WEB DEVELOPMENT

Unit 6

SLOs

- Recall the understanding of basic terms related to web development
- Define different terms
- Identify and compare different types of websites
- Compare various types of websites

6.1 BASIC TERMINOLOGY OF WEB DEVELOPMENT

Development of web sites and online applications is called web development. This is done by coding in different languages and by using several web development tools and frameworks. A complete web application may consist of a User Interface, Back-End Server Codes and a Database.

6.1.1 Definition of Terms

(i) World Wide Web (WWW)

The word world wide web (www) is commonly known as the web. The Web is a collection of computers connected through a network to provide publicly accessible information.

(ii) Web Page

A webpage is a document commonly written in HTML that is accessible through internet by using internet browser.

(iii) Website

A website is a collection of web pages containing text, images, and all types of multimedia related to a specific set of information. A website can be accessed through a Uniform Resource Locator (URL).

Teacher Note

Teachers are encouraged to give additional information. For example, how web hosting is availed. How web servers work. Videos can be used to explain such concepts.

(iv) Web Browser

A web browser is a software application for accessing websites on the world wide web. Most common web browsers include Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, and Safari.

v) Uniform Resource Locator (URL)

It is the address of a resource on the internet (e.g. https://www.google.com). It includes the following two components.

- The protocol used to access the resource (https://)
- The location of the server. (www.google.com)

(vi) Search Engine

A Search Engine is a web-based tool that enables a user to locate information on the web. Most popular search engines are Google, Yahoo, and Bing.

(vii) Home Page

A home page (also known as landing page) is a web page that serves as the starting point of the website.

(vii) Web Hosting

Web Hosting is a service that allows a web developer to make a website publicly accessible through the internet.

(viii) Web Server

A web server is the computer that is responsible for serving a website and all of its content including text and media to a user.

6.1.2 Types Of Website

Portal: A web portal is a website that provides a single access point of information for all of its users. It collects information from different sources like emails, forums, search engines and presents it to the user in a uniform way. Yahoo and MSN are common examples of web portal.

News: A news website is the modern-day alternative for newspapers. Such websites contain everyday information related to current affairs, sports, politics, weather, health, technology, entertainment, etc.

Informational: Informational websites provide detailed information of any field. There are many dedicated informational websites for science, arts, sports, online trainings, research, etc.

Educational: Educational websites are purely designed to deliver educational material for both, teachers and students such as sabaq.pk, khan academy.org, etc.

Personal: A person can share about his or her biography or achievements in a custom developed website.

Business: A business website is the best way for any organization to market their products and services. It also tells about the teams, policies and procedures of that business. For instance, www.psx.com.pk is the website of Pakistan Stock Exchange.

Blogs: A blog is a special type of website that is composed of articles and posts. These articles are organized into categories and sorted by the time when they were published. Wordpress is a popular blog site.

Forums: A forum is an online place where different users can discuss about any topic. These topics can be categorized so that users can easily locate topics of their interest.

Entertainment: An entertainment website serves content like videos or games purely for the purpose of entertainment. Youtube is widely used for entertainment.

Social: Social website is a platform where different people get together and socialize with each other. They can also share their ideas, opinions and media. Facebook and Twitter are instances of social networking websites.

Teacher Note

Teachers should demonstrate several websites to familiarize students with different types of websites.

SLOs

- Develop the understanding about HTML
- Apply the various steps involved in creating a web page
- Develop understanding about HTML tags
- Recognize the basic structure of an HTML document

6.2 INTRODUCTION TO HTML

HTML stands for Hypertext Markup Language. HTML is used to create web pages that are displayed by web browsers mainly on internet.

6.2.1 Hypertext Markup Language (HTML)

It is standard markup language for text documents. It allows the user to create structured content by adding headings, paragraphs, links, blockquotes and other media. It takes advantage of simple code structures called tags and attributes to achieve formatting, graphic and navigation effects on web pages.

6.2.2 Steps Involved In Creating Web Page In HTML

Creating a simple web page using HTML is very easy. It requires a text editor, a file with .html extension and a web browser to view that page.

