**HTML**

**HTML Basics**

HTML (HyperText Markup Language) is the standard language for creating webpages. It defines the structure and layout of web content.

**1. Introduction to HTML**

**Definition:** HTML is a markup language used to structure content on the web, such as headings, paragraphs, images, and links.

**Key Features:**

* Uses tags to define content structure.
* Forms the backbone of websites, often combined with CSS and JavaScript.

**When to Use:** For creating any type of web content, from static informational pages to dynamic web applications.

**Real-Life Example:** Building the skeleton of a webpage with headers, text, and images.

**2. HTML Syntax and Structure**

**Definition:** HTML syntax consists of elements enclosed in tags. A basic HTML document follows this structure:

**Basic HTML Document Structure:**

<!DOCTYPE html>

<html>

<head>

<title>Page Title</title>

</head>

<body>

<h1>Welcome to HTML</h1>

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

</body>

</html>

**Key Points:**

* Tags: Start with <tag> and end with </tag>.
* Elements: Consist of an opening tag, content, and a closing tag.
* Nesting: Tags must be properly nested.

**When to Use:** Always follow proper syntax for compatibility and validation.

**Real-Life Example:** Creating a basic webpage with a title and body content.

**3. HTML Tags and Elements**

**Definition:** Tags are the building blocks of HTML, and elements consist of the tags and their content.

**Common Tags:**

* <h1> to <h6>: Headings.
* <p>: Paragraphs.
* <a>: Links.
* <img>: Images.
* <div>: Container for grouping content.

**When to Use:**

* Use semantic tags like <header> and <footer> for better accessibility.
* Use structural tags like <div> and <span> for layout and styling.

**Example:**

<h1>This is a heading</h1>

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

<a href="https://example.com">Visit Example</a>

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

**Real-Life Example:** Creating a webpage with a title, description, and a link to another page.

**4. Attributes**

**Definition:** Attributes provide additional information about an element and are defined inside the opening tag.

**Common Attributes:**

* id: Unique identifier for an element.
* class: Class name for styling with CSS.
* src: Source for images or media.
* href: Hyperlink reference.
* alt: Alternative text for images.

**When to Use:**

* Use id for unique identification and class for reusable styling.
* Use alt for accessibility.

**Example:**

<img src="photo.jpg" alt="A beautiful sunset" id="image1" class="responsive">

**Real-Life Example:** Adding a responsive image to a webpage with a unique ID for JavaScript interaction.

**5. HTML5 Doctype**

**Definition:** The <!DOCTYPE> declaration informs the browser of the HTML version being used. HTML5 uses a simple declaration**:**

<!DOCTYPE html>

**Why Use It:**

* Ensures the webpage is rendered in standards mode.
* Reduces cross-browser inconsistencies.

**When to Use:** Always include it at the start of every HTML document.

**Example:**

<!DOCTYPE html>

<html>

<head>

<title>HTML5 Example</title>

</head>

<body>

<h1>Hello, World!</h1>

</body>

</html>

**Real-Life Example:** Creating modern webpages compatible with all browsers.

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Real-Life Example** |
| HTML Introduction | Defines web content structure using tags. | For any webpage or web app. | Building a homepage with headings and text. |
| HTML Syntax | Rules for writing HTML (tags, nesting). | For consistent and error-free documents. | Writing a properly structured contact form. |
| HTML Tags and Elements | Tags define content; elements include tags and content. | To create content like text, images, links. | Adding headings, images, and links to a webpage. |
| Attributes | Provide extra information about elements. | For interactivity, styling, or accessibility. | Adding alt text to images for better SEO. |
| HTML5 Doctype | Declares the document type for standards-compliant HTML. | At the start of every HTML document. | Ensuring a webpage displays correctly in all browsers. |
|  |  |  |  |

**Text Formatting in HTML**

Text formatting in HTML involves using various tags to define the appearance and structure of text, such as headings, paragraphs, and lists.

**1. Headings**

**Definition:**Headings are used to define the structure and hierarchy of a webpage. HTML provides six levels of headings, from <h1> (highest priority) to <h6> (lowest priority).

