FUNDAMENTALS OF FULL STACK DEVELOPMENT

(COURSE 1/3 UNDER FULL-STACK DEVELOPMENT TRACK)

L-T-P-C: 2-1-1-4

UNIT – 1

- Introduction
- What is a web application? History
- What is a webserver
- Browser
- HTTP/HTML/CSS

INTRODUCTION

- **The Internet and the Web**
  - **Internet** is a network of networks and Interconnected using standardized communication protocols.
  - **Who governs the Internet?**
  - **World Wide Web:**
    - Access information through the Internet.
    - stores electronic documents (Web Page):
    - communication between web **clients** and web **servers**.

- Web page: formatted document (contains text, image, interactive element and *hyperlink*)
- Website: Group of Related Web pages

- World Wide Web (WWW)
  - Global hypertext network of millions of Web servers & browsers
  - Connected by Hypertext Transfer Protocol (HTTP)
  - Web pages can be designed by Hypertext Markup Language (HTML)
- Browser is used to view web pages.
  - **Hyperlinks** let you move around different websites and web pages by clicking on them.
    - images
    - buttons
    - text

- Uniform resource allocator (URL)
  - address of a given unique resource on the Web
  - each valid URL points to a unique resource
  - URLs: The web page is accessed by using a unique URL address.
  - Hyperlinks

WEB APPLICATIONS

- A **web application** (or **web app**) is application software that runs on a web server
- Accessed by the user through a web browser with an active network connection.
- Programmed using a client-server modelled structure
- web documents are written in a standard format
  - HTML and JavaScript,
- Example: Email, online retail sales, online auctions, wikis, instant messaging services, etc
- **HTML**, **CSS**, and **JavaScript.**

- **Writing web applications is often simplified by the use of a web application framework.**
- Web application frameworks
  - Software framework that is designed to support the development of web application
  - facilitate rapid application development
  - Use of can often reduce the number of errors in a program
  - Use of best practices
  - Provide libraries for database access, templating frameworks, and session management and they often promote code reuse.

Development skills

WHAT IS HTTP?

- **WWW** is about communication between web **clients** and **servers**
- **HTTP** stands for **HyperText T**ransfer **P**rotocol
- Communication between client computers and web servers is done by sending **HTTP Requests** and receiving **HTTP Responses**

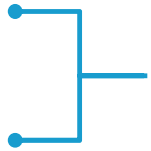
- HTTP Request / Response
  - A client (a browser) sends an **HTTP request** to the web
  - A web server receives the requests.
  - The server runs an application to process the request
  - The server returns an **HTTP response** (output) to the browser.
  - The client (the browser) receives the response

WEB DEVELOPMENT ROADMAPS

- **Front-End Roadmap**
  - Learn the Basics
  - Responsive Web Design is used in all types of modern web development.
    - HTML
    - CSS
    - JavaScript
    - JavaScriptECMAScript 5
  - Choose Frameworks
    - CSS side you should choose a framework for responsive web design:
      Bootstrap / Material Design / W3.CSS
    - On the JavaScript side you should learn at least one modern framework:
      React.js / Angular.js / Vue.js / W3.JS

- Back-End Roadmaps
  - Fullstack
    - SQL, PHP, ASP, Python
  - Fullstack JS
  - SQL,
  - Node.js
  - MySQL
  - Mongo.db

- Web page
  - Content
    - Header, Paragraph, Footer, Listing



HTML ⟹ **Determines the content and structure of a page**

- Font style, color, background, border ⟹ **CSS** controls how webpage would look like
- Popup, animation, widgets, special effects etc. **JavaScript** ⟹ decides advanced behaviours

HTML

- Hypertext Markup Language
  - Markup Languages
    - Embedded codes in documents
    - *Not* case sensitive
    - Codes are called `tags'
    - Code
      - Codes enclosed in brackets(paired)
        - <title>my web page</title>
      - Describe the structure documents
      - Include instructions for processing

<TITLE> = <title> = <TITLE>

Example HTML code:

ex1.html

```
<html>
<head>
<title>hello world</title>
</head>
<body bgcolor = “#000000” >
<font color = “#ffffff” >
<h1>hello world</h1>
</font>
</body>
</html>
```

File Extensions:

For more info: http://www.w3.org/MarkUp/

TAGS

- "**Normal text**" surrounded by bracketed *tags* that tell browsers how to display web pages.
- For example:

  Some content here.

