CSS – Cascading Style Sheets

Introduction

- CSS is the key presentational technology that is used in website design.
- CSS stands for Cascading Style Sheets. CSS is a standard style sheet language used for describing the presentation (i.e. the layout and formatting) of the web pages.
- CSS is used to design HTML tags.
- CSS3 is the latest version of the CSS specification. CSS3 adds several new styling features and improvements to enhance the web presentation capabilities.
- CSS is used along with HTML and JavaScript in most websites to create user interfaces for web applications and user interfaces for many mobile applications.
- CSS is rendered by Rendering Engine.

Features

- We can easily apply same style rules on multiple elements.
- We can control the presentation of multiple pages of a website with a single style sheet.
- We can present the same page differently on different devices.
- We can style dynamic states of elements such as hover, focus, etc. that isn't possible otherwise.
- We can change the position of an element on a web page without changing the markup.
- We can alter the display of existing HTML elements.
- We can transform elements like scale, rotate, skew, etc. in 2D or 3D space.
- We can create animations and transitions effects without using any JavaScript.
- We can create print friendly version of your web pages.

Advantages of CSS

The biggest advantage of CSS is that it allows the separation of style and layout from the content of the document.
There are few reasons that describe why should we use CSS :-

a) CSS Saves lots of time

CSS gives lots of flexibility to set the style properties of an element. You can write CSS once; and then the same code can be applied to the groups of HTML elements, and can also be reused in multiple HTML pages.

b) Easy Maintenance

CSS provides an easy means to update the formatting of the documents, and to maintain the consistency across multiple documents. Because the content of the entire set of web pages can be easily controlled using one or more style sheets.

c) Pages Load Faster

CSS enables multiple pages to share the formatting information, which reduces complexity and repetition in the structural contents of the documents. It significantly reduces the file transfer size, which results in a faster page loading.

d) Superior Styles to HTML

CSS has much wider presentation capabilities than HTML and provide much better control over the layout of your web pages. So you can give far better look to your web pages in comparison to the HTML presentational elements and attributes.

e) Multiple Device Compatibility

CSS also allows web pages to be optimized for more than one type of device or media. Using CSS the same HTML document can be presented in different viewing styles for different rendering devices such as desktop, cell phones, etc.

f) Provides more attribute

CSS provides more detailed attributes than plain HTML to define the look and feel of the website.

g) Efficient cache storing

CSS can be used to store the web applications locally with the help of offline cache mechanism which can be used to view the offline websites.

"Cascade" means in CSS

- "Cascading" means that styles can fall (or cascade) from one style sheet to another, enabling multiple style sheets to be used on one HTML document.
- When you have multiple style sheets—inline, internal and external and also user style sheets—they fall (or cascade) over the top of each other, one overriding another. That's the basic idea behind the "cascade" word in "CSS".
- The name cascading comes from the specified priority scheme to determine which style rule applies if more than one rule matches a particular element.
- The CSS Cascade is the algorithm by which the browser decides which CSS styles to apply to an element.
- The "cascading" in CSS refers to the fact that styling rules "cascade" down from several sources. This means that CSS has an inherent hierarchy and styles of a higher precedence will overwrite rules of a lower precedence.
- The term "cascading" means hierarchical order in which different style sheet types interact when two styles come into conflict. The conflict occurs when two different styles are applied to the same element.

Cascading order in CSS

To resolve conflicts, web browsers use the following sorting order to determine which style has precedence and will be used:

- First, look for all declarations that apply to the element in question, and for the assigned media type.
- Then look at what style sheet it's coming from. As above, author style sheets come first, then user, then user agent. With !important user styles having higher precedence than author !important styles.
- The more specific a selector is, the more precedence it will get. For example, a style on "div.co p" will have higher precedence than one just on the "p" tag.
- Finally, sort the rules by the order they were defined. Rules that are defined later in the document tree have higher precedence than those defined earlier. And rules from an imported style sheet are considered before rules directly in the style sheet.

Syntax of CSS

- A CSS rule set contains a selector and a declaration block.

The syntax of CSS as follows :-

```
h1
{
   color: yellow;
   font-size: 11 px;
}
```

a) Selector
Selector indicates the HTML element you want to style. It could be any tag like <h1>, <title> etc.

b) Declaration Block

- The declaration block can contain one or more declarations separated by a semicolon.
- Each declaration contains a property name and value, separated by a colon.

Example

```
color: yellow;
font-size: 11px;
```

c) Property
A Property is a type of attribute of HTML element. It could be color, border etc.

d) Value
Values are assigned to CSS properties. In the above example, value "yellow" is assigned to color property.

Why to learn CSS

CSS is a MUST for students and working professionals to become a great Software Engineer specially when they are working in Web Development Domain, so following reasons shows that why we want to learn CSS: -

a) Create Stunning Websites
We can create stunning websites by using CSS cause CSS handles the look & feel part of the web page.
With CSS, we can control the text color, font style, images and also variations in display for different devices and screen sizes as well as a variety of other effects.

b) Become a Web Designer
If we want to start a career as a professional web designer, HTML and CSS designing is a must skill.

c) Control Web
CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML document. Most, CSS is combined with the markup languages like HTML or XHTML.

d) Compatible with other languages
CSS not only works with HTML, JavaScript but it can work perfectly with php, python, .net etc.

