Understanding HTML
A Beginner to Intermediate Guide

Chirag Dhamija

Intro to Software Systems
International Institute of Information Technology, Hyderabad

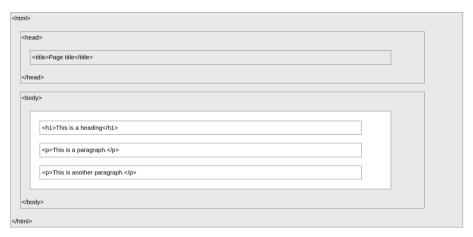March 11, 2025

What is HTML?

- **HTML** stands for **H**yper**T**ext **M**arkup **L**anguage
- Standard markup language for creating web pages
- Describes the structure of a webpage semantically
- Cornerstone technology of the World Wide Web, alongside CSS and JavaScript

Basic HTML Structure

- An HTML document has a nested structure defined by tags
- The basic skeleton includes:
    - `<!DOCTYPE html>` declaration
    - `<html>` element that wraps all content
    - `<head>` for metadata and scripts/styles
    - `<body>` for visible content

```
<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>
```

The content inside the <body> section will be displayed in a browser. The content inside the <title> element will be shown in the browser's title bar or in the page's tab.

What is an HTML Element?

- An HTML element consists of:
  - Start tag: `<tagname>`
  - Content: Text and other elements
  - End tag: `</tagname>`
- Some elements are self-closing (e.g., `<img />`, `<br />`)

Examples

```
<h1>My First Heading</h1>
<p>My first paragraph.</p>
```

Getting Started with HTML

1. **Create a new text file** using any text editor
2. **Write your HTML code**

```
<!DOCTYPE html>
<html>
<head>
    <title>My First Web Page</title>
</head>
<body>
    <h1>Hello, World!</h1>
    <p>This is my first web page.</p>
</body>
</html>
```

3. **Save with .html extension** (e.g., index.html)
4. **Open in a web browser** (double-click the file)

Inspecting HTML Elements

- Modern browsers have developer tools for inspecting elements
- Access methods:
  - Right-click + "Inspect" or "Inspect Element"
  - Keyboard: F12 or Ctrl+Shift+I (Cmd+Option+I on Mac)
- Uses:
  - View HTML structure
  - Edit CSS styles in real-time
  - Debug JavaScript
  - Test responsive designs

HTML Attributes

- Provide additional information about elements
- Always specified in the start tag
- Format: `<element attribute="value">`
- Common attributes:
    - `id` - Unique identifier
    - `class` - Group elements for styling
    - `style` - Inline CSS styles
    - `src` - Source for embedded content
    - `href` - Hyperlink target

Example

```html
<a href="https://example.com" target="_blank">
    Visit Example
</a>
```

Paragraphs, Headings, and Links

Paragraphs & Headings

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

<h1>Main Heading</h1>
<h2>Subheading</h2>
<h3>Section heading</h3>
```

Links (Anchors)

```html
<!-- External link -->
<a href="https://example.com">
    Visit Example
</a>

<!-- Page link -->
<a href="about.html">About</a>

<!-- Section link -->
<a href="#section1">Section</a>
```

Images, Line Breaks, and Dividers

Images

```
<img src="image.jpg"
    alt="Description">

<img src="logo.png"
    alt="Logo"
    width="200"
    height="100">
```

Line Breaks & Dividers

```
<p>Line 1<br>Line 2</p>

<p>Above the line</p>
<hr>
<p>Below the line</p>
```

HTML Text Formatting

```
<b>Bold text</b>
<strong>Important text</strong>
<i>Italic text</i>
<em>Emphasized text</em>
<mark>Highlighted text</mark>
```

```
<small>Smaller text</small>
<del>Deleted text</del>
<ins>Inserted text</ins>
<sub>Subscript text</sub>
<sup>Superscript text</sup>
```

Example Usage

```
<p>Water is H<sub>2</sub>O. The result is 5<sup>2</sup> = 25.</p>
<p>Price: <del>$50</del> <ins>$40</ins> <strong>Sale!</strong></p>
```

Comments, Title, and Favicon

HTML Comments

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


<!--
    Multi-line
    comment
-->
```

Title and Favicon

```
<!DOCTYPE html>
<html>
<head>
    <title>Page Title</title>
    <link rel="icon"
        href="favicon.ico"
        type="image/x-icon">
</head>
<body>
    <!-- Content -->
</body>
</html>
```

HTML Tables

- Basic table structure:
    - <table> - Container
    - <tr> - Table row
    - <th> - Table header cell
    - <td> - Table data cell

```
<table border="1">
    <tr>
        <th>Name</th>
        <th>Age</th>
    </tr>
    <tr>
        <td>Alice</td>
        <td>25</td>
    </tr>
    <tr>
        <td>Bob</td>
        <td>30</td>
    </tr>
</table>
```

HTML Lists

Unordered List

```html
<ul>
    <li>Coffee</li>
    <li>Tea</li>
    <li>Milk</li>
</ul>
```
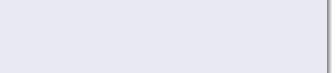
Ordered List

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

Description List

```html
<dl>
    <dt>Coffee</dt>
    <dd>Black hot drink</dd>
    <dt>Milk</dt>
    <dd>White cold drink</dd>
</dl>
```

Block vs. Inline Elements

Block-level Elements

- Start on a new line
- Take full width available
- Examples:
  - `<div>`
  - `<h1>`-`<h6>`
  - `<p>`
  - `<ul>`, `<ol>`
  - `<table>`

Inline Elements

- Do not start on a new line
- Take only necessary width
- Examples:
  - `<span>`
  - `<a>`
  - `<img>`
  - `<strong>`, `<em>`
  - `<b>`, `<i>`

Div and Span Elements

Div Element

- Block-level container
- Groups content for styling
- Creates natural breakpoints

```
<div class="container">
    <h2>Section Title</h2>
    <p>Paragraph text...</p>
</div>
```

Span Element

- Inline container
- Style parts of text
- No visual change by default

```
<p>
  This is <span class="highlight">
  important</span> text.
</p>
```

Classes and IDs

HTML Classes

- Group similar elements
- Reusable across many elements
- Element can have multiple classes

```html
<div class="box highlight">
    Content
</div>

<p class="highlight">
    Highlighted paragraph
</p>
```

HTML IDs

- Unique identifier
- Only one per page
- Used for JavaScript access
- Used as anchor links

```html
<div id="header">
    Header content
</div>


<a href="#section1">
    Jump to Section 1
</a>
<div id="section1">
    Section content
</div>
```

Using Classes and IDs with CSS

```html
<!DOCTYPE html>
<html>
<head>
    <style>
        /* Class selector (dot prefix) */
        .highlight {
            background-color: yellow;
        }

        /* ID selector (hash prefix) */
        #header {
            background-color: black;
            color: white;
            padding: 10px;
        }
    </style>
</head>
<body>
    <div id="header">Website Header</div>
```

Script and Link Elements

Script

```
<!-- Internal JavaScript -->
<script>
    function sayHello() {
        alert("Hello!");
    }
</script>

<!-- External JavaScript -->
<script src="script.js"></script>
```

Link

```
<!-- CSS stylesheet -->
<link rel="stylesheet"
    href="styles.css">

<!-- Favicon -->
<link rel="icon"
    href="favicon.ico"
    type="image/x-icon">
```

Lets go to CSS now!