

Advanced HTML & CSS - Complete Code Examples & Samples

▯ ADVANCED HTML TAGS

1. Structural/Semantic Elements

Basic Semantic Structure:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Semantic Page</title>
</head>
<body>
  <header>
    <h1>Site Title</h1>
    <nav aria-label="Main navigation">
      <ul>
        <li><a href="#home">Home</a></li>
        <li><a href="#about">About</a></li>
        <li><a href="#contact">Contact</a></li>
      </ul>
    </nav>
  </header>

  <main>
    <article>
      <header>
        <h2>Article Title</h2>
        <p>By <span>Author Name</span> on <time datetime="2025-09-22">September 2
      </header>

      <section>
        <h3>Section Heading</h3>
        <p>Main content goes here...</p>
      </section>

      <aside>
        <h4>Related Information</h4>
        <p>Sidebar content...</p>
      </aside>
    </article>
  </main>

  <footer>
    <p>&copy; 2025 Your Website</p>
  </footer>
```

```
</body>
</html>
```

Advanced Semantic Elements:

```
<!-- Details/Summary for collapsible content -->
<details>
  <summary>Click to expand FAQ</summary>
  <p>This is the answer to the frequently asked question.</p>
</details>

<!-- Mark for highlighted text -->
<p>The meeting is on <mark>Friday at 3 PM</mark>.</p>

<!-- Time with machine-readable format -->
<time datetime="2025-09-22T15:30:00">Today at 3:30 PM</time>

<!-- Figure with caption -->
<figure>
  
  <figcaption>Q3 2025 Sales Performance</figcaption>
</figure>

<!-- Address element -->
<address>
  Contact us at: <a href="mailto:hello@example.com">hello@example.com</a><br>
  123 Main Street, City, State 12345
</address>

<!-- Blockquote with citation -->
<blockquote cite="https://example.com">
  <p>"The best way to predict the future is to create it."</p>
  <footer>— <cite>Peter Drucker</cite></footer>
</blockquote>
```

2. Forms & Inputs - Complete Examples

Basic Form Structure:

```
<form action="/submit" method="post" novalidate>
  <fieldset>
    <legend>Personal Information</legend>

    <!-- Text inputs -->
    <label for="fullname">Full Name*</label>
    <input type="text" id="fullname" name="fullname" required
      placeholder="Enter your full name" autocomplete="name">

    <label for="email">Email Address*</label>
    <input type="email" id="email" name="email" required
      placeholder="user@example.com" autocomplete="email">
```

```
<label for="phone">Phone Number</label>
<input type="tel" id="phone" name="phone"
        placeholder="+1 (555) 123-4567" autocomplete="tel">

<label for="website">Website</label>
<input type="url" id="website" name="website"
        placeholder="https://example.com">
</fieldset>

<fieldset>
  <legend>Additional Details</legend>

  <!-- Date/Time inputs -->
  <label for="birthdate">Birth Date</label>
  <input type="date" id="birthdate" name="birthdate"
        min="1900-01-01" max="2025-12-31">

  <label for="appointment">Appointment Time</label>
  <input type="datetime-local" id="appointment" name="appointment">

  <label for="meeting-time">Meeting Time</label>
  <input type="time" id="meeting-time" name="meeting-time">

  <!-- Number inputs -->
  <label for="age">Age</label>
  <input type="number" id="age" name="age" min="18" max="120" step="1">

  <label for="salary">Expected Salary Range</label>
  <input type="range" id="salary" name="salary"
        min="30000" max="150000" step="5000" value="75000">
  <output for="salary">$75,000</output>

  <!-- Color picker -->
  <label for="theme-color">Preferred Theme Color</label>
  <input type="color" id="theme-color" name="theme-color" value="#007acc">

  <!-- File uploads -->
  <label for="resume">Resume (PDF only)</label>
  <input type="file" id="resume" name="resume" accept=".pdf">

  <label for="portfolio">Portfolio Images</label>
  <input type="file" id="portfolio" name="portfolio"
        accept="image/*" multiple>

  <!-- Search -->
  <label for="search">Search Query</label>
  <input type="search" id="search" name="search"
        placeholder="Search our database...">

  <!-- Password -->
  <label for="password">Password</label>
  <input type="password" id="password" name="password"
        minlength="8" required>

  <!-- Hidden field -->
  <input type="hidden" name="form-id" value="contact-form">
```

```

</fieldset>

<fieldset>
  <legend>Preferences</legend>

  <!-- Select dropdown -->
  <label for="country">Country</label>
  <select id="country" name="country" required>
    <option value="">Choose a country</option>
    <optgroup label="North America">
      <option value="us">United States</option>
      <option value="ca">Canada</option>
    </optgroup>
    <optgroup label="Europe">
      <option value="uk">United Kingdom</option>
      <option value="de">Germany</option>
    </optgroup>
    <option value="in">India</option>
  </select>

  <!-- Multi-select -->
  <label for="skills">Skills (Hold Ctrl to select multiple)</label>
  <select id="skills" name="skills" multiple size="4">
    <option value="html">HTML</option>
    <option value="css">CSS</option>
    <option value="js">JavaScript</option>
    <option value="python">Python</option>
  </select>

  <!-- Textarea -->
  <label for="bio">Biography</label>
  <textarea id="bio" name="bio" rows="4" cols="50"
    placeholder="Tell us about yourself..." maxlength="500"></textarea>

  <!-- Radio buttons -->
  <fieldset>
    <legend>Newsletter Frequency</legend>
    <input type="radio" id="daily" name="newsletter" value="daily">
    <label for="daily">Daily</label>

    <input type="radio" id="weekly" name="newsletter" value="weekly" checked>
    <label for="weekly">Weekly</label>

    <input type="radio" id="monthly" name="newsletter" value="monthly">
    <label for="monthly">Monthly</label>
  </fieldset>

  <!-- Checkboxes -->
  <fieldset>
    <legend>Interests</legend>
    <input type="checkbox" id="webdev" name="interests" value="web-development">
    <label for="webdev">Web Development</label>

    <input type="checkbox" id="design" name="interests" value="design">
    <label for="design">Design</label>
  </fieldset>

```

```

        <input type="checkbox" id="marketing" name="interests" value="marketing">
        <label for="marketing">Marketing</label>
    </fieldset>

    <!-- Agreement checkboxes -->
    <input type="checkbox" id="terms" name="terms" required>
    <label for="terms">I agree to the Terms and Conditions*</label>

    <input type="checkbox" id="newsletter-signup" name="newsletter-signup">
    <label for="newsletter-signup">Subscribe to our newsletter</label>
</fieldset>

<!-- Form buttons -->
<button type="submit">Submit Form</button>
<button type="reset">Reset Form</button>
<button type="button" onclick="validateForm()">Validate</button>
</form>

```

Advanced Form Features:

