Web Technology-I
DU#2305CS103

Darshan UNIVERSITY
योगः कर्मसु कौशलम्

Unit-01
HTML

Prof. Dharmik P Vasiyani
Computer Engineering Department
Darshan Institute of Engineering & Technology, Rajkot
dharmik.vasiyani@darshan.ac.in
9924664064

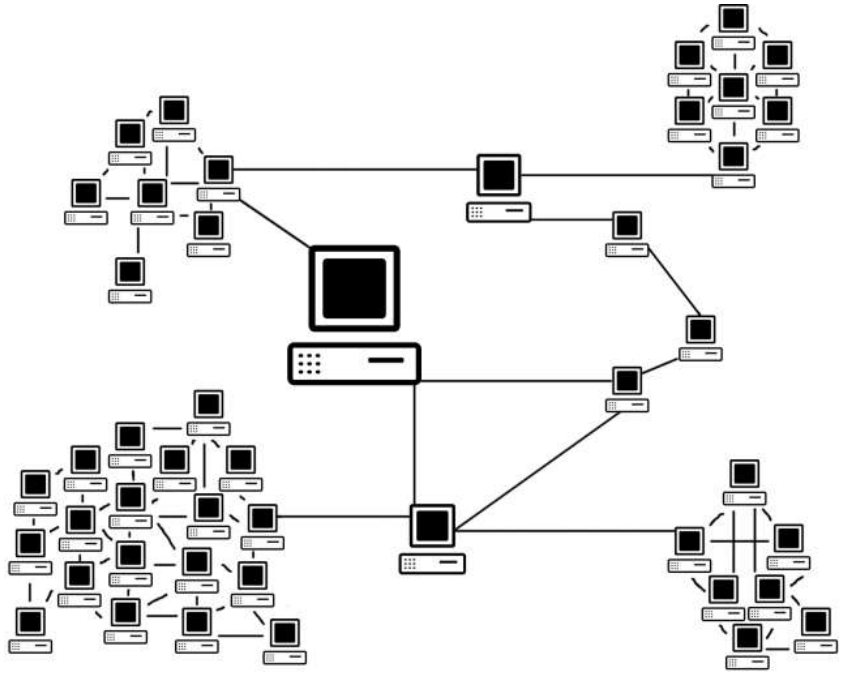
Outline HTML

- ✓ Introduction to HTML
  - ✓ What is a Web Page?
  - ✓ My First HTML Page
  - ✓ HTML Code Formatting
- ✓ Basic HTML Tags
- ✓ Heading
- ✓ Paragraph
- ✓ Color
- ✓ Font
- ✓ List
- ✓ Anchor
- ✓ Image
- ✓ HTML Tables
- ✓ HTML Meta tags
- ✓ HTML Formatting Tags
- ✓ HTML Forms
- ✓ Introduction to HTML5
- ✓ Semantic Elements of HTML5
- ✓ HTML 5 tags and validation
- ✓ Fieldset and Legend
- ✓ Media tags

Darshan UNIVERSITY
योग: कर्मसु कौशलम्

What is Internet?

- The Internet is a massive **network of networks**, a networking infrastructure.
- It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet.
- Information that travels over the Internet uses many different set of rules which are known as **protocols**.



Darshan UNIVERSITY

What is WWW?

- WWW stands for **W**orld **W**ide **W**eb.
- A technical definition of the WWW is – All the resources and users on the Internet that are using HTTP.
- HTTP stands for **H**yper**t**ext **T**ransfer **P**rotocol which is a text-based request-response protocol.
- HTTP is an application layer protocol that allows web-based applications to communicate and exchange the data.
- HTTP is a TCP/IP based protocol, so it also is a connectionless and stateless protocol.
  - ↪ After making the request, the client disconnects from the server, then when the response is ready the server re-establish the connection again and deliver the response.
- HTTP is the protocol being used to transfer hypertext documents that makes the World Wide Web possible.