VSCode extensions for CSS

1 - Intellisense for CSS class names in HTML -- zignd
2 - CSS peek -- Pranay Prakash
3 - CSS Responsive -- MrEzechi3l

Linking CSS with HTML

CSS can either be attached as a separate document or embedded in the HTML document itself. There are three methods of including CSS in an HTML document :-

a) Inline Styling
b) Internal Styling / Embedded StyleSheets
c) External StyleSheets

a) Inline Styling

- In Inline CSS we put the CSS codes in one line along with the HTML tag.
- Inline styles are used to apply the unique style rules to an element by putting the CSS rules directly into the start tag. It can be attached to an element using the style attribute.
- The style attribute includes a series of CSS property and value pairs. Each "property: value" pair is separated by a semicolon (;), just as you would write into an embedded or external style sheets.
- Usually, we use the inline CSS when we have to use that format only once or if the formatting needs just a few attributes to be added. Though it is not used very frequently in actual web development are supposed to learn everything.

b) Internal Styling / Embedded Stylesheets

- Embedded or internal style sheets only affect the document they are embedded in.
- Embedded style sheets are defined in the <head> section of an HTML document using the <style> element. You can define any number of <style> elements in an HTML document but they must appear between the <head> and </head> tags.

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <meta http-equiv="X-UA-Compatible" content="ie=edge">
   <title>Internal Stylesheets</title>
   <style>
      p
      {
         color:red;
         font-size: 20px ;
      }

      body
      {
         background-color: blue;
      }
   </style>
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```

c) External Stylesheets

- It is called external because in this type a CSS file has to be created which is then linked with the web page to introduce the feature of the defined tags.
- It makes the size of the main web page very light as no CSS codes are required to be written that web page. All the code will be contained in a separate CSS file which will be linked to that web page.
- An external style sheet is ideal when the style is applied to many pages of the website.
- An external style sheet holds all the style rules in a separate document that you can link from any HTML file on your site. External style sheets are the most flexible because with an external style sheet, you can change the look of an entire website by changing just one file.

We can attach external style sheets in two ways :-

1) Linking
2) importing.

1) Linking Using "<link/>" TAG

An external style sheet can be linked to an HTML document using the <link> tag.

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <meta http-equiv="X-UA-Compatible" content="ie=edge">
   <title>Internal Stylesheets</title>
   <link rel="stylesheet" href="style.css">
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```

2) Importing Using "@import"

The @import rule is another way of loading an external style sheet. The @import statement instructs the browser to load an external style sheet and use its styles.

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <meta http-equiv="X-UA-Compatible" content="ie=edge">
   <title>Internal Stylesheets</title>
   <style>
      @import url("css/style.css");
      @import url("css/color.css");
   </style>
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```

Note :-

- In all the three methods, using external style sheet is the best method for defining and applying styles to the HTML documents.
- Also external files will be stored in the "cache" memory of the browser.

CSS Styling Priority

In CSS styling could be done according to the priority of the styles :-

According to linking

- First priority is for inline styles.
- Second priority is for Internal Styling.
- Third priority is for External Styling.
- Last priority is for "browser default styling".

According to selectors

- First priority is set to "!important"
- Second priority is for inline styles.
- Third priority is for "id" selector(e.g., #elmId / #elmId>p / #elmId p)
- Fourth priority is for "class/pseudo class" selector(e.g., .elmClass / .elmClass>p / .elmClass p).
- Fifth priority is for "element/pseudo element" selector.

Inheritance Vs Overriding In CSS

a) Inheritance

- CSS Inheritance greatly reduces the time and effort required to create a website.
- Inheritance is a process of receiving values of properties by a child element from its parent element.
- Inheritance means "use whatever value is assigned to my parent". If no value was explicitly defined on the parent element, the browser works up the DOM tree until the property is found. Ultimately, it ends at the browser default.
- HTML uses parent-child relationships. A child element will usually inherit the characteristics of the parent element unless otherwise defined.

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>Document</title>
    <style>
        Body  {
            color: red;
            font-size: 30px;
        }
    </style>
</head>
<body>
    <h1>CSS Inheritance</h1>
    <p>Lorem ipsum dolor sit amet consectetur adipisicing elit. Blanditiis necessitatibus consequuntur ducimus quae ipsa aliquam nihil eos provident laudantium tempore consectetur eveniet id odio, ratione accusantium? Repellendus maxime animi commodi!</p>
</body>
</html>
```

Note :- In the above example the child elements increases their font-sizes to 30px from current.

b) Overriding

- The overriding of CSS takes place when the same property is apply on the single element at different CSS(inline, internal or external).
- The CSS relating to corresponding elements, that is written at the latter has the highest priority, and it overrides those written at the top.
- The Order of overriding is the same. That is first preference is to Inline CSS, then Internal CSS and lastly External CSS.

We can override CSS styles by :-

- Cascading Order
- Inheritance
- Internal properties
- !important Rule

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
	<meta charset="UTF-8">
	<meta name="viewport" content="width=device-width, initial-scale=1.0">
	<meta http-equiv="X-UA-Compatible" content="ie=edge">
	<title>Document</title>
	<style>
		body
		{
			color: red;
			font-size: 30px;
		}

		p
		{
			font-size: 20px;
			color: green;
		}
	</style>
</head>
<body>

	<h1>CSS Overriding</h1>

	<p>Lorem ipsum dolor sit amet consectetur adipisicing elit. Blanditiis necessitatibus consequuntur ducimus quae ipsa aliquam nihil eos provident laudantium tempore consectetur eveniet id odio, ratione accusantium? Repellendus maxime animi commodi!</p>

</body>
</html>
```