Step 1: Text Editor

Start by simply creating a new blank file in a text editor of your choice. A simple text editor like notepad can be used to start coding HTML for a web page.

Step 2: Write HTML code in Text Editor

Example:

```
<html>
    <head>
        <title>My Website</title>
    </head>
    <body>
        Welcome to my first  web page.
    </body>
</html>
```

Step 3: Save HTML Page

Go to File menu and click on Save. Make sure to provide .htm or .html extension for the file being saved. This will save the document as a web page instead of a plain text file.

Step 4: View HTML Page in Browser

Open the saved HTML file in your default web browser. The web browser will automatically translate HTML codes to correctly display the web page.

6.2.3 HTML Tags

HTML elements are the building blocks of HTML pages. These elements are defined by placing HTML tags in our document. These tags are placed inside angular brackets (<>). Some tags also allow further customization by adding attributes to them. An HTML tag has the following structure:

Simple Tag: `<tag-name>content</tag-name>`

Tag with Attribute: `<tag-name attribute-name= “attribute value”>content</tag-name>`

The above syntaxes show the structure of opening a tag, defining attribute values, placing content inside the element represented by that tag and its closing structure. Most of HTML tags always require a closing tag while some HTML tags such as `<br>` are empty tags which means that they don't require a closing tag.

SLOs

- Use Title and Footer tags for inserting title and footer in a web page
- Compose a paragraph in a webpage
- Use line break for starting the text from new line
- Use different text formatting tags like bold, italic, underline, etc.
- Apply Pre-tag for preserving both spaces and line breaks
- Change text color, face
- Align the portion of text in center of web page
- Write subscript and superscript text in a web page

6.3 DESIGNING AND FORMATTING

Some HTML tags introduce content directly into the web page while others enhance the design and format of that content. Some most commonly used HTML tags which change the looks of the web page are explained here.

Tag	Description
`<!DOCTYPE html>`	It specifies the HTML version used so the web browsers can show the web page according to HTML standards. All HTML documents must start with this tag.
`<html>`	All HTML documents start with `<html>` tag and end with `</html>` tag.
`<head>`	It is used to define additional information about the web page. It contains a set of tags such as `<title>`, `<meta>` , `<style>`,`<script>`, etc.
`<body>`	The main content of the web page is contained between `<body>` and `</body>` .

6.3.1 Titles and Footers

Tag	Description
`<title>`	It defines the title of a web page. Titles are very important as they appear on top of the browser window and displayed on search engine result pages.
`<footer>`	It defines the footer for a web page. e.g. “Copyright 2020. All rights reserved.”

6.3.2 Paragraphs and Line Breaks

Tag	Description
<p>	It defines a paragraph of text in a webpage. It always starts from a new line and adds space before and after its text.
 	It defines a line break and starts the following content from a new line. Unlike <p> tag, it does not add space before or after the break.
<hr>	It draws a horizontal line where it is defined. It is used to differentiate between sections of the page.

6.3.3 Headings

Tag	Description
<h1> - <h6>	It is used to define six levels of HTML headings (h1, h2, h3, h4, h5 and h6) with <h1> being heaviest heading and <h6> being the lightest heading.

