

# Web Design and Development



Tutorial #1: Creating HTML documents

# Learning Objectives

1. Understand the Unicode standard and its applications in web development
2. Set up your development environment
3. Use the browser developer tools
4. Create a basic HTML document

# The Construction of the Multilingual Internet

The Web allows people from anywhere to communicate and share information.

People worldwide use different languages and writing systems, and each writing system comes with a unique set of characters and symbols.



However, computers understand only one language: binary. Successful exchange of information across the Web means web browsers and web servers can translate (encode) text characters back and forth into numbers that can be represented as binary. So, for example, a web page in Chinese can be seen in a web browser anywhere in the world.

Traditionally, different languages required different encodings. A problem with this approach was supporting multilingual computer processing, e.g., rendering a web page with characters from multiple languages.

As a solution, the community came up with **Unicode**: a character encoding standard capable of representing most of the world's writing systems.

Reference: <https://en.wikipedia.org/wiki/Unicode>

# The Unicode Standard

**Unicode** is a standard in information technologies maintained by the [Unicode Consortium](#) for handling the characters used in the writing systems of most of the world's languages.

The Unicode standard enables processing, storage, and transport of text independent of platform and language.

The Unicode standard assigns a numerical value (code) to each character in a given writing system. The code is commonly represented as "U+" plus the value in hexadecimal prepended with leading zeros necessary to result in a minimum of four digits.

The table below shows the Unicode codes for the first five letters of the Latin alphabet capitalized.

Decimal representations are also commonly used in domains like web development.

Code (hex)	Character	Decimal value	Description
U+0041	A	65	Latin Capital letter A
U+0042	B	66	Latin Capital letter B
U+0043	C	67	Latin Capital letter C
U+0044	D	68	Latin Capital letter D
U+0045	E	69	Latin Capital letter E

# The Unicode Standard: Unicode Transformation Format (UTF)

The Unicode standard maps characters to hexadecimal/decimal values. Unicode codes need to be transformed into bytes (8-bit) to be useful for computers.

The **Unicode Transformation Format (UTF)** specifies several types of character encodings that define how to translate Unicode codes into bytes. The most commonly used UTF encoding is UTF-8.

- The **UTF-8** character encoding specifies one to four bytes to encode all the Unicode characters.
- UTF-8 is the standard encoding character set in the current version of HTML.

The following table shows the structure of the UTF-8 encoding.

First code point	Last code point	Byte 1	Byte 2	Byte 3	Byte 4
U+0000	U+007F	0xxxxxxx			
U+0080	U+07FF	110xxxxx	10xxxxxx		
U+0800	U+FFFF	1110xxxx	10xxxxxx	10xxxxxx	
U+10000	<sup>[nb 2]</sup> U+10FFFF	11110xxx	10xxxxxx	10xxxxxx	10xxxxxx

The example below illustrates the conversion of two Unicode characters into their binary representation using UTF-8.

Unicode Character		Binary Unicode code	Binary UTF-8 (bytes)
A	U+0041	100 0001	01000001
€	U+20AC	0010 0000 1010 1100	11100010 10000010 10101100

## References:

- <https://en.wikipedia.org/wiki/UTF-8>
- Unicode codes: <https://unicode-table.com/en/#0061>
- Hexadecimal to binary converter: <https://www.rapidtables.com/convert/number/hex-to-binary.html>

# The Unicode Standard: HTML Entities

In general, when including text in your HTML code, you use the literal representation of the text characters.

However, some characters have special meanings in HTML, and therefore you need to use an alternate representation. The most common example is the symbols less-than "<" and more-than ">". You can't use these characters directly because they are used for enclosing HTML tags.

Thus, you can use Unicode-based codes called **HTML entities** for representing any character in HTML.

An HTML entity begins with an ampersand (&), followed by the entity name or code and ends with a semicolon (;). The entity codes follow the Unicode standard.

The following table shows examples of HTML entities.

Character	Entity name	Code
<	&lt;	&#60;
>	&gt;	&#62;
&	&amp;	&#38;

## References:

- <https://unicode-table.com/en/html-entities/>
- Decoder tool: <https://mothereff.in/html-entities>

# Metadata in HTML documents

While much of the content included in an HTML document is visible to the user, an HTML document can also include additional information called **metadata** that influences several aspects of the web page.

Metadata typically consists of descriptors of the content in the web page used by search engines and links to external resources such as JavaScript and CSS files and.

Different tags can be used to specify metadata, such as the meta tag (meta tag) and the title tag. The meta tag is critical for implementing search engine optimization, as you will see later.