**Syntax:**

<h1>This is a Heading 1</h1>

<h2>This is a Heading 2</h2>

<h3>This is a Heading 3</h3>

**When to Use:**

* Use <h1> for the main title of the page.
* Use other heading levels (<h2> to <h6>) for subheadings or sections.

**Real-Life Example:** Creating a blog post with a title and sub-sections.

**2. Paragraphs**

**Definition:** Paragraphs are used to display blocks of text.

**Syntax:**

<p>This is a paragraph of text.</p>

**When to Use:** For separating distinct sections of text.

**Real-Life Example:** Writing content for an article or a webpage.

**3. Bold, Italic, Underline**

These tags are used for emphasizing text.

**Tags:**

* Bold: <b> or <strong> for important text.
* Italic: <i> or <em> for emphasized text.
* Underline: <u> for underlined text.

**Syntax:**

<p>This is <b>bold</b> text.</p>

<p>This is <i>italic</i> text.</p>

<p>This is <u>underlined</u> text.</p>

**When to Use:**

* Use <b> or <strong> for highlighting keywords.
* Use <i> or <em> for book titles or emphasis.
* Use <u> sparingly as it may be confused with links.

**Real-Life Example:** Highlighting important terms or titles in a document.

**4. Lists (Ordered, Unordered, Description)**

Lists organize content into points or steps.

**Ordered List**

**Definition:** Displays items in a numbered format.

**Syntax:**

<ol>

<li>First item</li>

<li>Second item</li>

<li>Third item</li>

</ol>

**When to Use:** For steps or sequences (e.g., instructions).

**Real-Life Example:** Displaying a recipe's steps.

**Unordered List**

**Definition:** Displays items in a bulleted format.

**Syntax:**

<ul>

<li>Apples</li>

<li>Bananas</li>

<li>Cherries</li>

</ul>

**When to Use:** For non-sequential information (e.g., a list of features).

**Real-Life Example:** Creating a shopping list.

**Description List**

**Definition:** Displays terms and their descriptions.

**Syntax:**

<dl>

<dt>HTML</dt>

<dd>A markup language for web pages.</dd>

<dt>CSS</dt>

<dd>Styles web pages.</dd>

</dl>

**When to Use:** For defining terms or creating glossaries.

**Real-Life Example:** Explaining technical terms on a documentation page.

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Real-Life Example** |
| Headings | Define content hierarchy with <h1> to <h6>. | For titles and section headers. | A blog post title and its subheadings. |
| Paragraphs | Display blocks of text using <p>. | To separate textual content. | Writing an article introduction. |
| Bold | Highlight important text with <b> or <strong>. | For emphasis on keywords or warnings. | Displaying "Important Notes" on a webpage. |
| Italic | Emphasize text with <i> or <em>. | For titles or added emphasis. | Mentioning book titles in an article. |
| Underline | Underline text with <u>. | For special emphasis, sparingly. | Highlighting hyperlinks in a footer. |
| Ordered List | Numbered list using <ol>. | For sequences or steps. | Writing instructions for an application. |
| Unordered List | Bulleted list using <ul>. | For listing features or non-sequential items. | Listing key benefits of a product. |
| Description List | Terms and definitions using <dl>. | For glossaries or FAQs. | Explaining terms in a tech document. |

**Links and Navigation in HTML**

Links and navigation are fundamental in HTML, enabling users to move between pages or sections of a website. HTML provides tags and attributes to create links and navigation structures effectively.

**1. Anchor Tags (<a>)**

**Definition:** The <a> tag is used to create hyperlinks, which navigate users to other web pages, sections of the same page, or external resources.

**Syntax:**

<a href="URL">Link Text</a>

**Key Attributes:**

* href: Specifies the URL of the destination.
* title: Provides additional information when hovered over.
* target: Opens the link in the same tab (\_self) or a new tab (\_blank).

**When to Use:**

* To connect different pages or sections.
* To link external websites.