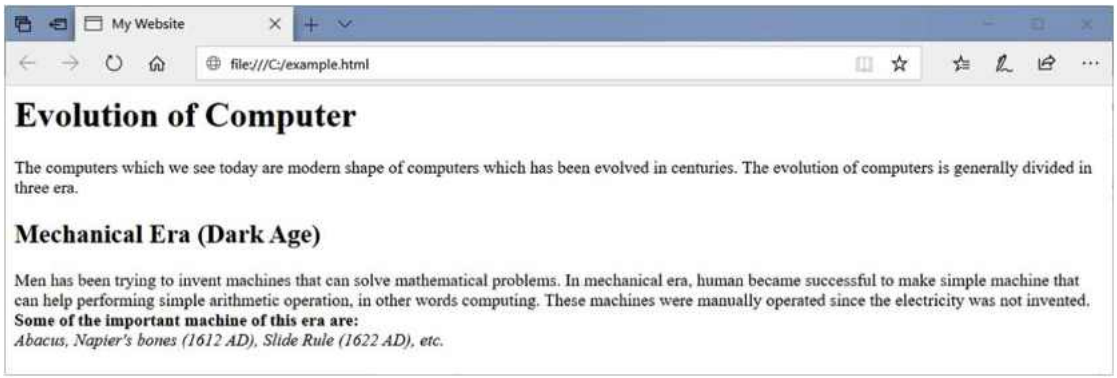
6.3.4 Text Formatting

Tag	Description
<b>, <i>, <u>	These tags are used to bold, italicize and underline text respectively.
<pre>	It is used to define a preformatted text. The web browser displays such text with spaces and line breaks as defined in HTML codes.
<font>	It is used to define the font, size and color of its text. This tag can be composed with three attributes: size, color and face. This tag is supported till version 4.1 of HTML.
	It is used to align its text to the horizontal center of the web page. This tag is supported till version 4.1 of HTML.
<sub>	It defines subscript text which is under the baseline of other text and has a smaller size. e.g. H_2O
<sup>	It defines superscript text which is slightly above the normal line of other text and has a smaller size. e.g. $E=mc^2$

Example:

```
<html>
    <head>
        <title>My Website</title>
    </head>
    <body>
        <h1>Evolution of Computer</h1>
        <p>The computers which we see today are modern shape of com
puters which has been evolved in centuries. The evolution of comput
ers is generally divided in three eras.</p>
        <h2>Mechanical Era (Dark Age)</h2>
        <p>
            Men has been trying to invent machines that can solve
athematical problems. In mechanical era, human became successful to
 make simple machine that can help performing simple arithmetic ope
ration, in other words computing. These machines were manually oper
ated since the electricity was not invented.
            <br>
            <b>Some of the important machine of this era are: </b>
            <br>
            <i>Abacus, Napier's bones (1612 AD), Slide Rule (1622 A
D), etc.</i>
        </p>
    </body>
</html>
```

Output:



Teacher Note Teachers should demonstrate practical application of common tags with their attributes

SLOs

- Differentiate among unordered list, ordered list, definition list and nested list
- Create unordered, ordered, definition and nested lists

6.4 CREATING LISTS

Lists are very useful in displaying point by point information such as to-do list, list of ingredients for a recipe, list of categories, etc. HTML provides three different types of list elements namely Unordered Lists, Ordered Lists and Description Lists. The web browsers automatically add indents, spaces and markers to HTML lists.

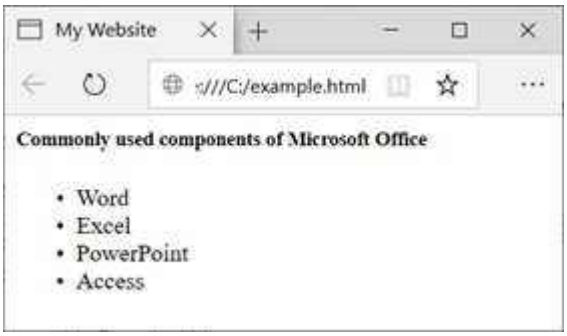
6.4.1 Unordered List

An unordered list is a list of related items in which the order of items is irrelevant. It is defined by `<ul>` tag and each of its list item is defined by `<li>` tag. The web browser will display these list items as bullet points.

Example:

```
<h5>Commonly used components of
 Microsoft Office</h5>
<ul>
    <li>Word</li>
    <li>Excel</li>
    <li>PowerPoint</li>
    <li>Access</li>
</ul>
```

Output:



6.4.2 Ordered List

An ordered list also displays a list of related items. It is used where the order of the list is important e.g. names of students in order of their exam ranks. It is defined by `<ol>` tag and each of its list item is defined by `<li>`. The web browser will display these list items with numbers starting from 1 instead of bullet points.

Ordered lists can also be defined with two of its attributes: start and reversed. Start attribute defines the starting number of first list item. Reversed attribute is used to display the list in descending order.

The list items for ordered list can also be defined with a value attribute which is used to place that item at a specific position or number in the list.

