

CSE104 Web Programming

HTML/CSS

Introduction to HTML

What is HTML

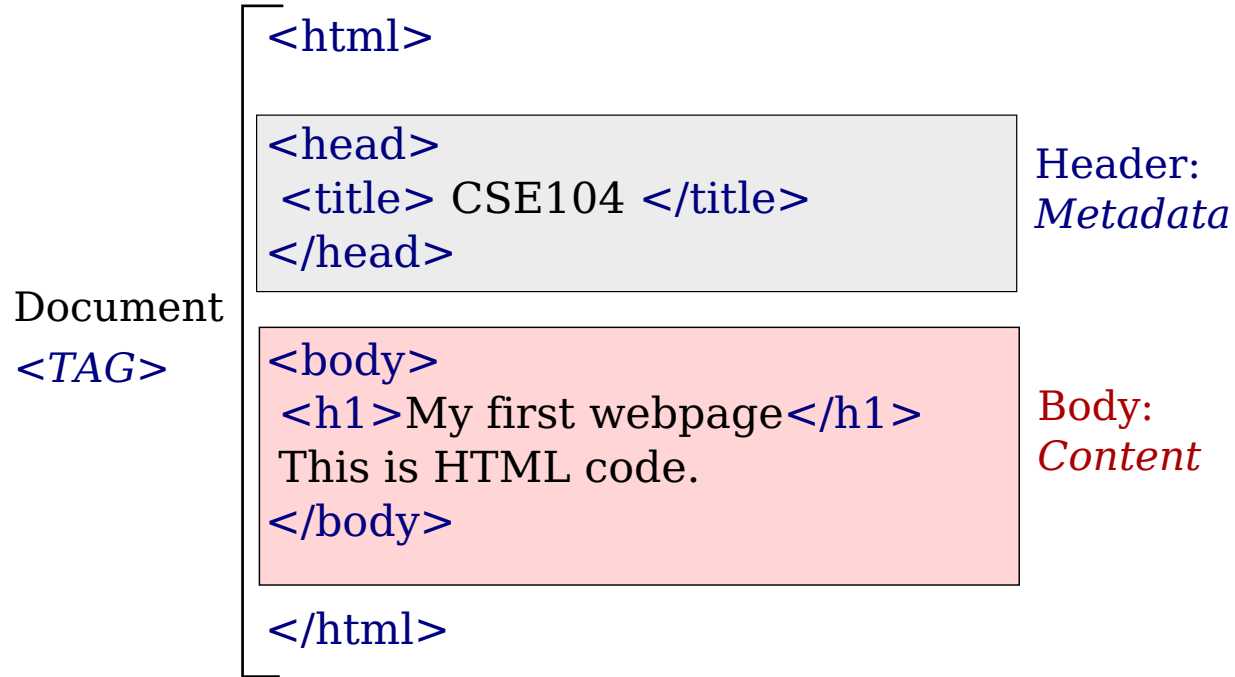
HTML : HyperText Markup Language

- A **descriptive** language based on tags (Markups)
- Handle **links** between html pages (Hypertext)

```
<!DOCTYPE html>
<html>
<head>
  <title> CSE104 </title>
</head>
<body>
  <h1>My first webpage</h1>
  This is HTML code.
</body>
</html>
```

Example of HTML file

HTML5 tag `<!DOCTYPE html>`



Display an HTML webpage in the Browser

HTML file (text)

```
<!DOCTYPE html>

<html>

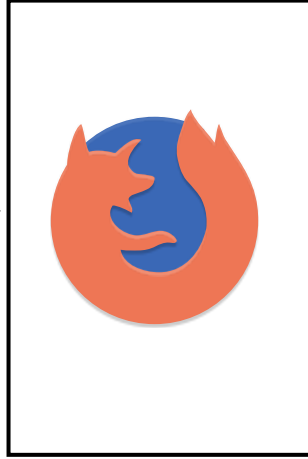
<head>
<title> CSE104 </title>
</head>

<body>
<h1>My first webpage</h1>
I am learning HTML
</body>

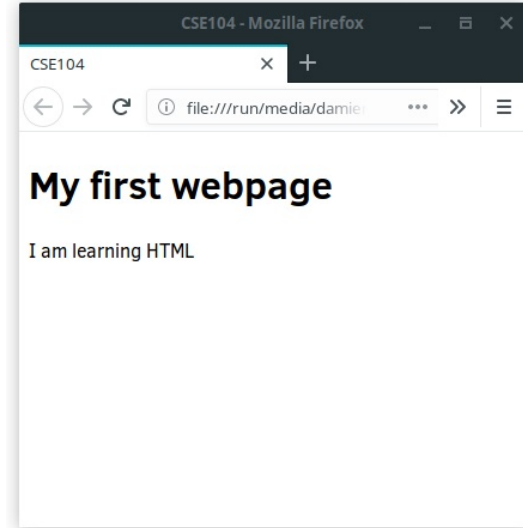
</html>
```

Read

Browser



Render



HTML code is **parsed**, **analysed**, and **rendered** by the browser

Browser interpret HTML code (similar to Python interpreter VS Python code)

Browser also perform rendering of the result webpage

Web Browser

A web browser is a software that can

- Access **ressourcess** from the internet (distant servers using internet protocols)
- Parse and render these ressources

Ressources are commonly **HTML files**

But can also be images, videos, etc.

