CSE104 Web Programming

HTML/CSS

Introduction to HTML

What is HTML

HTML : Hyper**T**ext **M**arkup **L**anguage

- 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>`

Document

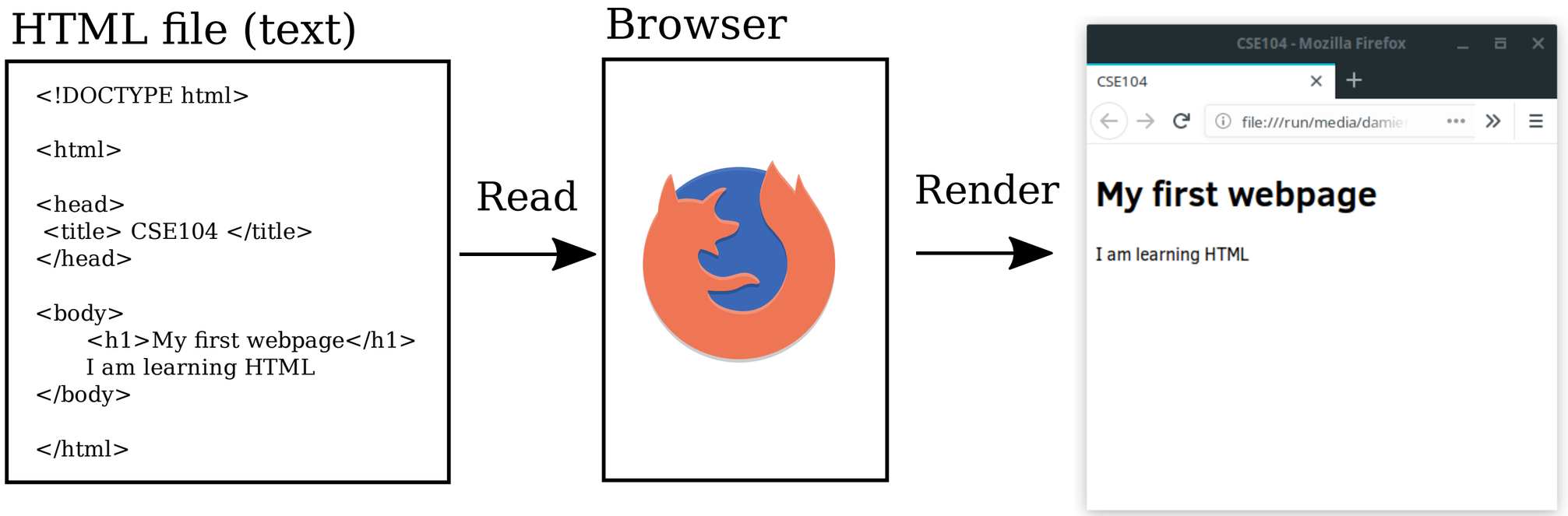
<TAG>

```
<html>

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

<body>
      <h1>My first webpage</h1>
      This is HTML code.
</body>

</html>
```

Header:
Metadata

Body:
Content

Display an HTML webpage in the Browser



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*

Formated 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 **H**ypertex **A**pplication **T**echnology **W**orking **G**roup
- HTML 5 $\rightarrow$ **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>
<img src="mypic.jpg" alt="description">
```

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>
<img src="mypic.jpg" alt="description">
```