```

<!-- Form with validation messages -->
<form>
    <label for="username">Username</label>
    <input type="text" id="username" name="username" required
        pattern="[a-zA-Z0-9]{3,20}"
        title="Username must be 3-20 characters, letters and numbers only"
        aria-describedby="username-help">
    <div id="username-help">3-20 characters, letters and numbers only</div>

    <!-- Custom validation -->
    <label for="confirm-password">Confirm Password</label>
    <input type="password" id="confirm-password" name="confirm-password"
        oninput="validatePassword(this)" required>

    <!-- Datalist for autocomplete -->
    <label for="city">City</label>
    <input type="text" id="city" name="city" list="cities">
    <datalist id="cities">
        <option value="New York">
        <option value="Los Angeles">
        <option value="Chicago">
        <option value="Houston">
    </datalist>
</form>

```

3. Media Elements

Images:

```
<!-- Basic image -->


<!-- Responsive image with srcset -->


<!-- Picture element for art direction -->
<picture>
    <source media="(min-width: 800px)" srcset="wide-image.jpg">
    <source media="(min-width: 400px)" srcset="medium-image.jpg">
    
</picture>

<!-- Figure with caption -->
<figure>
    
    <figcaption>
        <strong>Figure 1:</strong> Sales growth over the last quarter
    </figcaption>
</figure>
```

Video:

```
<!-- Basic video -->
<video controls width="640" height="360" poster="thumbnail.jpg">
    <source src="video.mp4" type="video/mp4">
    <source src="video.webm" type="video/webm">
    <source src="video.ogv" type="video/ogg">
    <track kind="subtitles" src="subtitles.vtt" srclang="en" label="English">
    <track kind="captions" src="captions.vtt" srclang="en" label="English Captions">
    <p>Your browser doesn't support HTML video. <a href="video.mp4">Download the video</a>
</video>

<!-- Auto-playing background video -->
<video autoplay muted loop playsinline poster="poster.jpg">
    <source src="background.mp4" type="video/mp4">
    <source src="background.webm" type="video/webm">
</video>
```

Audio:

```
<!-- Basic audio -->
<audio controls>
  <source src="podcast.mp3" type="audio/mpeg">
  <source src="podcast.ogg" type="audio/ogg">
  <source src="podcast.wav" type="audio/wav">
  <p>Your browser doesn't support HTML audio. <a href="podcast.mp3">Download the audio</a>
</audio>

<!-- Audio with preload -->
<audio controls preload="metadata">
  <source src="music.mp3" type="audio/mpeg">
  <track kind="descriptions" src="descriptions.vtt" srclang="en">
</audio>
```

Embedded Content:

```
<!-- YouTube embed -->
<iframe width="560" height="315"
  src="https://www.youtube.com/embed/VIDEO_ID"
  title="Video title"
  frameborder="0"
  allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture"
  allowfullscreen>
</iframe>

<!-- Google Maps embed -->
<iframe src="https://www.google.com/maps/embed?pb=..."
  width="600" height="450"
  style="border:0;"
  allowfullscreen=""
  loading="lazy"
  referrerpolicy="no-referrer-when-downgrade"
  title="Office location on Google Maps">
</iframe>

<!-- Generic iframe -->
<iframe src="embedded-page.html"
  width="100%" height="400"
  title="Embedded content description"
  sandbox="allow-scripts allow-same-origin">
  <p>Your browser doesn't support iframes. <a href="embedded-page.html">View the content</a>
</iframe>
```

4. Tables & Lists

Advanced Table:

```
<table>
  <caption>Employee Performance Data - Q3 2025</caption>
  <colgroup>
    <col style="width: 20%;">
    <col style="width: 15%;">
    <col style="width: 15%;">
    <col style="width: 25%;">
    <col style="width: 25%;">
  </colgroup>
  <thead>
    <tr>
      <th scope="col" id="name">Employee Name</th>
      <th scope="col" id="dept">Department</th>
      <th scope="col" id="rating">Rating</th>
      <th scope="col" id="projects">Projects Completed</th>
      <th scope="col" id="notes">Notes</th>
    </tr>
  </thead>
  <tbody>
    <tr>
      <th scope="row" headers="name">Alice Johnson</th>
      <td headers="dept">Engineering</td>
      <td headers="rating">4.8/5</td>
      <td headers="projects">12</td>
      <td headers="notes">Excellent performance</td>
    </tr>
    <tr>
      <th scope="row" headers="name">Bob Smith</th>
      <td headers="dept">Design</td>
      <td headers="rating">4.5/5</td>
      <td headers="projects">8</td>
      <td headers="notes">Creative solutions</td>
    </tr>
    <tr>
      <th scope="row" headers="name">Carol Davis</th>
      <td headers="dept">Marketing</td>
      <td headers="rating">4.9/5</td>
      <td headers="projects">15</td>
      <td headers="notes">Outstanding results</td>
    </tr>
  </tbody>
  <tfoot>
    <tr>
      <th scope="row">Average</th>
      <td colspan="2">All Departments</td>
      <td>11.7 projects</td>
      <td>4.7/5 rating</td>
    </tr>
  </tfoot>
</table>
```


Complex Table with Merged Cells:

```
<table>
  <caption>Sales Report by Region and Quarter</caption>
  <thead>
    <tr>
      <th rowspan="2" scope="col">Region</th>
      <th colspan="4" scope="colgroup">2025 Quarters</th>
      <th rowspan="2" scope="col">Total</th>
    </tr>
    <tr>
      <th scope="col">Q1</th>
      <th scope="col">Q2</th>
      <th scope="col">Q3</th>
      <th scope="col">Q4</th>
    </tr>
  </thead>
  <tbody>
    <tr>
      <th scope="row">North</th>
      <td>$150K</td>
      <td>$175K</td>
      <td>$200K</td>
      <td>$225K</td>
      <td>$750K</td>
    </tr>
    <tr>
      <th scope="row">South</th>
      <td>$125K</td>
      <td>$140K</td>
      <td>$160K</td>
      <td>$180K</td>
      <td>$605K</td>
    </tr>
  </tbody>
</table>
```

All List Types:

```
<!-- Unordered list -->
<ul>
  <li>First item</li>
  <li>Second item</li>
  <li>Third item with nested list:
    <ul>
      <li>Nested item 1</li>
      <li>Nested item 2</li>
    </ul>
  </li>
</ul>

<!-- Ordered list with different numbering -->
<ol type="A" start="3">
  <li>Item C</li>
```

```

    <li>Item D</li>
    <li>Item E</li>
</ol>

<!-- Ordered list with Roman numerals -->
<ol type="I">
    <li>Introduction</li>
    <li>Methodology</li>
    <li>Results</li>
    <li>Conclusion</li>
</ol>

<!-- Definition list -->
<dl>
    <dt>HTML</dt>
    <dd>HyperText Markup Language - the standard markup language for web pages</dd>

    <dt>CSS</dt>
    <dd>Cascading Style Sheets - describes how HTML elements are displayed</dd>

    <dt>JavaScript</dt>
    <dd>A programming language that enables interactive web pages</dd>
    <dd>Also used for server-side development with Node.js</dd>