Example:

```
<h5>Steps to create HTML file </
h5>
<ol>
    <li>Text Editor</li>
    <li>New File</li>
    <li>HTML codes</li>
    <li>Save as .html</li>
</ul>
```

Output:

6.4.3 Description List

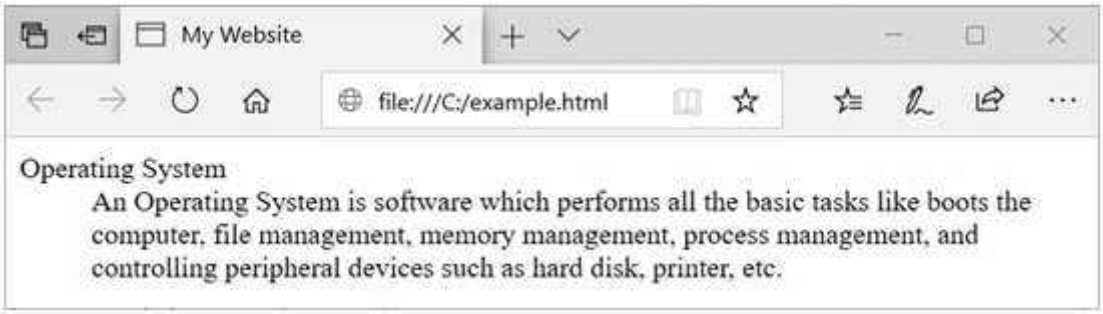
Description lists are used to display different terms and their descriptions just like in a dictionary or glossary. It is defined by `<dl>` tag and each of its list items is composed of two elements: term and description.

Term is defined by `<dt>` tag and its description is defined by `<dd>` tag. In description lists, a term can have one or more descriptions and a description can have one or more terms.

Example:

```
<dl>
    <dt>Operating System</dt>
    <dd>An Operating System is software which performs all the basic
 tasks like boots the computer, file  management, memory management,
process management, and controlling peripheral devices such as hard
disk, printer, etc.</dd>
</dl>
```

Output:



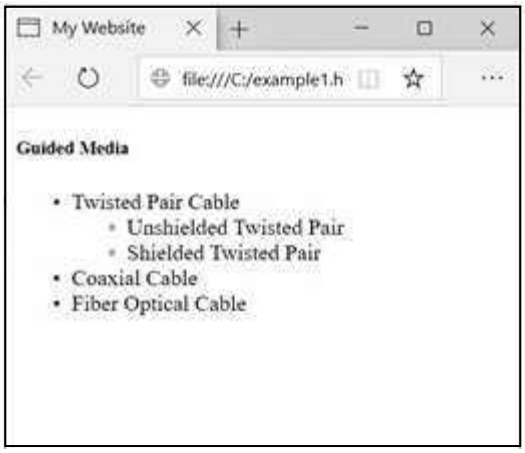
6.4.4 Nested Lists

A very powerful feature of HTML lists is their ability to nest one into another. Any of the list type can contain any other list type as its list item. It is defined by placing the new list tag inside the `<li>` tag of previous list. Web browsers automatically indent nested lists and assign appropriate marker to those nested list items as well.

Example:

```
<h5>Guided Media</h5>
<ul>
  <li>Twisted Pair Cable
    <ul>
      <li>Unshielded Twisted Pair</li>
      <li>Shielded Twisted Pair</li>
    </ul>
  </li>
  <li>Coaxial Cable</li>
  <li>Fiber Optical Cable</li>
</ul>
```

Output:



Teacher Note

Teachers are supposed to demonstrate use of various attributes of list elements.

SLOs

- Add an Image to a web page
- Apply Border to an Image in a web page
- Specify width and height of an Image
- Specify an alternate text for the image
- Apply background color to a web page
- Use and image as a background of web page

6.5 IMAGE AND BACKGROUND

Images and backgrounds give a visual appeal to the websites. Sometimes images can present a better understanding than long and uninteresting texts.

6.5.1 Images

Images can be inserted in an HTML document by using `<img>` tag. This does not create a copy of image. Instead, it only creates a reference to original image placed somewhere in the computer's storage.