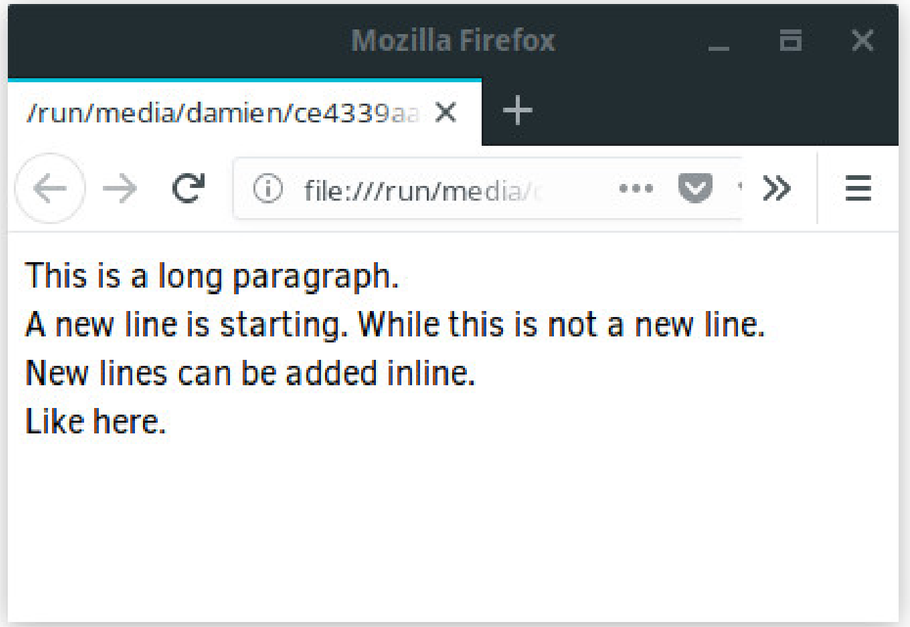
Same visual appearance

Manual line break

Specific tag: **< br >**

```
<p>
This is a long paragraph. <br>
A new line is starting.
While this is not a new line. <br>

New lines can be added inline. <br> Like here.
</p>
```

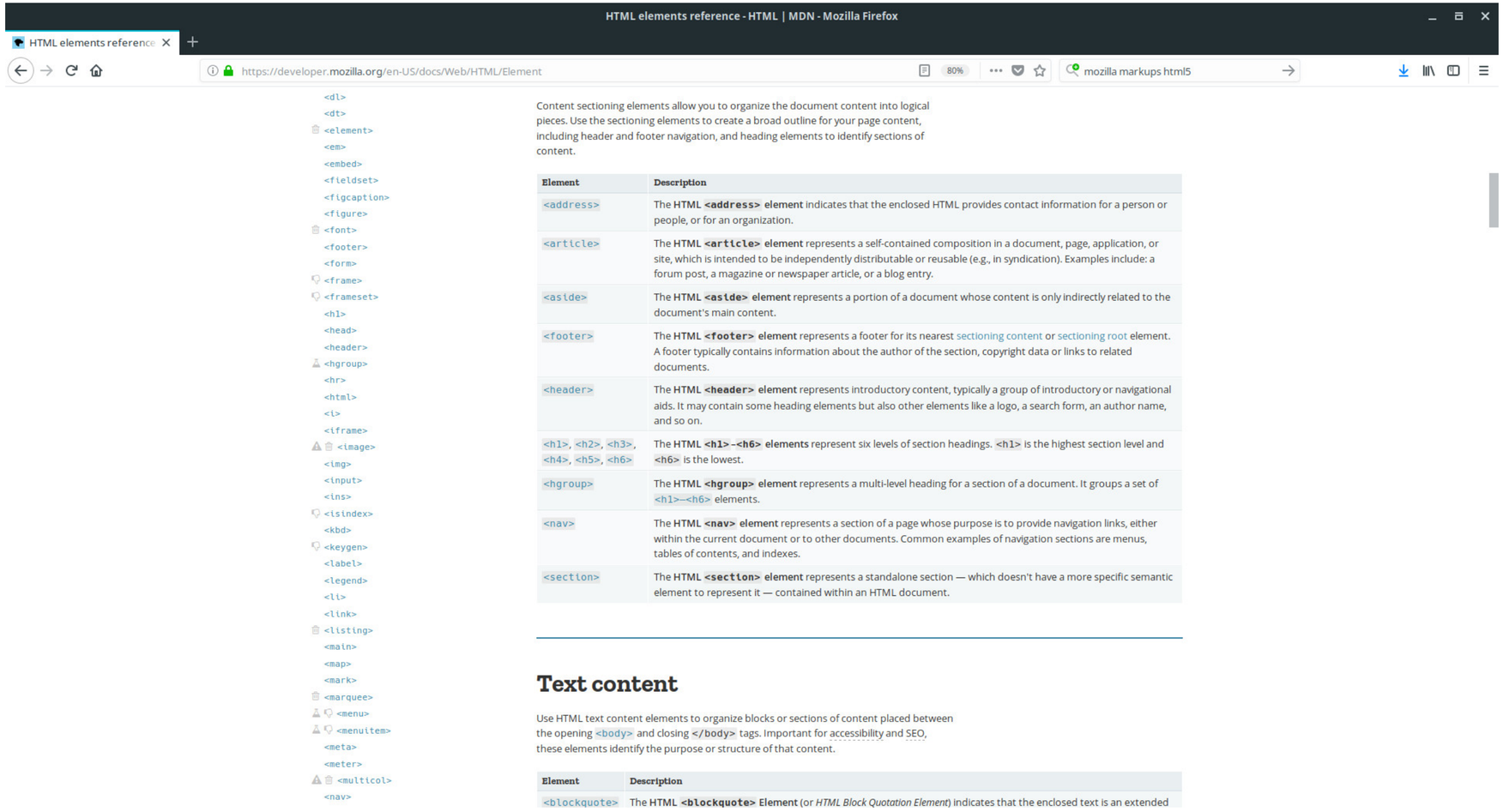
<p> indicates semantically a paragraph of text.



