Basics of HTML, CSS and JS

Based on https://www.w3schools.com/

What is HTML?

Hyper Text Markup Language

HTML is the standard **markup** language for creating Web pages.

It is used to give **websites structure** with text, links, images, and other fundamental elements.

What is CSS?

Cascading Style Sheets

CSS describes how HTML elements are **to be displayed** on screen, paper, or in other media.

It is used to change **the appearance** of HTML elements.

HTML + CSS

HTML and CSS are used by browser to render (display) a website on a screen.

Tools

- Professional IDEs
  - Visual Studio
  - WebStorm
- Professional text editors
  - VS Code
  - Sublime text
- Normal text editors
  - Notepad
  - Notepad++
  - TextEdit

- Online tools
  - Codepen
  - JSFiddle

- Visual editors

HTML Tags

HTML tags are element names surrounded by angle brackets

<tag>some content**</tag>**

- Usually come in pairs
- Are called start/end tags or opening/closing tags
- Closing tag is written the same way as opening, but with slash

Browser does not show tags, but use them to show content

Page structure

HTML tags may contain either content (text) or other HTML tags.

Nesting - putting HTML tags into other tags (like putting a something into a nest □)

```
<html>
    <head>
        <title>Sample page</title>
    </head>
    <body>
        <h1>Hello world</h1>

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

HTML document

- All documents must start with `<!DOCTYPE html>`

- Must include `<html>...</html>` tags

- All visible content should be located in `<body>...</body>`

HTML Elements

- Headings
  - `<h1>`, `<h2>`, `<h3>` …. `<h6>`
- Paragraph
  - `<p>...</p>`
- Link
  - `<a href="...">` … `</a>`
- Image
  - `<img src="..." alt="..." width="..." height="...">`
- Button
  - `<button>` .. `</button>`
- Lists
  - `<ul>` or `<ol>` for list
  - `<li>` for list item

HTML Attributes

All HTML elements can have **attributes**.

Attributes provide **additional information** about an element.

Attributes are always specified **in the start tag**.

Attributes come in pairs of key and value: **key="value"**

<a **href="https://example.com"**>This is a link

"href" is an attribute of tag **"<a>"**

HTML Attributes #2

"**<img>**" attributes:

- **src** - url for image file
- **alt** - text which will be shown if url is inaccessible
- **width** - width of the image in pixels
- **height** - width of the image in pixels

HTML links