Examples of Browser

Mozilla Firefox, Google Chrome, Chromium, Edge, Safari, etc.

Quick history of HTML

1990 - Creation of the *World Wide Web*

Formatted text document using HTML tags, embedding links to navigate between web pages

Several evolutions

- 1995 HTML 2
- 1997 HTML 3,4
- 2000 XHTML
- 2007 HTML 5

Today - HTML 5 as a *Living Standard*

- Updated by the [WHATWG](#)

Web Hypertext Application Technology Working Group

- HTML 5 → **HTML**

HTML - a programming language ?

HTML is a textual way to describe the **structure** and **content** of a document

- Parts: header, navigation, body, footer
- Titles, subtitles, etc.
- Type of elements (image, video, code, etc.)
- Relative importance of text element (emphasize, strong, un-relevant, etc.)

HTML is **not** a programming language able to automatize tasks (*wait for JavaScript*)

- No loops, if, include, etc.

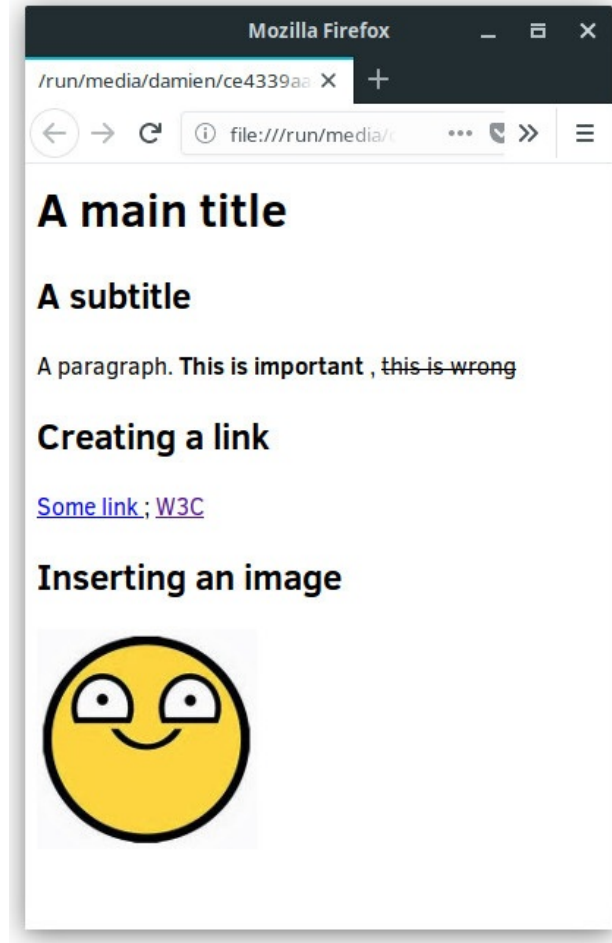
HTML(5) : describe the **semantic** of the document, not its appearance (it will be CSS)

HTML example

```
<h1> A main title </h1>
<h2> A subtitle </h2>
<p>
  A paragraph.
  <strong> Important to know </strong>,
  <s>this is wrong</s>
</p>
<h2> Creating a link </h2>
<a href="www.google.com"> Some link </a>
<a href="https://www.w3.org/"> W3C </a>
<h2> Inserting an image </h2>

```

HTML elements have special default visual appearance



Independance of line breaks and spaces

```
<h1> A main  
title </h1>  
<h2>  
A subtitle  
</h2>  
<p>  
A paragraph.  
<strong> Important  
to know  
  </strong>, <s>this is wrong</s>  
</p>  
<h3> Creating a link </h3>  
<a href="www.google.com"> Some link </a>  
<a href="https://www.w3.org/"> W3C </a>  
<h3> Inserting an image </h3>  

```

Same visual appearance



Manual line break

Specific tag: **
**

<p>

This is a long paragraph. **
**

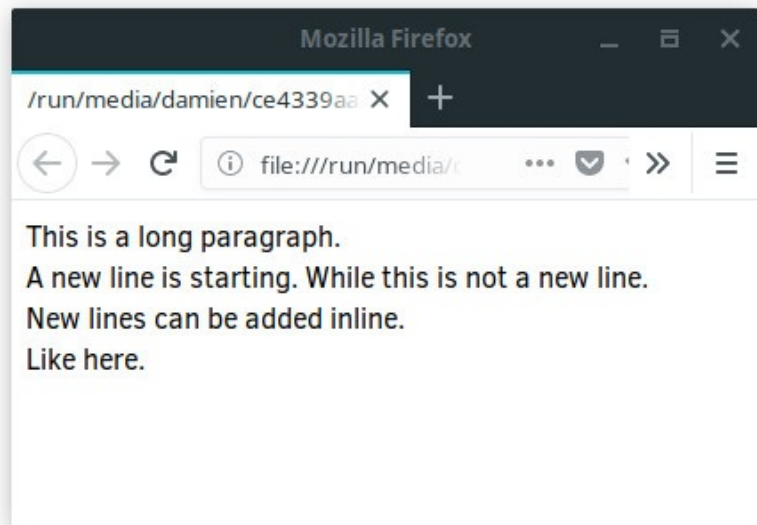
A new line is starting.