Darshan UNIVERSITY

What is a Web Page?

- A web page or webpage is a document, commonly written in HTML, that is viewed in an Internet browser.
- HTML – Hyper Text Markup Language is the notation for describing
  - document structure (semantic markup)
  - formatting (presentation markup)
- A web page can be accessed by entering a URL address into a browser's address bar.
- A web page may contain text, graphics, and hyperlinks to other web pages and files.
- The first web page was created at CERN by Tim Berners-Lee on August 6, 1991.
- You can visit and browse the first website and the first web page at the info.cern.ch address.

Darshan UNIVERSITY

How the Web Works?

- World Wide Web (WWW) use classical client / server architecture.

Client running a Web Browser

HTTP

Page request

HTTP

Server response

Server running **Web Server** Software (Apache, IIS, Tomcat, etc.)

Darshan UNIVERSITY

HTTP request

- The HTTP request message consist of following,
  - A request line (e.g. GET /index.php HTTP1.1)
  - Request header fields (e.g. Accept-Language: en)
  - An empty line (CRLF)
  - An optional message body
- The request line and other header fields must end with CRLF (Carriage return, Line Feed) (/r/n)
- A **request line** contains the **method** of request followed by the **resource** we want and at the end protocol **version** used.
  - HTTP Request Methods: GET, POST, PUT, DELETE etc...
- There are many **request header fields** available with HTTP Request, some of are listed below
  - **Accept** : Media type(s) that is/are acceptable for the response. (e.g. Accept: text/html)
  - **Accept-Charset**: Character sets that are acceptable. (e.g. Accept-Charset: utf-8)
  - **Date**: The date and time at which the message was originated (e.g. Date: Tue, 15 Nov 1994 08:12:31 GMT)
  - **Host**: The domain name of the server (e.g. Host: darshan.ac.in)
  - **User-Agent**: details of the browser used (e.g. User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/88.0.4324.150 Safari/537.36)

HTTP Request (Example)

GET /index.php HTTP/1.1		index.php is requested from server using GET method of HTTP version 1.1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/88.0.4324.150 Safari/537.36		Version 5.0 of mozila browser is used on windows 10 (64 bit) while requesting the page from the server.
Host: www.darshan.ac.in		Host of the requested page is www.darshan.ac.in
Accept-Language: en-us		Client accepts US English locale while receiving the response from the server.
Accept: text/html		Client accepts text file containing the HTML in it while receiving the response from the server.

HTTP Response

- After receiving and interpreting a HTTP request message, a server responds with an HTTP response message.
- The HTTP response message consist of following,
  - Status-Line (format= HTTP-Version SP Status-Code SP Reason-Phrase CRLF)
  - *((general-header | response-header | entity-header) CRLF)
  - An empty line (CRLF)
  - An optional message body
- Status-Line consist of
  - HTTP-Version, which can be HTTP/1.1
  - Status-Code is a 3 digit code which is in below format
    - **1**xx: **Informational** - Request received, continuing process
    - **2**xx: **Success** - The action was successfully received, understood, and accepted
    - **3**xx: **Redirection** - Further action must be taken in order to complete the request
    - **4**xx: **Client Error** - The request contains bad syntax or cannot be fulfilled
    - **5**xx: **Server Error** - The server failed to fulfill an apparently valid request
  - Reason-Phase is a textual representation of the status code in human readable format.