https://codepen.io/minajevs/pen/gqjxLy

- **<a>** … **** to create a link

Attributes:

- **href** - link to a website. Could be absolute url ("https://www.example.com") or relative url ("/contacts")
- **target** - specifies where to open the linked document
  - **_blank** - new window or tab
  - **_self** - same window/tab

Can contain text or other HTML elements, such as images!

HTML links #2

Tag "<a>" means "**a**nchor". It can be used to "throw an anchor" on some element and then return to it.

To set an anchor:

- `<h1 id="myid">My heading</h1>`

To make a link to an anchor:

- `<a href="#myid">Jump to My heading</a>`

HTML <head> Element

<head> is **not** a heading

<head> is a container for webpage metadata. Metadata is something which **is not displayed**, but has information about HTML.

Types of metadata:

- Document title
- Charset (ASCII, UTF-8, Unicode, ..)
- Styles
- Links to resources (external styles)
- Scripts
- etc...

HTML text formatting

https://codepen.io/minajevs/pen/mvjmmP

- **\<br\>** - Text break
- **\<b\>** - Bold text
- **\<strong\>** - Important text
- **\<i\>** - Italic text
- **\<em\>** - Emphasized text
- **\<mark\>** - Marked text
- **\<small\>** - Small text
- **\<del\>** - Deleted text
- **\<ins\>** - Inserted text
- **\<sub\>** - Subscript text
- **\<sup\>** - Superscript text

HTML comments

`<!-- Write your comment here -->`

- Used for HTML documentation
- Used for HTML debug

HTML Tables

- **<table>** - To define a table

- **<tr>** - To define a **row**

- **<td>** - To define a **cell**
- **<th>** - To define a **heading cell**

Cell is used to display data (text, images, lists, other tables, etc)

HTML <div> element

<div> element is a **block element** (always starts on a new line and takes up the full width available)

It is used **to make containers** for other HTML Elements.

Has no required attributes, but usually is used with style, class and id

- style - applies CSS to an element
- class - many elements of same class will have the same format and style
- id - unique ID for an element on a page

Self-check questions!

1) `<p class="red-text">This text is red </p>` - what is the **name** of the tag, what attributes it has, what content it has?
2) What is the difference between HTML and CSS?
3) Can some HTML tags contain other tags?
4) What HTML tag should all web pages have?
5) What HTML tag is NOT displayed in browser? (<head> or <body>)
6) What is metadata?
