

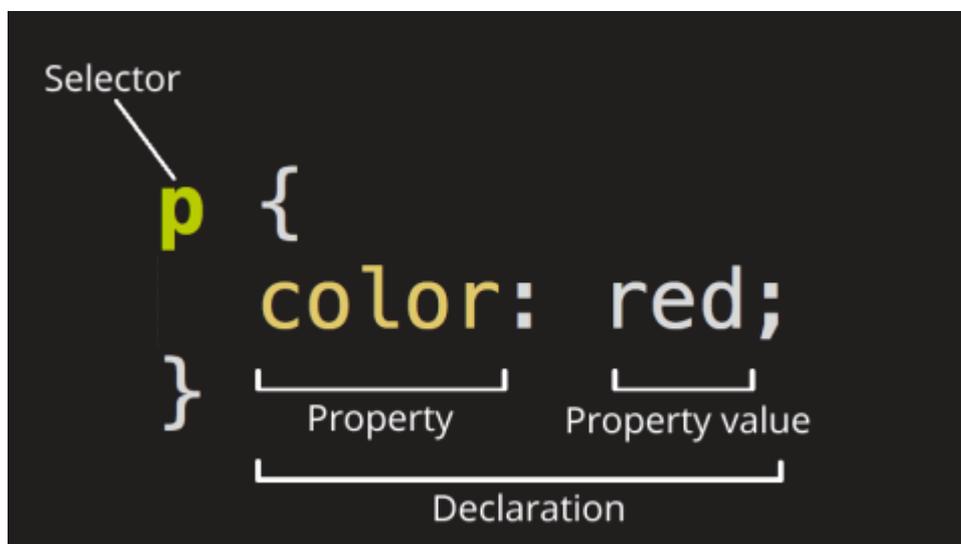
CSS (Cascading Style Sheets)

1. What is CSS?

Cascading Style Sheets (CSS) is a fundamental technology used in web development to control the formatting and layout of HTML documents. While HTML provides the structure and content of a web page, CSS allows developers to apply styles, such as colors, fonts, spacing, and positioning, to create visually appealing and user-friendly interfaces.

2. Selectors and declarations

CSS is built around selectors and declarations.



Selectors specify which HTML elements the styles should target. They can be as simple as selecting an element by its name (e.g., `p` for all paragraph elements) or as targeting elements based on classes, IDs, attributes.

Declarations define the style properties and their values that should be applied to the selected elements. A declaration consists of a property (e.g., `color`) and a value (e.g., `blue`), separated by a colon and enclosed in curly braces. For example, `p { color: blue; }` changes the text color of all paragraphs to blue.

Let's see it in a very simple example:

```
<!DOCTYPE html>
<html>
<head>
  <title>Blue Paragraph</title>
  <style>
    p {
      color: blue;
    }
  </style>
```

```
</head>
<body>
  <p>This is a blue paragraph.</p>
  <p>This is also a blue paragraph.</p>
</body>
</html>
```

3. Defining CSS styles

CSS offers three main methods for applying styles to HTML documents: **inline**, **embedded**, and **external CSS**. Each method has its own use cases, benefits, and limitations.

Choosing the right method depends on the project requirements. Inline CSS is useful for quick fixes or unique styling, embedded CSS works well for single-page designs, and external CSS is best for larger projects with multiple pages, as it promotes code reusability and maintainability.

Inline

Inline CSS applies styles directly to individual HTML elements using their `style` attribute. It is defined within the opening tag of an element, such as a `<p>` or `<h1>` tag. For example:

```
<p style="color: red; font-size: 16px;">This is a uniquely styled paragraph
with red color and a font size of 16 pixels.</p>
<p>This paragraph has the default formatting, no CSS is applied to it.</p>
```

Inline CSS is useful for making quick style changes to a specific element without affecting other parts of the page. However, it is not ideal often, as these styles are not easily reusable in other parts of the page.

Embedded

Embedded CSS, also known as internal CSS, is used within the `<style>` tag in the `<head>` section of an HTML document. This method allows you to apply styles to multiple elements on the page without creating a separate stylesheet file. For example:

```
<head>
  <style>
    h1 {
      color: blue;
    }

    .bold {
      font-weight: bold;
    }
  </style>
```

```
</head>
<body>
  <h1>Blue Heading</h1>
  <p>This is an <span class="bold">example</span> paragraph. </p>
</body>
```

Embedded CSS is beneficial for styling a single page because it keeps all the CSS rules in one place within the document. However, it is less efficient when working with multiple pages, as styles have to be repeated in each document.