Darshan UNIVERSITY

HTTP Status Codes with reason phrase

"100": Continue
"101": Switching Protocols
"200": OK
"201": Created
"202": Accepted
"203": Non-Authoritative Information
"204": No Content
"205": Reset Content
"206": Partial Content
"300": Multiple Choices
"301": Moved Permanently
"302": Found
"303": See Other
"304": Not Modified
"305": Use Proxy
"307": Temporary Redirect
"400": Bad Request
"401": Unauthorized
"402": Payment Required
"403": Forbidden
"404": Not Found
"405": Method Not Allowed
"406": Not Acceptable
"407": Proxy Authentication Required
"408": Request Time-out
"409": Conflict
"410": Gone
"411": Length Required
"412": Precondition Failed
"413": Request Entity Too Large
"414": Request-URI Too Large
"415": Unsupported Media Type
"416": Requested range not satisfiable
"417": Expectation Failed
"500": Internal Server Error
"501": Not Implemented
"502": Bad Gateway
"503": Service Unavailable
"504": Gateway Time-out
"505": HTTP Version not supported

Refer:
https://www.w3.org/Protocols/rfc2616/rfc2616-sec6.html for more details on HTTP Status Code

HTTP Response (Example)

HTTP/1.1 200 OK		Response is 200 status code with OK message using HTTP1.1
Date: Mon, 27 Jul 2009 12:28:53 GMT		Response Date & Time
Server: Apache/2.2.14 (Win32)		Webserver used by server is Apache and version is 2.2.14 built for 32bit OS
Last-Modified: Wed, 22 Jul 2009 19:15:56 GMT		Last modified at Date & Time.
Content-Length: 88		Content size of the response is 88 bytes
Content-Type: text/html		Content type of the response is text file containing HTML

Introduction to Web Technologies

- HTML
  - HTML stands for Hypertext Markup Language.
  - It is used to design the front-end portion of web pages using a markup language.
  - HTML is the combination of Hypertext and Markup language. Hypertext defines the link between the web pages. The markup language is used to define the text documentation within the tag which defines the structure of web pages.
- CSS
  - Cascading Style Sheets fondly referred to as CSS is a simply designed language intended to simplify the process of making web pages presentable.
  - CSS allows you to apply styles to web pages.
  - More importantly, CSS enables you to do this independent of the HTML that makes up each web page.
- JavaScript
  - JavaScript is a famous scripting language used to create magic on the sites to make the site interactive for the user.
  - It is used to enhancing the functionality of a website to running cool games and web-based software.

Introduction to Web Technologies (Cont.)

- Bootstrap
  - Bootstrap is the most popular HTML, CSS, and JavaScript framework for developing responsive, mobile-first websites.
  - Bootstrap is completely free to download and use! The primary purpose of adding it to a web project is to apply Bootstrap's choices of color, size, font and layout to that project.
  - As such, the primary factor is whether the developers in charge find those choices to their liking.
  - Once added to a project, Bootstrap provides basic style definitions for all HTML elements.
- Material Design
  - Material is a design system created by Google to help teams build high-quality digital experiences for Android, iOS, Flutter, and the web.
  - Material Design is inspired by the physical world and its textures, including how they reflect light and cast shadows.

Creating HTML Pages

- An HTML file must have an .htm or .html file extension
- HTML files can be created with text editors:
  - NotePad, NotePad ++, PSPad
- Or HTML editors (WYSIWYG Editors):
  - Microsoft FrontPage
  - Macromedia Dreamweaver
  - Netscape Composer
  - Visual Studio
- Open any above mentioned editors and create a new file with .html extension and save the file.
- After saving the file you can open the file with any Web Browser in order to view the output.

Darshan UNIVERSITY

First HTML Page

test.html

```
<!DOCTYPE HTML>
<html>
  <head>
    <title>My First HTML Page</title>
  </head>
  <body>
     <p>This is some text...</p>
  </body>
</html>
```

HTML Structure

- HTML is comprised of “elements” and “tags”
  - Begins with `<html>` and ends with `</html>`
- Elements (tags) are nested one inside another:

```
<html> <head></head> <body></body> </html>
```

- Tags have attributes:

```
<img src="logo.jpg" alt="logo" />
```

- HTML describes structure using two main sections: `<head>` and `<body>`
- The HTML source code should be formatted to increase readability and facilitate debugging.
  - Every block element should start on a new line.
  - Every nested (block) element should be indented.
  - Browsers ignore multiple whitespaces in the page source, so formatting is harmless.
- For performance reasons, formatting can be sacrificed