    <dt>API</dt>
    <dt>Application Programming Interface</dt>
    <dd>A set of protocols and tools for building software applications</dd>
</dl>

<!-- Mixed nested lists -->
<ol>
    <li>Web Technologies
        <ul>
            <li>Frontend
                <ol>
                    <li>HTML</li>
                    <li>CSS</li>
                    <li>JavaScript</li>
                </ol>
            </li>
            <li>Backend
                <ul>
                    <li>Node.js</li>
                    <li>Python</li>
                    <li>PHP</li>
                </ul>
            </li>
        </ul>
    </li>
    <li>Databases
        <ul>
            <li>SQL (MySQL, PostgreSQL)</li>
            <li>NoSQL (MongoDB, Redis)</li>
        </ul>
    </li>
</ol>

```

5. Accessibility Features

ARIA Attributes:

```
<!-- Navigation with ARIA -->
<nav aria-label="Main navigation" role="navigation">
  <ul>
    <li><a href="#home" aria-current="page">Home</a></li>
    <li><a href="#about">About</a></li>
    <li><a href="#services" aria-expanded="false" aria-haspopup="true">Services</a></li>
    <li><a href="#contact">Contact</a></li>
  </ul>
</nav>

<!-- Breadcrumb navigation -->
<nav aria-label="Breadcrumb">
  <ol>
    <li><a href="/">Home</a></li>
    <li><a href="/products">Products</a></li>
    <li aria-current="page">Laptops</li>
  </ol>
</nav>

<!-- Form with ARIA -->
<form role="form">
  <div class="form-group">
    <label for="username">Username</label>
    <input type="text" id="username" name="username"
      required
      aria-required="true"
      aria-describedby="username-help username-error"
      aria-invalid="false">
    <div id="username-help">Must be 3-20 characters</div>
    <div id="username-error" role="alert" aria-live="polite"></div>
  </div>

  <fieldset>
    <legend>Notification Preferences</legend>
    <div role="group" aria-labelledby="notification-legend">
      <input type="checkbox" id="email-notify" name="notifications" value="email">
      <label for="email-notify">Email notifications</label>

      <input type="checkbox" id="sms-notify" name="notifications" value="sms">
      <label for="sms-notify">SMS notifications</label>
    </div>
  </fieldset>
</form>

<!-- Live regions -->
<div aria-live="polite" id="status-message"></div>
<div aria-live="assertive" id="error-message" role="alert"></div>
<div aria-live="off" id="log-message" aria-atomic="true"></div>

<!-- Modal dialog -->
<div role="dialog" aria-labelledby="modal-title" aria-describedby="modal-desc" aria-modal
```

```

    <h2 id="modal-title">Confirm Action</h2>
    <p id="modal-desc">Are you sure you want to delete this item?</p>
    <button onclick="confirmDelete()" aria-describedby="delete-help">Yes, Delete</button>
    <button onclick="closeModal()">Cancel</button>
    <div id="delete-help">This action cannot be undone</div>
</div>

<!-- Tab interface -->
<div role="tablist" aria-label="Content sections">
    <button role="tab" aria-selected="true" aria-controls="panel1" id="tab1">Tab 1</button>
    <button role="tab" aria-selected="false" aria-controls="panel2" id="tab2">Tab 2</button>
</div>
<div role="tabpanel" id="panel1" aria-labelledby="tab1">Content for tab 1</div>
<div role="tabpanel" id="panel2" aria-labelledby="tab2" hidden>Content for tab 2</div>

<!-- Progress indicator -->
<div role="progressbar" aria-valuenow="32" aria-valuemin="0" aria-valuemax="100" aria-label="Progress" >
    32% complete
</div>

<!-- Landmarks -->
<header role="banner">
    <h1>Site Title</h1>
</header>
<main role="main">
    <article role="article">
        <h2>Article Title</h2>
    </article>
</main>
<aside role="complementary">
    <h3>Related Links</h3>
</aside>
<footer role="contentinfo">
    <p>Copyright information</p>
</footer>

```

Screen Reader Optimizations:

```

<!-- Skip navigation links -->
<a href="#main-content" class="skip-link">Skip to main content</a>
<a href="#sidebar" class="skip-link">Skip to sidebar</a>

<!-- Hidden content for screen readers -->
<span class="sr-only">This text is only for screen readers</span>

<!-- Button with accessible label -->
<button aria-label="Close modal dialog">✕</button>

<!-- Image with long description -->

<div id="chart-description">
    Detailed description: This chart shows sales data for Q1-Q4 2025,
    with Q4 showing the highest performance at $2.5M...
</div>

```

```
<!-- Abbreviations -->
<abbr title="World Wide Web">WWW</abbr>
<abbr title="HyperText Markup Language">HTML</abbr>

<!-- Language specification -->
<p>The French word <span lang="fr">bonjour</span> means hello.</p>
<blockquote lang="es">Hola, ¿cómo estás?</blockquote>
```

▮ ADVANCED CSS SELECTORS & STYLING

1. Attribute Selectors

```
/* Has attribute */
input[required] {
    border-left: 3px solid #dc3545;
}

img[alt] {
    border: 2px solid green;
}

/* Exact attribute value */
input[type="email"] {
    background-color: #e6f3ff;
}

button[type="submit"] {
    background-color: #007acc;
    color: white;
}

/* Attribute contains value (substring) */
a[href*="example.com"] {
    color: #28a745;
    font-weight: bold;
}

img[src*="thumbnail"] {
    max-width: 150px;
}

/* Attribute starts with value */
a[href^="https://"] {
    padding-left: 20px;
    background: url('secure-icon.png') no-repeat left center;
}

a[href^="mailto:"] {
    color: #dc3545;
}

a[href^="tel:"] {
    color: #007acc;
```

```

}

/* Attribute ends with value */
a[href$=".pdf"] {
    color: #dc3545;
    text-decoration: underline;
}

a[href$=".zip"] {
    font-weight: bold;
}

img[src$=".svg"] {
    filter: drop-shadow(2px 2px 4px rgba(0,0,0,0.3));
}

/* Attribute contains word (space-separated) */
img[alt~="photo"] {
    border-radius: 8px;
}

div[class~="featured"] {
    background-color: #fff3cd;
}

/* Attribute starts with value followed by hyphen */
p[lang|="en"] {
    font-family: "Times New Roman", serif;
}

/* Case-insensitive matching */
input[type="email" i] {
    background: #f0f8ff;
}

/* Multiple attribute selectors */
input[type="text"][required] {
    border: 2px solid #ffc107;
}

button[type="submit"][disabled] {
    opacity: 0.5;
    cursor: not-allowed;
}

```

2. Pseudo-classes

User Action Pseudo-classes:

```

/* Link states */
a:link {
    color: #007acc;
    text-decoration: none;
}

```

```
a:visited {
    color: #6f42c1;
}

a:hover {
    color: #0056b3;
    text-decoration: underline;
    transform: translateY(-1px);
    transition: all 0.2s ease;
}

a:active {
    color: #004085;
    transform: translateY(0);
}

a:focus {
    outline: 2px solid #007acc;
    outline-offset: 2px;
}

/* Form element states */
input:focus {
    border-color: #007acc;
    box-shadow: 0 0 0 3px rgba(0, 122, 204, 0.1);
}

input:hover {
    border-color: #6c757d;
}

input:invalid {
    border-color: #dc3545;
    background-color: #f8d7da;
}

input:valid {
    border-color: #28a745;
    background-color: #d1ecf1;
}

input:required {
    box-shadow: inset 0 0 5px rgba(220, 53, 69, 0.2);
}

input:optional {
    box-shadow: inset 0 0 5px rgba(40, 167, 69, 0.2);
}

input:disabled {
    opacity: 0.6;
    cursor: not-allowed;
    background-color: #e9ecef;
}
```

```
input:enabled {
  cursor: text;
}

input:checked + label {
  font-weight: bold;
  color: #007acc;
}

input:indeterminate {
  opacity: 0.7;
}

/* Button states */
button:hover {
  background-color: #0056b3;
  transform: translateY(-2px);
  box-shadow: 0 4px 8px rgba(0,0,0,0.2);
}

button:active {
  transform: translateY(0);
  box-shadow: 0 2px 4px rgba(0,0,0,0.2);
}
```

Structural Pseudo-classes:

```
/* Child selectors */
li:first-child {
  font-weight: bold;
  color: #007acc;
}

li:last-child {
  border-bottom: none;
  margin-bottom: 0;
}

li:only-child {
  text-align: center;
  font-style: italic;
}

/* Nth-child patterns */
tr:nth-child(odd) {
  background-color: #f8f9fa;
}

tr:nth-child(even) {
  background-color: #ffffff;
}

li:nth-child(3n) {
  color: #dc3545;
}
```



```
li:nth-child(3n+1) {
    color: #28a745;
}

li:nth-child(3n+2) {
    color: #007acc;
}

/* Start from specific position */
li:nth-child(n+3) {
    margin-top: 10px;
}

li:nth-child(-n+3) {
    font-weight: bold;
}

/* Type-based selectors */
h2:first-of-type {
    margin-top: 0;
    font-size: 2em;
}

h2:last-of-type {
    margin-bottom: 0;
}

p:nth-of-type(2) {
    font-style: italic;
}

img:only-of-type {
    display: block;
    margin: 0 auto;
}

/* Content-based selectors */
p:empty {
    display: none;
}

div:not(.special) {
    color: #6c757d;
}

input:not([type="hidden"]) {
    margin-bottom: 10px;
}

/* Root and target */
:root {
    --primary-color: #007acc;
}

:target {
```

```
background-color: #fff3cd;
padding: 20px;
border-left: 4px solid #ffc107;
}
```

3. Pseudo-elements

```
/* First line and letter */
p::first-line {
  font-weight: bold;
  text-transform: uppercase;
  letter-spacing: 1px;
}

p::first-letter {
  font-size: 3em;
  font-weight: bold;
  float: left;
  margin: 0.1em 0.1em 0.1em 0;
  color: #007acc;
  line-height: 0.8;
}

/* Drop cap effect */
.drop-cap::first-letter {
  font-size: 4em;
  font-family: serif;
  font-weight: bold;
  float: left;
  margin: 0.1em 0.1em 0 0;
  padding: 0.1em;
  background: linear-gradient(45deg, #007acc, #28a745);
  color: white;
  border-radius: 4px;
}

/* Before and after content */
.quote::before {
  content: "";
  font-size: 2em;
  color: #007acc;
  position: absolute;
  left: -0.5em;
  top: -0.2em;
}

.quote::after {
  content: "";
  font-size: 2em;
  color: #007acc;
  position: absolute;
  right: -0.5em;
  bottom: -0.5em;
}
```

```

/* Icon additions */
.external-link::after {
    content: " ↗";
    font-size: 0.8em;
    color: #6c757d;
}

.required-field::after {
    content: " *";
    color: #dc3545;
    font-weight: bold;
}

.email::before {
    content: "✉ ";
}

.phone::before {
    content: "☎ ";
}

/* Counter usage */
body {
    counter-reset: section;
}

h2::before {
    counter-increment: section;
    content: "Section " counter(section) ": ";
    color: #007acc;
    font-weight: bold;
}

/* Tooltip using pseudo-elements */
.tooltip {
    position: relative;
}

.tooltip::after {
    content: attr(data-tooltip);
    position: absolute;
    bottom: 100%;
    left: 50%;
    transform: translateX(-50%);
    background: #333;
    color: white;
    padding: 5px 10px;
    border-radius: 4px;
    white-space: nowrap;
    opacity: 0;
    visibility: hidden;
    transition: all 0.3s;
    font-size: 0.8em;
}

.tooltip::before {

```

```

    content: "";
    position: absolute;
    bottom: 100%;
    left: 50%;
    transform: translateX(-50%);
    border: 5px solid transparent;
    border-top-color: #333;
    opacity: 0;
    visibility: hidden;
    transition: all 0.3s;
}

.tooltip:hover::after,
.tooltip:hover::before {
    opacity: 1;
    visibility: visible;
}

/* List styling */
ul.custom-list {
    list-style: none;
    padding: 0;
}

ul.custom-list li::before {
    content: "✓ ";
    color: #28a745;
    font-weight: bold;
    margin-right: 8px;
}

ol.fancy-list {
    list-style: none;
    counter-reset: fancy-counter;
}

ol.fancy-list li::before {
    counter-increment: fancy-counter;
    content: counter(fancy-counter);
    background: #007acc;
    color: white;
    font-weight: bold;
    padding: 2px 6px;
    border-radius: 50%;
    margin-right: 10px;
    font-size: 0.8em;
}

/* Selection styling */
::selection {
    background: #007acc;
    color: white;
}

::-moz-selection {
    background: #007acc;
}

```

```
        color: white;
    }

    /* Placeholder styling */
    input::placeholder {
        color: #6c757d;
        font-style: italic;
        opacity: 0.7;
    }

    input::-webkit-input-placeholder {
        color: #6c757d;
        font-style: italic;
    }

    input::-moz-placeholder {
        color: #6c757d;
        font-style: italic;
        opacity: 1;
    }

    /* File input styling */
    input[type="file"]::file-selector-button {
        background: #007acc;
        color: white;
        border: none;
        padding: 8px 16px;
        border-radius: 4px;
        margin-right: 10px;
        cursor: pointer;
    }

    /* Scrollbar styling (Webkit) */
    ::-webkit-scrollbar {
        width: 12px;
    }

    ::-webkit-scrollbar-track {
        background: #f1f1f1;
        border-radius: 6px;
    }

    ::-webkit-scrollbar-thumb {
        background: #007acc;
        border-radius: 6px;
    }

    ::-webkit-scrollbar-thumb:hover {
        background: #0056b3;
    }
}
```

4. Box Model & Spacing