Main HTML Tags

Tags

Many different HTML tags exists



Main tags

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

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

Neasted 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 meaning**, 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 see
  - 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

```html
<!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>
```

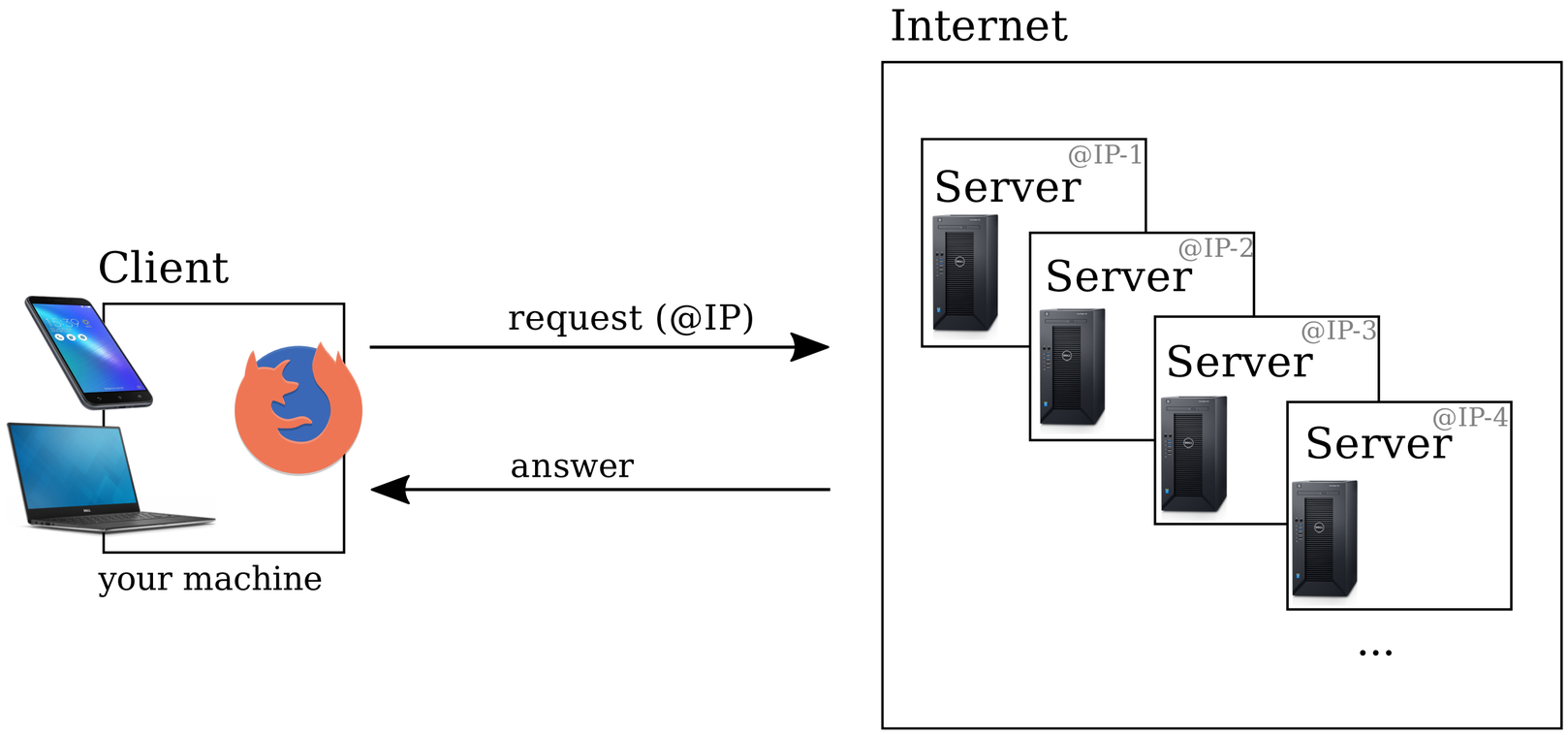
- **<meta charset="utf-8">** : Text encoding (prefer utf-8 to other)
  Text encoding = how letters are encoded in binary
  If you see characters like ÃƒÂ©Â¿  ⇒ problem with encoding
  Non ASCII characters (ex. accent letters) may be encoded in different ways
- **<meta name="viewport" content="width=device-width, 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

