Hyper Text Markup Language

Html

- Html stands for Hyper Text Markup Language
- Standard markup language for web pages
- Web pages consists of number of html elements and tags that define the structure of a webpage
- It allows to create contents that contain text, images, multimedia and hyperlinks
- Html document consist of series of elements represented by tags
- Tags are enclosed in angle brackets(<>) and comes in pairs with opening and closing tag.

Structure of Html with example

- <!DOCTYPE html>
- <html>
  - <head>
    - <title> Page Title</title>
  - </head>
  - <body>
    - <h1>Heading Text</h1>
    - Paragraph goes here
  - </body>
- </html>

- <!DOCTYPE html> declaration defines the document to be HTML5
- Html, head, title body h1, p etc are html elements
- <> denotes the opening tag and </> denotes closing tag of a element
- <html> elements is the root element of an html page
- <head> element contains <title> which defines the Title of html page
- <body> element contains the visible page content
- <h1> element defines a large heading
- <p> element defines the paragraph.

HTML Elements

- Html element is a fundamental building block of a webpage
- HTML element is defined by a start tag, some content and an end tag
- Each Html Element has a specific purpose and can contain or other elements nested inside them.
- Most html element consist of an opening tag , content and a closing tag
- Some html elements don’t have content and have no end tag like
<input/>
- Example:
- <h1> Heading</h1>, Paragraph

Html Attributes

- All html elements can have attributes
- Attributes provide additional information about element
- Attributes are specified in start tag.
- Attributes usually comes in key value pairs like name=“value”

Html attributes examples

- **href:** It is used in hyperlink <a> tag. The href attribute specifies the URL of the page the link goes to.
  - **Google**
- **The src attribute:** It is usually used in <img> tag to embed an image in a html page. The src attribute specifies the path to the image to be displayed.
  - **<img src="happy.gif">**
- **The height and width attribute:** height and width attribute defines the height and width of the html element to be displayed.
- **The alt attribute:** The alt attribute is used in img tag that specifies an alternate text to be displayed for image when image is not able to be displayed for some reason
  - <img height="400px" width="400px" alt="happy face">

HTML Heading

- HTML heading are used for titles and subtitles in a web page
- Heading can be defined with the <h1> to <h6>.
- <h1> should be used for main heading and others for sub heading
- <h1> tag being the most important heading and has largest font size
- <h6> tag has the smallest tag among heading tags.

Example

- <html>
- <body>
  - <h1>Main heading </h1>
  - <h2>Sub header 2 </h2>
  - </h3>Sub header 3 <h3>
  - …
- </body>
- </html>

Html Paragraph

- Paragraph html element always starts on a new line and is usually a block of text
- tag defines the paragraph
- It also add some white space (margin) before and after a paragraph
- Example:
- <html>
- <body>
  - This is a paragraph
- </body>
  </html>

HTML Division

- The tag defines a division or a section in an html document
- It is used as the a container for other html element which is then styled with css or manipulate with javascript.
- It is block-level element, which means it takes up the full width available and starts on a new line
- The element itself does not have any inherent visual meaning.

Example

```
<!DOCTYPE html>
<html>
<body>
<div style="float:right;">
<span>Hello world</span>
<h1>This is a Heading</h1>
<h2> This is heading 2<h1>
<p>This is a paragraph.</p>
</div>
</body>
</html>
```

HTML Comments

- Html comments are not displayed though added in the html
- Html comments are used to add information about the source code
- Html comments are added to html source using following syntax:
- <!- - HTML comment here- - >

Formatting

- Html formatting is used for formatting text.
- Formatting elements are designed to display special type of text
- <b> Bold text
- Important text
- <i>Italic text
- Emphazied text
- <mark>Marked text(highlight text)
- <small>Smaller text
- <del>Delete (strikethrough text)
- <ins>Represent the text is inserted/edited. (underline text by default)
- <sup>Superscript text example: $(a+b)^2=a^2+2ab+b^2$
- <sub> Subscript text example: H_2O

Spacing

- Spacing is used to maintain space between text.
- There are several options for creating and controlling white space

i. Html
 Element

- The html
 tag denotes a line break.
- We use
 tag if we want to display the upcoming text in the next line.

ii. HTML <pre> Element

- The HTML <pre> tag is used with preformatted text.
- It instructs the browser that the text is to appear exactly as written in the HTML file including spaces and blank lines

- iii.   adds the single white space
- iv.   adds two white spaces
- v.   adds four white spaces