**Real-Life Example:**

<a href="https://www.google.com" target="\_blank">Visit Google</a>

**2. Navigation Bars**

**Definition:** Navigation bars are used to organize and display links for easy website navigation.

**Basic Example:**

<nav>

<ul>

<li><a href="index.html">Home</a></li>

<li><a href="about.html">About</a></li>

<li><a href="contact.html">Contact</a></li>

</ul>

</nav>

**When to Use:** To provide users with a clear and structured way to navigate your website.

**Real-Life Example:**

* Navigation menus in e-commerce sites or blogs.

**Enhanced Example with CSS:**

<nav>

<ul style="list-style: none; display: flex; gap: 10px;">

<li><a href="index.html">Home</a></li>

<li><a href="services.html">Services</a></li>

<li><a href="portfolio.html">Portfolio</a></li>

</ul>

</nav>

**3. Internal and External Links**

**Internal Links**

**Definition:** Link to another section of the same page or another page on the same website.

**Syntax:**

<a href="#section1">Go to Section 1</a>

<div id="section1">Content of Section 1</div>

**When to Use:** For linking to specific sections of a page (e.g., FAQs or Table of Contents).

**External Links**

**Definition:** Link to a different website or resource.

**Syntax:**

<a href="https://www.example.com" target="\_blank">External Link</a>

**When to Use:** For redirecting users to external resources or websites.

**4. Target Attribute**

**Definition:** The target attribute defines how the linked document is displayed.

**Values:**

* \_self (default): Opens in the same tab.
* \_blank: Opens in a new tab or window.
* \_parent: Opens in the parent frame.
* \_top: Opens in the full body of the window.

**Syntax:**

<a href="https://www.example.com" target="\_blank">Open in New Tab</a>

**Real-Life Example:**

<!-- Link to privacy policy in a new tab -->

<a href="privacy-policy.html" target="\_blank">Privacy Policy</a>

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Real-Life Example** |
| Anchor Tags | Creates hyperlinks using <a>. | For linking pages, sections, or resources. | Link to "About Us" page or download a file. |
| Navigation Bars | Structures website links in a menu format using <nav>. | For main website navigation. | Top menu on a corporate website. |
| Internal Links | Links within the same website or page using IDs. | To navigate between sections on the same page. | FAQ page navigation. |
| External Links | Redirects to other websites or resources. | For references, external articles, or downloads. | Link to a blog post or an external article. |
| Target Attribute | Controls how links open (\_self, \_blank, etc.). | To decide where the link should open. | Open a Terms of Service in a new tab. |

**Images and Multimedia in HTML**

HTML supports the inclusion of images, audio, and video to enhance content presentation and user engagement.

**1. Image Tags (<img>)**

**Definition:**

The <img> tag is used to embed images into a webpage.

**Syntax:**

<img src="image\_url" alt="description" width="value" height="value">

**Key Attributes:**

* src: Specifies the path to the image file.
* alt: Provides alternative text for accessibility or when the image fails to load.
* width and height: Define the dimensions of the image.

**When to Use:**

* To add visual content like photos, illustrations, or logos.

**Real-Life Example:**

<img src="logo.png" alt="Company Logo" width="150" height="50">

**2. Image Attributes**

**alt (Alternative Text):**

Provides a textual description of the image, improving accessibility for screen readers and SEO.

**src (Source):**

Defines the image's location. Can be a relative path or an absolute URL.

**width and height:**

Used to resize images proportionally or explicitly.

**Example:**

<img src="https://via.placeholder.com/150" alt="Placeholder Image" width="150" height="150">

**3. Audio and Video Embedding**

**Audio Embedding (<audio>)**

**Syntax:**

**<audio controls>**

<source src="audiofile.mp3" type="audio/mpeg">

Your browser does not support the audio element.

</audio>

**Key Attributes:**

* controls: Adds play/pause controls.
* autoplay: Automatically plays the audio.
* loop: Loops the audio.
* muted: Starts the audio in a muted state.