Darshan UNIVERSITY

First HTML Page

```
<!DOCTYPE HTML>
<html>
  <head>
    <title>My First HTML Page</title>
  </head>
  <body>
     <p>This is some text...</p>
  </body>
</html>
```

HTML header

Opening tag

Closing tag

HTML body

Darshan UNIVERSITY

Basic HTML Tags

- Headings
- Paragraph
- Fonts
- List
- Anchor Tag
- Image
- Table
- Form

Headings

- Headings are important because search engines use the headings to index the structure and content of your web pages.

<h1> text </h1> -- largest of the six
<h2> text </h2>
<h3> text </h3>
<h4> text </h4>
<h5> text </h5>
<h6> text </h6> -- smallest of the six

align="*position*" --left (default), center or right

paragraph

- The HTML element represents a paragraph.
- Paragraphs are usually represented in visual media as blocks of text separated from adjacent blocks by blank lines and/or first-line indentation, but HTML paragraphs can be any structural grouping of related content, such as images or form fields.
- Paragraphs are block-level elements, and notably will automatically close if another block-level element is parsed before the closing tag.
- We can use align attribute of the paragraph tag to specify the text alignment for the text inside the paragraph, ex. our test

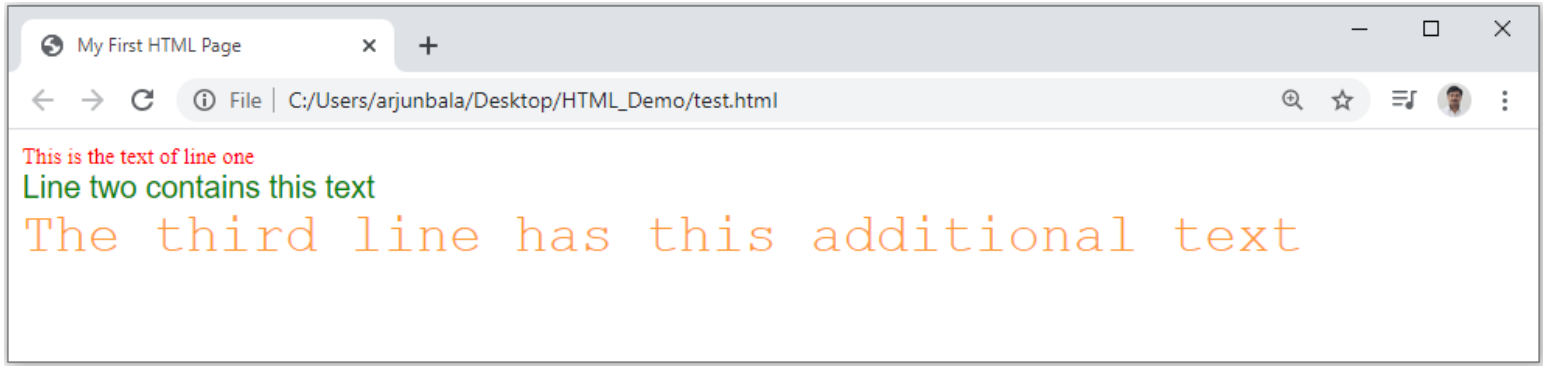
Colors

- We can use color values for mainly two attributes named **bgcolor** and **color.**
- Possible values for the color are,
  - many are predefined (red, blue, green, ...)
  - all colors can be specified as a six character hexadecimal value: #RRGGBB
    - #FF0000 – red
    - #888888 – gray
    - #00FF00 –green
    - #000000 – black
- For example, <body bgcolor="#FF0000"> or <body bgcolor="#888888">