While this is not a new line. **
**

New lines can be added inline. **
** Like here.

</p>

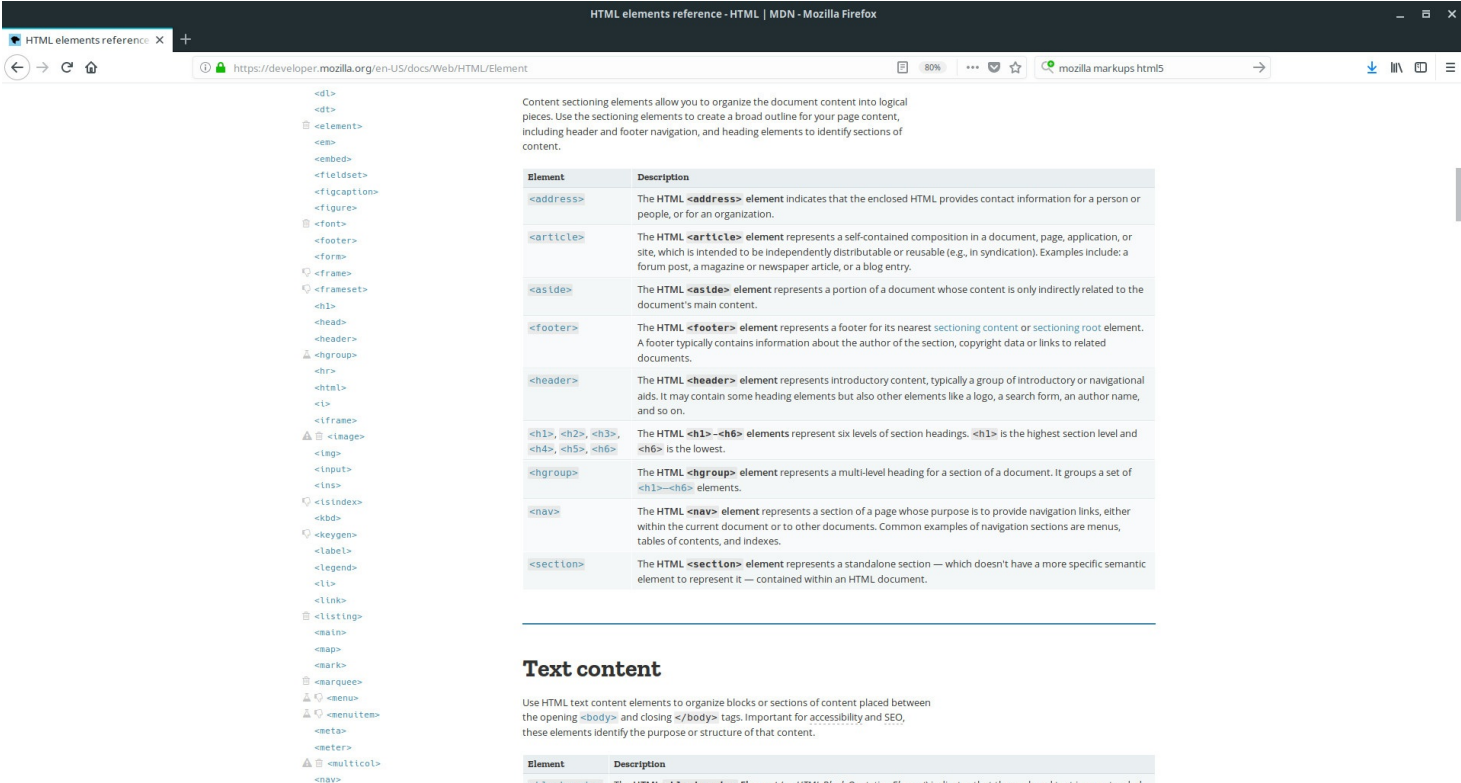
<p> indicates semantically a paragraph of text.



Main HTML Tags

Tags

Many different **HTML tags** exists



The screenshot shows the MDN HTML elements reference page. On the left is a scrollable list of HTML tags, including <dl>, <dt>, <element>, <es>, <embed>, <fieldset>, <figcaption>, <figure>, , <footer>, <form>, <frame>, <frameset>, <h1>, <head>, <header>, <hgroup>, <hr>, <html>, , <iframe>, , , <input>, <ins>, <isindex>, <kbd>, <keygen>, <label>, <legend>, , <link>, <listing>, <main>, <map>, <mark>, <marquee>, <menu>, <menuitem>, <meta>, <meter>, <multicol>, and <nav>. The main content area on the right is titled 'Content sectioning elements allow you to organize the document content into logical pieces. Use the sectioning elements to create a broad outline for your page content, including header and footer navigation, and heading elements to identify sections of content.'