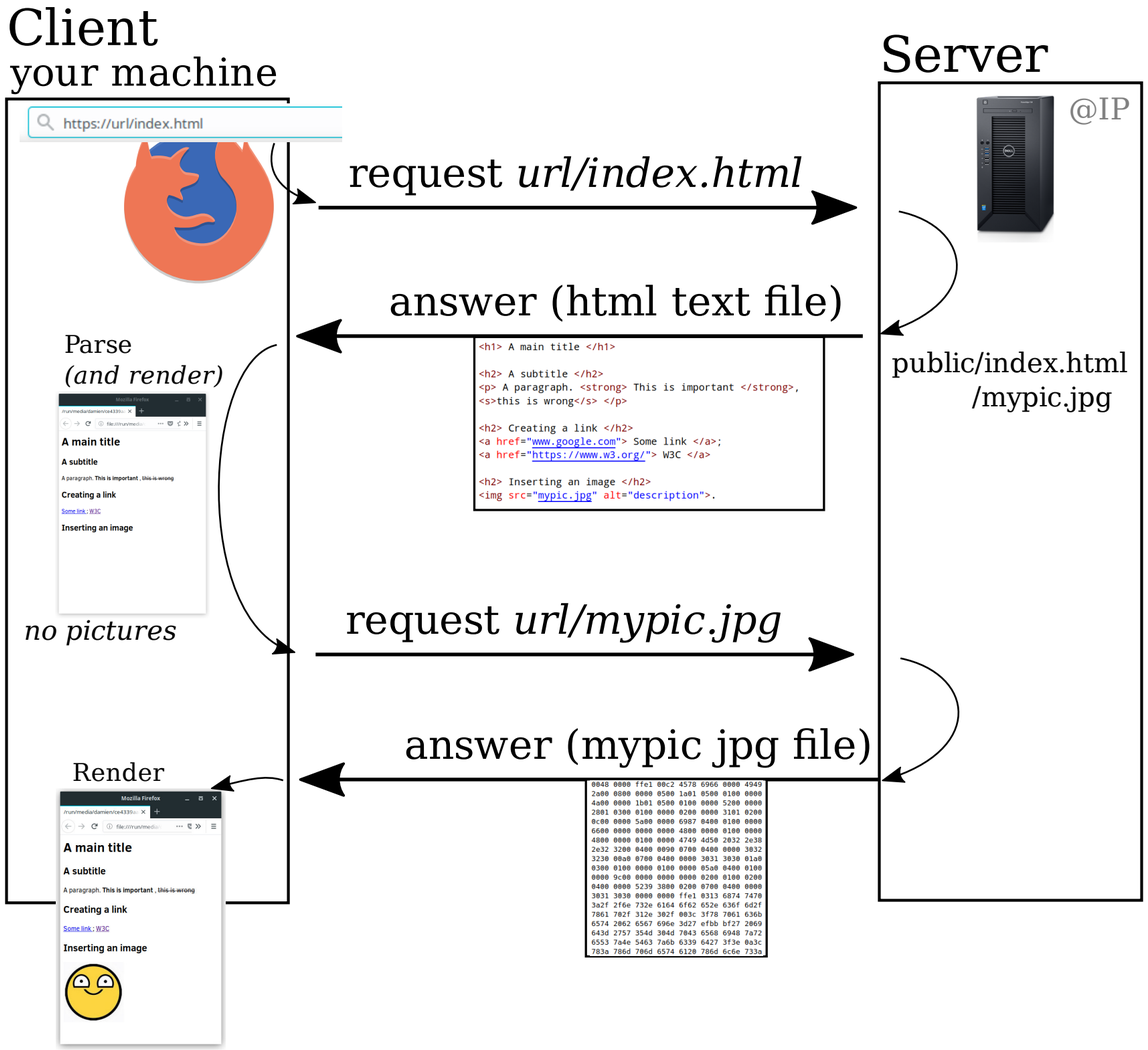
- Front-end = client size

appearance, local user interaction

- Back-end = server size

storage, data-base, service

- "Full-stack": client and server programming



Browser and incorrect HTML

Many possibilities to write incorrect HTML

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

Browser are made to be extremely robusts 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*