The `<img>` tag is an empty tag which means that it does not require a closing `</img>` tag. It contains five attributes out of which two are required and three are optional.

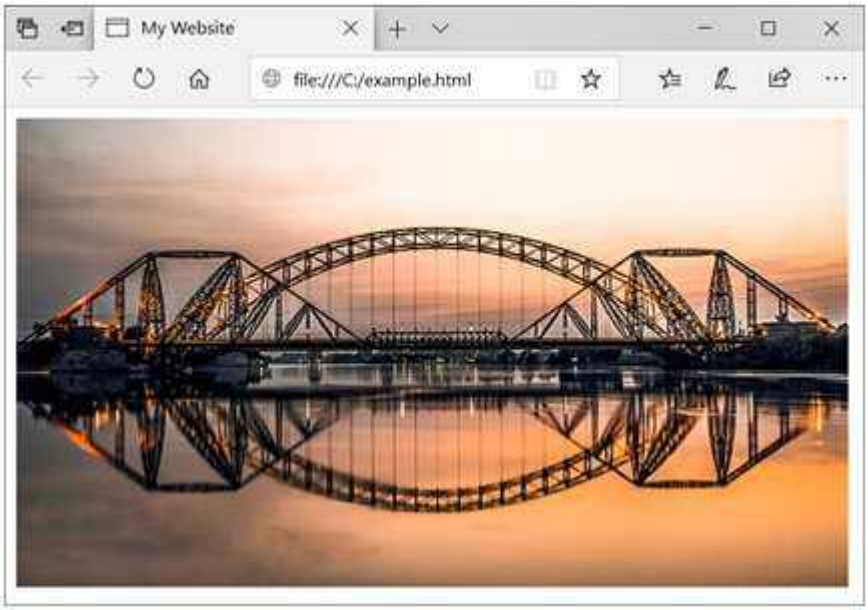
6.5.2 Attributes of Image Tag

Attribute	Value	Description
src	URL	Defines the source or reference of the image file. Syntax: `<img src="image.jpg">`
alt	text	Defines alternate text for the image. Syntax:`<img src="image.jpg" alt="Introduction">`
width	pixels	Defines the display width of the image. Syntax: `<img src="image.jpg" width="300">`
height	pixels	Defines the display height of the image. Syntax: `<img src="image.jpg" height="120">`
border	pixels	Defines the width of the border to be displayed around the image. (This attribute is supported till version 4.1 of HTML). Syntax: `<img src="image.jpg" border="2">`

Example:

```
<img src="bridge.jpg" alt="Bridge" width="600">
```

Output:



6.5.3 Backgrounds

The web browsers display an HTML document with white background by default. However, this can easily be changed to a different color or even an image with the help of bgcolor and background attributes of the `<body>` tag.

bgcolor: This attribute is used to change the color of the entire web page. Its color value can be defined as RGB code, hexadecimal code or by color name. For instance, to set the background color of the web page to green we can use any one of these values: rgb(0,255,0) : #00FF00 : green e.g. `<body bgcolor="green">`
background: This attribute is used to display an image as the background of the web page. Its value will be the reference or URL of the background image. e.g. `<body background="image.jpg">`

Both of these attributes are supported till version 4.1 of HTML.

SLOs

- Define a hyperlink
- Create a hyperlink to an external web page or within the same web page
- Develop the understanding about anchor tag
- Use different attributes of anchor tag

6.6 HYPERLINKS

Hyperlinks allow a user to navigate from one web page to another. It also enables users to navigate to different sections within the same web page. Hyperlinks convert text or other media into clickable objects.

6.6.1 Definition

A hyperlink in HTML is defined by `<a>` tag and its `href` attribute. The value of `href` is the reference of another web page or a different section within the same page.