7) What metadata can HTML <head> contain?
8) What attribute should be unique? (style, class or id)

CSS

Cascading Style Sheets

CSS = Styles and Colors

Manipulate Text

Colors, Boxes

What is CSS?

Cascading Style Sheets

CSS describes how HTML elements are **to be displayed** on screen, paper, or in other media.

It is used to change **the appearance** of HTML elements.

CSS can save a lot of work because it can control the layout of multiple web pages all at once.
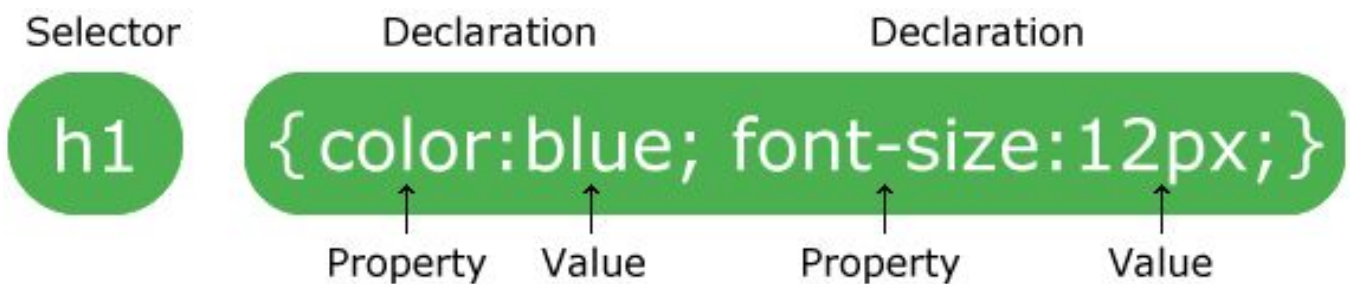
How to add CSS to a page

https://codepen.io/minajevs/pen/qgyoMm

CSS can be added to HTML in 3 ways:

- Inline
- Internal
- External

CSS Syntax

CSS styles are called "**rules**".

A rule consist of **selector** and **declarations**
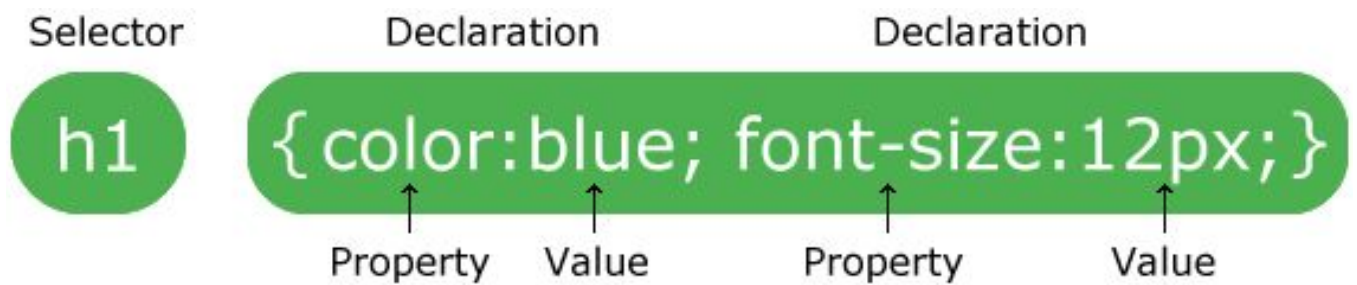
Declarations consist of **properties** and **values**

h1 { color: blue; font-size: 12px; }

or

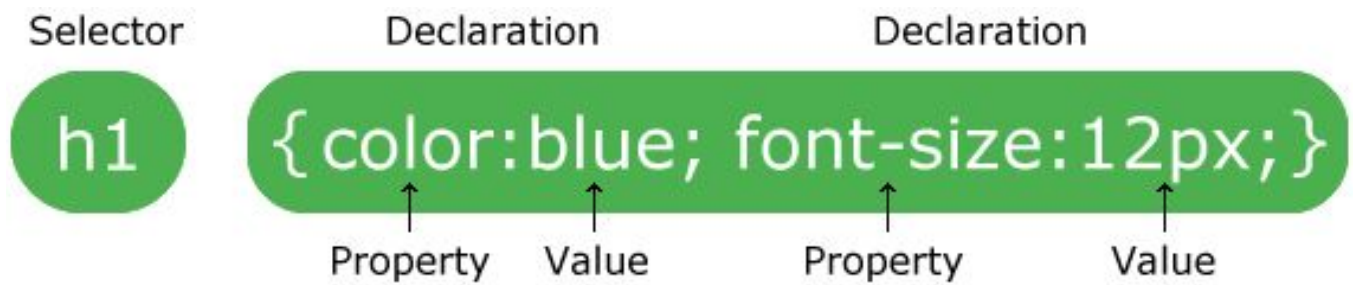h1 {
    color: blue;
    font-size: 12px;
}

CSS Selectors

Selector Declaration Declaration

h1 {color:blue; font-size:12px;}

Property Value Property Value

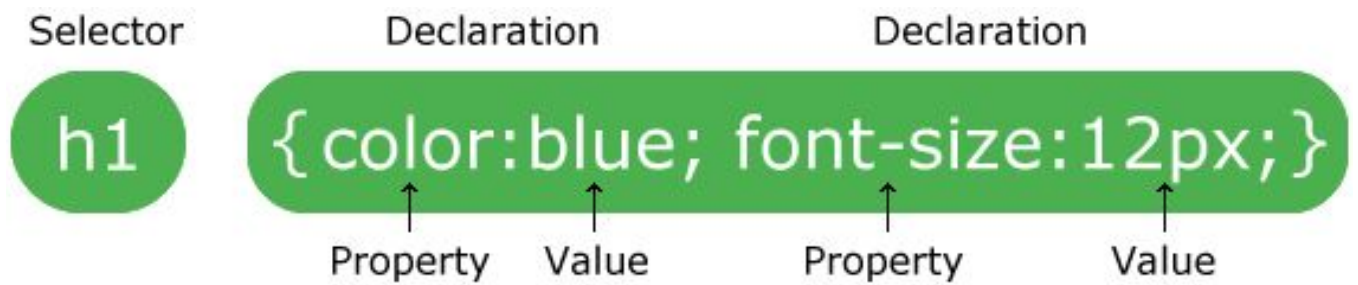Selectors **points** to the HTML element(s) you want to style.

Selectors are used to "**find**" HTML elements by their **name, id, class, attribute, etc.**

CSS Selectors #2

- **name** - select HTML element by its name
- **#some-id** - select HTML element by its ID
- **.some-class** - select HTML element by its class

CSS Selectors #3

Selector   Declaration   Declaration

h1   { color:blue; font-size:12px; }

      Property   Value   Property   Value

Selectors can be combined to select more specific element:

name.some-class {...}

Selectors can be grouped to select multiple elements:

name, othername, .some-class {...}

CSS Comments

CSS has comments:

`/* this is some comment */`

CSS Colors

- **color** - to set color of content
- **background-color**- to set color of background of content

To specify color you can use:

- RGB - rgb(*red*, *green*, *blue*)
- HEX - *#rrggbb*
- Color names - red, gray, MediumSeaGreen
- HSL, RGBA, HSLA

CSS Borders

- **border** - to set style, width and color of elements border
- border-style - set style of the border
  - dotted
  - dashed
  - solid
- border-width - width of the border
- border-color - color of the border

Can set individual values for **top**, **right**, **bottom**, **left** borders

Can use border declaration shorthand

Shorthand can be used to set specific style to **one side only**!

