Unit (5) Designing Website

Short Introduction

Internet surfing is part of almost everyone's life and we use it for online shopping, social networking, checking results, sending/receiving emails etc. In this unit, the techniques to develop a simple website are discussed.

HTML </>

Students' Learning Outcomes

1. Introduction to HTML

- Define Hypertext Markup Language (HTML)
- Explain the steps involved to:
  - Create and save an HTML file
  - Display a webpage
- Identify the tags used to mark-up HTML elements
- Identify the following elements:
  - HTML
  - Head section
  - Body section

2. Text Formatting

- Describe the steps involved to:
  - Specify a page title
  - Create a paragraph
  - Insert line breaks
  - Insert spaces
  - Add headings/sub-headings
- Identify the text formatting tags used to format the text in various font styles, colours and sizes
- Use appropriate text formatting tags to define:
  - Font size
  - Font colour
  - Font face
  - Bold text
  - Italic text
  - Underline text

3. **Creating Lists**
   - Differentiate among unordered list, ordered list, definition list and nested list
   - Create:
     - Unordered list
     - Ordered list
     - Definition list
     - Nested list

4. **Images and Backgrounds**
   - Add:
     - An image
     - Border to the image
   - Specify:
     - Width of the image
     - Height of the image
     - An alternate text for the image
     - Applying Background and Foreground colours to a webpage
   - Assign a background image to the webpage

5. **Hyperlinks**
   - Define a hyperlink
   - Create a hyperlink to a webpage
   - Define an anchor
   - Create an anchor to hyperlink within a webpage
   - Create a graphical hyperlink

6. **Creating Tables**
   - Create a table in the webpage
   - Apply the following table attributes:
     - Border
     - Colspan
     - Rowspan

5.1 Introduction to HTML

When you send request to a web server through a web browser to access a webpage, you get HTML as a response from there. The web browser understands the HTML and displays contents of the webpage. HTML tells the browser how the contents are structured inside a webpage.

5.1.1 Definition

HyperText Markup Language (HTML) is a simple language to create webpages.

There are two important terms that you need to understand in the name HTML.

1- Hypertext
2- Markup Language

Hypertext

The term *Hypertext* is used due to the special text in a webpage called hyperlinks. By clicking on these links you can move from one webpage to another. Hyperlinks are used to navigate on the World Wide Web (WWW).

Markup Language

A webpage consists of a series of elements which are represented by tags. For example, if you need a paragraph of text on your webpage, you use it as:

<p> Some Text Here </p>

Here <p> shows marking of paragraph opening tag and </p> means marking of paragraph closing tag as shown in Figure 5-1. Due to marking of each element, it is called a markup language.

<p> I am a student <\p>

<P> I am in class 9 <\P>

<P> I am in computer section <\p>
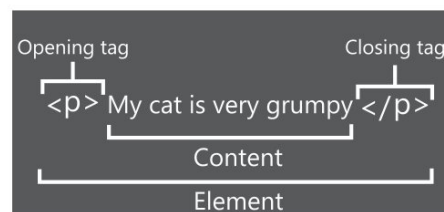
<p> I have a computer <\P>

Figure 5-1 Example of Tag in HTML

Do you know?

HTML is not case sensitive. It means that a tag written uppercase is not different from the one written in lowercase. For example, the paragraph tag p can be written as <p> or <P>. So, all of the following lines have same effect.

5.1.2 Creating First Webpage and Displaying it

To create a webpage, you need a text editor, a software to edit text in a file. In MS Windows, you can use Notepad and in Mac you use TextEdit. You can follow these four steps to create your first webpage.

Step 1. Open text editor.

Step 2. Write some HTML content, as shown in Figure 5-2.

