definition List

Definition (Glossary) lists using DL element

Each item has 2 parts: a term (DT) element and a definition (DD) element

```
<dl>  
  <dt> SGML </dt>  
  <dd> Standard Generalised Markup Language </dd>  
  <dt> HTML </dt>  
  <dd> HyperText Markup Language </dd>  
  <dt> XML </dt>  
  <dd> eXtensible Markup Language </dd>  
</dl>
```

Images

Images can be added to a web page using the `` tag (empty tag)

```

```

- The images themselves can be GIF, JPG or PNG
- The 'src' attribute is the image filename or UR
- The 'alt' attribute provides an alternative to the image
- The height and width may also be set

```

```



Links

A link is a connection from one Web resource to another

A link has two ends - called anchors - and a direction.

The link starts at the "source" anchor and points to the "destination" anchor, which may be any Web resource

– (page, image, video, sound, program etc.)



Using Anchors

An anchor is defined with the `<a>` tag

The href (Hypertext REFerence) attribute specifies the name of the resource to link to

This may be a full URI

```
Click <a href="http://www.webhomecover.com">here</a>  
for a great insurance deal...
```

Or, if the resource is in the same web application,
just a local file name

```
<a href="aboutus.htm">About us</a>
```



Destination Anchors

Within a document we can define a destination anchor

The `id` attribute assigns a unique id to an anchor.

```
<a id="terms">Terms and Conditions</a>
```

We can link to this name by preceding it with a '#' in the source anchor

```
<a href="#terms">terms and conditions</a>
```



Images as Link Anchors

Images, as well as text, can be used as link anchors by nesting IMG elements inside anchor elements, for example

```
<a href="home.htm">  
    
</a>
```

This is a useful technique for implementing the 'home page at top left' pattern



Email Links

Anchors can also be used for email links. To do this you simply use a 'mailto' value in the 'href' attribute, which takes this format:

```
<a href="mailto:help@webhomecover.com">Email the help desk</a>
```

When 'Email the help desk' is clicked, the web browser may open your email client to compose a message



Tables

A table consist of rows and columns, with option column headings and a caption

- Each part of table is known as a cell

caption

headings →	Column heading	Column heading	Column heading	Column heading
rows →	data	data	data	data
	data	data	data	data
	data	data	data	data

Table Tags

A table is defined by `<table>...</table>` tags

Table caption: `<caption>...</caption>`

Table rows: `<tr>...</tr>`

Table headers: `<th>...</th>`

Table data: `<td>...</td>`



Task – Simple Table

Our Call Centres

Territory	Location	Phone	Fax
Americas	New York	0800 1425364	0800 1122334
EMEA	London	0800 1324536	0800 8444463
EMEA	Cape Town	0800 9009586	0800 9944474
APAC	Sydney	0800 1114445	0800 1114445

Solution

```
<html><head><title>Our Call Centres</title></head>
<table>
<caption>Our Call Centres</caption>
<tr>
<th>Territory</th> <th>Location</th> <th>Phone</th> <th>Fax</th>
</tr>
<tr>
<td>Americas</td> <td>New York</td> <td>0800 1425364</td> <td>0800 1122334 </td>
</tr>
<tr>
<td>EMEA</td> <td>London</td> <td>0800 1324536</td> <td>0800 8444463</td>
</tr>
<tr>
<td>EMEA</td> <td>Cape Town</td> <td>0800 9009586</td> <td>0800 9944474</td>
</tr>
<tr>
<td>APAC</td> <td>Sydney</td> <td>0800 1114445</td> <td>0800 1114445</td>
</tr>
</table>
</body>
</html>
```

Blank Cells

To leave cells blank, we can simply replace the data in TH or TD elements with a non breaking space

Our Call Centres

Territory	Location	Phone	Fax
Americas	New York	0800 1425364	0800 1122334
EMEA	London	0800 1324536	0800 8444463
EMEA	Cape Town	0800 9009586	
APAC	Sydney	0800 1114445	0800 1114445



