

ROBOTICS 8 - HTML & WEB FUNDAMENTALS

Exact Course Reviewer

Pre-test: Internet Abbreviations

- **1. HTML:** Hyper Text Markup Language
- **2. HTTP:** Hypertext Transfer Protocol
- **3. URL:** Uniform Resource Locator
- **4. WWW:** World Wide Web
- **5. IP:** Internet Protocol

1. HTML and Web Fundamentals

HTML Definition & Purpose

- HTML stands for **Hyper Text Markup Language**.
- It is the standard markup language for creating Web pages.
- It describes the structure of a Web page.
- It consists of a series of elements.
- HTML elements tell the browser how to display the content.
- HTML elements label pieces of content such as "this is a heading", "this is a paragraph", "this is a link", etc.

Difference and Relationship: Internet & World Wide Web

- **ARPANET (1958/1969):** Advanced Research Projects Agency Network – The first military-based computer agency network built to test large scale computer network and used for research formed by Dwight D. Eisenhower.
- **Lawrence Roberts & Leonard Kleinrock:** Roberts was responsible for developing computer networks at ARPA with Kleinrock. Roberts was the first person to connect two computers. In 1969, Kleinrock used packet switching to send messages, and ARPANET was born.
- **Packet Switching:** A method of splitting and sending data. A file is broken into small segments called 'packets' (around 1500 bytes each), distributed across a network, and reordered back at the destination.
- **TCP/IP (1974):** Invented by Bob Kahn and Vint Cerf. Stands for Transmission Control Protocol/Internet Protocol. A set of protocols that govern how data moves through a network and allows computers to speak the same language.
- **The Internet:** After introducing TCP/IP, ARPANET grew to become a global interconnected network of networks.
- **IP Address:** IP stands for Internet Protocol. Every device connected to the internet is given a unique IP number used to find its location.
- **World Wide Web (WWW):** Created by Sir Tim Berners-Lee (1955–). He developed principles used today: HTML, HTTP, URLs, and web browsers.
- **Marc Andreessen (1971–):** Inventor of Mosaic, the first widely-used web browser.

Web Browsers & Editors

- **Creating/Editing HTML:** Web pages can be created/modified using text editors like Notepad (PC) or TextEdit (Mac).
- **Saving HTML File:** Save the file with a `.html` extension. Once it becomes a browser icon, it has become a webpage.
- **Editing Source Code:** Right-click the web file, then choose "Open with Notepad".
- **Role of Browser:** Displays web pages by reading HTML elements.

2. Basic HTML Elements and Tags

An HTML element is defined by a start tag, some content, and an end tag: `<tagname> Content goes here... </tagname>`. The element is everything from start tag to end tag.

Tag / Element	Description & Function
<code><!DOCTYPE html></code>	Defines that this document is an HTML5 document.
<code><html></code>	The root element of an HTML page.
<code><head></code>	Contains meta information about the HTML page.
<code><title></code>	Specifies a title for the HTML page (shown in browser's title bar or page tab).
<code><body></code>	Defines the document's body; container for all visible content (headings, paragraphs, images, links, tables, lists).
<code><h1></code> to <code><h6></code>	Defines headings; <code><h1></code> defines a large heading.
<code><p></code>	Defines a paragraph.
<code>
</code>	Line break element. Has no content and no end tag (empty element).
<code><hr></code>	Horizontal line element.
<code></code>	Used for inserting images.
<code><a></code>	Hyperlink tag.

Empty Elements: Elements with no content (like `<br>`) are called empty elements. They do not have an end tag.

Detailed Tag Structure & Essential Attributes

Some HTML tags require specific **attributes** to function properly. Attributes provide additional information about HTML elements and are always specified in the start tag in name/value pairs like `name="value"`.

1. Hyperlink Tag (`<a>`)

- **Attribute:** `href` (Hypertext Reference)
- **Purpose:** Specifies the URL/destination page that the link goes to. Without `href`, the anchor element does not create a functional hyperlink.

```
<!-- Basic Anchor/Link Tag Structure -->
<a href="https://www.example.com">Visit Example Site</a>
```

2. Image Tag (`<img>`)

- **Attribute:** `src` (Source)
- **Purpose:** Specifies the path/URL to the image file to be displayed.
- **Attribute:** `alt` (Alternate Text)
- **Purpose:** Provides alternative text for an image if the user cannot view it (due to slow connection, error, or screen reader usage).
- **Note:** `<img>` is an *empty element* (it has no closing tag).

```
<!-- Basic Image Tag Structure -->

```

3. HTML Document Structure

```
<html>
<head>
```

```

<title>Page title</title>
</head>
<body>
  <h1>This is a heading</h1>
  <p>This is a paragraph.</p>
  <p>This is another paragraph.</p>
</body>
</html>

```

HTML Lists

- **Unordered List (`<ul>`)**: Used for bulleted lists. Defines list items with `<li>`.
- **Ordered List (`<ol>`)**: Used when items require sequential numbering. Defines list items with `<li>`.
- **Description List (`<dl>`)**: Used for listing terms with descriptions. Uses `<dt>` for terms and `<dd>` for descriptions.