Formatting text phrases

i. The element
   - The element: This tag is an inline container used to mark up a part of a text.
   - The tag is much like element but is a block-level element and <span is inline element

ii. The <tt> element
   - <tt> tag is used to represent text that should be displayed in a monospaced font.
   - Monospaced fonts are those in which each character occupies the same amount of horizontal space
   - It was historically used to display computer code, command line input and output

Image Element

- <img> tag is used for image element
- It is used to embed an image in a web page.
- The <img> tag is a void element which means it doesn’t have a closing tag.
- <img> tag have two important attributes
  - Src
  - Alt

Src attribute specifies the URL or file path of the image that is to be displayed. It can be absolute URL, a relative path or a data URL representing the image’s data

Alt attribute provides alternative text for the image. The text is displayed if the image cannot be loaded

Example: <img src=“happy.gif” alt=“happy face”>

Background Image

- A background image can be set for an element using the ‘background-image property
- Background-image propery allows to specify the URL of the image to be displayed as the background
- Example:

Anchor Element

- We use <a> tag for anchor element
- It is used to create a hyperlink that link the current page to another page
- It is one of the most important and commonly used tag in web development for enabling navigation between different pages
- Syntax: Google
- The href attribute specifies the URL or web address to which the link points.
- Path can be absolute URL or relative URL
- The text between opening and closing <a> tag is the link text
- <a> tag can also be used to create the internal links within the same webpage.
- Eg:Jump to section1
- ..
- <h2 id="section1">Section 1</h2>

Lists

- Lists are created to organize and structure the content.
- There are two main types of lists
  - Ordered List
  - Unordered List

Ordered List

- An ordered list is used to present a list of items in a specific order, typically with numbers or letters.
- An ordered list starts with the <ol> tag.
- Each items is represented by an <li> (list item) element.
- Example:
-
  Item 1
  Item 2
  Item 3
-
- Nested ordering can also be done.
- tag has the attribute name ‘type’.Based the type value, ordered listing is done.
- Values for type attribute can be ‘i’, ‘a’, ‘1’ etc

Unordered List

- An unordered list is used to present a list of items without any specific order
- Each item is represented by an <li> element
- tag has the attribute name ‘type’.Based the type value, ordered listing is done.
- Values for type attribute can be ‘square’, ‘circle’ etc

HTML Tables

- Tables are an essential component in HTML for organizing and displaying tabular data on webpages.
- They are structured using ‘<table>’ element and consist of rows and columns
- The <table> element defines the start of the table.
- Table rows are created using the <tr> (table row) element.
- Within each row, data cells are represented by the <td> (table data) element.

Example

- <table>
- <tr>
- <td>Row 1, Cell 1</td>
- <td>Row 1, Cell 2</td>
- </tr>
- <tr>
- <td>Row 2, Cell 1</td>
- <td>Row 2, Cell 2</td>
- </tr>
- </table>

Table Headings

- The first row of a table can be designated as the table header using the <th> (table header) element.
- It helps to identify the content of each column.

Example

- <table>
  - <tr>
    - <th>Name</th>
    - <th>Age</th>
  - </tr>
  - <tr>
    - <td>Ram</td>
    - <td>24</td>
  - </tr>
- </table>

Rowspan and Colspan

- The rowspan attribute specifies how many rows a cell should span vertically.
- The colspan attribute specifies how many columns a cell should span horizontally.
- Example:
- <td colspan=“2”></td>
- <td rowspan=“2”></td>

Table Caption

- We can add caption that serves as a heading for the entire table
- We use <caption> tag immediately after the <table> tag.
- Example:

Styling Tables

- Tables can be styled using CSS to improve their appearance and visual presentation.
- CSS properties like border, padding, and background-color can be applied to tables and cells.

```html
<table>
  <caption>Employee Information</caption>
  <tr>
    <th>Employee ID</th>
    <th>Name</th>
    <th colspan="2">Address</th>
    <th>Contact</th>
  </tr>
  <tr>
    <td>101</td>
    <td>John Doe</td>
    <td rowspan="2">123 Main St</td>
    <td rowspan="2">Cityville</td>
    <td>john@example.com</td>
  </tr>
  <tr>
    <td>102</td>
    <td>Jane Smith</td>
    <td>jane@example.com</td>
  </tr>
</table>
```

```html
<style>
  table {
    border-collapse: collapse;
    width: 100%;
  }

  th, td {
    border: 1px solid #ccc;
    padding: 8px;
    text-align: center;
  }

  caption {
    font-weight: bold;
    margin-bottom: 10px;
  }
</style>
```