CSS Margins

Margin is a white space **around** HTML element, **outside** any border.

- **margin** - to set amount of space around element

Can set individual values for **top**, **right**, **bottom**, **left** margins

CSS Padding

Padding is a white space **around** HTML element **content**, **inside** any border.

- **padding** - to set amount of space around element content

Can set individual values for **top**, **right**, **bottom**, **left** padding

CSS Height & Width

The **height** and **width** properties are used to set the **height** and width **of an element**.

Browser can calculate and use such units as:

- px - pixels
- cm - centimeters
- % - percent of containing block
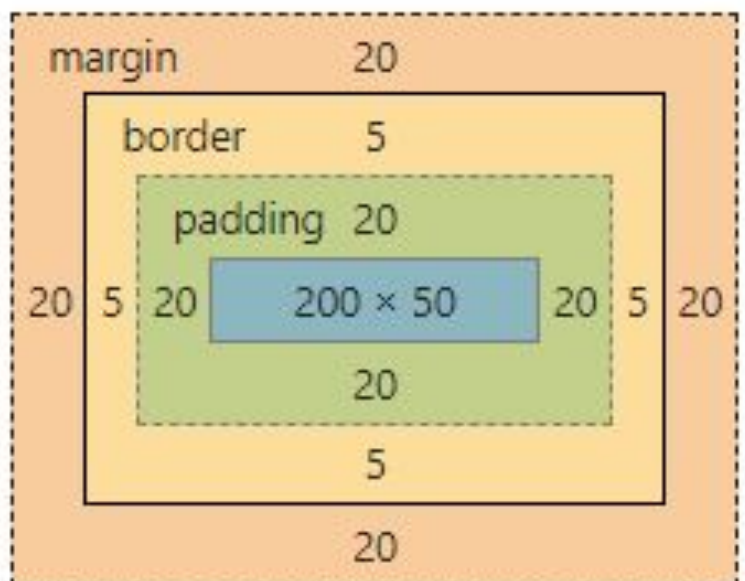- etc...

CSS Box Model

The **CSS box model** is the **foundation of layout** on the Web!

All HTML elements can be considered as **boxes.**

Every Element (p, div, a, table, ...) is wrapped into a box.

Box is made of:

- margins
- borders
- padding
- Actual content

HTML and CSS debug

It is possible to check any website structure and CSS.

To do that browser **developer tools** are used.

Open it with **F12**, **Ctrl+Shift+I** or **right-click -> inspect**.

Demo: www.dexie.me

Self-check questions!

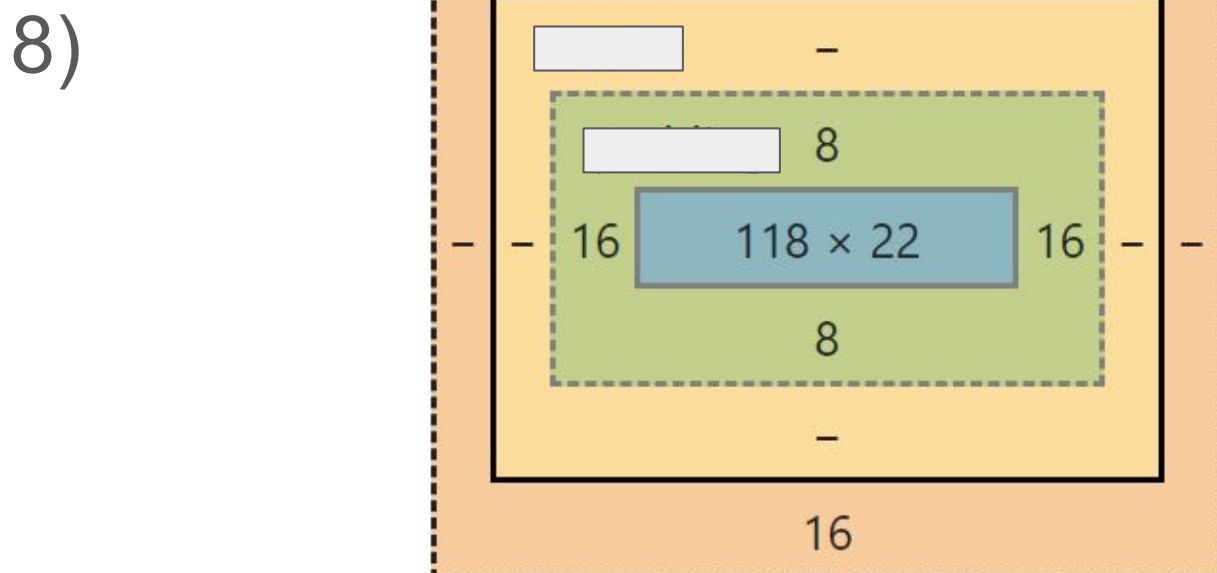1) `h1 {color:blue; font-size:12px;}`

2) 3 ways of adding CSS to HTML

3) span, .header, #container - what does those selectors select?

4) p.text - what does this selector select?

5) What does rgb(255, 91, 71) mean?

6) What is the difference between margin and padding?

7) What units can be used to set elements height and width, except for % ?

8)

JavaScript

https://codepen.io/minajevs/pen/jdpJyX

What is JavaScript?

Programming language of the WEB.

It is used to program the behavior of web pages.

HTML defines web **elements**
CSS customizes their **look and style**
JS programs element **behavior**

JavaScript is one of the most popular programming languages in the world.

Was first released in 1995 for web pages.
In 2019 can be used for any kind of application.

JavaScript

- **High-level** - automates a lot of complex things, such as memory, garbage collection, e.t.c.
- **Interpreted** - does not require compilation and is run directly in your browser
- **Dynamically typed** - has no explicit variable types. Any value can be assigned to any variable
- **Multi-paradigm** - you can write the code in imperative, object-oriented, functional and other styles