- Links to external document: To send a user to any other web page, use the URL of that page as the value for `href` attribute.
  e.g.`<a href="http://www.google.com">Goto Google</a>`
- Links within the same document: Setting the link within the same page requires two steps:
  1. Use `id` attribute of any HTML tag to give a name to the section of the page, where a user should reach after clicking on the link.
  2. Create a hyperlink and set the above name as `href` attribute of this link, starting with hash (#) symbol.
     e.g. `<p id="navigate">Send user here on click</p>`
     `<a href="#navigate">Go to the linked paragraph</a>`

Attribute	Value	Description
`href`	URL	Specifies the URL or section id of the page the link goes to.
`name`	Section Name	Specifies the name of an anchor. This attribute works till version 4.1 of HTML.
`target`	_blank : _parent : _self : _top : framename	Specifies where to open the linked document.

SLOs

- Define term table
- Differentiate between rows and columns
- Differentiate between table heading and table data tags
- Create a table in a web page
- Change horizontal and vertical alignment of cell contents
- Set the width of contents to specific number of pixels or percentage
- Draw a border around the table
- Control the distance between data in a cell using cell padding attribute
- Control space between adjacent cells using cells pacing attribute
- Create data cells that span given number of rows or column using colspan and rowspan attributes

6.7 TABLES

Tables allow displaying the content (like text, image, links) in the form of rows and columns. The coordinating place of a row with a column is called a cell. These cells contain some content of the webpage. In HTML, a table is defined by `<table>` tag.

6.7.1 Rows and Columns

A row is the collection of all horizontal cells of a table. A table can contain any number of rows. All the rows in a table have an equal number of cells. It is defined by `<tr>` tag which is placed inside the `<table>` tag.
A column is the collection of all vertical cells of a table. A table can contain any number of columns as well. It is defined by `<td>` tag which is placed inside the `<tr>` row tag.

6.7.2 Table Heading

HTML table allows defining a header for the columns of our table. A header cell is defined by `<th>` tag and is placed inside a `<tr>` row tag. It is used to differentiate from the content placed inside normal `<td>` data cells. To make the entire header row stand out from rest of the table contents, defined `<th>` tags for all columns of the first `<tr>` row tag of any `<table>` tag.

6.7.3 Table Data

The content is placed inside a cell in a table by using `<td>` table data tag. A cell can contain any type of data such as text, image, media, link, etc.

6.7.4 Table Attributes:

Attribute	Value	Description
align	left : center : right	Specifies the alignment of a table according to surrounding text.
width	pixels : %	Specifies the width of a table.
border	1 or 0	Enables or disables the border around the table.
cellpadding	pixels	Specifies the space between the edge of cell and the content inside.
cellspacing	pixels	Specifies the space between cells.

All the above attributes are supported till version 4.1 of HTML.

6.7.5 Cell Attributes:

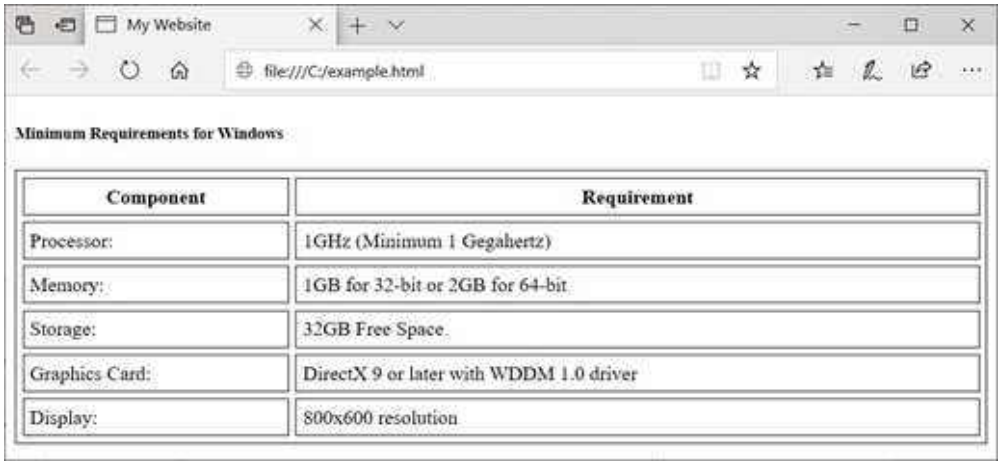
Attribute	Value	Description
align	left : center : right	Specifies the alignment of the content inside the cell.
valign	top : middle : bottom : baseline	Vertically aligns the content in a cell.
colspan	number	Specifies the number of columns a cell should merge into.
rowspan	number	Sets the number of rows a cell should merge into.