Employee Information

Employee ID	Name	Address		Contact
101	John Doe	123 Main St	Cityville	john@example.com
102	Jane Smith			jane@example.com

Html Frames (iframe)

- <iframe> tag is used to embed another HTML document or an external webpage within the current webpage.
- Content displayed in iframe can come from same domain or different domain
- Many times we see youtube videos are embedded within the other websites. This is done with the help of iframe.
- Embedding content from malicious sources could pose security risks.
- Syntax: <iframe src=“url” title=“description width=“400px” >

Forms

- Html form is used to collect user inputs.
- The user input is most often sent to a server for processing.
- <form> tag is used to create the html form.
- <form> element is a container for different types of input elements like textbox, checkboxes,radio buttons, textarea, submit buttons etc

Note: Form example and its attributes in next slide

```
<form action="URL" method="HTTP_method">
   <!-- Input elements go here -->
</form>
```

‘action’:

- The action attribute specifies the URL or script to which the form data should be submitted when the user submits the form.
- It can be an absolute URL, a relative URL, or the name of a script on the same server.

‘method’:

- The method attribute specifies the HTTP method to be used when submitting the form data.
- Common methods are "GET" and "POST."
- "GET" appends form data to the URL, while "POST" sends the data in the request body.

‘**target**’:

- this attribute specifies where to display the response that is received after submitting the form.
- Its default value is ‘_self’ which means that the response will open in the current window.
- Other possible values are:
- _blank The response is displayed in new tab.
- _self the response is displayed in current tab.
- _parent the response is displayed in parent frame. Applicable when form is displayed in the iframe
- _top the response is displayed in full body of window or tab. Applicable when form is displayed in the iframe

‘**autocomplete**’:

- This attribute specifies whether a form should have autocomplete on or off. When autocomplete is on , the browser automatically complete value on values that user has entered before.
- Syntax: <form action=“action.php” autocomplete=“on”>

‘**novalidate**’

- The novalidate attribute is a Boolean attribute. When present, it specifies that the form-data should not be validated when submitted
- Syntax: <form action=“action.php” novalidate>

Input Element

- The html <input> element is mostly used form element
- Depending on the ‘type’ attribute, way of input controls are changed.
- Types of Input:

<input type=“button”>	<input type=“file”>	<input type=“range”>
<input type=“checkbox”>	<input type=“image”>	<input type=“reset”>
<input type=“color”>	<input type=“number”>	<input type=“search”>
<input type=“date”>	<input type=“password”>	<input type=“submit”>
<input type=“email”>	<input type=“radio”>	<input type=“text”>
<input type=“url”>	<input type=“week”>	

Html Input Attributes

- Value attribute
  - The input value attribute specifies an initial value for an input field.
  - When form is submitted, user entered value is set in this attribute
  - <input type="text" value="John">
- Readonly attribute
  - The readonly attribute specifies that an input field is readonly. It can't be modified.
  - <input type="text" value="John" readonly>
- Disabled attribute
  - The disable attribute specifies that an input field should be disabled.
  - Disabled input element is unclickable.
  - Value of disabled input will not be sent when submitting the form.
  - <input type="text" value="john" disabled>

- Size attribute
  - The size attribute specifies the width of the input field.
  - Default value is 20
  - <input type=“text” size=“10”>
- Min and Max attribute:
  - The min and mas attribute specifies minimum and maximum value that user an enter in the number field or the range field
  - <input type =“number” min=“1” max=“5”>
  - <input type=“range” min=“0” max=“10”>

- Placeholder attribute
  - The placeholder attribute specifies a short hint that describes the expected value of an input field
  - <input type=“email” placeholder=“enter the email”>
- Required attribute
  - The required attribute specifes that input field must be filled out before submitting the form.

1. **Text Input:**

```html
<label for="username">Username:</label>
<input type="text" id="username" name="username">
```

- Displays a single line text input field

Password Input:

```html
<label for="password">Password:</label>
<input type="password" id="password" name="password">
```

- Displays a single line text input field for password
- Entered text are not visible.