External

External CSS is defined in a separate .css file and linked to the HTML document using the <link> element. This file contains all the CSS rules for the website and can be referenced by multiple HTML files. For example, an HTML document can link to an external stylesheet as follows:

```
<head>
  <link rel="stylesheet" type="text/css" href="styles.css">
</head>
```

An external stylesheet might include rules like:

```
p {
  color: blue;
  line-height: 1.5;
}
```

External CSS is ideal for websites because it allows for a consistent style across multiple pages, simplifies maintenance, and improves load times by enabling browsers to cache the stylesheet.

4. CSS comments

Comments in CSS are used to add notes, explanations, or temporarily disable code without affecting the styles applied to a webpage. They are not displayed in the browser and do not impact the page's layout or design.

```
/* Formatting rules for paragraphs */
p {
  color: black; /* Set the text color to black */
  font-size: 16pt; /* Set font size to 16 pts */
}
```

5. Element, ID, and class Selectors

* **Element selector**: Applies to all specified elements. * **ID selector**: Targets a specific element based on its unique ID. * **Class selector**: Targets one or more elements with a specific class.

```
/* Element selector, applies to all paragraphs */
p {
  color: blue;
}

/* ID selector, applies to the element with the specific ID "header" */
#header {
  font-size: 24px;
}

/* Class selector, applies to all elements with the class "button" */
.button {
  background-color: green;
}
```

6. Cascading

When multiple rules target the same selector, the later rule will override the previous one.

```
<head>
  <style>
    p {
      color: red;
    }

    p {
      color: green;
    }
  </style>
</head>
<body>
  <p>This paragraph will be green.</p>
</body>
```

7. Role of "span" and "div" elements

* span: An inline element, which is used to mark a portion of text. * div: A block element, which is used to group multiple contents into a block.

```
<p>This is a <span style="color: red">red</span> text.</p>
<div style="font-weight: bold">
  <p>This is bold text.</p>
  <p>So is this.</p>
  <p>And this too.</p>
</div>
```

8. Background styling

The background property defines the background style of an element.

```
body {  
  background-color: #f0f0f0;  
}  
  
#header {  
  background-image: url('header.jpg');  
}
```

9. Margin, padding and border

The margin is the outer space around an element, while the padding is the inner space between the content and the border. The border defines the outline of the element. This is called the “box model.”



```
div {  
  margin: 10px;  
  padding: 20px;  
  border: 1px solid black;  
  border-radius: 5px;  
}
```

10. Setting width and height

The width and height properties allow you to set the dimensions of an element.

```
img {  
  width: 100px;  
  height: 100px;  
}
```

11. Text styling

There are several properties available for text formatting.

```
p {  
  font-family: Arial;  
  font-size: 16px;  
  font-weight: bold;  
  font-style: italic;  
  
  text-decoration: underline;  
  text-align: justify;  
}
```

12. Exercise

Create the following webpage by using HTML and CSS. Use inline CSS for formatting the text, and also apply class-based and id-based selectors!

Feel free to use online resources (e.g. [W3Schools CSS tutorial](#)) as help.

John von Neumann

*"Young man, in mathematics you don't understand things. You just get used to them."
John von Neumann*

John von Neumann (born **János Lajos Neumann**) (Budapest, December 28, 1903 - Washington, February 8, 1957) was a Hungarian-born mathematician. In addition to his theoretical research in quantum mechanics, he became famous for laying the foundations of the digital computer.

John von Neumann



Born: December 28, 1903
Died: February 8, 1957 (aged 53)
Known for: Mathematician, computer scientist, physicist, professor
Citizenship: Hungarian, American
Education:

- Budapest-Fasori Evangelical Gymnasium
- Friedrich Wilhelm University
- Royal Hungarian Pázmány Péter University
- Swiss Federal Institute of Technology Zurich
- University of Göttingen

Neumann made tremendous contributions to mathematics, quantum mechanics, quantum theory, game theory, economics, and computer science. Several concepts and principles are associated with his name, such as the *Neumann principle* in quantum mechanics, the *Neumann stability theory* in game theory, and the *Neumann process* in numerical analysis.

John von Neumann was one of the most significant figures in computer science. He was among the first to recognize the potential of digital computers. Neumann developed fundamental concepts and architectures that have become foundational in the design and operation of modern computers. He is known for the "*von Neumann architecture*", which is a computer architecture where programs and data are stored in the same memory.

John von Neumann was an incredibly versatile scientist, and his research had a profound impact on computer science, mathematics, and other scientific fields. His work and legacy continue to influence modern scientific and technological developments.

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Image:

<https://upload.wikimedia.org/wikipedia/commons/thumb/d/d6/JohnvonNeumann-LosAlamos.jpg/462px-JohnvonNeumann-LosAlamos.jpg>

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