  - The ... tag displays a paragraph
  - opens the paragraph (opening tag)
  - closes the paragraph (closing tag)
  - "Some content here." will be displayed on the page

```
<font color = "#ffffff" >
<h1>hello world</h1>
```

Tags and attributes

- Tags are sometimes enhanced by **attributes**, which are name-value pairs that modify the tag.

```
<img src = "logo.jpg" Alt = "this is logo" />
```

Nested tags

Tags can be (and frequently are) nested inside each other.

```
<a>
<b></b>
</a>
```

Not legal

```
 <a>
<b></a>
</b>
```

PAGE STRUCTURE ELEMENTS

Element	Description
<html></html>	Surrounds the entire page
<head></head>	Contains header information (metadata, CSS styles, JavaScript code)
<title></title>	Holds the page title normally displayed in the title bar and used in search results
<body></body>	Contains the main body text. All parts of the page normally visible are in the body

Required Tags

- All HTML documents should have following tag
  - doctype
  - <html>
  - <head> </head>
  - <body> </body>
  - </html>

Doctype defines a set of standards the page adheres

KEY STRUCTURAL ELEMENTS

Element	Name	Description
 	Heading 1	Reserved fo strongest emphasis
 	Heading 2	Secondary level heading. Headings go down to level 6, but <h1> through <h3> are most common
 	Paragraph	Most of the body of a page should be enclosed in paragraphs
 	Division	Similar to a paragraph, but normally marks a section of a page. Divs usually contain paragraphs

LISTS AND DATA

Element	Name	Description
	Unordered list	Normally these lists feature bullets (but that can be changed with CSS)
	Ordered list	These usually are numbered, but this can be changed with CSS
	List item	Used to describe a list item in an unordered list or an ordered list
<dl></dl>	Definition list	Used for lists with name-value pairs
<dt></dt>	Definition term	The name in a name-value pair. Used in definition lists
<dd></dd>	Definition description	The value (or definition) of a name, value pair
<table></table>	Table	Defines beginning and end of a table
<tr></tr>	Table row	Defines a table row. A table normally consists of several <tr> pairs (one per row)
<td></td>	Table data	Indicates data in a table cell. <td> tags occur within <tr> (which occur within <table>)
<th></th>	Table heading	Indicates a table cell to be treated as a heading with special formatting

- **LINKS AND IMAGES**
  - Links and images are both used to incorporate external resources into a page

```
<a href = "http://www.example.com">link to example.com</a>
```

- **SPECIALTY MARKUP**
  - **<quote> </quote>**
  - **<code> </code>**

LINKS

- Links are created using the **<a>** element (the “a” stands for anchor).
- A link has two main parts: the destination and the label.

- Types of Links
  - You can use the anchor element to create a wide range of links:
    - Links to external sites
    - Links to other pages
    - Links to other places within the current page
    - Etc.

Link to external site

```
<a href="http://www.centralpark.com">Central Park</a>
```

Link to resource on external site

```
<a href="http://www.centralpark.com/logo.gif">Central Park</a>
```

Link to another page on same site as this page

```
<a href="index.html">Home</a>
```

Link to another place on the same page

```
<a href="#top">Go to Top of Document</a>
```

Link to specific place on another page

```
<a href="productX.html#reviews">Reviews for product X</a>
```