Fonts

- The <font> tag specifies the font face, font size, and color of text.
- The <font> tag is **not supported in HTML5**.

```
<font color="red" size="2" face="Times Roman">
    This is the text of line one
</font>
<br/>
<font color="green" size="4" face="Arial">
    Line two contains this text
</font>
<br/>
<font color="#FF9933" size="6" face="Courier">
    The third line has this additional text
</font>
```



List

Ordered List

1. Block-A
2. Block-B
3. Block-C
4. Block-D

a) Block-A
b) Block-B
c) Block-C
d) Block-D

A. Block-A
B. Block-B
C. Block-C
D. Block-D

i. Block-A
ii. Block-B
iii. Block-C
iv. Block-D

I. Block-A
II. Block-B
III. Block-C
IV. Block-D

Unordered List

- Block-A
- Block-B
- Block-C
- Block-D

- Block-A
- Block-B
- Block-C
- Block-D

- Block-A
- Block-B
- Block-C
- Block-D

Defination List

HTML
: Hyper Text Markup Language

WWW
: World Wide Web

Ordered List (OL)

```
<ol>
    <li> Item one </li>
    <li> Item two </li>
    <ol type="I">
        <li> Sublist item one </li>
        <li> Sublist item two </li>
        <ol type="i">
            <li> Sub-sub list item one </li>
            <li> Sub-sub list item two </li>
        </ol>
    </ol>
</ol>
```

Types:

Type = 1 (default)
Type = a
Type = A
Type = I
Type = i

Output

1. Item one
2. Item two
    I. Sublist item one
    II. Sublist item two
        i. Sub-sub list item one
        ii. Sub-sub list item two

Darshan UNIVERSITY

Unordered List (UL)

```
<ul>
    <li> One </li>
    <li> Two </li>
    <ul type="circle">
        <li> Three </li>
        <li> Four </li>
        <ul type="square">
            <li> Five </li>
            <li> Six </li>
        </ul>
    </ul>
</ul>
```

Types:

Type = disc (default)

Type = circle

Type = square

Output

- One
- Two
  - Three
  - Four
    - Five
    - Six

Definition / Description List (DL)

```
<dl>
    <dt>HTML</dt>
    <dd>Hyper Text Markup Language</dd>

    <dt>URL</dt>
    <dd>Uniform Resource Locator</dd>

    <dt>WWW</dt>
    <dd>World Wide Web</dd>
</dl>
```

Output

HTML
    Hyper Text Markup Language
URL
    Uniform Resource Locator
WWW
    World Wide Web

<a> Anchor Tag (Hyperlinks)

- The <a> tag defines a hyperlink, which is used to link from one page to another.
- An Anchor tag have 3 important attributes:
  - the **href** attribute (**h**ypertext **ref**erence) defines the target address of the document.
  - the **name** attribute of the anchor tag can be used to enable users to “jump” to a specific point on a page.
  - the **target** attribute specifies how the destination page or the target document should be opened. `target="_ blank"` is used for opening of the target page in a new tab.
- Link to an absolute URL:
  - Example, Darshan .
- Link to a relative URL:
  - Example, Home .
- Link to a section within a URL:
  - Example, Reference Section. .