```
/* Global box-sizing reset */
*, *::before, *::after {
    box-sizing: border-box;
}

/* Box model examples */
.box-content {
    box-sizing: content-box; /* Default */
    width: 300px;
    height: 200px;
    padding: 20px;
    border: 5px solid #007acc;
    margin: 10px;
    /* Total width: 300 + 40 + 10 + 20 = 370px */
}

.box-border {
    box-sizing: border-box; /* Recommended */
    width: 300px;
    height: 200px;
    padding: 20px;
    border: 5px solid #007acc;
    margin: 10px;
    /* Total width: 300px (includes padding and border) */
}

/* Margin examples */
.margin-demo {
    margin: 20px; /* All sides */
    margin: 10px 20px; /* Vertical | Horizontal */
    margin: 5px 10px 15px; /* Top | Horizontal | Bottom */
    margin: 5px 10px 15px 20px; /* Top | Right | Bottom | Left */

    margin-top: 10px;
    margin-right: 20px;
    margin-bottom: 15px;
    margin-left: 25px;

    margin: 0 auto; /* Center horizontally */
}

/* Padding examples */
.padding-demo {
    padding: 15px; /* All sides */
    padding: 10px 20px; /* Vertical | Horizontal */
    padding: 5px 10px 15px; /* Top | Horizontal | Bottom */
    padding: 5px 10px 15px 20px; /* Top | Right | Bottom | Left */

    padding-top: 10px;
    padding-right: 20px;
    padding-bottom: 15px;
    padding-left: 25px;
}
```

```

/* Border examples */
.border-demo {
    border: 2px solid #007acc;          /* Width | Style | Color */
    border-width: 1px 2px 3px 4px;    /* Top | Right | Bottom | Left */
    border-style: solid dashed dotted double;
    border-color: red green blue yellow;

    border-top: 3px solid #dc3545;
    border-right: 2px dashed #28a745;
    border-bottom: 1px dotted #007acc;
    border-left: 4px double #ffc107;

    border-radius: 8px;                /* All corners */
    border-radius: 10px 5px;           /* Top-left & bottom-right | Top-right & bottom-left */
    border-radius: 10px 5px 15px;      /* Top-left | Top-right & bottom-left | Bottom-right */
    border-radius: 10px 5px 15px 20px; /* Top-left | Top-right | Bottom-right | Bottom-left */
}

/* Advanced spacing techniques */
.spacing-system {
    --space-xs: 0.25rem;    /* 4px */
    --space-sm: 0.5rem;     /* 8px */
    --space-md: 1rem;       /* 16px */
    --space-lg: 1.5rem;     /* 24px */
    --space-xl: 2rem;       /* 32px */
    --space-2xl: 3rem;      /* 48px */
    --space-3xl: 4rem;      /* 64px */
}

.space-xs { margin: var(--space-xs); }
.space-sm { margin: var(--space-sm); }
.space-md { margin: var(--space-md); }
.space-lg { margin: var(--space-lg); }
.space-xl { margin: var(--space-xl); }

/* Negative margins */
.negative-margin {
    margin-top: -10px;
    margin-left: -20px;
}

/* Margin collapse prevention */
.margin-collapse-fix {
    padding: 1px 0; /* Prevents margin collapse */
}

/* Overflow control */
.overflow-demo {
    width: 200px;
    height: 100px;
    overflow: hidden;          /* Clip content */
    overflow: scroll;           /* Always show scrollbars */
    overflow: auto;            /* Show scrollbars when needed */
    overflow-x: hidden;        /* Hide horizontal overflow */
    overflow-y: scroll;         /* Vertical scrollbar */
}

```

```

/* Max/Min dimensions */
.responsive-box {
  width: 100%;
  max-width: 600px;
  min-width: 300px;
  height: auto;
  min-height: 200px;
  max-height: 400px;
}

```

5. CSS Variables (Custom Properties)

```

/* Global variables */
:root {
  /* Colors */
  --primary-50: #e3f2fd;
  --primary-100: #bbdefb;
  --primary-200: #90caf9;
  --primary-300: #64b5f6;
  --primary-400: #42a5f5;
  --primary-500: #2196f3;
  --primary-600: #1e88e5;
  --primary-700: #1976d2;
  --primary-800: #1565c0;
  --primary-900: #0d47a1;

  --secondary-500: #4caf50;
  --accent-500: #ff9800;
  --error-500: #f44336;
  --warning-500: #ff5722;
  --success-500: #4caf50;

  /* Typography */
  --font-family-primary: 'Inter', system-ui, sans-serif;
  --font-family-secondary: 'Roboto Mono', monospace;

  --font-size-xs: 0.75rem;    /* 12px */
  --font-size-sm: 0.875rem;   /* 14px */
  --font-size-base: 1rem;     /* 16px */
  --font-size-lg: 1.125rem;   /* 18px */
  --font-size-xl: 1.25rem;    /* 20px */
  --font-size-2xl: 1.5rem;    /* 24px */
  --font-size-3xl: 1.875rem;  /* 30px */
  --font-size-4xl: 2.25rem;   /* 36px */

  --font-weight-light: 300;
  --font-weight-normal: 400;
  --font-weight-medium: 500;
  --font-weight-semibold: 600;
  --font-weight-bold: 700;

  --line-height-tight: 1.25;
  --line-height-normal: 1.5;
  --line-height-relaxed: 1.75;
}

```



```

/* Spacing scale */
--space-0: 0;
--space-1: 0.25rem; /* 4px */
--space-2: 0.5rem; /* 8px */
--space-3: 0.75rem; /* 12px */
--space-4: 1rem; /* 16px */
--space-5: 1.25rem; /* 20px */
--space-6: 1.5rem; /* 24px */
--space-8: 2rem; /* 32px */
--space-10: 2.5rem; /* 40px */
--space-12: 3rem; /* 48px */
--space-16: 4rem; /* 64px */
--space-20: 5rem; /* 80px */

/* Border radius */
--radius-none: 0;
--radius-sm: 0.125rem; /* 2px */
--radius-base: 0.25rem; /* 4px */
--radius-md: 0.375rem; /* 6px */
--radius-lg: 0.5rem; /* 8px */
--radius-xl: 0.75rem; /* 12px */
--radius-2xl: 1rem; /* 16px */
--radius-full: 9999px; /* Circle */

/* Shadows */
--shadow-sm: 0 1px 2px 0 rgba(0, 0, 0, 0.05);
--shadow-base: 0 1px 3px 0 rgba(0, 0, 0, 0.1), 0 1px 2px 0 rgba(0, 0, 0, 0.06);
--shadow-md: 0 4px 6px -1px rgba(0, 0, 0, 0.1), 0 2px 4px -1px rgba(0, 0, 0, 0.06);
--shadow-lg: 0 10px 15px -3px rgba(0, 0, 0, 0.1), 0 4px 6px -2px rgba(0, 0, 0, 0.05);
--shadow-xl: 0 20px 25px -5px rgba(0, 0, 0, 0.1), 0 10px 10px -5px rgba(0, 0, 0, 0.04);