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

<h1> My First Heading </h1>

<p> My First paragraph. </p>

</body>
</html>
```

Figure 5-2 Example of HTML

Step 3. Save the HTML Page with extension .htm or .html as shown in Figure 5-3.

Figure 5-3 saving HTML file

Step 4. In order to view your first webpage, just double click the HTML file you saved in step 3. A web browser is automatically opened to show your webpage as shown in Figure 5-4.

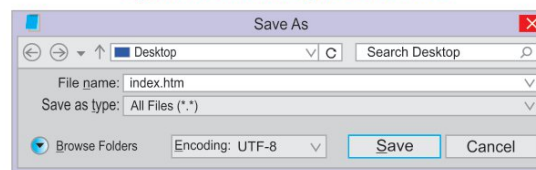**My First Heading**

My First paragraph.

Figure 5-4 My First webpage

5.1.3 Identifying the Tags Used to Markup HTML Elements

There are two types of tags in an HTML document.

1- Paired Tags
2- Singular Tags

Paired Tags

Most of the tags in HTML are paired tags. They consist of a start tag, an end tag and contents between them. Following is the general structure of paired tags:

<tagname> Contents </tagname>

For example, tag *p* to create a paragraph in HTML document is a paired tag.

<p> I study in 9th class. </p>

Singular Tags

Some tags do not have closing tags and they are called singular tags or empty tags. They are simply written as <tagname>. For example, <br> for line break, <hr> to insert a horizontal line.

5.1.4 Attributes in HTML Tags

Attributes are the properties associated with tags. They provide some information with respect to a specific tag. Each attribute is given a value. Generally, a tag with attributes is written as:

<tagname attribute1="value" attribute2="value" ..... attributeN="value">

For example, <p align = "center"> Content </p> shows the content of a paragraph at centre with respect to left and right margins.

5.1.5 Main Sections in a Webpage, HTML, HEAD and BODY

* **HTML:** The HTML document begins with the tag <html> and ends with </html>. It is the top level tag that contains the whole contents of a webpage.

An HTML document primarily consists of two sections.
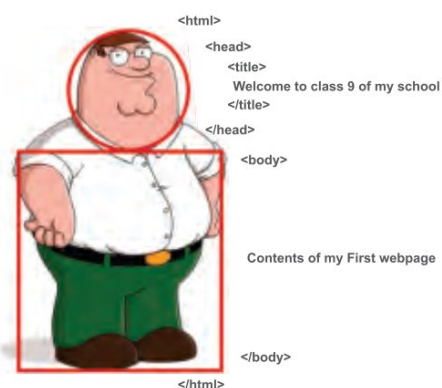
　　1- Head Section
　　2- Body Section

Figure 5-5 Sections of a Webpage

These sections are shown in Figure 5-5, and explained in the following.

- **Head Section:** Head section typically defines the document title, styles and other information about the whole document. Head section starts with <head> tag and ends with </head>. To specify title of the webpage, you use <title> tag inside <head> </head> tags. Figure 5-5 shows an example, where we set the title of the webpage as "Welcome to class 9 of my school" by writing it inside <title> </title> tags.

- **Body Section:** Body section contains the actual contents of a webpage that are visible inside a webpage. This section starts with <body> tag and ends with </body>.

> **Activity 5.1**
>
> Create a webpage having title "Information about Pakistan".
> Save the webpage with name "Pakistan.html".

5.2 Text Formatting

5.2.1 Content Formatting in HTML

HTML defines special elements for defining text with a special meaning. Here is the description about performing various content formatting tasks in HTML.

- **Creating a paragraph:** The <p> tag marks starting of a paragraph, and </p> tag marks closing of the paragraph. The text inside <p> </p> tags is actual contents of the paragraph.

- **Insert line breaks:** The <br> element inserts a line break without starting a new paragraph. For example, <p>This is
a paragraph</p> displays text in two lines, as following.

    This is
    a paragraph

- **Insert spaces:** If you insert multiple spaces in a text, HTML only considers one space and ignores the others. For example, <p> I study in 9th class. </p> generates the following output.

    I study in 9th class.

You can see that HTML has ignored the multiple spaces inside the text. In order to insert spaces you need to write " " where the space is needed. For example, <p> I study   in 9th class. </p> generates the following output.

I study   in 9th class.

In order to add two spaces, you can use " ".

* **Add headings/sub-headings:** Headings are defined with the <h1> to <h6> tags. <h1> defines the most important heading. <h6> defines the least important heading. For example, <h1>Heading 1</h1> <h2> Heading 2 </h2 > <h3> Heading 3 </h3> <h4> Heading 4 </h4> <h5> Heading 5 </h5> <h6> Heading 6 </h6> produces the output shown in Figure 5-6.

Heading 1

Heading 2

Heading 3

Heading 4

Heading 5

Heading 6

Figure 5-6
Headings

Activity 5.2

In the file "Pakistan.html", create a first level heading "Pakistan". Inside this heading, write a paragraph about Pakistan.

5.2.2 Identify the Text Formatting Tags

The tag specifies the font styles, font size, and colour of text. You can use *color* attribute of the tag to specify the colour of text. For specifying the size of text, *size* attribute is used. Similarly, *face* attribute is used to set the font style of text. For example, Some Text.