Submit Button:

```html
<input type="submit" value="Submit">
```

- Displays a clickable button
- When the button is clicked, user input values are posted to the server

Checkboxes:

```html
<label>
 <input type="checkbox" name="subscribe" value="yes"> Subscribe to newsletter
</label>
```

- Displays a checkbox for selecting zero or more of many choices

Radio Buttons:

```html
<label>
  <input type="radio" name="gender" value="male"> Male
</label>
<label>
  <input type="radio" name="gender" value="female"> Female
</label>
```

- Displays a radio button
- Used when we need to select only one option from many choices

html Copy code

```html
<!DOCTYPE html>
<html>
<head>
  <title>HTML Form Example</title>
</head>
<body>
  <h2>Contact Form</h2>
  <form action="process_form.php" method="post">
    <label for="name">Name:</label>
    <input type="text" id="name" name="name" required>

    <label for="email">Email:</label>
    <input type="email" id="email" name="email" required>

    <label for="message">Message:</label>
    <textarea id="message" name="message" required></textarea>

    <input type="submit" value="Submit">
  </form>
</body>
</html>
```

Label Element

- The <label> tag defines the label for many form elements
- The <label> element is useful for screen reader users to distinguish different fields like username, password etc

Dropdown List:

html

```
<label for="country">Country:</label>
<select id="country" name="country">
  <option value="us">United States</option>
  <option value="uk">United Kingdom</option>
  <option value="ca">Canada</option>
</select>
```

Select Element

- The <select> element defines a drop down list
- Generally used when we have one option to select and available choices are many
- <select> element is the container element
- <option> element is used for the options that can be selected.
- By default, first option is selected
- To define the pre-selected option, add the selected attribute to the option.
- Multiple options can also be selected by using multiple attribute
- We can use the size attribute in select tag, to define the number of items to be visible

Dropdown List:

html

```html
<label for="country">Country:</label>
<select id="country" name="country">
  <option value="us">United States</option>
  <option value="uk">United Kingdom</option>
  <option value="ca">Canada</option>
</select>
```

Textarea Element

- The <textarea> element defines a multi-line input field.
- The rows and cols are two attributes in <textarea> element that defines the size of the element
- Example:

```
<textarea name="message" rows="10" cols="30">
  This is a user message…….
</textarea>
```

Meta Tag

- In html, <Meta> tag is used to provide metadata or additional information about the webpage.
- These metadata are typically meant for browsers, search engines
- It is placed in the <head> section of the html document.
- Syntax: <meta name="name_attribute" content="value">
  - name: the name attribute specifies the name of the metadata property
  - content: the content attribute contains the value for the selected name.
- Example:
    - <meta charset="utf-8">
    - <meta name="viewport" content="width=device-width, initial-scale=1.0">
    - <meta name="title" content="Page Title">
    - <meta name="keywords" content="keyword1, keyword2, keyword3">
    - <meta name="author" content="John Doe">

Html Audio

- The html <audio> element is used to play an audio file on the webpage
- Example:
  - <audio controls autoplay>
    <source src="horse.ogg" type="audio/ogg">
    <source src="horse.mp3" type="audio/mpeg">
    Your browser does not support the audio element.
  - </audio>
- controls attribute adds audio controls like play,pause, volume
- <source> element allows to specify the path or url of the audio file.
- Autoplay attribute specifies the audio to be played automatically
- Muted attribute can be added with autoplay attribute to play the audio automatically but muted.
- Preload attribute specifies how the media content should be preloaded when web page is loaded. It can be either 'auto' or 'metadata' or 'none'

HTML Video

- The html <video> element is used to show a video on the web page
- Example:
  - <video width="400" height="300" controls>
    <source src="movie.mp4" type="video/mp4">
  - </video>
- controls attribute adds audio controls like play,pause, volume
- <source> element allows to specify the path or url of the audio file.
- Autoplay attribute specifies the audio to be played automatically
- Muted attribute can be added with autoplay attribute to play the audio automatically but muted.
- Loop attribute specifies to play the media over again when it finishes.
- Preload attribute specifies how the media content should be preloaded when web page is loaded. It can be either 'auto' or 'metadata' or 'none'
- Poster attribute is used to display the image while video is downloading. It will take the first frame of video as poster image if not specified.

Canvas

- The html <canvas> element is used to draw graphics on a web page.
- <canvas> element is only a container for graphics.
- Javascript must be used to draw the graphics.
- Canvas has several functions for drawing paths, boxes, circles, text and adding images
- Canvas is a rectangular area on an html page
- By default a canvas has no border or content

Example of canvas

```
<canvas id="myCanvas" width="300" height="150" style="border:1px solid grey"></canvas>

<script>
	const c = document.getElementById("myCanvas");
	const ctx = c.getContext("2d");
	ctx.fillRect(20, 20, 150, 100);
</script>
```

Html Semantic Elements

- A semantic element clearly describes its meaning to both browser and the developer.
- , are example of non-semantic elements which tells nothing about its content.
- <form>,<table><article>,<header>,<footer>,<main> are some examples of semantic elements which clearly defines it’s content.