Images

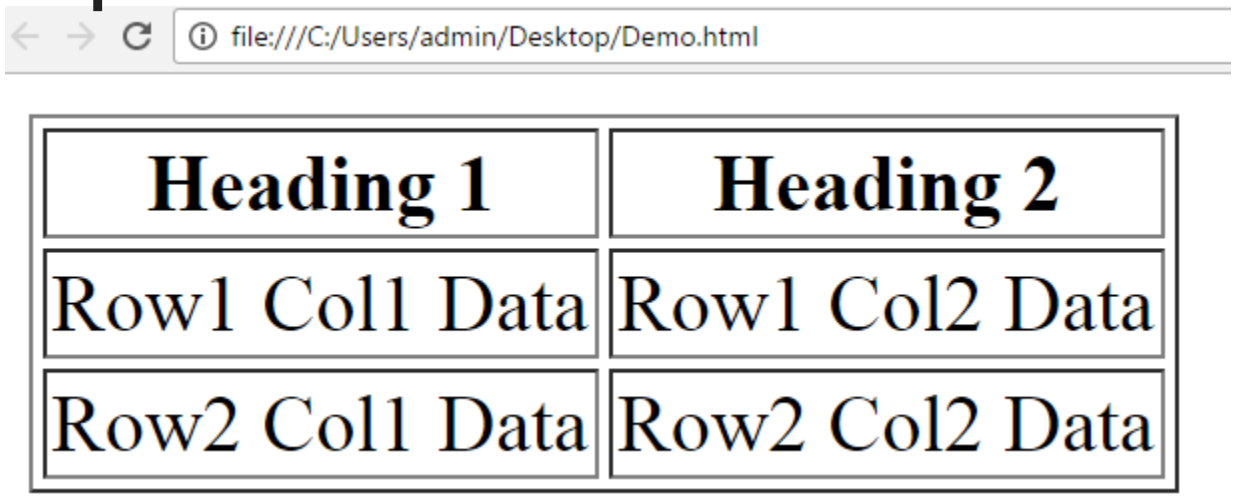
- The HTML <img> element embeds an image into the document.
- Syntax: `<img src= "pathToImage" />`
- Attributes:
  - the **src** attribute is required, and contains the path to the image we want to embed.
  - the **alt** attribute holds a text description of the image, which isn't mandatory but is incredibly useful for accessibility (screen readers read this description out to their users so they know what the image means). Alt text is also displayed on the page if the image can't be loaded for some reason: for example, network errors, content blocking etc…
  - the **width** & **height** attribute can be in units of pixels or percentage of page or frame.
  - the **align** attribute (currently deprecated) will aligns the image with its surrounding context (Use the float and/or vertical-align CSS properties instead of this attribute).

Table

```
<table border=1>
    <caption>Table Caption</caption>
    <tr>
        <th>Heading1</th>
        <th>Heading2</th>
    </tr>
    <tr>
        <td>Row1 Col1 Data</td>
        <td>Row1 Col2 Data</td>
    </tr>
    <tr>
        <td>Row2 Col1 Data</td>
        <td>Row2 Col2 Data</td>
    </tr>
</table>
```

<table>	table tag
<caption>	optional table title
<tr>	table row
<th>	table header
<td>	table data element

Output



Darshan UNIVERSITY

META Tag

- Metadata is data (information) about data.
- The <meta> tag provides metadata about the HTML document.
- Metadata will not be displayed on the page.
- Meta elements are typically used to specify page description, keywords, author of the document, last modified and other metadata.
- The metadata can be used by search engines (keywords), browsers (how to display content or reload page) or other web services.
- Meta tag can be used to stop the page from being listed by search engines.

```
1 <meta name="robots" content="noindex">
```

- It can be used to set an expiry date so that the browser will fetch fresh copy from the server.

```
1 <meta http-equiv="expires" content="Tue, 08 feb 2022 1:00:00 GMT">
```

- Meta tag can be used to stop the browser from caching a page.

```
1 <meta http-equiv="Cache-Control" content="no-store">
```

Darshan UNIVERSITY

Meta Tag Attributes

Attribute	Value	Description
charset	character_set	Specifies the character encoding for the HTML document
name	author description keywords robots expires	Specifies a name for the metadata
http-equiv	content-type default-style refresh	Provides an HTTP header for the information/value of the content attribute
content	text	Gives the value associated with the http-equiv or name attribute
scheme	format/URI USA/Europe	Not supported in HTML5. Specifies a scheme to be used to interpret the value of the content attribute

HTML Formatting Tags

Tags	Description
<b>	Defines bold text
<i>	Defines italic text
<small>	Defines smaller text
****	Defines important text
<sub>	The <sub> tag defines subscript text. Subscript text appears half a character below the baseline. Subscript text can be used for chemical formulas, like H_2O.
<sup>	The <sup> tag defines superscript text. Superscript text appears half a character above the baseline. Superscript text can be used for footnotes, like ^{WWW}
<mark>	Defines Highlighted text
<del>	Defines deleted text
****	Defines emphasized text
<tt>	The <tt> tag defines teletype text
<blink>	The <blink> tag is used for blinking the text.