**Real-Life Example:**

<audio controls>

<source src="podcast.mp3" type="audio/mpeg">

</audio>

**Video Embedding (<video>)**

**Syntax:**

<video width="320" height="240" controls>

<source src="videofile.mp4" type="video/mp4">

Your browser does not support the video tag.

</video>

**Key Attributes:**

* controls: Adds play/pause controls.
* autoplay: Plays the video automatically.
* loop: Loops the video.
* poster: Defines an image displayed before the video plays.

**Real-Life Example:**

<video width="640" height="360" controls poster="thumbnail.jpg">

<source src="trailer.mp4" type="video/mp4">

</video>

**4. Responsive Images (srcset)**

**Definition:**

The srcset attribute allows the browser to select the most appropriate image size for the screen or resolution.

**Syntax:**

<img src="small.jpg" srcset="small.jpg 480w, medium.jpg 768w, large.jpg 1200w" sizes="(max-width: 600px) 480px, (max-width: 1200px) 768px, 1200px" alt="Responsive Example">

**Key Attributes:**

* srcset: Specifies multiple image sources with their widths.
* sizes: Defines the display size of the image in different scenarios.

**When to Use:**

To ensure optimized image loading based on device resolution or screen size.

**Real-Life Example:**

<img src="default.jpg"

srcset="small.jpg 480w, medium.jpg 768w, large.jpg 1200w"

sizes="(max-width: 600px) 480px, (max-width: 1200px) 768px, 1200px"

alt="Example of a responsive image">

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Real-Life Example** |
| Image Tags (<img>) | Embeds images in a webpage. | To display visual content like photos. | Adding a company logo. |
| Attributes | Add properties like alt, src, width, height. | To describe, resize, and load images. | Adding alternative text for accessibility. |
| Audio Embedding | Embeds audio using <audio>. | To play podcasts or background music. | Embedding a music player on a website. |
| Video Embedding | Embeds videos using <video>. | To play trailers or tutorials. | Embedding a product demo video. |
| Responsive Images | Adapts image loading to device resolutions. | For faster loading and responsive design. | Displaying optimized images for mobile users. |

**HTML Tables**

Tables are used to organize data in rows and columns, making it easier to present structured information like schedules, statistics, or tabular data.

**1. Table Structure**

**Definition:**

**An HTML table is built using <table> and organized with the following tags:**

* <thead>: Defines the table header.
* <tbody>: Contains the main table body.
* <tfoot>: Defines the footer section.

**Syntax:**

<table>

<thead>

<tr>

<th>Header 1</th>

<th>Header 2</th>

</tr>

</thead>

<tbody>

<tr>

<td>Data 1</td>

<td>Data 2</td>

</tr>

</tbody>

<tfoot>

<tr>

<td colspan="2">Footer Information</td>

</tr>

</tfoot>

</table>

**When to Use:**

* For structured data presentations such as reports, comparison tables, or schedules.

**2. Table Rows and Cells**

**Tags:**

* <tr>: Table row.
* <td>: Table cell (data).
* <th>: Table header (bold and centered by default).

**Real-Life Example:**

<table border="1">

<tr>

<th>Name</th>

<th>Age</th>

</tr>

<tr>

<td>John Doe</td>

<td>25</td>

</tr>

<tr>

<td>Jane Smith</td>

<td>30</td>

</tr>

</table>

**3. Table Headers and Footers**

* Headers (<thead>): Used for column labels.
* Footers (<tfoot>): Summarizes or provides additional information for the table.

**Example with Header and Footer:**

<table border="1">

<thead>

<tr>

<th>Product</th>

<th>Price</th>

</tr>

</thead>

<tbody>

<tr>

<td>Book</td>

<td>$10</td>

</tr>

<tr>

<td>Pen</td>

<td>$2</td>

</tr>

</tbody>

<tfoot>

<tr>

<td>Total</td>

<td>$12</td>

</tr>

</tfoot>

</table>

**4. Merging Cells (rowspan, colspan)**

**Definition:**

* rowspan: Merges multiple rows into one cell.
* colspan: Merges multiple columns into one cell.