Link to email

```
<a href="mailto://person@somewhere.com">Someone</a>
```

- **HTML Formatting Elements**
  - `<b>` - Bold text
    `<strong>` - Important text
    `<i>` - Italic text
    `<em>` - Emphasized text
    `<mark>` - Marked text
    `<small>` - Smaller text
    `<del>` - Deleted text
    `<ins>` - Inserted text
    `<sub>` - Subscript text
    `<sup>` - Superscript text

- **HTML Comment Tag**
  - You can add comments to your HTML source by using the following syntax:
  - `<!-- Write your comments here -->`

```
<!-- This is a comment -->

<p>This is a paragraph.</p>

<!-- Remember to add more information
here -->
```

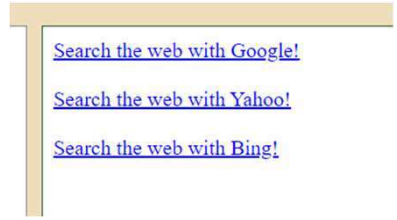
  - Comments can be used to hide content.

PRACTICE

1. Print the squares of the numbers 1 - 20. Each number should be on a separate line, next to it is the number 2 superscripted, an equal sign and the result. (Example: $10^2 = 100$)

$$1^2 = 1$$
$$2^2 = 4$$
$$3^2 = 9$$

2. Create some links to various search engines (Google, yahoo, Bing and etc)



3. Display five different images. Skip two lines between each image. Each image should have a title.
4. Create a page with a link at the bottom of it that when clicked will jump all the way to the top of the page.

HTML COLORS

- HTML colors are specified with predefined color names, or with RGB values.
-

- Color Values
  - rgb(255, 99, 71)
  - #ff6347
  -

```
<h1 style="background-color:DodgerBlue;">Hello World</h1>
<p style="background-color:Tomato;">Lorem ipsum...</p>
```

```
<h1 style="color:Tomato;">Hello World</h1>
<p style="color:DodgerBlue;">Lorem ipsum...</p>
<p style="color:MediumSeaGreen;">Ut wisi enim...</p>
```

```
<h1 style="border:2px solid Tomato;">Hello World</h1>
<h1 style="border:2px solid DodgerBlue;">Hello World</h1>
<h1 style="border:2px solid Violet;">Hello World</h1>
```

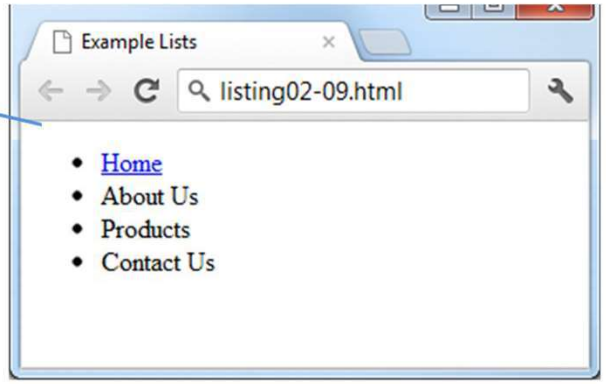
LISTS

- Unordered lists. Collections of items in no particular order; these are by default rendered by the browser as a bulleted list.
- Definition lists. Collection of name and definition pairs
- Ordered lists. Collections of items that have a set order; are by default rendered by the browser as a numbered list.

- HTML supplies several list elements.
- Most list elements are composed of one or more
  - Unordered List
    - Items in this list start with a list mark such as a bullet.
    - three bullet types
      - **disc(default), circle, square.**
      - bullet types can be changed using the "**TYPE**" attribute in <UL> element

Notice that the list item element can contain other HTML elements

```
<ul>
   <li><a href="index.html">Home</a></li>
   <li>About Us</li>
   <li>Products</li>
   <li>Contact Us</li>
</ul>
```



- Ordered lists.

```
<ol>
   <li>Introduction</li>
   <li>Background</li>
   <li>My Solution</li>
   <li>
      <ol>
         <li>Methodology</li>
         <li>Results</li>
         <li>Discussion</li>
      </ol>
   </li>
   <li>Conclusion</li>
</ol>
```