Element	Description
<address>	The HTML <address> element indicates that the enclosed HTML provides contact information for a person or people, or for an organization.
<article>	The HTML <article> element represents a self-contained composition in a document, page, application, or site, which is intended to be independently distributable or reusable (e.g., in syndication). Examples include: a forum post, a magazine or newspaper article, or a blog entry.
<aside>	The HTML <aside> element represents a portion of a document whose content is only indirectly related to the document's main content.
<footer>	The HTML <footer> element represents a footer for its nearest sectioning content or sectioning root element. A footer typically contains information about the author of the section, copyright data or links to related documents.
<header>	The HTML <header> element represents introductory content, typically a group of introductory or navigational aids. It may contain some heading elements but also other elements like a logo, a search form, an author name, and so on.
<h1>, <h2>, <h3>, <h4>, <h5>, <h6>	The HTML <h1>–<h6> elements represent six levels of section headings. <h1> is the highest section level and <h6> is the lowest.
<hgroup>	The HTML <hgroup> element represents a multi-level heading for a section of a document. It groups a set of <h1>–<h6> elements.
<nav>	The HTML <nav> element represents a section of a page whose purpose is to provide navigation links, either within the current document or to other documents. Common examples of navigation sections are menus, tables of contents, and indexes.
<section>	The HTML <section> element represents a standalone section — which doesn't have a more specific semantic element to represent it — contained within an HTML document.

Text content

Use HTML text content elements to organize blocks or sections of content placed between the opening <body> and closing </body> tags. Important for accessibility and SEO, these elements identify the purpose or structure of that content.

Element	Description
<blockquote>	The HTML <blockquote> Element (or HTML Block Quotation Element) indicates that the enclosed text is an extended

Main tags

- **<h1>, <h2>, ..., <h6>**: titles, subtitles, etc.
- **<p>**: Paragraph
- **<a>**: Link (href="url") - *can be distant url (https://...), or local html file*
- ****: Image (src="url")

Main tags - lists

Unordered list of elements

```
<ul>  
<li> First </li>  
<li> Second </li>  
<li> Third </li>  
</ul>
```

- First
- Second
- Third

Ordered list of elements

```
<ol>  
<li> First </li>  
<li> Second </li>  
<li> Third </li>  
</ol>
```

1. First
2. Second
3. Third

Main tags - lists

- Nested lists

```
<ul>
  <li> First </li>
  <li>
    <ul>
      <li> Subpart one </li>
      <li>
        <ol>
          <li> a </li>
          <li> b </li>
          <li> c </li>
        </ol>
      </li>
      <li> Subpart two </li>
    </ul>
  </li>
  <li> Second </li>
  <li> Third </li>
</ul>
```

- First
 - Subpart one
 1. a
 2. b
 3. c
 - Subpart two
- Second
- Third

Good Practices (general rules)

- Use tags for their semantic, not their default appearance
- Check tags documentation
 - <https://developer.mozilla.org/en-US/docs/Web/HTML/Element>
 - <https://www.w3schools.com/tags/>

Metadata

- Tags which are not visualized may serve as metadata
titles, favicon, Keywords, Description, Author, Encoding, etc.

- Metadata are mostly found in the <head> section

- Metadata are used by search-engine

Clean and accurate meta-data improve automatic analysis of websites (and indexation)

```
<!DOCTYPE html>
<html>
<head>
  <title> TITLE </title>
  <meta name="author" content="">
  <meta name="keywords" XXX >
  <meta name="description" YYY >
  <meta name="icon" ZZZ >
</head>
<body>...</body>
</html>
```

Special tag

- **<!DOCTYPE html>** indicates the start of HTML(5) document
- You may also find
 - XHTML : `<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">`
 - HTML4 : `<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">`