Below are some examples for usage of tag, along with their output.

HTML Code Snippet	Output
This is some text! This is some text! This is some text!	This is some text! This is some text! This is some text!

Important Note

In HTML, you write US English so you use "color" instead of "colour" which is used in British English.

Important Note

The <font> tag is deprecated in HTML5, the latest version of HTML. HTML uses tags like , <i>, <u> to make text **bold**, *italic* or underline respectively. Below are some examples for usage of these tags, along with their outputs.

HTML Code Snippet	Output
This text is bold <i>This text is italic</i> This is an <u>underline text</u>	**This text is bold** *This text is italic* This is an underline text

5.3   Creating Lists

Sometimes, you need to provide information in the form of lists e.g. list of subjects, list of teachers, list of friends etc. In the following, we study what type of lists are available in HTML and how to create them.

5.3.1 Types of Lists

There are following three types of lists in HTML:

- **Unordered List**

  In an unordered list, the order of the list items is not important. In other words, shuffling of items in an unordered list has no effect. For example, list of cities in Pakistan. An unordered list is created inside the <ul> tags. Each list item is added with <li> tag, as shown below.

HTML Code Snippet	Output
     - Item - Item - Item - Item 	• Item • Item • Item • Item

- **Ordered List**

  An ordered list keeps each list item with an order number. If you change the order, the meaning of the whole list may also change. For example, if your teacher makes a list of students with respect to their marks then definitely order will matter.

  An ordered list starts with <ol> and ends with tag. Each list item starts with <li> tag, as shown below.

HTML Code Snippet	Output
      - First item - Second item - Third item - Fourth item 	1. First item 2. Second item 3. Third item 4. Fourth item

- **Definition List**

  There is another type of list, called "Definition list" or "Description list". It is used when you need to show some terms and their descriptions. For example, if you want to write names of subjects you are studying in 9th class along with their introduction then this type of list is helpful. The <dl> tag is used to define the description list, the <dt> tag specifies the term, and the <dd> tag describes that term as shown in the following example.

HTML Code Snippet	Output

<dl>
    <dt>Coffee</dt>
    <dd>- black hot drink</dd>
    <dt>Milk</dt>
    <dd>- white cold drink</dd>
</dl>
	Coffee
	   - black hot drink
	Milk
	   - white cold drink

- **Nested Lists**

  In a list, a list item can contain another list. Such list is called a nested list. It is useful for situations where you have multiple options for a single item in a list e.g. for writing table of contents that contain sub-sections. For example, see the following code snippet and its output.

HTML Code Snippet	Output

`<ul>`
  `<li>Coffee</li>`
  `<li>Tea`
      `<ul>`
          `<li>Black Coffee </li>`
          `<li>Green tea</li>`
      `</ul>`
  `</li>`
  `<li>Milk</li>`
`</ul>`
	• Coffee
	• Tea
	    ○ Black Coffee
	    ○ Green tea
	• Milk

Activity 5.3

In the file "Pakistan.html", create a list of provinces of Pakistan, and in each province make a list of at least 5 cities.

5.4 Images and Backgrounds

In a webpage, images are added with the <img> tag in HTML. The <img> tag is an empty tag but it contains attributes of an image. For example, the **src** attribute specifies the URL (web address) of the image. <img src="url" >

- **Adding an Image**

  Images can improve the design and the appearance of a webpage. In HTML, images are added with the <img> tag. The attributes "width" and "height" can be used to specify the width and height of the image respectively. The "border" attribute can be used to specify the border size around the image. The *alt* attribute provides an alternate text for an image, if the image is not displayed due to any reason.

  Example:

  <**img src**="https://www.publicdomainpictures.net/ pictures/180000/ velka/tree-1465369020Wxg.jpg" **border**="2" **width**="200" **height**="200" **alt**="A Green Tree">

  The output is shown in Figure 5-7.

Figure 5-7 HTML image

- **Applying Background and Foreground Colours to a Webpage**

  The *bgcolor* attribute of <body> tag specifies the background colour of a document and *text* attribute specifies the foreground text colour of the webpage. These attributes are no longer supported in HTML5.

  See the following example:

  ```
  <body bgcolor="#E6E6FA" text="red">
  <h1>Hello world!</h1>
  </body>
  ```

  The output is shown in Figure 5-8.

Hello world!

Figure 5-8 bgcolor

- **Assign a background image to the webpage**

  The *background* attribute of the <body> tag specifies the background image of a document or webpage. See the following example: <body background="myimage.jpg">. The output is shown in Figure 5-9.
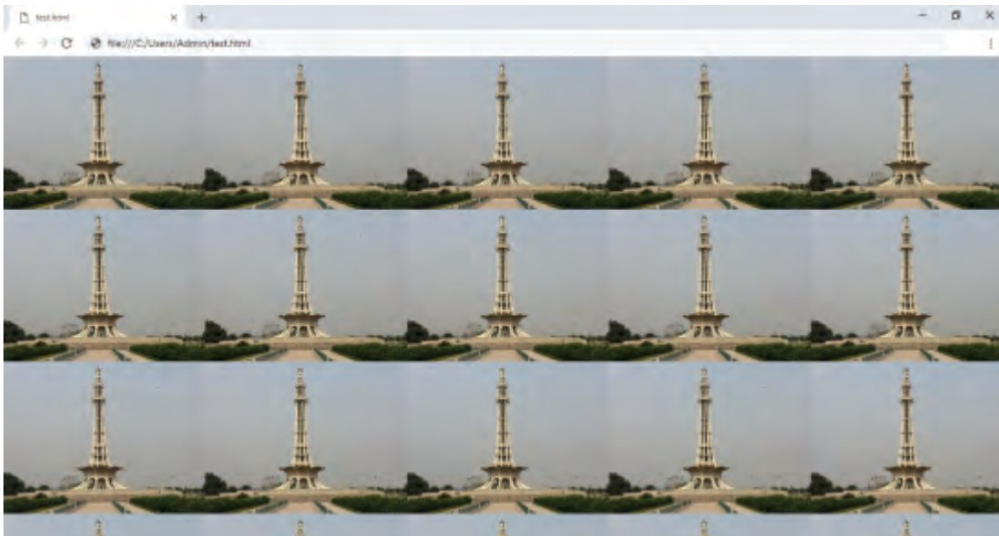

Figure 5-9 Background image

Activity 5.4

In the file "Pakistan.html", set the background colour to Green, and set the foreground text colour to white.

5.5   Define a Hyperlink

Hyperlink is such an icon, graphic, or text in a webpage, that when clicked, takes you to some other webpage.

5.5.1 Create a hyperlink to a webpage

The <a> tag is used to create a hyperlink in a webpage. The href attribute is used to specify the URL of the linked webpage. For example, Visit www.google.com makes the text "Visit www.google.com" a hyperlink. If you click on this text in the webpage, it takes you to the website www.google.com.

Activity 5.5

In the file "Pakistan.html", create a hyperlink to the article about Pakistan at Wikipedia. The article can be found at URL: "https://en.wikipedia.org/wiki/Pakistan".

5.5.2 Define an anchor

Anchor links allow you to go from one part of the same page to another part. Both hyperlinks and anchors are defined by the HTML anchor element <a>.

5.5.3 Create an anchor to hyperlink within a webpage

Suppose you have an html page with a lot of text, and after reaching bottom of the page, user needs to scroll up to reach the top of page. You can add a link at the bottom of page that takes the user directly to the top of page. For this purpose, you need to follow these steps.

1- Create an anchor at the top of page, and give it a name, e.g.

2- Create an anchor link at the bottom of page that uses *href* attribute to link to the anchor created in 1st step. Name of the anchor should be preceded by # sign in the *href* attribute, e.g. Go to top

You can give any name to an anchor, and then use the same name with preceding # sign to move to that anchor. This is shown in Figure 5-10 and Figure 5-11.
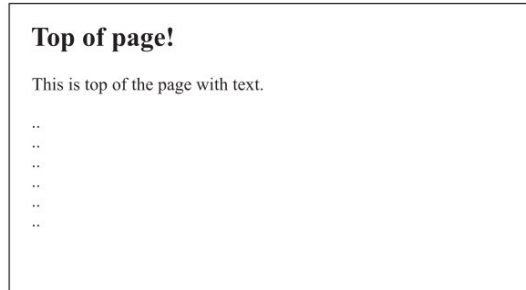
Top of page!

This is top of the page with text.

..
..
..
..
..
..

Figure 5-10 Anchor example

In Figure 5-11, by clicking the "Go to top" link you will jump back to the top of the page

..
..
..
..
..

End of page!

This is end of the page with text.

Go to top

Figure 5-11 Anchor link example

5.5.4 Create a graphical hyperlink

You can also use an image as a hyperlink, by using the <img> tag inside the <a> tags. We can see this in the following example.

An image that is a hyperlink:

```
<a href="https://www.google.com">
<img src="smiley.gif" alt="Go to google!" width="50" height="50" border="1">
</a>
```
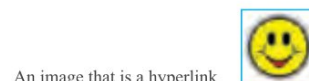
The output is shown in Figure 5-12.

An image that is a hyperlink

Figure 5-12

5.6   Creating Tables

In HTML, a table is defined with the <table> tag. Each table row is defined with the <tr> tag. A table header is defined with the <th> tag. A table data or cell is defined with the <td> tag.

See the following example with output (Figure 5-13):

```
<table >
    <tr>
        <th>Firstname</th><th>Lastname</th><th>Age</th>
    </tr>
    <tr>
        <td>Ali</td><td>Ahmed</td><td>50</td>
    </tr>
    <tr>
        <td>Usman</td><td>Ali</td>   <td>60</td>
    </tr>
</table>
```

Firstname	Lastname	Age
Ali	Ahmed	50
Usman	Ali	60

Figure 5-13 Table tag output

Apply the following table attributes:

- **colspan:** To make a cell span more than one columns, colspan attribute is used. See the following example with output (Figure 5-14):

```
<table>
    <tr>
        <th>Name</th><th colspan="2">Telephone</th>
    </tr>
    <tr>
        <td> Ali Ahmed</td>
        <td>5557785412</td>
        <td>5557785545</td>
    </tr>
</table>
```

Cell that is spans two columns

Name	Telephone	
Ali Ahmed	557785412	5557785545

Figure 5-14 Col span output

- **rowspan**: To make a cell span more than one row, rowspan attribute is used. See the following example with output (Figure 5-15):

