

HTML & CSS Fundamentals

🎓 **CS Perspective:** HTML and CSS form the **declarative** layer of web development—you describe *what* you want, not *how* to render it. HTML implements a **tree data structure** (the DOM) using nested tags, which the browser parses into an in-memory tree. CSS applies styles through a **pattern-matching system** (selectors) with a **specificity algorithm** to resolve conflicts. The cascade follows a well-defined **precedence hierarchy**: inline > ID > class > element. This separation of structure (HTML) and presentation (CSS) embodies the **separation of concerns** principle, making code more maintainable and enabling different stylesheets for different devices (responsive design).

📌 HTML Document Structure

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0"
  />
    <link href="style.css" rel="stylesheet" />
    <title>Page Title</title>
  </head>
  <body>
    <!-- Content goes here -->
  </body>
</html>
```

Element	Purpose
<!DOCTYPE html>	Declares HTML5 document
<html>	Root element
<head>	Metadata, links, title
<body>	Visible content

📌 Common HTML Elements

Headings & Text

```
<h1>Main Heading</h1>
<h2>Subheading</h2>
<p>Paragraph text</p>
```

Links & Images

```
<a href="https://example.com">Link text</a>

```

Forms

```
<form id="my-form">
  <input type="text" placeholder="Enter text" />
  <button>Submit</button>
</form>
```

📌 CSS Selectors

Selector	Syntax	Specificity
Element	p { }	Low (0,0,1)
Class	.classname { }	Medium (0,1,0)
ID	#idname { }	High (1,0,0)
Descendant	#parent h2 { }	Combined
Universal	* { }	Lowest (0,0,0)

```
/* Element selector */
p {
  margin-bottom: 20px;
}

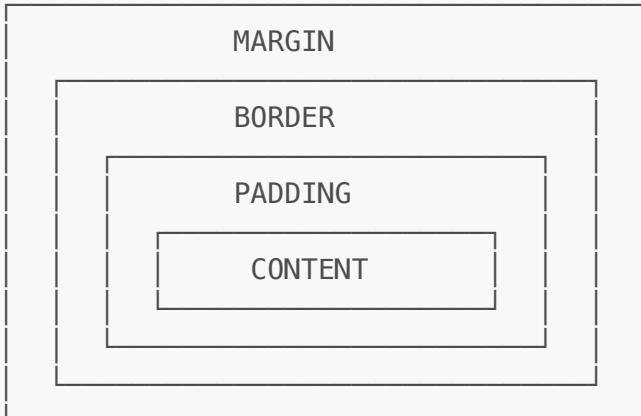
/* Class selector */
.first {
  color: red;
}

/* ID selector */
#course-image {
  width: 300px;
}

/* Descendant selector */
#your-name h2 {
  color: olivedrab;
}
```

📌 CSS Box Model

Every element is a box with:



box-sizing Property

```
* {  
  box-sizing: border-box; /* Width includes padding + border */  
}
```

Value	Width Calculation
content-box	width = content only (default)
border-box	width = content + padding + border

📌 Common CSS Properties

Colors & Backgrounds

```
body {  
  background-color: rgb(255, 247, 201);  
  color: #444;  
}  
  
a {  
  background-color: yellowgreen;  
}
```

Typography

```
body {  
    font-family: Arial, sans-serif;  
    font-size: 20px;  
}  
  
h1 {  
    font-size: 35px;  
}
```

Spacing

```
h1 {  
    margin-bottom: 25px; /* Outside spacing */  
    padding: 5px; /* Inside spacing */  
}
```

Borders

```
#your-name {  
    border: 5px solid #444;  
}
```

Sizing

```
#your-name {  
    width: 400px;  
}  
  
#course-image {  
    width: 300px;  
}
```

📌 CSS Reset

Remove default browser styles for consistency:

```
* {  
    margin: 0;  
    padding: 0;  
    box-sizing: border-box;  
}
```

📌 Linking CSS to HTML

```
<!-- External stylesheet (recommended) -->
<link href="style.css" rel="stylesheet" />

<!-- Internal styles -->
<style>
  p { color: blue; }
</style>

<!-- Inline styles (avoid) -->
<p style="color: blue;">Text</p>
```

Specificity Hierarchy (Highest → Lowest)

1. Inline styles
2. ID selectors
3. Class selectors
4. Element selectors
5. Universal selector