**Syntax:**

<td rowspan="2">Row Merged</td>

<td colspan="2">Column Merged</td>

Real-Life Example:

<table border="1">

<tr>

<th>Name</th>

<th colspan="2">Contact Details</th>

</tr>

<tr>

<td>John Doe</td>

<td>Email</td>

<td>Phone</td>

</tr>

<tr>

<td>Jane Smith</td>

<td colspan="2">Not Available</td>

</tr>

</table>

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Real-Life Example** |
| Table Structure | Organizes data into header, body, and footer sections. | When presenting structured tabular data. | Product inventory with headers and footers. |
| Rows and Cells | <tr> creates rows, <td> adds data cells. | To fill the table with content. | Employee names and their departments. |
| Headers/Footers | <thead> and <tfoot> for table headers and footers. | To label columns or summarize totals. | Summarizing prices in a bill. |
| Merging Cells | Combines rows or columns using rowspan and colspan. | To group related data in tables. | Merging cells for a multi-column report title. |

**HTML Forms**

Forms are used to collect user input and send it to a server for processing.

**1. Form Tags and Attributes**

Form Tag (<form>):

* Used to define a form.
* Attributes:
  + - action: Specifies the URL where form data is sent.
    - method: Defines the HTTP method for sending data (GET or POST).

**Syntax:**

<form action="/submit-form" method="POST">

<!-- Form elements go here -->

</form>

**When to Use:**

* Use GET for retrieving data (e.g., search queries).
* Use POST for sending sensitive data (e.g., login or registration).

**Real-Life Example:**

**A login form:**

<form action="/login" method="POST">

<input type="text" name="username" placeholder="Username" required>

<input type="password" name="password" placeholder="Password" required>

<button type="submit">Login</button>

</form>

**2. Input Elements**

**Common Input Types:**

|  |  |  |
| --- | --- | --- |
| **Input Type** | **Description** | **Example** |
| text | For text input. | <input type="text" name="name"> |
| password | Hides input characters. | <input type="password"> |
| email | Validates email addresses. | <input type="email"> |
| number | Accepts numeric values. | <input type="number" min="1" max="5"> |
| checkbox | For multiple options. | <input type="checkbox"> |
| radio | For single-choice options. | <input type="radio" name="gender"> |
| date | For date input. | <input type="date"> |

**Example:**

<form>

<label for="email">Email:</label>

<input type="email" id="email" name="email" required>

<label for="age">Age:</label>

<input type="number" id="age" name="age" min="18" max="99">

</form>

**3. Labels, Fieldsets, and Legends**

**Label (<label>):**

* Links a text label to a form element for accessibility.

**Fieldset (<fieldset>) and Legend (<legend>):**

* Groups related form elements and provides a description.

**Example:**

<form>

<fieldset>

<legend>Personal Information</legend>

<label for="name">Name:</label>

<input type="text" id="name" name="name" required>

</fieldset>

</form>

**4. Form Validation**

**HTML Validation Attributes:**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Purpose** | **Example** |
| required | Makes a field mandatory. | <input type="text" required> |
| pattern | Validates input against a regex pattern. | <input pattern="[A-Za-z]{3,}"> |
| min/max | Sets numeric input limits. | <input type="number" min="1"> |

**Example:**

<form>

<label for="username">Username:</label>

<input type="text" id="username" name="username" required pattern="[A-Za-z0-9]{5,}">

<button type="submit">Submit</button>

</form>

**5. Buttons**

**Button Types:**

|  |  |  |
| --- | --- | --- |
| **Type** | **Purpose** | **Example** |
| submit | Submits the form. | <button type="submit">Submit</button> |
| reset | Clears all form inputs. | <button type="reset">Reset</button> |
| button | Performs custom actions using JavaScript. | <button type="button">Click</button> |

**Example:**

<form>

<input type="text" name="name" placeholder="Name">

<button type="submit">Submit</button>

<button type="reset">Reset</button>

</form>

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Example** |
| Form Tags | Define forms and specify actions. | Collect and send user data to a server. | Login forms, search forms. |
| Input Elements | Collect user inputs like text, email, etc. | Any user data entry. | Registration forms. |
| Labels/Fieldsets | Improve form accessibility and organization. | Group related form elements. | Personal info section in forms. |
| Validation | Ensures data meets requirements. | To avoid incorrect submissions. | Password length, email format. |
| Buttons | Interact with the form (submit/reset/custom). | Perform form-related or custom actions. | Submit or cancel buttons. |

**Semantic HTML**

Semantic HTML provides meaningful tags that describe the content's purpose and structure, improving readability, accessibility, and SEO.