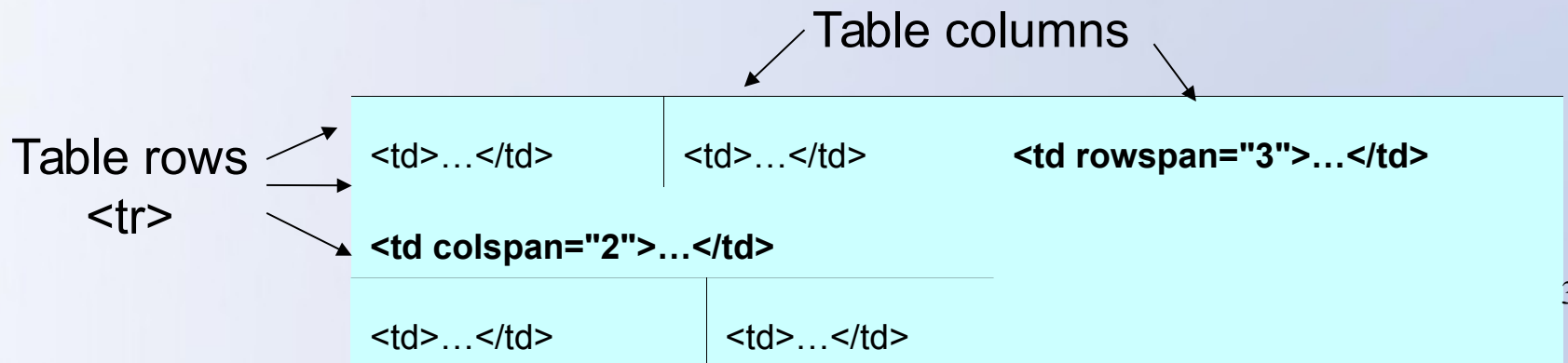
Blank Cells

```
<tr>  
  <td>EMEA</td> <td>Cape Town</td> <td>0800 9009586</td>  
  <td>&nbsp;</td>  
</tr>
```

Spanning Cells

Cells may span several rows or columns.

- The number of rows or columns spanned by a cell is set by the “rowspan” and “colspan” attributes of the TD and TD elements.
 - e.g. `<td colspan="2">` means span 2 columns,
 - `<td rowspan="3">` means span 3 rows.



Spanning Example

Our Call Centres

Territory	Location	Phone	Fax
Americas	New York	0800 1425364	0800 1122334
EMEA	London	0800 1324536	0800 8444463
	Cape Town	0800 9009586	
APAC	Sydney	0800 1114445	



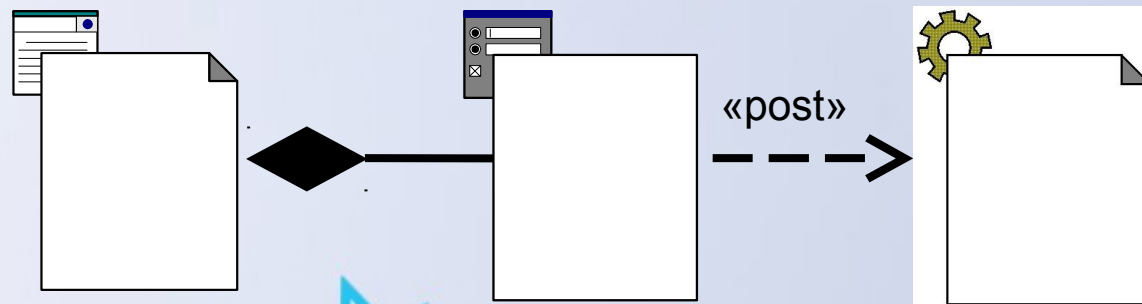
Spanning Solution

```
<table>
<caption>Our Call Centres</caption>
<tr>
  <th>Territory</th> <th>Location</th> <th>Phone</th> <th>Fax</th>
</tr>
<tr>
  <td>Americas</td> <td>New York</td> <td>0800 1425364</td> <td>0800 1122334 </td>
</tr>
<tr>
  <td rowspan="2">EMEA</td> <td>London</td> <td>0800 1324536</td> <td>0800 8444463</td>
</tr>
<tr>
  <td>Cape Town</td> <td>0800 9009586</td> <td></td>
</tr>
<tr>
  <td>APAC</td> <td>Sydney</td> <td colspan="2">0800 1114445</td>
</tr>
</table>
```

HTML Forms

Forms allow the user to send information to a web application.

Forms enable an HTTP 'POST' request to be made, which sends data from a client to a server.



Form Elements

```
<form action="insuranceQuote" method="post" >  
...components of the form  
</form>
```

Method attribute

- Either post or get

Action attribute

- Program to be executed by the server when the form's data is submitted. Can be a CGI script, JSP, ASP, PHP etc.