All the above attributes are supported till version 4.1 of HTML.

Example:

```
<h5>Minimum Requirements for Windows</h5>
<table width="100%" border="1" cellspacing="5" cellpadding="5">
  <tr>
    <th>Component</th>
    <th>Requirement</th>
  </tr>
  <tr>
    <td>Processor:</td>
    <td>1GHz (Minimum 1 Gegahertz)</td>
  </tr>
  <tr>
    <td>Memory:</td>
    <td>1GB for 32-bit or 2GB for 64-bit</td>
  </tr>
  <tr>
    <td>Storage:</td>
    <td>32GB Free Space</td>
  </tr>
  <tr>
    <td>Graphics Card:</td>
    <td>DirectX 9 or later with WDDM 1.0 driver</td>
  </tr>
  <tr>
    <td>Display:</td>
    <td>800x600 resolution</td>
  </tr>
</table>
```

Output:



SLOs

- Define a frame
- Differentiate between a frame and a frameset
- Use rows and cols attributes of <frameset> tag to divide the browser screen into rows and columns
- Use different attributes like src, marginheight, marginwidth, name, noresize and scrolling of <frame> tag

6.8 FRAMES

HTML frames are powerful elements which allow displaying the contents of another HTML document within a web page. A web page can be divided into multiple sections and each section can display all contents from a different web page by using frames.

It is defined by `<frame>` tag. The `src` attribute is used to provide the reference URL of another web page to be displayed in this frame.

Attribute	Value	Description
`src`	URL	Defines the URL of the page which should be displayed in the frame.
`marginheight`	pixels	Defines top and bottom spaces of a frame.
`marginwidth`	pixels	Defines left and right spaces of a frame.
`noresize`	noresize	Defines if the user can change the frame size or not.
`scrolling`	yes : no : auto	Defines if the scroll bar should be displayed within the frame or not.

HTML frames and framesets are supported till version 4.1 of HTML.

6.8.1 Framesets

Framesets define how a web page is divided into rows and columns to display multiple frames on that web page. It is defined by `<frameset>` tag and contains one or more `<frame>` tags.

Attribute	Value	Description
`cols`	pixels : %	Defines the number and the size of frame columns.
`rows`	pixels : %	Defines the number and the size of frame rows.

SLO
- List out different website development tools.

6.9 WEB DESIGNING TOOLS

Following is the list of some of the tools that help in designing and developing a website:

- Microsoft FrontPage
- Coral Draw
- Adobe Dreamweaver
- Wordpress
- Microsoft Visual Studio
- Wix
- Figma
- CoffeeCup HTML Editor
- Adobe XD

SUMMARY

- WWW stands for world-wide web and is a way of accessing different websites through internet.
- There are multiple aspects involved in using accessing information through internet like Web Server, Web Hosting, Website and Web Browser.
- URL stands for Uniform Resource Locator and is the format in which external resources like web pages, images, other media and supporting files are referenced.
- There are different types of specialized websites such as Portal, News, Informational, Educational, Personal, Business, Blogs, Forums, Entertainment and Social.
- HTML is the language in which web pages are coded.
- Any text editor can be used to create HTML files however there are specialized editors also available.
- An HTML file must be of .htm or .html extension.
- A web browser is used to view HTML pages.
- The codes used in HTML are called tags and are denoted by angular brackets (<>).
- There are various HTML tags. Some define the appearance of the content. Some carry actual content such as text, images, videos, etc. Some provide additional information about the web pages.
- There are three kinds of HTML lists namely unordered list, ordered list and description list.
- Unordered lists display the list of items in which the sequential order of its items does not matter.
- Ordered lists display the items in numerically ordered sequence.
- Description Lists are less commonly used and are used to define terms and their descriptions such as in a dictionary.
- HTML lists can be nested into one another.
- HTML pages can make use of images to decorate and provide greater meaning to their content.