Good practice: Head metadata

You should use the minimal following template for your webpage

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="utf-8" />
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <title> Your title </title>
</head>
<body>...</body>
</html>
```

- **<meta charset="utf-8">** : Text encoding (prefer utf-8 to other)

Text encoding = how letters are encoded in binary

If you see characters like ÃfÂ©Â; ❖ ⇒ problem with encoding

Non ASCII characters (ex. accent letters) may be encoded in different ways

- **<meta name="viewport" content="width=device-width, initial-scale=1">** Set scale to fit screen width

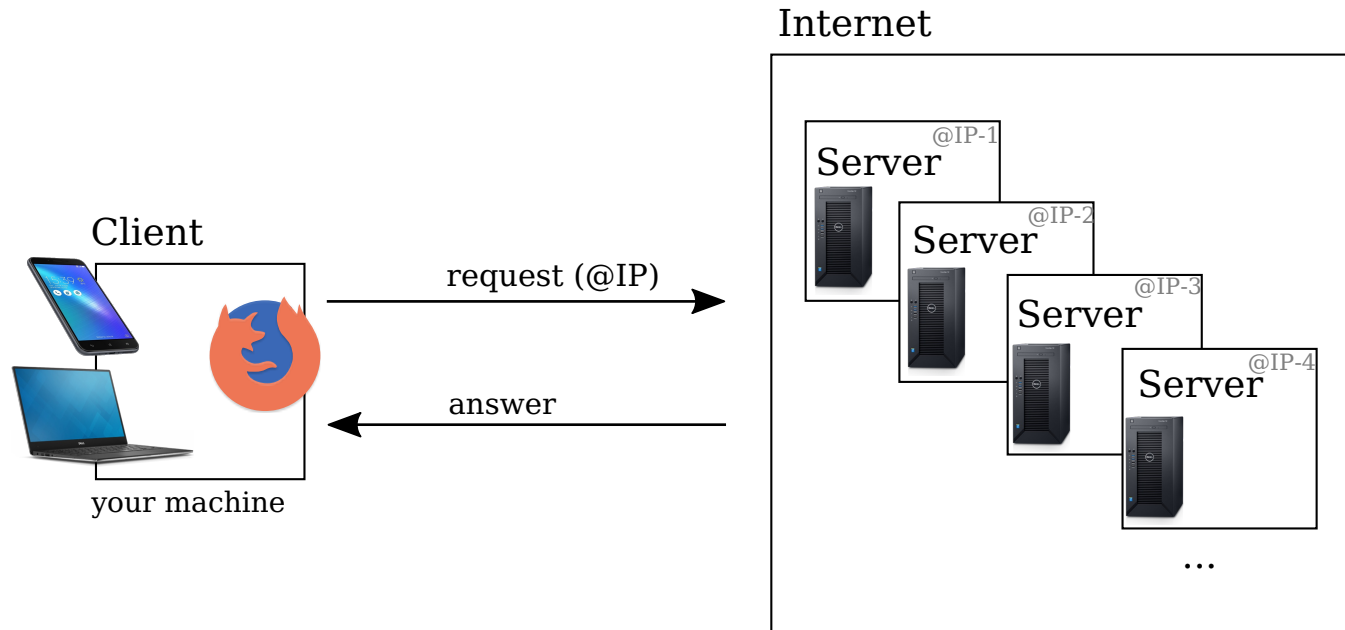
Used to get correct rendering in smartphone

Browser, HTML and internet

What happen when you visit a website

- Client/server communication
 - Client: Your computer/smartphone
 - Server: A distant computer hosting the data
- Communication using protocols (HTTP, FTP, etc)

(See networks)



Loading a webpage

Loading Webpage = Several requests/answers steps

- First request HTML text
- Then request all ressources separately (img)
(text may appear before images)

Group of webpages on the same site is called Website

Terminology

Front-end = client size

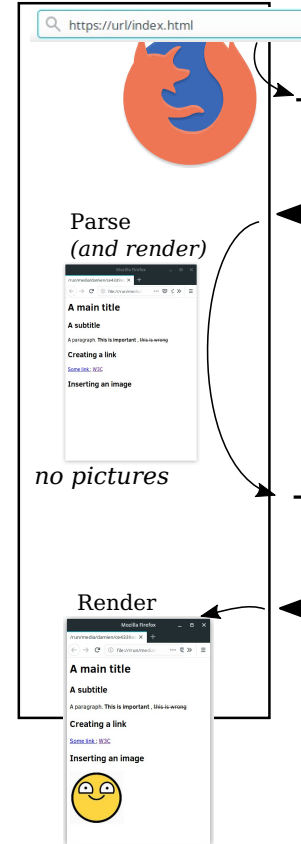
appearance, local user interaction

Back-end = server size

storage, data-base, service

Full-stack developer: client and server programming

Client
your machine



Server



request url/index.html

answer (html text file)

request url/mypic.jpg

answer (mypic jpg file)

Browser and incorrect HTML

Many possibilities to write incorrect HTML

- Forget to close tags ()
- Embedding incompatible tags (<p><h1></h1></p>)
- Typos (<ui>)

Browsers are made to be extremely robust to wrong HTML

- Try to correct your HTML and give visual result
- Try to adapt to non standard practices
- Try to be convenient to non expert developers

⇒ Silent correction : a good looking page may have wrong HTML

⇒ Warning: Incorrect/non standard HTML may

- work on one browser, but not on another one
- work today, but not in a future version

As a developer: Should **check the validity** of your HTML by external tools

HTML Validator

W3C Markup Validator

<https://validator.w3.org/>

Good practice:

- Check often your code in the validator
- Always check before final render of your website

Nu Html Checker

This tool is an ongoing experiment in better HTML checking, and its behavior is subject to change.

Showing results for contents of text-input area

Checker Input

Show ☒ source ☐ outline ☐ image report Options...

Check by text input ☐ css