Input Types

Many of the components of a form use the `<input>` tag

- The “type” attribute specifies what type of control is used for input
- The “name” attribute is used by the server to process the data
- The “value” attribute can be used to set a default value for the control
- The “id” attribute can be used in conjunction with a LABEL element



Submit and Reset Buttons

A form must have a submit button in order to invoke its action

- It may optionally have a reset button

```
<input type="submit" value="Login">  
<input type="reset" value="Clear form">
```

Text and Password Input

```
<form action="login" method="post" >
  <table>
    <tr>
      <td><label for="loginid">Login Name:</label></td>
      <td><input type="text" name="loginid" id="loginid"></td>
    </tr>
    <tr>
      <td><label for="pword">Password:</label></td>
      <td><input type="password" name="pword" id="pword"/></td>
    </tr>
    <tr>
      <td></td>
      <td>
        <input type="submit" value="Login"/>
        <input type="reset" value="Clear form"/>
      </td>
    </tr>
  </table>
</form>
```

Login Name:	<input type="text" value="Dave"/>
Password:	<input type="password" value="••••••"/>
	<input type="button" value="Login"/> <input type="button" value="Clear form"/>

Checkboxes And Radio Buttons

These are also input types

- Note how a set of radio buttons share the same name

```
<tr><td colspan="2">Welcome to our site. How would you like to continue?</td></tr>
<tr><td><input type="radio" name="status" value="guest"></td>
<td>Access the site as a guest</td></tr>
<tr><td><input type="radio" name="status" value="new"></td>
<td>Set up a new user account</td></tr>
<tr>
<td><input type="radio" name="status" value="login" checked="checked"></td>
<td>Login using an existing account</td></tr>
<tr><td colspan="2">
<label for="mailinglist">
Please check this box if you would like to be added to our mailing list</label>
</td>
<td><input type="checkbox" name="mailinglist" id="mailinglist" checked="checked"></td>
</tr>
```

Welcome to our site. How would you like to continue?

- ☐ Access the site as a guest
- ☐ Set up a new user account
- ☒ Login using an existing account

Please check this box if you would like to be added to our mailing list ☒

Continue

Reset

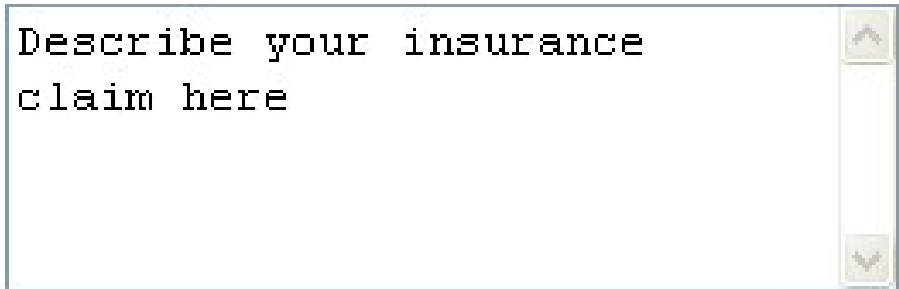


Text Area

Text areas do not use the input tag

- Use a separate `<textarea>` tag

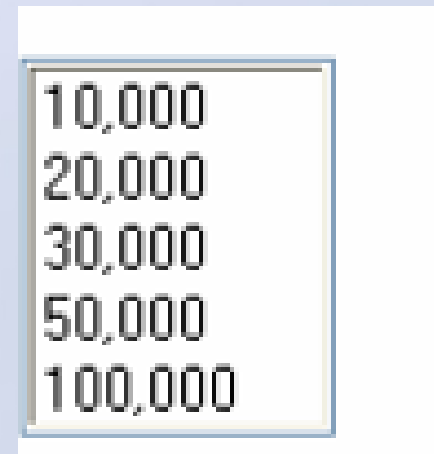
```
<textarea name="description" rows="5" cols="30">  
Describe your insurance claim here  
</textarea>
```



Describe your insurance
claim here

Select Lists

```
<select name="cover" size="n">  
  <option value="10000">10,000</option>  
  <option value="20000">20,000</option>  
  <option value="30000">30,000</option>  
  <option value="50000">50,000</option>  
  <option value="100000">100,000</option>  
</select>
```



HTML 5



HTML5 is a W3C specification that defines the fifth major revision of the Hypertext Markup Language (HTML).

Other new features in HTML5 include specific functions for embedding graphics, audio, video, and interactive documents.

New elements also allow you to define sections of your Web page using new tags such as `< article >` which defines an article, `< nav >` which defines navigation links, `< source >` which defines media resources, and many others.