Metadata is included inside the head element of an HTML document:

```
<head>  
  <meta charset="utf-8">  
  <title>My home page</title>  
</head>
```

## References:

- [https://developer.mozilla.org/en-US/docs/Learn/HTML/Introduction\\_to\\_HTML/The\\_head\\_metadata\\_in\\_HTML](https://developer.mozilla.org/en-US/docs/Learn/HTML/Introduction_to_HTML/The_head_metadata_in_HTML)
- <https://developer.mozilla.org/en-US/docs/Web/HTML/Element/meta>

# Metadata in HTML documents

An important use of the meta tag is to specify the character encoding or charset of the web page:

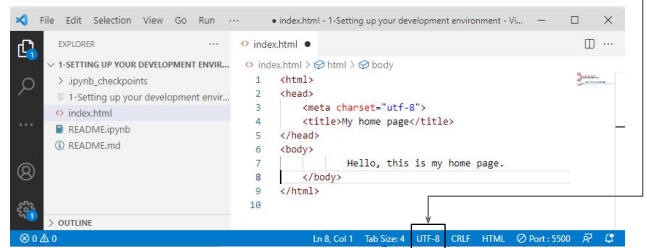
```
<meta charset="utf-8">
```

This meta tag informs the browser about the encoding used to represent the text on the web page. Failing to specify the correct charset leads to the display of unrecognizable characters on the web page.

Les véhicules autonomes utilisent normalement de moyens techniques sans fil pour assurer la communication entre un véhicule et un autre, pour transmettre des informations relatives la circulation

The current standard to be used in any web page (regardless of the language) is UTF-8.

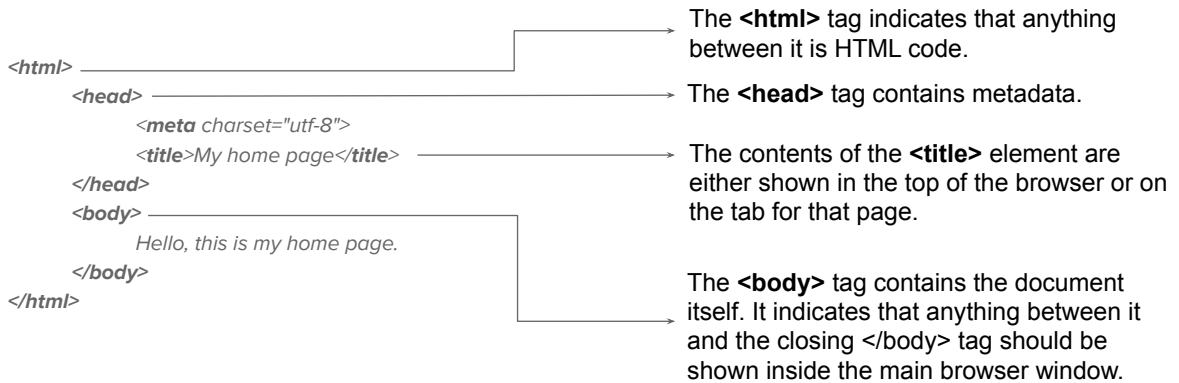
Therefore, you also need to make sure to use UTF-8 when creating your web pages in your source-code editor.





# Basic structure of an HTML document

The HTML tags below represent the basic structure of an HTML document.

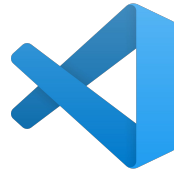


# What is a development environment?

Before start building a website, you need to set up the tools required for web development. The **development environment** is a collection of tools and procedures for developing, testing, and debugging a software application.

You will need the following tools in your development environment:

- A **source-code** editor for writing the code of your websites and web applications
- A **web browser**
- A **version control system** to keep track of your changes



# Working with Visual Studio Code

**Visual Studio Code** (VS Code) is a source-code editor made by Microsoft and available for Windows, Linux and macOS.

VS Code is currently one of the most popular editors for writing computer code.

Installation guide:

- <https://code.visualstudio.com/download>



VS Code functionality can be extended via extensions.

A handy extension for web development is [Live Server](#). It launches a local development server with live (automatic) reload feature for web pages.



**Live Server** ritwickdey.liveserver

Ritwick Dey | 13,058,157 | ★★★★★ | Repository | License | v5.6.1

Launch a development local Server with live reload feature for static & dynamic pages

[Install](#) 

# Using the browser developer tools

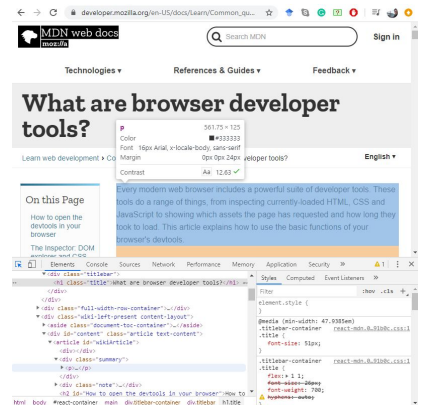
Every modern web browser includes a suite of **developer tools**. These tools do a range of things, from inspecting currently-loaded HTML, CSS and JavaScript to showing which assets the page has requested and how long they took to load.

How to enable it?

- All major browsers: type in the keyboard: Ctrl + Shift + I
- Except:
  - Internet Explorer and Edge: F12
  - macOS: ⌘ + ⇧ + I

The developer tools include the **inspector**. This tool shows how the HTML on your page looks at runtime and its corresponding styling (CSS).

It also allows you to instantly modify the HTML and CSS and see the results of your changes reflected live in the browser viewport (the user's visible area of a web page).





# Exercise: Creating a HTML document

In this exercise, you will create an HTML document from scratch with the basic structure.