- Hyperlinks give the ability to any HTML object of being clickable. Hyperlinks provide means of navigation from one page to another or from one section in a page to another within the same page.
- HTML tables can be used to display data, information or content in a tabular format. Tables organize the content into rows and columns.
- HTML Frames can be used to display the entire contents of another web page within a web page.
- Framesets define the layout to display different frames and their contents.
- There are different tools available which facilitate the designing and development of web pages and websites.

EXERCISE

A. Choose the right answer:

1. The service that is responsible for making websites publicly accessible through the internet is called

   a) Web Server b) Web Hosting
   c) Web Site d) Web Browser

2. The type of special website where different users can ask questions and give answers or discuss on various topics is called:

   a) Social site b) Blogs site
   c) Forums site d) Informational site

3. Entertainment site specializes in delivering:

   a) News, weather and current affairs
   b) Information about products and services of a business
   c) Personal information of a particular person
   d) Content like videos, images and games for entertainment

4. A web browser will translate the codes in a web page if the extension of the document is:

a) .html b) .txt
c) .doc d) .pdf

5. The tag used to automatically add line space before and after the containing text is:

a) `<br>` b) `<hr>`
c) `<p>` d) `<pre>`

6. The type of list which shows its items in a numerically ordered sequence is:

a) Nested List b) Unordered List
c) Ordered List d) Description List

7. To create a clickable text which navigates to another page or section, we use:

a) `<input>` tag b) `<li>` tag
c) `<b>` tag d) `<a>` tag

8. To differentiate the heading cells from rest of the data in a table, we use:

a) `<th>` tag b) `<tr>` tag
c) `<td>` tag d) `<dt>` tag

9. The tag used to define the title caption of the web browser is:

a) `<thead>` b) `<head>`
c) `<title>` d) `<h1>`

10. The attribute used to define the URL for reference of image in <img> tag is:

a) target b) name
c) src d) href

B. Respond to the following:

1. Differentiate between web hosting and web server.
2. What are the steps involved in creating a complete website?
3. Differentiate between `<head>`, `<title>` and `<h1>` to `<h6>` tags.
4. Identify and explain some HTML tags used for formatting of the content.
5. Differentiate between ordered and unordered lists.
6. How are images displayed in an HTML page?
7. How can a user be redirected to another web page?
8. What kind of HTML elements are used to display data in rows and columns? Discuss some of its formatting features.
9. Is it possible to display the entire contents of another web page in our HTML page? How?
10. List some popular text editors and other tools which help in designing and development of websites.

C. Match the columns.

S.NO.	A	S.NO.	B	C
(i)	E-Commerce	(a)	Add navigation support to web pages	
(ii)	`<head>`	(b)	Organize information as list points	
(iii)	`<ul><ol><dl>`	(c)	Organize information in rows and columns	
(iv)	`<tables>`	(d)	Contains additional information and styling features of the web page	
(v)	`<img>`	(e)	Business website	
(vi)	Hyperlinks	(f)	Add images and infographics to the web page	

ACTIVITIES

Create three pages with following features:

Page 1 (home.html):

- Name of the file should be home.html
- Title of the page should be "Unit 6 – Activity – Home"
- Place a heading of "Input and Output Devices"
- Create an Unordered List with two items:
    - Input Devices
    - Output Devices
- Both of these items should be hyperlinks. Clicking on "Input Devices" should navigate to another html page named "inputs.html" and clicking on "Output Devices" should navigate to page named "outputs.html"

Page 2 (inputs.html)

- Title of the page should be "Unit 6 – Activity – Input Devices"
- The page should display a table with two columns:
    - Left column should contain names of different Input Devices
    - Right column should contain images for those input devices. The width of images should be set to 200 pixels.

Page 3 (outputs.html)

- Title of the page should be "Unit 6 – Activity – Output Devices"
- The page should display a table with two columns:
    - Left column should contain names of different Output Devices
    - Right column should contain images for those output devices. The width of images should be set to 200 pixels.