HTML 5 Semantic elements

<article>

<aside>

<details>

<figcaption>

<figure>

<footer>

<header>

<main>

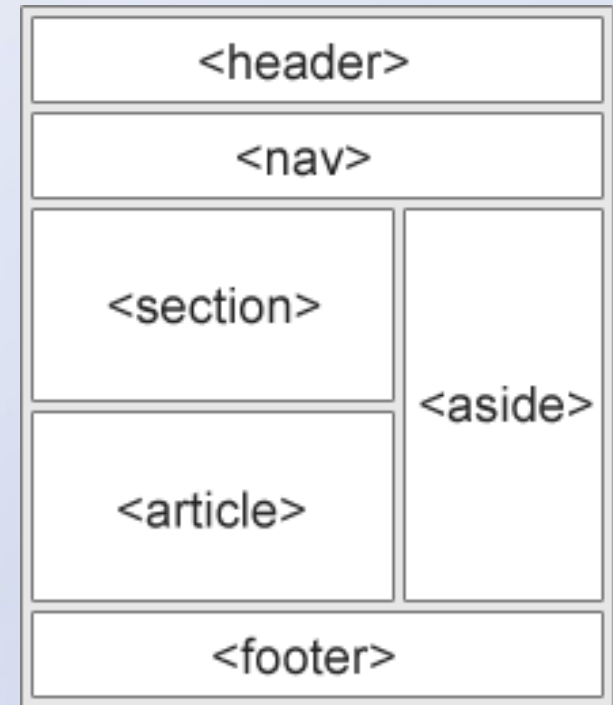
<mark>

<nav>

<section>

<summary>

<time>

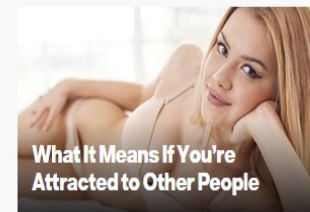
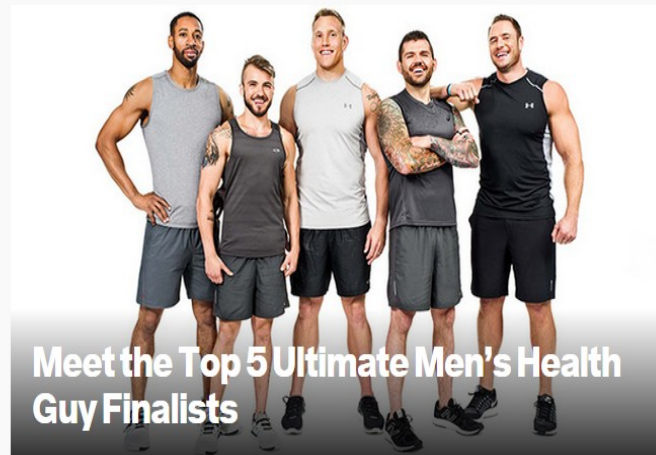


Task – HTML 5 Semantic Elements



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HTML 5 Canvas



Smile!

The HTML `<canvas>` element is used to draw graphics on a web page.

The graphic to the left is created with **`<canvas>`**. It shows four elements: a red rectangle, a gradient rectangle, a multicolor rectangle, and a multicolor text.

```
<canvas id="myCanvas" width="200" height="100"></canvas>
```

HTML 5 Audio

Before HTML5, there was no standard for playing audio files on a web page. Before HTML5, audio files could only be played with a plug-in (like flash). The HTML5 <audio> element specifies a standard way to embed audio in a web page.

```
<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>
```









Different files for different browsers

Browser	MP3	Wav	Ogg
Internet Explorer	YES	NO	NO
Chrome	YES	YES	YES
Firefox	YES	YES	YES
Safari	YES	YES	NO
Opera	YES	YES	YES

HTML 5 Audio

HTML Audio element supports several attributes with which you can set up the element