/* Transitions */
--transition-fast: 150ms ease-in-out;
--transition-base: 250ms ease-in-out;
--transition-slow: 350ms ease-in-out;

/* Z-index scale */
--z-dropdown: 1000;
--z-sticky: 1020;
--z-fixed: 1030;
--z-modal-backdrop: 1040;
--z-modal: 1050;
--z-popover: 1060;
--z-tooltip: 1070;

/* Breakpoints */
--breakpoint-sm: 576px;
--breakpoint-md: 768px;
--breakpoint-lg: 992px;
--breakpoint-xl: 1200px;
--breakpoint-2xl: 1400px;
}

/* Component-level variables */
.button {

```

```

--button-bg: var(--primary-500);
--button-color: white;
--button-padding: var(--space-3) var(--space-6);
--button-radius: var(--radius-md);
--button-transition: var(--transition-base);

background-color: var(--button-bg);
color: var(--button-color);
padding: var(--button-padding);
border-radius: var(--button-radius);
transition: var(--button-transition);
border: none;
cursor: pointer;
font-weight: var(--font-weight-medium);
}

.button:hover {
  --button-bg: var(--primary-600);
}

.button--secondary {
  --button-bg: var(--secondary-500);
}

.button--large {
  --button-padding: var(--space-4) var(--space-8);
  font-size: var(--font-size-lg);
}

/* Card component with variables */
.card {
  --card-bg: white;
  --card-border: 1px solid #e2e8f0;
  --card-radius: var(--radius-lg);
  --card-shadow: var(--shadow-base);
  --card-padding: var(--space-6);

  background: var(--card-bg);
  border: var(--card-border);
  border-radius: var(--card-radius);
  box-shadow: var(--card-shadow);
  padding: var(--card-padding);
}

/* Theme variations using variables */
.theme-dark {
  --primary-500: #3b82f6;
  --card-bg: #1f2937;
  --card-border: 1px solid #374151;
  color: white;
}

.theme-high-contrast {
  --primary-500: #000000;
  --card-bg: #ffffff;
  --card-border: 2px solid #000000;
}

```

```

}

/* Conditional variables with fallbacks */
.conditional-style {
  color: var(--custom-color, var(--primary-500));
  margin: var(--custom-margin, var(--space-4));
  font-size: var(--custom-font-size, var(--font-size-base));
}

/* Mathematical calculations with variables */
.calculated-spacing {
  padding: calc(var(--space-4) * 2);
  margin: calc(var(--space-2) + var(--space-4));
  width: calc(100% - var(--space-8));
}

/* Media query variables (CSS Container Queries) */
@supports (container-type: inline-size) {
  .responsive-container {
    container-type: inline-size;
  }

  @container (min-width: 400px) {
    .card {
      --card-padding: var(--space-8);
    }
  }
}

```

▮ LAYOUT & RESPONSIVE DESIGN

1. Positioning Examples

Static Positioning (Default):

```

.static-element {
  position: static; /* Default value */
  /* top, right, bottom, left have no effect */
}

```

Relative Positioning:

```

.relative-container {
  position: relative;
  width: 300px;
  height: 200px;
  background: #f0f0f0;
  border: 2px solid #ddd;
}

```

```

.relative-item {
  position: relative;
  top: 20px;          /* Move 20px down from normal position */
  left: 30px;         /* Move 30px right from normal position */
  background: #007acc;
  color: white;
  padding: 10px;
  width: 100px;
}

/* Relative positioning for layering */
.layered-text {
  position: relative;
  z-index: 2;
  background: white;
  padding: 20px;
}

```

Absolute Positioning:

```

.absolute-container {
  position: relative; /* Creates positioning context */
  width: 400px;
  height: 300px;
  background: #f8f9fa;
  border: 2px dashed #6c757d;
}

.absolute-item {
  position: absolute;
  top: 10px;
  right: 10px;
  background: #28a745;
  color: white;
  padding: 8px 12px;
  border-radius: 4px;
}

/* Corner positioning examples */
.top-left {
  position: absolute;
  top: 0;
  left: 0;
}

.top-right {
  position: absolute;
  top: 0;
  right: 0;
}

.bottom-left {
  position: absolute;
  bottom: 0;
  left: 0;
}

```

```

}

.bottom-right {
  position: absolute;
  bottom: 0;
  right: 0;
}

/* Centered absolute positioning */
.absolute-center {
  position: absolute;
  top: 50%;
  left: 50%;
  transform: translate(-50%, -50%);
}

/* Stretched absolute positioning */
.absolute-stretched {
  position: absolute;
  top: 0;
  left: 0;
  right: 0;
  bottom: 0;
}

```

Fixed Positioning:

```

/* Fixed header */
.fixed-header {
  position: fixed;
  top: 0;
  left: 0;
  right: 0;
  height: 60px;
  background: #007acc;
  color: white;
  z-index: 1000;
  box-shadow: 0 2px 4px rgba(0,0,0,0.1);
  padding: 0 20px;
  display: flex;
  align-items: center;
  justify-content: space-between;
}

/* Fixed sidebar */
.fixed-sidebar {
  position: fixed;
  top: 60px; /* Below header */
  left: 0;
  width: 250px;
  height: calc(100vh - 60px);
  background: #f8f9fa;
  border-right: 1px solid #dee2e6;
  overflow-y: auto;
  z-index: 999;
}

```

```

}

/* Fixed floating action button */
.fixed-fab {
  position: fixed;
  bottom: 20px;
  right: 20px;
  width: 60px;
  height: 60px;
  border-radius: 50%;
  background: #007acc;
  color: white;
  border: none;
  box-shadow: 0 4px 12px rgba(0,0,0,0.15);
  cursor: pointer;
  z-index: 1001;
  display: flex;
  align-items: center;
  justify-content: center;
  font-size: 24px;
}

/* Fixed overlay */
.fixed-overlay {
  position: fixed;
  top: 0;
  left: 0;
  right: 0;
  bottom: 0;
  background: rgba(0, 0, 0, 0.5);
  z-index: 1040;
  display: flex;
  align-items: center;
  justify-content: center;
}

```

Sticky Positioning:

```

/* Sticky navigation */
.sticky-nav {
  position: sticky;
  top: 0; /* Sticks when scrolled to top of viewport */
  background: white;
  border-bottom: 1px solid #dee2e6;
  z-index: 100;
  padding: 15px 0;
}

/* Sticky sidebar */
.sticky-sidebar {
  position: sticky;
  top: 20px; /* 20px from top when stuck */
  height: fit-content;
  max-height: calc(100vh - 40px);
  overflow-y: auto;
}

```

```

}

/* Sticky table headers */
.sticky-table th {
  position: sticky;
  top: 0;
  background: white;
  z-index: 10;
  box-shadow: 0 2px 2px -1px rgba(0, 0, 0, 0.4);
}