**1. HTML5 Semantic Elements**

**Key Semantic Elements:**

|  |  |  |
| --- | --- | --- |
| **Element** | **Purpose** | **Example Use** |
| <header> | Represents the introductory content or navigation links. | Page header or a section title. |
| <footer> | Represents the footer of a document or section. | Author info, copyright, or related links. |
| <article> | Represents self-contained, reusable content. | Blog posts, news articles, or user comments. |
| <section> | Groups related content thematically. | Chapters in a book, or sections of a web page. |
| <aside> | Represents complementary content related to the main content. | Sidebars or pull quotes. |
| <nav> | Represents navigation links. | Main menu or internal page links. |
| <main> | Represents the dominant content of a document. | Primary content on a page. |
| <figure> | Represents self-contained media with optional captions. | Images, charts, or diagrams. |
| <figcaption> | Provides a caption for the content inside <figure>. | Describing an image or chart. |

**Real-Life Example:**

<header>

<h1>Welcome to My Website</h1>

<nav>

<a href="#home">Home</a>

<a href="#about">About</a>

<a href="#contact">Contact</a>

</nav>

</header>

<main>

<section>

<h2>About Us</h2>

<p>Our company focuses on creating quality products...</p>

</section>

<aside>

<h3>Did You Know?</h3>

<p>We started with just three employees!</p>

</aside>

</main>

<footer>

<p>&copy; 2025 My Website. All rights reserved.</p>

</footer>

**2. Accessibility Best Practices**

**Accessibility ensures that content is usable by everyone, including people with disabilities.**

**Best Practices:**

1. Use semantic elements appropriately for better screen reader support.
2. Add alt attributes for images to describe their purpose.
3. Ensure high contrast for text visibility.
4. Use keyboard navigation-friendly elements.

**Example:**

<img src="team.jpg" alt="Our Team at the annual meetup">

**3. ARIA Roles and Attributes**

**Accessible Rich Internet Applications (ARIA) roles and attributes help bridge gaps in accessibility for custom components.**

**Common ARIA Roles:**

|  |  |  |
| --- | --- | --- |
| **Role** | **Purpose** | **Example Use** |
| role="navigation" | Marks a section as a navigation landmark. | Main menus. |
| role="button" | Indicates interactive button-like functionality. | Custom JavaScript buttons. |
| role="dialog" | Represents a dialog box. | Popups or modals. |

**Common ARIA Attributes:**

|  |  |  |
| --- | --- | --- |
| **Attribute** | **Purpose** | **Example Use** |
| aria-label | Provides an accessible label. | Buttons without text. |
| aria-hidden="true" | Hides elements from assistive technologies. | Icons with no meaning. |
| aria-live="polite" | Updates dynamically and informs screen readers. | Notifications or alerts. |

**Real-Life Example:**

**A custom button:**

<div role="button" aria-label="Close Menu" tabindex="0" onclick="closeMenu()">

X

</div>

**Summary Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Definition** | **When to Use** | **Example** |
| Semantic Elements | Tags with meaning for structure and purpose. | Always for clarity and SEO. | <header>, <main>, <footer>. |
| Accessibility Practices | Methods to ensure content is usable by all users. | Always to make inclusive websites. | Alt text, semantic elements. |
| ARIA Roles and Attributes | Extend accessibility for custom components. | For custom UI elements. | role="dialog", aria-live. |

Semantic HTML combined with accessibility best practices ensures robust, user-friendly, and well-structured websites.