Specificity in CSS

CSS Conflicts

- Generally, whenever we are writing our CSS styling code for our project then it will be happening most of the times when two or more declarations are applied to the same element this process is called conflicts in CSS.
- CSS cascading inevitably leads to conflicts in the way styles are applied to elements.
- Conflicts can change the appearance of your Calendar or site, or can make items disappear altogether.
- Conflicts in CSS occurs when two different styles are applied to the same element.

Reasons for conflicts in CSS code

There are few reasons by which conflicts happens in our CSS code includes :-

1) Inheritance
2) Cascade
3) Specificity
4) !important

Resolving CSS Conflicts

- The quickest and simplest way resolve this issue is to use your web browser's CSS inspector to inspect the misbehaving element's CSS rules.
- Document inspectors are available in all modern web browsers – they're part of the developer tools which are bundled with each browser and are usually opened by pressing F12.

Example

```
<!DOCTYPE html>
<html lang="en">
<head>
	<meta charset="UTF-8">
	<meta name="viewport" content="width=device-width, initial-scale=1.0">
	<meta http-equiv="X-UA-Compatible" content="ie=edge">
	<title>Document</title>
	<style>

		p
		{
			color : blue;
			font-size: 40px;
		}

		p
		{
			color: red;
			font-size: 70px;
		}

	</style>
</head>
<body>

	<h1>CSS Conflicts</h1>

	<p>Hello World</p>

</body>
</html>
```

CSS3 DevTools

- Chrome DevTools is a set of web developer tools built directly into the Google Chrome browser.
- DevTools can help you edit pages on-the-fly and diagnose problems quickly, which ultimately helps you build better websites, faster.

Open CSS3 DevTools

There are many ways to open DevTools, because different users want quick access to different parts of the DevTools UI :-

- When you want to work with the DOM or CSS, right-click an element on the page and select Inspect to jump into the Elements panel. Or press Command+Option+C (Mac) or Control+Shift+C (Windows, Linux, Chrome OS).
- When you want to see logged messages or run JavaScript, press Command+Option+J (Mac) or Control+Shift+J (Windows, Linux, Chrome OS) to jump straight into the Console panel.

CSS3 comments

- A comment is a programmer-readable explanation or annotation in the source code of a computer program. They are added with the purpose of making the source code easier for humans to understand, and are generally ignored by compilers and interpreters.
- A CSS comment is used to add explanatory notes to the code or to prevent the browser from interpreting specific parts of the style sheet.
- By design, comments have no effect on the layout of a document.
- Comments in CSS are typically used to explain the purpose of the style rules declarations. It will help you and others to understand what you were trying to do with the style rules at the time of editing style sheets. Comments are not displayed by the browsers.
- A CSS comment begins with /*, and ends with */

In CSS3 we have

a) Single Line Comments

```
<!DOCTYPE html>
<html lang="en">
<head>
   <title>CSS Comments</title>
   <style>
      /* This is CSS Single Line Comment */
   </style>
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```

b) Multi Line Comments

```
<!DOCTYPE html>
<html lang="en">
<head>
   <title>CSS Comments</title>
   <style>
      /* This is
         Multiline
         CSS Comments*/
   </style>
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```

Shorthand Properties

CSS properites

- CSS properties are used to apply styles to structured documents, such as those created with HTML or XML.
- CSS properties are specified in the CSS standard. Each property has a set of possible values. Some properties can affect any type of element, and others apply only to particular groups of elements.
- CSS properties are used within a declaration block with a corresponding value.
- There are a number of CSS properties that we can use to style a site. Some examples are: Border , Padding & Margins.
- If we specify more than one CSS property, the each name - value pair is separated by a semicolon,
- A CSS property declaration consists of a property name and a property value. The property name comes first, then a colon, and then the value. Here is the general pattern a CSS property

Syntax of CSS properites

property-name : property-value

How to apply CSS properites

We can apply CSS properties on the web page through elements, classes, id's etc.

Example -- Single CSS property

```
<!DOCTYPE html>
<html lang="en">
<head>
   <title>Internal Stylesheets</title>
   <style>
      p
      {
         font-size: 40px;
      }
   </style>
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```

Example -- Multiple CSS property

```
<!DOCTYPE html>
<html lang="en">
<head>
   <title>Internal Stylesheets</title>
   <style>
      p
      {
         font-size: 40px;
         color: blue;
      }
   </style>
</head>
<body>
   <p>Hello Html Content</p>
</body>
</html>
```