```
<!doctype html>
<head>
  <title> CSE104 </title>
</head>

<body>
  <strong> Some text </strong>
</body>
</html>
```

Check

Use the Message Filtering button below to hide/show particular messages.

Message Filtering

1. **Error** Stray end tag: `<strong>`.

From line 7, column 28: to line 7, column 36

Some text `</strong>`

Nu Html Checker

This tool is an ongoing experiment in better HTML checking, and its behavior is subject to change.

Showing results for contents of text-input area

Checker Input

Show ☒ source ☐ outline ☐ image report Options...

Check by text input ☐ css

```
<!doctype html>
<head>
  <title> CSE104 </title>
</head>

<body>
  <strong> Some text </strong>
</body>
</html>
```

Check

Use the Message Filtering button below to hide/show particular messages.

Message Filtering

Document checking completed. No errors or warnings to show.

CSS to set webpage appearance

CSS

Cascading **S**tyle **S**heet

Language describing the appearance

Focus on the appearance: not the structure/semantic

Orthogonal to HTML

CSS Example

HTML

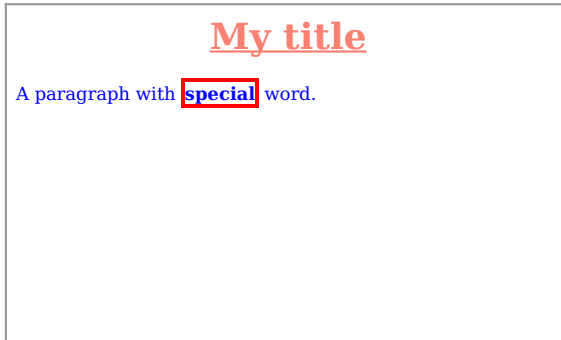
```
<h1>My title</h1>
<p> A paragraph with
<strong>special</strong> word. </p>
```

CSS 1

```
h1 {
  color: salmon;
  text-align: center;
  text-decoration: underline;
}
p {
  color: blue;
}
strong {
  border: 3px solid red;
}
```

CSS 2

```
body {
  background-color: black;
  text-align: right;
}
h1 {
  color: yellow;
  font-variant: small-caps;
}
p {
  color: cyan;
}
strong {
  font-size: 200%;
  color: orange;
}
```



Link HTML file to CSS file

Add in the HTML header

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

index.html

```
<!DOCTYPE html>
<html>

<head>
| | | <title> CSE104 </title>
| | | <link rel="stylesheet" href="style.css">
</head>

<body>
| | | <h1>Content of Webpage</h1>
</body>

</html>
```

style.css

```
h1 {
  background-color: blue;
}
```

CSS rule structure

rule { Selector { property: value; property: value;
...
 } } *declaration*

Example

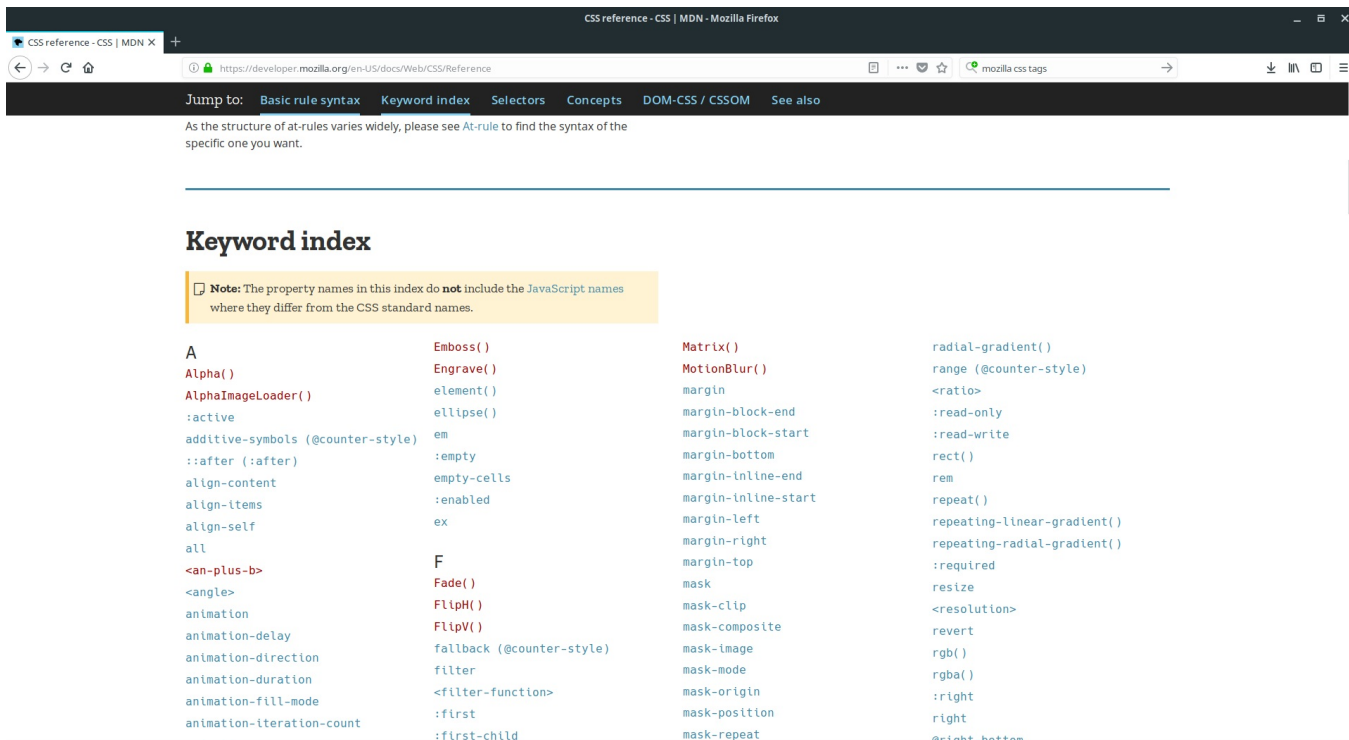
```
h1 {  
    background-color: yellow;  
    text-align: right;  
}  
  