- **Simple** - simple things are done simply. Even some errors are allowed!

How to add ~~CSS~~ JS to a page

JS can be added to HTML in 3 ways:

- Inline
- Internal
- External

HTML DOM

Document Object Model

When a web page is loaded, the browser creates a **Document Object Model** of the page.

JavaScript has access to this model. By having access to DOM JavaScript can:

- change all the HTML elements
- change all the HTML attributes
- change all the CSS styles
- remove existing HTML elements and attributes
- e.t.c.

JavaScript and HTML DOM

https://codepen.io/minajevs/pen/GzBLgY

- document.**getElementById**(id) - to access HTML elements on page
- HTMLElement.**onclick** - to set what happens when element is clicked
- HTMLElement.**style.*property*** - to change style of the element

- e.t.c.

JavaScript comments

Single line comments

- `//`

Multi line comments

- `/* .. */`

JavaScript variables

All variables in JS are **dynamically typed**, meaning that you can assign any value to any variable.

- `var` - to create a global variable

- `let` - to create a local variable

- `const` - to create a variable which should not change

JavaScript data types

https://codepen.io/minajevs/pen/zeLQNm

JavaScript variable can be of any data type which you assign to it.

Assigning a new value to variable will change it data type.

Developer **can't** specify datatypes for variables

Primitive data-types:

- String
- Boolean
- Number
- Object
- Function
- Undefined

JSON

JavaScript Object Notation

JavaScript objects are written with curly braces { }.

Object properties are written as name:value pairs, separated by commas.

Value are accessible by using object.property notation.

Value can be any JavaScript value, including Objects itself

JSON #2

Arrays in JavaScript are objects!

Creating array:

`var array_name = **[**item1, item2, ...**]**;`

Arrays have properties:

- `length` - amount of elements in array

- `sort()` - sorts an array

- `push()` - adds element to the end of array

- `pop()` - removes element from the end of array

Self-learning:

HTML:

https://www.w3schools.com/html/default.asp

https://www.w3schools.com/quiztest/quiztest.asp?qtest=HTML

CSS:

https://www.w3schools.com/css/default.asp

https://www.w3schools.com/quiztest/quiztest.asp?qtest=CSS

JS:

https://www.w3schools.com/js/default.asp

https://www.w3schools.com/quiztest/quiztest.asp?qtest=JavaScript