Darshan UNIVERSITY

HTML Forms

- HTML forms are used to create GUIs on Web pages
  - Usually the purpose is to ask the user for information
  - The information is then sent back to the server
- A form is an area that can contain form elements
  - The syntax is: <form ***parameters***> ***...form elements...*** </form>
  - Form elements include: buttons, checkboxes, text fields, radio buttons, drop-down menus, etc
    - Other kinds of HTML tags can be mixed in with the form elements
  - A form usually contains a Submit button to send the information in the form elements to the server
  - The form's ***parameters*** tell browser how to send the information to the server (there are two different ways it could be sent)

Darshan UNIVERSITY

The <form> Tag

- The <form *arguments*> ... </form> tag encloses form elements (and probably other HTML as well)
- The arguments to form tell what to do with the user input
  - action="***url***" (required)
    - Specifies where to send the data when the Submit button is clicked
  - method="**get**" (default)
    - Form data is sent as a URL with ?form_data info appended to the end
    - Can be used *only* if data is all ASCII and not more than 100 characters
  - method="**post**"
    - Form data is sent in the body of the URL request
    - Cannot be bookmarked by most browsers
  - target="***target***"
    - Tells where to open the page sent as a result of the request
    - ***target=*** _blank means open in a new window
    - ***target=*** _top means use the same window

Darshan UNIVERSITY

Form Elements

- Input
- Select
- Textarea
- Button
- Label
- Fieldset
- Legend
- Etc…

Input Types (HTML4)

- text
- password
- checkbox
- radio
- submit
- button
- reset
- file

Input Types (HTML5)

- number
- email
- search
- url
- tel
- range
- color
- date
- time
- datetime-local
- month
- week

Introduction to HTML5

- It stands for Hypertext markup language version 5.
- HTML5 is the latest version of HTML.
- HTML5 is cooperation between the World Wide Web Consortium (W3C) and the Web Hypertext Application Technology Working Group (WHATWG).
- **What is new in HTML5?**
  - Support multimedia without flash player.
  - So, we can include audio, video in our web page without installing flash player.
  - We create drawing in our webpage using canvas without graphics software.
  - We can trace user's location.
  - HTML5 coding structure is user friendly
  - HTML5 program is run in latest version of Google chrome, Mozilla Firefox, Opera, Internet explorer 9.0

Semantic Elements of HTML5

- A semantic element clearly describes its meaning to both the browser and the developer.
- Examples of non-semantic elements: and - Tells nothing about its content.
- Examples of semantic elements: <form> and <table> - Clearly defines its content.
- Many semantic elements which is used to develop any webpages are:
  - <header>
  - <nav>
  - <section>
  - <article>
  - <figure>
  - <footer>
  - <dialog>
  - <aside>

HTML5 Form Validation

- Form validation is a “technical process where a web-form checks if the information provided by a user is correct.”
- The form will either alert the user that something is not in correct format and need to fix to proceed, or the form will be validated and the user will be able to continue with their process.
- Form can be validated both in Client-Side as well as Server-Side, it is recommended to validate the form in both the side.
- Form validation generally performs two functions.
  1. **Basic Validation**
     - Emptiness
     - Length Validation etc……
  2. **Data Format Validation**
     - Secondly, the data that is entered must be checked for correct **form** and **value**.
     - Email Validation
     - Mobile Number Validation
     - Enrollment Number Validation etc….