List Attributes & Styling

1. Unordered List Styling (`<ul>`)

Use the CSS `style="list-style-type: ...;"` attribute to define the marker style of bullet points:

- `disc` – Sets the list item marker to a bullet (default).
- `circle` – Sets the list item marker to a circle.
- `square` – Sets the list item marker to a square.
- `none` – Removes all markers from list items.

```

<ul style="list-style-type: circle;">
  <li>Coffee</li>
  <li>Tea</li>
</ul>

```

2. Ordered List Attributes (`<ol>`)

Ordered lists support specific attributes to customize numbering and starting points:

- **type attribute**: Defines the numbering/lettering style.
 - `type="1"` – Default numbers (1, 2, 3...)
 - `type="A"` – Uppercase letters (A, B, C...)
 - `type="a"` – Lowercase letters (a, b, c...)
 - `type="I"` – Uppercase Roman numerals (I, II, III...)
 - `type="i"` – Lowercase Roman numerals (i, ii, iii...)
- **start attribute**: Specifies the starting number/value for the list items (e.g., `start="5"` begins numbering at 5).

```

<!-- Ordered List starting at 5 with Uppercase Roman Numerals -->
<ol type="I" start="5">
  <li>Fifth item (V)</li>
  <li>Sixth item (VI)</li>
</ol>

```

Unordered List Code Example (`<ul>`)

```

<ul>
  <li>Coffee</li>
  <li>Tea</li>
  <li>Milk</li>
</ul>

```

Ordered List Code Example (`<ol>`)

```
<ol>
  <li>First step</li>
  <li>Second step</li>
  <li>Third step</li>
</ol>
```

Description List Code Example (`<dl>` , `<dt>` , `<dd>`)

```
<dl>
  <dt>HTML</dt>
  <dd>Hyper Text Markup Language</dd>
  <dt>HTTP</dt>
  <dd>Hypertext Transfer Protocol</dd>
</dl>
```

Nested List Code Example

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

5. The Marquee Element (`<marquee>`)

The `<marquee>` tag is used to create scrolling text or images across a web page. While deprecated in modern HTML standards, it is frequently tested in foundational HTML curricula.

Marquee Attributes

- **scrollamount** : Sets the speed of the scrolling text (higher values increase speed, e.g., `scrollamount="10"`).
- **behavior** : Defines how the text scrolls.
 - `scroll` – Text scrolls across and restarts from the opposite side (default).
 - `slide` – Text scrolls in and stops once it reaches the end.
 - `alternate` – Text bounces back and forth between edges.
- **direction** : Sets the direction of the scrolling content (`left` , `right` , `up` , or `down`).

Marquee Code Example

```
<!-- Bouncing marquee moving right at speed 12 -->
<marquee direction="right" scrollamount="12" behavior="alternate">
  This text bounces back and forth!
</marquee>
```

6. Essential CSS Style Properties

The `style` attribute allows inline styling of HTML elements using CSS key-value pairs (e.g., `style="property: value;"`).

- **color** : Sets the text/foreground color (e.g., `color: red;` or `color: #1a365d;`).
- **font-size** : Controls the text size (e.g., `font-size: 18px;` or `font-size: 1.2rem;`).

- **background-color** : Sets the background color of an element (e.g., `background-color: #f0f0f0;`).
- **font-style** : Sets the font styling to normal, italic, or oblique (e.g., `font-style: italic;`).
- **font-weight** : Sets the thickness or boldness of text (e.g., `font-weight: bold;` or `font-weight: 600;`).
- **text-align** : Specifies the horizontal alignment of text (`left` , `right` , `center` , or `justify`).
- **border** : Sets the element's border thickness, style, and color in one property (e.g., `border: 2px solid black;`).
- **font-family** : Specifies the font/typface used for text (e.g., `font-family: Arial, sans-serif;`).

Inline CSS Code Example

```
<p style="color: navy; font-size: 20px; background-color: lightyellow; font-style: italic; font-weight: bold; text-align: center; border: 2px solid navy; font-family: Arial, sans-serif;">
  Styled Paragraph Example
</p>
```

7. HTML Tables

7. HTML Tables

Tag	Name	Difference & Organization
<table>	Table Container	Defines an HTML table. Can take the <code>border</code> attribute.
<tr>	Table Row	Defines a row in a table.
<th>	Table Heading	Defines a header cell in a table (header text is bold and centered by default).
<td>	Table Data	Defines a standard data cell in a table (regular text, left-aligned by default).

Table Code Example

```
<table border="1">
  <tr>
    <th>Heading 1</th>
    <th>Heading 2</th>
  </tr>
  <tr>
    <td>Data 1</td>
    <td>Data 2</td>
  </tr>
</table>
```