/* Sticky footer */
.sticky-footer {
  position: sticky;
  bottom: 0;
  background: #f8f9fa;
  padding: 15px;
  border-top: 1px solid #dee2e6;
  margin-top: auto;
}

/* Complex sticky example */
.sticky-container {
  height: 100vh;
  overflow-y: auto;
}

.sticky-header {
  position: sticky;
  top: 0;
  background: #007acc;
  color: white;
  padding: 20px;
  z-index: 2;
}

.sticky-subheader {
  position: sticky;
  top: 80px; /* Below main header */
  background: #0056b3;
  color: white;
  padding: 10px;
  z-index: 1;
}

```

2. Media Queries & Mobile-First Approach

Basic Media Query Structure:

```

/* Mobile First Approach - Base styles for mobile */
.container {
  width: 100%;
  padding: 0 16px;
  margin: 0 auto;
}

```

```

}

.grid {
  display: block;
}

.grid-item {
  width: 100%;
  margin-bottom: 20px;
}

/* Typography - Mobile */
h1 {
  font-size: 24px;
  line-height: 1.2;
}

h2 {
  font-size: 20px;
}

p {
  font-size: 16px;
  line-height: 1.5;
}

/* Navigation - Mobile */
.nav {
  flex-direction: column;
}

.nav-item {
  width: 100%;
  text-align: center;
  padding: 12px;
}

/* Small devices (landscape phones, 576px and up) */
@media (min-width: 576px) {
  .container {
    max-width: 540px;
  }

  h1 {
    font-size: 28px;
  }

  .grid {
    display: flex;
    flex-wrap: wrap;
    gap: 20px;
  }

  .grid-item {
    width: calc(50% - 10px);
    margin-bottom: 0;
  }
}

```



```
}  
}  
  
/* Medium devices (tablets, 768px and up) */  
@media (min-width: 768px) {  
  .container {  
    max-width: 720px;  
    padding: 0 24px;  
  }  
  
  h1 {  
    font-size: 36px;  
  }  
  
  h2 {  
    font-size: 28px;  
  }  
  
  p {  
    font-size: 18px;  
    line-height: 1.6;  
  }  
  
  .nav {  
    flex-direction: row;  
    justify-content: space-between;  
  }  
  
  .nav-item {  
    width: auto;  
    padding: 8px 16px;  
  }  
  
  .grid {  
    display: grid;  
    grid-template-columns: repeat(2, 1fr);  
    gap: 30px;  
  }  
}  
  
/* Large devices (desktops, 992px and up) */  
@media (min-width: 992px) {  
  .container {  
    max-width: 960px;  
    padding: 0 32px;  
  }  
  
  h1 {  
    font-size: 48px;  
  }  
  
  .grid {  
    grid-template-columns: repeat(3, 1fr);  
    gap: 40px;  
  }  
}
```

```

/* Multi-column layout */
.content-layout {
  display: grid;
  grid-template-columns: 1fr 300px;
  gap: 40px;
}

.sidebar {
  position: sticky;
  top: 20px;
  height: fit-content;
}
}

/* Extra large devices (large desktops, 1200px and up) */
@media (min-width: 1200px) {
  .container {
    max-width: 1140px;
  }

  .grid {
    grid-template-columns: repeat(4, 1fr);
    gap: 50px;
  }

  .content-layout {
    grid-template-columns: 1fr 350px;
  }
}

/* Extra extra large devices (1400px and up) */
@media (min-width: 1400px) {
  .container {
    max-width: 1320px;
  }
}

```

Advanced Media Query Features:

```

/* Orientation queries */
@media (orientation: portrait) {
  .hero {
    height: 100vh;
    flex-direction: column;
  }

  .image-gallery {
    grid-template-columns: repeat(2, 1fr);
  }
}

@media (orientation: landscape) {
  .hero {
    height: 50vh;
    flex-direction: row;
  }
}

```

```

    }

    .image-gallery {
        grid-template-columns: repeat(4, 1fr);
    }
}

/* Specific landscape height for mobile */
@media (orientation: landscape) and (max-height: 500px) {
    .hero {
        height: 100vh;
        padding: 20px 0;
    }

    .nav {
        height: 50px;
    }
}

/* Aspect ratio queries */
@media (min-aspect-ratio: 16/9) {
    .widescreen-content {
        display: flex;
        justify-content: space-between;
    }
}

/* Resolution/pixel density queries */
@media (-webkit-min-device-pixel-ratio: 2), (min-resolution: 192dpi) {
    .high-res-image {
        background-image: url('image@2x.png');
        background-size: 200px 100px;
    }
}

/* Pointer capability */
@media (pointer: coarse) {
    /* Touch devices */
    .button {
        min-height: 44px;
        min-width: 44px;
        padding: 12px 20px;
    }

    .nav-item {
        padding: 16px;
    }
}

@media (pointer: fine) {
    /* Mouse/trackpad devices */
    .button {
        padding: 8px 16px;
    }

    .tooltip:hover::after {

```

```

        opacity: 1;
    }
}

/* Hover capability */
@media (hover: hover) {
    .card:hover {
        transform: translateY(-4px);
        box-shadow: 0 8px 25px rgba(0,0,0,0.15);
    }

    .button:hover {
        background-color: var(--button-hover-bg);
    }
}

@media (hover: none) {
    /* Touch devices that don't support hover */
    .card:active {
        transform: scale(0.98);
    }
}

/* User preferences */
@media (prefers-color-scheme: dark) {
    :root {
        --bg-color: #1a1a1a;
        --text-color: #ffffff;
        --border-color: #333333;
    }

    body {
        background-color: var(--bg-color);
        color: var(--text-color);
    }

    .card {
        background: #2d2d2d;
        border-color: var(--border-color);
    }
}

@media (prefers-reduced-motion: reduce) {
    * {
        animation-duration: 0.01ms !important;
        animation-iteration-count: 1 !important;
        transition-duration: 0.01ms !important;
        scroll-behavior: auto !important;
    }
}

@media (prefers-contrast: high) {
    .button {
        border: 2px solid currentColor;
    }
}

```

```

    .card {
        border: 2px solid;
    }
}

/* Print styles */
@media print {
    /* Hide interactive elements */
    .nav,
    .sidebar,
    .button,
    .form,
    .no-print {
        display: none !important;
    }

    /* Optimize for print */
    body {
        font-size: 12pt;
        line-height: 1.4;
        color: black !important;
        background: white !important;
    }

    .container {
        max-width: none !important;
        margin: 0 !important;
        padding: 0 !important;
    }

    /* Page breaks */
    .page-break {
        page-break-before: always;
    }

    .avoid-break {
        page-break-inside: avoid;
    }

    /* Show URLs for links */
    a[href]:after {
        content: " (" attr(href) )";
        font-size: 10pt;
        color: #666;
    }

    /* Abbreviation expansions */
    abbr[title]:after {
        content: " (" attr(title) )";
    }
}

```

Container Queries (Modern Browsers):