h2 {  
    margin: 25px;  
    font-size: 150%;  
}
```

CSS tags

Many tags

<https://developer.mozilla.org/en-US/docs/Web/CSS/Reference>

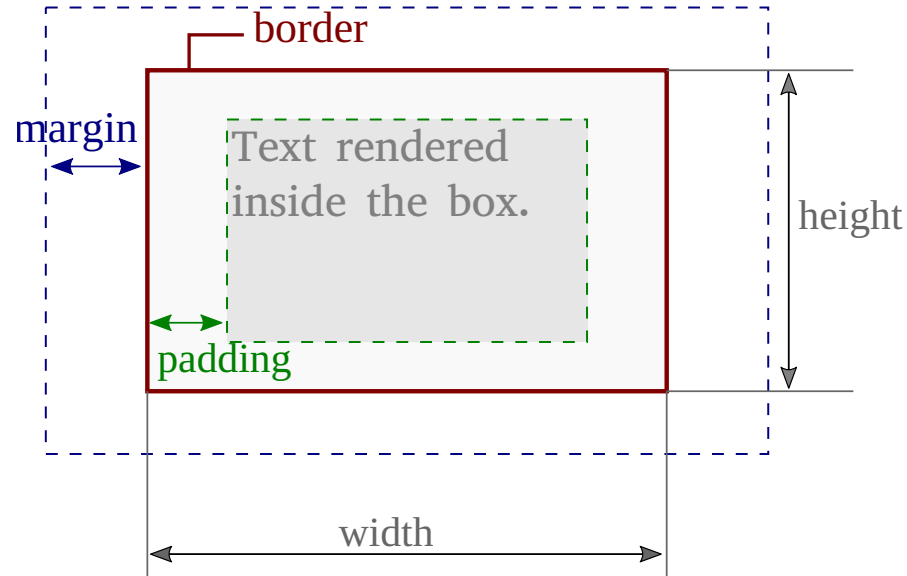
<https://www.w3schools.com/cssref/>



Box model

Box model

Each HTML element (between opening/closing tag) is a rectangular block



- Set in CSS: Margin, padding, border, width, height
- Can separate: left, right, top, down

Boxes in webpage

Webpages contain several boxes

Boxes may include other boxes (cascading behavior)

A main title

A subtitle

A paragraph. **This is important**, ~~this is wrong~~

Creating a link

[Some link](#); [W3C](#)

Inserting an image



Display

- Elements may have different layout behavior
 - Flow one after the other
 - No fixed size: *ex. words and emphasized words (italic, bold, etc)*

Words are flowing left to right

- Fixed size: *ex. pictures*



- Span the entire line *ex. titles*

Titles span a full line

Other title go to the next line

- Display values: **inline**, **inline-block**, **block**

Inline-Block

CSS

```
div {  
  display: inline-block;  
  background-color: yellow;  
  margin: 10px;  
  padding: 30px;  
  border: 2px solid black;  
}
```

HTML

```
<div>Inline Block element</div>  
<div>Inline Block element</div>
```

Inline Block element

Inline Block element

- Inline-block size can be fully set by the user
- Typically used for image-like elements

Block

CSS

```
div {  
  display: block;  
  background-color: yellow;  
  margin: 10px;  
  padding: 30px;  
  border: 2px solid black;  
}
```

HTML

```
<div>Block element</div>  
<div>Block element</div>
```

Block element

Block element

- Block elements span the entire line
- Default behavior for titles

Inline

CSS