```
<table>
	<tr>
		<th>Name:</th>
		<td>Ali Ahmed</td>
	</tr>
	<tr>
		<th rowspan="2">Telephone:</th>
		<td>5557785423</td>
	</tr>
	<tr>
		<td>55577855456</td>
	</tr>
</table>
```

Name:	Ali Ahmed
Telephone:	5557785425
	55577855456

Figure 5-15 Row span output

Activity 5.6

In the file "Pakistan.html", create a table that shows the population of largest cities in different provinces of Pakistan. Your table should be structured as follows.

Province	City	Population
Balochistan	Quetta	
Khyber Pakhtunkhwa	Peshawar	
Punjab	Lahore	
	Faisalabad	
	Rawalpindi	
	Gujranwala	
Sindh	Karachi	
	Hyderabad	
	Sukkur	

SUMMARY

- HTML is Hypertext Markup Language and its purpose is to create a webpage.
- A website consist of webpages.
- The head element is a container for metadata.
- The visible part of the HTML document is between <body> and </body>.
- Text formatting refers to the attributes of text other than the actual text itself.
- There are different types of lists in HTML such as unordered, ordered, and description lists.
- Hyperlink is an icon, graphic, or text in a document by which you move around on the other documents
- To move from one part of the same page to the other page we use anchor.
- In HTML the <table> tag defines table.

EXERCISE

5.1   Choose the correct option.

1.   An individual list item can contain another entire list called _____.

   (i)   Ordered list   (ii)   Unordered list

   (iii)   Nested list   (iv)   Definition list

2.   HTML is not a _____language.

   (i)   Programing   (ii)   Markup

   (iii)   Both i and ii   (iv)   None of above

3.   Webpages can be created and modified by using _____.

   (i)   Notepad ++   (ii)   Notepad

   (iii)   TextEdit   (iv)   All of above

4.   An HTML element usually consists of a _____tags.

   (i)   Start   (ii)   End

   (iii)   Start and End   (iv)   None of above

5. **The _____ element is a container for metadata (data about data).**

    (i)   <body>   (ii)   <head>

    (iii)   <title>   (iv)   <html>

6. **To save the HTML Page, you can use _____as file extension.**

    (i)   htm   (ii)   html

    (iii)   xhtml   (iv)   Both i and ii

7. **There are _____of headings in HTML document.**

    (i)   4   (ii)   5

    (iii)   6   (iv)   1

8. **_____tag is used to display data in tabular form.**

    (i)   td   (ii)   table

    (iii)   tr   (iv)   th

9. **A hyperlink can be applied to _____.**

    (i)   image   (ii)   text

    (iii)   Both i and ii

10. **In "body" tag_____ is used to make a picture of a background image of a webpage?.**

    (i)   bg   (ii)   background

    (iii)   bgiamge   (iv)   Both i and ii

5.2   Fill in the blanks.

1. _____make a cell span more than one row.

2. By clicking on special text called _____which bring you to the next page.

3. The _____attribute specifies the foreground colour of the webpage.

4. In HTML, images are defined with the _____ tag.

5. _____refers to the way tags are used to define the page layout and elements within the page.

6. HTML is a computer language which is used to create _____.

7. _____tag makes the enclosed text bold

8. Tags and text that are not directly displayed on the page are written in _____ section.

9. _____tag is used for inserting a line break.

10. _____attribute is used with *img* tag to display the text if image could not load in browser.

5.3 Give short answers.

1. Differentiate between ordered and unordered list.
2. Describe the basic text formatting tags.
3. What is difference between hyperlink and anchor?
4. Create a basic table with following attributes:
   * colspan
   * rowspan
5. Explain the steps involved to create a HTML page.

5.4 Write the output of the following HTML

```
<html>
<head>
<title> My Webpage</title>
</head>
<body>
<ol>
  <li> Sports
    <dl>
        <dt>Cricket</dt>
                <dd>Each team has 11 players</dd>
        <dt>Badminton</dt>
                <dd>Each team has 1 or 2 players</dd>
        <dt>Chess</dt>
                <dd>Each team has exactly 1 player</dd>
    </dl>
  </li>
  <li> Cities of Pakistan
    <dl>
        <dt>Lahore</dt>
                <dd>Capital of Punjab</dd>
        <dt>Karachi</dt>
                <dd>Capital of Sindh</dd>
        <dt>Peshawar</dt>
                <dd>Capital of Khyber Pakhtunkhwa</dd>
        <dt>Quetta</dt>
                <dd>Capital of Balochistan</dd>
    </dl>
  </li>
</ol>
</body>
</html>
```

5.5   Write HTML to get the following output

- **Algorithms**

Plain Interest Calculation

This algorithm takes number of years, amount and interest rate as input and produces total plain interest

1. Start
2. Input numbers years, amount, rate
3. Set Plain Interest to years * (amount*rate/100)
4. Print Plain Interest
5. Stop

Acceleration Calculation

This algorithm takes mass and force as input and produces acceleration

1. Start
2. Input numbers mass, force
3. Set Acc to force/mass
4. Print Acc
5. Stop

Activity 5.7

Create a webpage showing the subjects you are studying in 9th class and the professions you can join if you become expert in that subject. Display each profession with the image of some famous personality in that field. For example, in the field of computer science, you can display image of Bill Gates and possible professions are, "Software Developer", "Database Administrator", "Network Administrator", "Software Architect", etc.

You can display the subjects as ordered list while the professions can be displayed as sub-list.