```
/* Container queries for component-based responsive design */
.card-container {
  container-type: inline-size;
  container-name: card;
}

@container card (min-width: 300px) {
  .card {
    display: flex;
    align-items: center;
    gap: 20px;
  }

  .card-image {
    width: 100px;
    height: 100px;
    flex-shrink: 0;
  }
}

@container card (min-width: 500px) {
  .card {
    flex-direction: column;
    text-align: center;
  }

  .card-image {
    width: 150px;
    height: 150px;
  }
}

/* Multiple container contexts */
.sidebar-container {
  container-type: inline-size;
  container-name: sidebar;
}

@container sidebar (max-width: 250px) {
  .sidebar-nav {
    flex-direction: column;
  }

  .sidebar-nav a {
    padding: 8px;
    text-align: center;
  }
}
```

▮ INLINE EVENT HANDLERS

Mouse Events:

```
<!-- Click events -->
<button onclick="alert('Button clicked!')">Simple Alert</button>
<button onclick="toggleMenu(this)">Toggle Menu</button>
<button onclick="changeColor(this, 'red')">Change Color</button>

<!-- Mouse hover events -->
<div onmouseover="showTooltip(this)" onmouseout="hideTooltip(this)">
  Hover for tooltip
</div>



<!-- Mouse down/up events -->
<button onmousedown="pressEffect(this)" onmouseup="releaseEffect(this)">
  Press Me
</button>

<!-- Double click -->
<div ondblclick="expandCard(this)">Double-click to expand</div>

<!-- Right click (context menu) -->
<div oncontextmenu="showCustomMenu(event); return false;">
  Right-click for custom menu
</div>
```

Keyboard Events:

```
<!-- Key press events -->
<input type="text"
  onkeydown="handleKeyDown(event)"
  onkeyup="handleKeyUp(event)"
  onkeypress="handleKeyPress(event)"
  placeholder="Type something...">

<!-- Specific key detection -->
<input type="text"
  onkeydown="if(event.key === 'Enter') submitForm()"
  placeholder="Press Enter to submit">

<!-- Character counter -->
<textarea onkeyup="updateCounter(this)" maxlength="100"></textarea>
<div id="counter">0/100 characters</div>

<!-- Tab navigation -->
<input type="text" onfocus="highlightField(this)" onblur="removeHighlight(this)">
```

Form Events:

```
<!-- Form submission -->
<form onsubmit="return validateForm(this)">
  <input type="email"
    oninput="validateEmail(this)"
    onchange="checkEmailAvailability(this)"
    required>

  <select onchange="updateOptions(this)">
    <option value="">Choose...</option>
    <option value="option1">Option 1</option>
    <option value="option2">Option 2</option>
  </select>

  <input type="checkbox"
    onchange="toggleSection(this)"
    id="subscribe">

  <button type="submit">Submit</button>
  <button type="reset" onclick="clearForm()">Reset</button>
</form>

<!-- Real-time validation -->
<input type="password"
  oninput="checkPasswordStrength(this)"
  onpaste="return false"
  placeholder="Password">

<!-- File upload -->
<input type="file"
  onchange="previewFile(this)"
  accept="image/*">
<div id="preview"></div>
```

Window Events:

```
<!-- Page load events -->
<body onload="initializePage()" onunload="cleanup()">

<!-- Window resize -->
<div id="responsive-content"
  onresize="adjustLayout()"
  style="width: 100%; height: 200px; background: #f0f0f0;">
  Resize the window
</div>

<!-- Scroll events -->
<div onscroll="handleScroll(this)"
  style="height: 200px; overflow-y: scroll;">
  <div style="height: 500px;">Scrollable content</div>
</div>
```


Focus Events:

```
<!-- Focus management -->
<input type="text"
  onfocus="this.style.backgroundColor='#e6f3ff'"
  onblur="this.style.backgroundColor=''"
  placeholder="Focus me">

<!-- Tab order -->
<input type="text" tabindex="1" onfocus="showHint(1)">
<input type="text" tabindex="2" onfocus="showHint(2)">
<input type="text" tabindex="3" onfocus="showHint(3)">
```

Touch Events (Mobile):

```
<!-- Touch events -->
<div ontouchstart="handleTouchStart(event)"
  ontouchmove="handleTouchMove(event)"
  ontouchend="handleTouchEnd(event)"
  style="width: 200px; height: 200px; background: #007acc; color: white; display: flex; align-items: center; justify-content: center; border-radius: 10px;">
  Touch me (mobile)
</div>

<!-- Gesture detection -->
<div ongesturestart="handleGestureStart(event)"
  ongesturechange="handleGestureChange(event)"
  ongestureend="handleGestureEnd(event)">
  Pinch to zoom (iOS Safari)
</div>
```

Complete Example with Multiple Events:

```
<div class="interactive-card"
  onclick="selectCard(this)"
  ondblclick="editCard(this)"
  onmouseover="highlightCard(this)"
  onmouseout="unhighlightCard(this)"
  onkeydown="handleCardKeyboard(event, this)"
  tabindex="0"
  role="button"
  aria-label="Interactive card">

  

  <h3 contenteditable="true"
    oninput="updateTitle(this)"
    onblur="saveTitle(this)">
    Editable Title
  </h3>
```

```

        <button onclick="event.stopPropagation(); deleteCard(this.parentElement)">
            Delete
        </button>
    </div>

<script>
// Supporting JavaScript functions
function selectCard(card) {
    document.querySelectorAll('.interactive-card').forEach(c =>
        c.classList.remove('selected'));
    card.classList.add('selected');
}

function editCard(card) {
    card.classList.add('editing');
    card.querySelector('h3').focus();
}

function highlightCard(card) {
    card.style.transform = 'scale(1.05)';
    card.style.boxShadow = '0 8px 16px rgba(0,0,0,0.2)';
}

function unhighlightCard(card) {
    card.style.transform = 'scale(1)';
    card.style.boxShadow = '0 2px 4px rgba(0,0,0,0.1)';
}

function handleCardKeyboard(event, card) {
    if (event.key === 'Enter' || event.key === ' ') {
        event.preventDefault();
        selectCard(card);
    } else if (event.key === 'Delete') {
        deleteCard(card);
    }
}

function updateTitle(element) {
    // Real-time title update
    console.log('Title changed to:', element.textContent);
}

function saveTitle(element) {
    // Save title when editing is done
    element.parentElement.classList.remove('editing');
}

function deleteCard(card) {
    if (confirm('Are you sure you want to delete this card?')) {
        card.remove();
    }
}

function imageLoaded(img) {
    img.style.opacity = '1';
}

```

```
        img.style.transition = 'opacity 0.3s ease';  
    }  
  
    function imageError(img) {  
        img.src = 'placeholder.jpg';  
        img.alt = 'Image failed to load';  
    }  
</script>
```

This comprehensive collection covers all the advanced HTML and CSS topics you requested, with practical, ready-to-use examples that demonstrate each concept clearly!