**Advanced Topics in HTML**

**1. HTML5 New Features**

**HTML5 introduced several new elements and APIs to enhance web functionality.**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Description** | **Example Use** |
| <canvas> | Used for rendering graphics, animations, and charts. | Drawing shapes or game graphics. |
| <video> | Embeds a video file directly into the webpage. | Hosting videos without plugins. |
| <audio> | Embeds an audio file for playback. | Background music or podcasts. |
| <output> | Represents the result of a calculation or user interaction. | Showing calculation results. |
| <progress> | Displays progress for a task (e.g., a file upload). | Upload or download progress. |

**Examples:**

* **Canvas:**

<canvas id="myCanvas" width="400" height="200"></canvas>

<script>

const canvas = document.getElementById("myCanvas");

const ctx = canvas.getContext("2d");

ctx.fillStyle = "blue";

ctx.fillRect(20, 20, 150, 100);

</script>

* **Video:**

<video controls width="600">

<source src="video.mp4" type="video/mp4">

Your browser does not support the video tag.

</video>

**2. Web Storage (localStorage, sessionStorage)**

The Web Storage API allows storage of data on the client-side.

|  |  |  |
| --- | --- | --- |
| **Storage Type** | **Description** | **Data Lifetime** |
| localStorage | Stores data with no expiration. | Until manually cleared. |
| sessionStorage | Stores data for the session; cleared when the browser is closed. | Until the session ends. |

**Example Usage:**

* **Storing Data:**

// localStorage

localStorage.setItem("username", "JohnDoe");

// sessionStorage

sessionStorage.setItem("sessionID", "12345");

* **Retrieving Data:**

console.log(localStorage.getItem("username")); // JohnDoe

console.log(sessionStorage.getItem("sessionID")); // 12345

**3. Meta Tags and SEO**

Meta tags provide metadata about a webpage to improve SEO and user experience.

|  |  |  |
| --- | --- | --- |
| **Meta Tag** | **Purpose** | **Example** |
| <meta charset> | Defines the character set (e.g., UTF-8). | <meta charset="UTF-8"> |
| <meta name> | Describes the page (keywords, description). | <meta name="description" content="Learn HTML basics"> |
| <meta viewport> | Controls responsive design on mobile devices. | <meta name="viewport" content="width=device-width, initial-scale=1.0"> |
| <meta robots> | Guides search engine crawlers (index/noindex). | <meta name="robots" content="index, follow"> |
| <meta property> | Open Graph for social media sharing. | <meta property="og:title" content="HTML Guide"> |

**4. HTML Entities**

HTML entities represent reserved characters or special symbols.

|  |  |  |
| --- | --- | --- |
| **Entity** | **Description** | **Symbol** |
| &lt; | Less than | < |
| &gt; | Greater than | > |
| &amp; | Ampersand | & |
| &quot; | Double quotation mark | " |
| &copy; | Copyright symbol | © |

**Example:**

<p>Use &lt;h1&gt; for headings.</p>

<p>&copy; 2025 My Company</p>

**5. Microdata and Schema.org**

Microdata helps search engines understand the content structure better. Schema.org provides a vocabulary for annotating content.

**Example (Recipe Schema):**

<div itemscope itemtype="http://schema.org/Recipe">

<h1 itemprop="name">Chocolate Cake</h1>

<p>Preparation time: <span itemprop="prepTime">PT30M</span></p>

<p>Cooking time: <span itemprop="cookTime">PT1H</span></p>

</div>

**Summary Table**

|  |  |  |
| --- | --- | --- |
| **Topic** | **Description** | **Example Use** |
| Canvas | Drawing and animations. | Game graphics or charts. |
| Video & Audio | Embedding multimedia. | Video tutorials or podcasts. |
| Web Storage | Client-side data storage. | Save preferences or session data. |
| Meta Tags | Metadata for SEO and responsiveness. | Improve search ranking and UX. |
| HTML Entities | Reserved characters and special symbols. | Displaying <, >, or &. |
| Microdata | Structured data for better search engine understanding. | Marking recipes, reviews, or products. |

**These advanced features ensure modern, accessible, and optimized web applications.**