Darshan UNIVERSITY

Cont.

- We can use **required** attribute in order to stop user sending empty data to server.

```
1 <input type="text" name="txtName" required/>
```

- We can use **pattern** attribute in order to force some format on user before sending the data to server.

```
1 <input type="text" name="txtName" pattern="[0-9]{10}"/>
```

- We can use **title** attribute for custom error message.

```
1 <input  type="text" name="txtName"
                pattern="[0-9]{10}"
                title="Please enter 10 digit mobile number"
                required/>
```

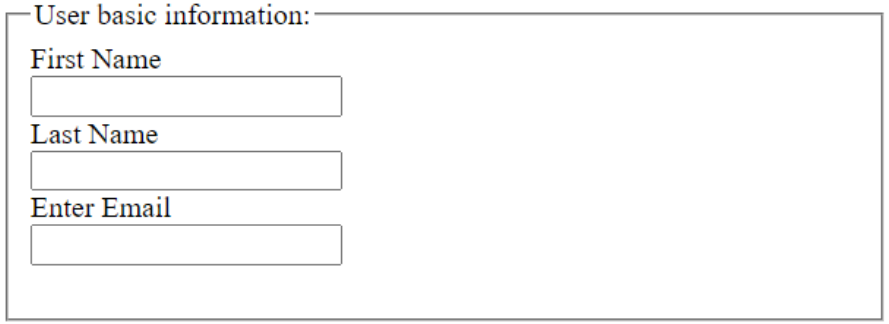
Fieldset and Legend

- The HTML <fieldset> tag is used for grouping related form elements.
- The use of this tag is optional while creating an HTML form but using <fieldset>, it is easy to understand the purpose of grouped elements of form.
- The <legend> tag is used with the <fieldset> element as a first child to define the caption for the grouped related fields.

```
1  <form>
       <fieldset>
              <legend>User basic information:</legend>

              <label>First Name</label><br>
              <input type="text" name="fname"><br>
              <label>Last Name</label><br>
              <input type="text" name="lname"><br>
              <label>Enter Email</label><br>
              <input type="email" name="email"><br><br>
       </fieldset>
   </form>
```

Output



Media Tags

- Video tag
- Audio tag

Video Tag

- The HTML <video> element is used to show a video on a web page.
- The controls attribute adds video controls, like play, pause, and volume.
- The width and height attributes are used to set width and height respectively.
- The autoplay attribute start a video automatically.
- The muted attribute will mute your video sound.
- The <source> element allows you to specify alternative video files in src attribute which the browser may choose from. The browser will use the first recognized format.
- The text written in between the <video> and </video> tags will display only if browser do not support the <video> element.

```
<video width="300" height="200" controls autoplay muted>
  <source src="video.mp4" type="video/mp4">
  <source src="video.ogg" type="video/ogg">
  The video tag is not supported in your browser.
</video>
```

Darshan UNIVERSITY

Audio Tag

- The HTML <audio> element is used to play an audio file on a web page.
- The controls attribute adds audio controls, like play, pause, and volume.
- The autoplay attribute start a audio automatically.
- The muted attribute will mute your audio sound.
- The <source> element allows you to specify alternative audio files in src attribute which the browser may choose from. The browser will use the first recognized format.
- The text written in between the <audio> and </audio> tags will display only if browser do not support the <audio> element.

```
<audio controls autoplay muted>
  <source src="myaudio.ogg" type="audio/ogg">
  <source src="myaudio.mp3" type="audio/mpeg">
  The audio tag is not supported in your browser.
</audio>
```

Darshan UNIVERSITY

Darshan UNIVERSITY
योगः कर्मसु कौशलम्

Thank You

Prof. Dharmik P Vasiyani
Computer Engineering Department
Darshan Institute of Engineering & Technology, Rajkot
dharmik.vasiyani@darshan.ac.in
9924664064