```
div {  
  display: inline;  
  background-color: yellow;  
  margin: 10px;  
  padding: 5px;  
  border: 2px solid black;  
}
```

HTML

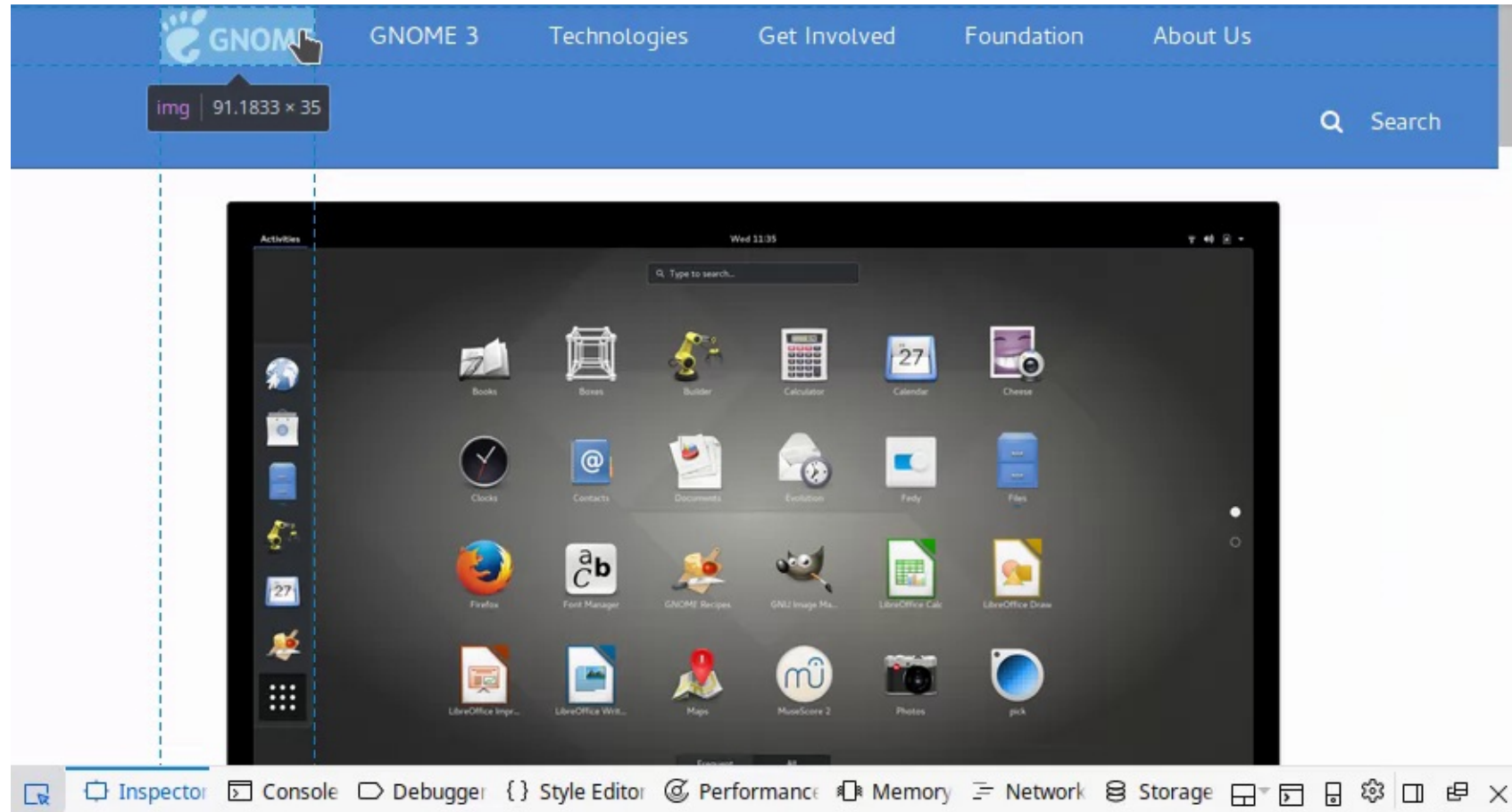
```
<div>Inline element</div>  
<div>Inline element</div>
```

Inline element

Inline element

- Inline elements flow one after the other
- Left/right margin/padding can be set by the user
- Top/Down margin/padding are ignored
- Default behavior for text elements (strong, emphasized, etc.)

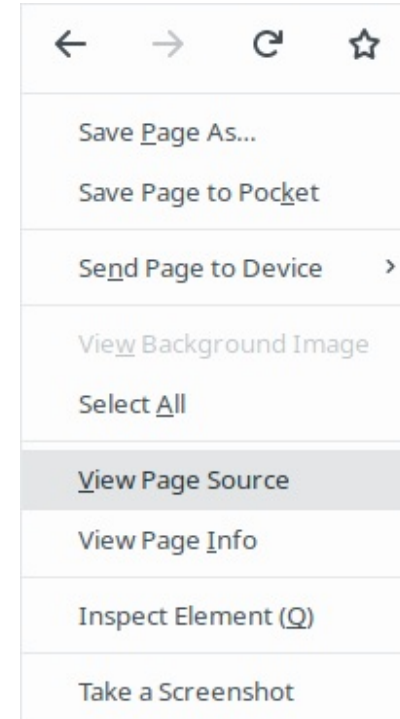
Boxes on a real website



Source and debug tools

Source code

- HTML and CSS *open source* by design
- Don't hesitate to check source code of websites
 - In your browser **view-source:URL** in the adress bar
 - Or graphically



Browser debug and analysis tool

- Browser have embedded debugging tools (developer mode)
- Firefox, Chrome : access using F12 key