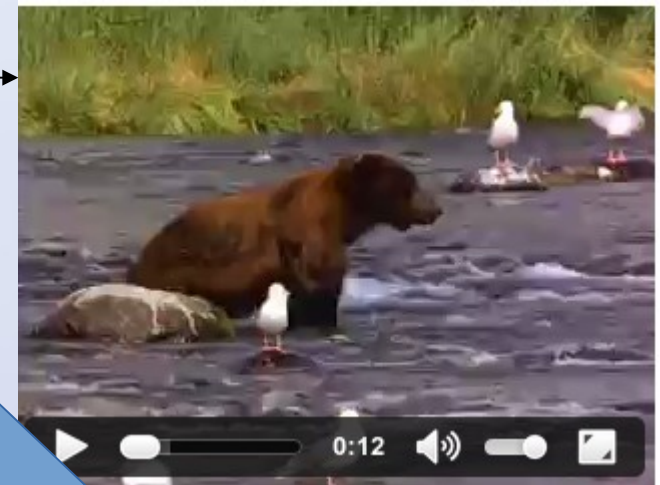
Attribute	Value	Description
<u>autoplay</u>	 autoplay	Specifies that the audio will start playing as soon as it is ready
<u>controls</u>	 controls	Specifies that audio controls should be displayed (such as a play/pause button etc)
<u>loop</u>	 loop	Specifies that the audio will start over again, every time it is finished
<u>muted</u>	 muted	Specifies that the audio output should be muted
<u>preload</u>	 auto metadata none	Specifies if and how the author thinks the audio should be loaded when the page loads
<u>src</u>	 URL	Specifies the URL of the audio file

HTML 5 Video

Before HTML5, there was no standard for showing videos on a web page. Before HTML5, videos could only be played with a plug-in (like flash). The HTML5 <video> element specifies a standard way to embed a video in a web page.

```
<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>
```












Browser	MP4	WebM	Ogg
IE	Yes	No	No
Chrome	Yes	Yes	Yes
Firefox	Yes	Yes	Yes
Safari	Yes	No	No
Opera	Yes(>25)	Yes	Yes



Different file formats for different browsers

HTML 5 Video

HTML Video element supports several attributes with which you can set up the element

Attribute	Value	Description
<u>autoplay</u>	 <i>autoplay</i>	Specifies that the video will start playing as soon as it is ready
<u>controls</u>	 <i>controls</i>	Specifies that video controls should be displayed (such as a play/pause button etc).
<u>height</u>	 <i>pixels</i>	Sets the height of the video player
<u>loop</u>	 <i>loop</i>	Specifies that the video will start over again, every time it is finished
<u>muted</u>	 <i>muted</i>	Specifies that the audio output of the video should be muted
<u>poster</u>	 <i>URL</i>	Specifies an image to be shown while the video is downloading, or until the user hits the play button
<u>preload</u>	 <i>auto</i>  <i>metadata</i>  <i>none</i>	Specifies if and how the author thinks the video should be loaded when the page loads
<u>src</u>	 <i>URL</i>	Specifies the URL of the video file
<u>width</u>	 <i>pixels</i>	Sets the width of the video player

DEMO

HTML 5 Audio and Video



HTML 5 Form Inputs

HTML 5 defines several new form input types and also several attributes

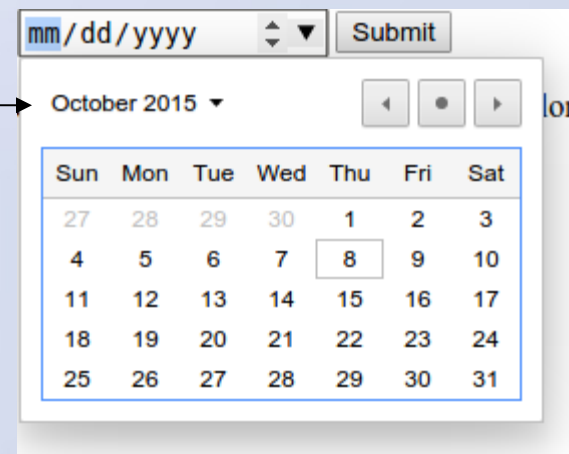
- number -

```
<input type="number" name="points" min="0" max="100" step="10" value="30">
```



- date

```
<input type="date" name="bday">
```

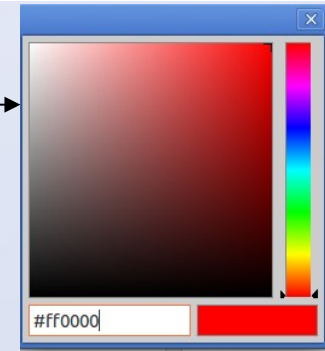


HTML 5 Form Inputs

- color -

```
<input type="color" name="favcolor">
```

Select your favorite color:



- range

```
<input type="range" name="points" min="0" max="10">
```

Points:

- Tel (means phone), search, url, and others.
- For more info: http://www.w3schools.com/html/html_form_input_types.asp

Summary

- What is HTML and why we use it ?
- What is a tag ?
- What are the basic tags in HTML ?
- What is web form and what is its purpose ?
- HTML 5 semantic elements
- HTML 5 audio and video
- HTML 5 form elements