- <article> defines independent and self contained content like, blogs,new articles,comments etc.
- <aside> defines the content aside from page content. Generally it includes off the topic contents like recent updates, ads etc
- <details> defines the additional details that user can view or hide the details
- <footer> defines the footer for a web page
- <main> Actual content to be displayed
- <nav> defines the navigation links
- <figure> defines the image/charts and its caption

HTML Events

- Events are the actions that happen on a webpage when user interacts with the browser or web page.
- Some of the events are:
- Mouse Events:
  - onclick: Occurs when a mouse click is detected on an element.
  - ondblclick: Occurs when a double-click is detected on an element.
  - onmouseover: Occurs when the mouse pointer moves over an element.
  - onmouseout: Occurs when the mouse pointer moves out of an element.
  - onmousemove: Occurs when the mouse pointer moves within an element.
  - onwheel: Occurs when the mouse wheel rolls up or down over an element

- Keyboard Events:
  - onkeydown: Occurs when a key is pressed down.
  - onkeyup: Occurs when a key is released.
  - onkeypress: Occurs when a key is pressed down and then released.

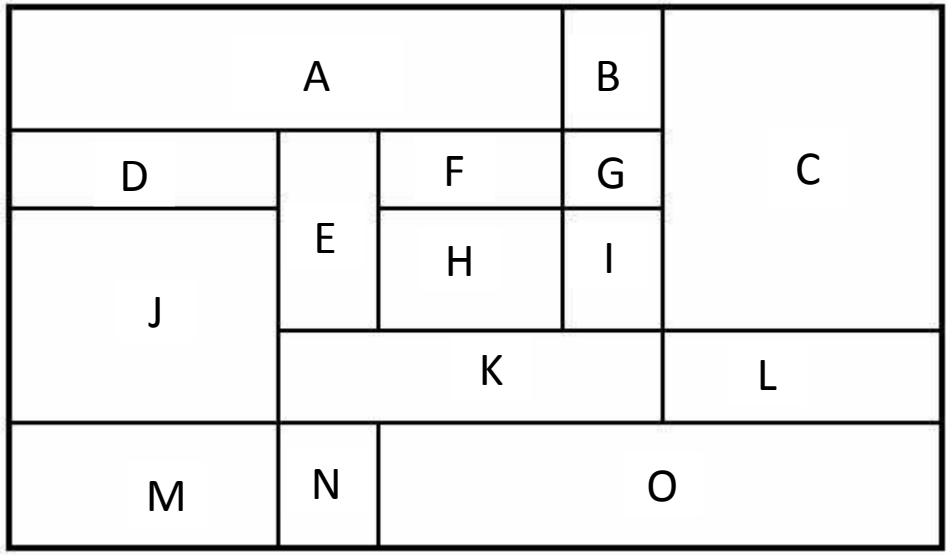
- Form Events:
  - onsubmit: Occurs when a form is submitted.
  - oninput: Occurs when the value of an input field changes.
  - onfocus: Occurs when an element gains focus (e.g., user clicks on an input field).
  - onblur: Occurs when an element loses focus.
  - onchange: Occurs when the value of the element is changed.
  - onreset: Occurs when reset button in the form is clicked
  - onsearch: Occurs when the user writes some keywords on search field

- Window Events:
  - onload: Occurs when the web page has finished loading.
  - onresize: Occurs when the browser window is resized.
  - onscroll: Occurs when the user scrolls the web page.

Excercise

- 1. create a basic html page with a heading, paragraph and an image
- 2. Implement an HTML form to collect user details like name, email, and age. Use javascript to get form values and display them in html table.
- 3. create a nav bar using unordered list('<ul>'). Add 5 items. Each item should be the anchor tag. Each link should navigate to different page.
- 4. Add 5 hyperlinks in a page and each link should be anchored to the same page.
- 5. Create a html page that will have the youtube video embedded in the webpage.
- 6.Create a user sign up form that have following fields:
- a. username (textbox)
- b. password(password)
- c. confirmPassword(password)
- d. email
- e. gender (radio)
- f. hobbies (checkbox)
- g. country (select box) with 5 items
- h.submit button.
- On submit button click, form selected values should be collected by javascript and show all the fields in tabular form.
-
- 7. Build a FAQ page using HTML headings. Atleast add 5 questions. Answers should be hidden by default. When user click on the link, answers should be expanded.

8. Create a HTML table structure as shown below



9. Use Canvas to draw to the bar chart.