$\Rightarrow$ Silent correction : a good looking page may have wrong HTML

$\Rightarrow$ **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 Computer Scientist: Should **check the validity** of your HTML by external tools.

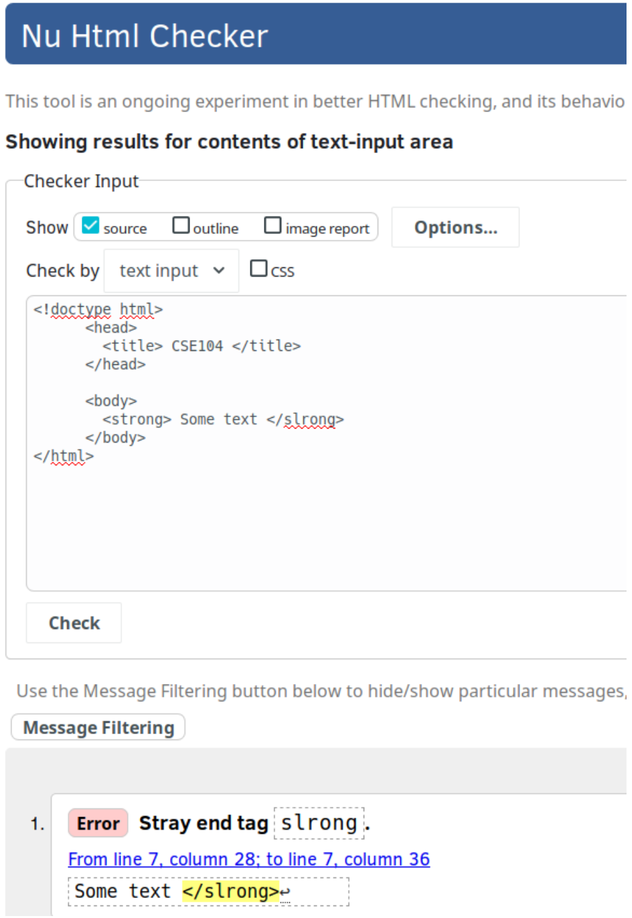
HTML Validator

W3C Markup Validator

https://validator.w3.org/

Good practice:

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



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

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

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;
}
```

My title

A paragraph with special word.

MY TITLE

A paragraph with special word.

Associate CSS file to HTML

Add to the HTML header

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

"style.css": pathname of the CSS file

index.html

```
<!DOCTYPE html>
<html>

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

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

</html>
```

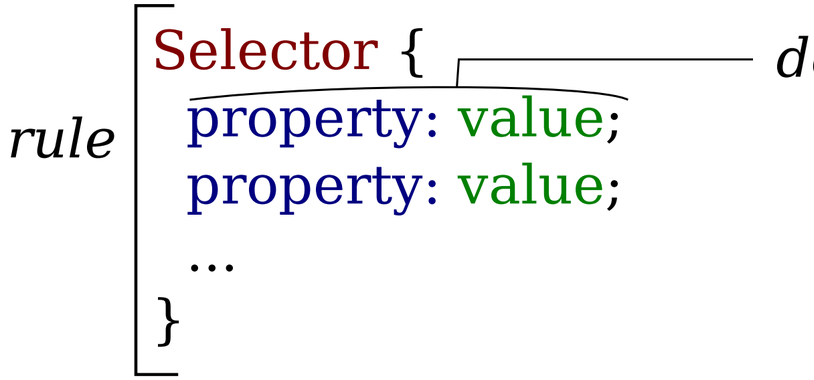
style.css

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

Note: Can associate multiple CSS files to a single HTML

```
<link rel="stylesheet" type="text/css" href="file_1.css">
<link rel="stylesheet" type="text/css" href="file_2.css">
etc.
```

CSS rule structure



Example

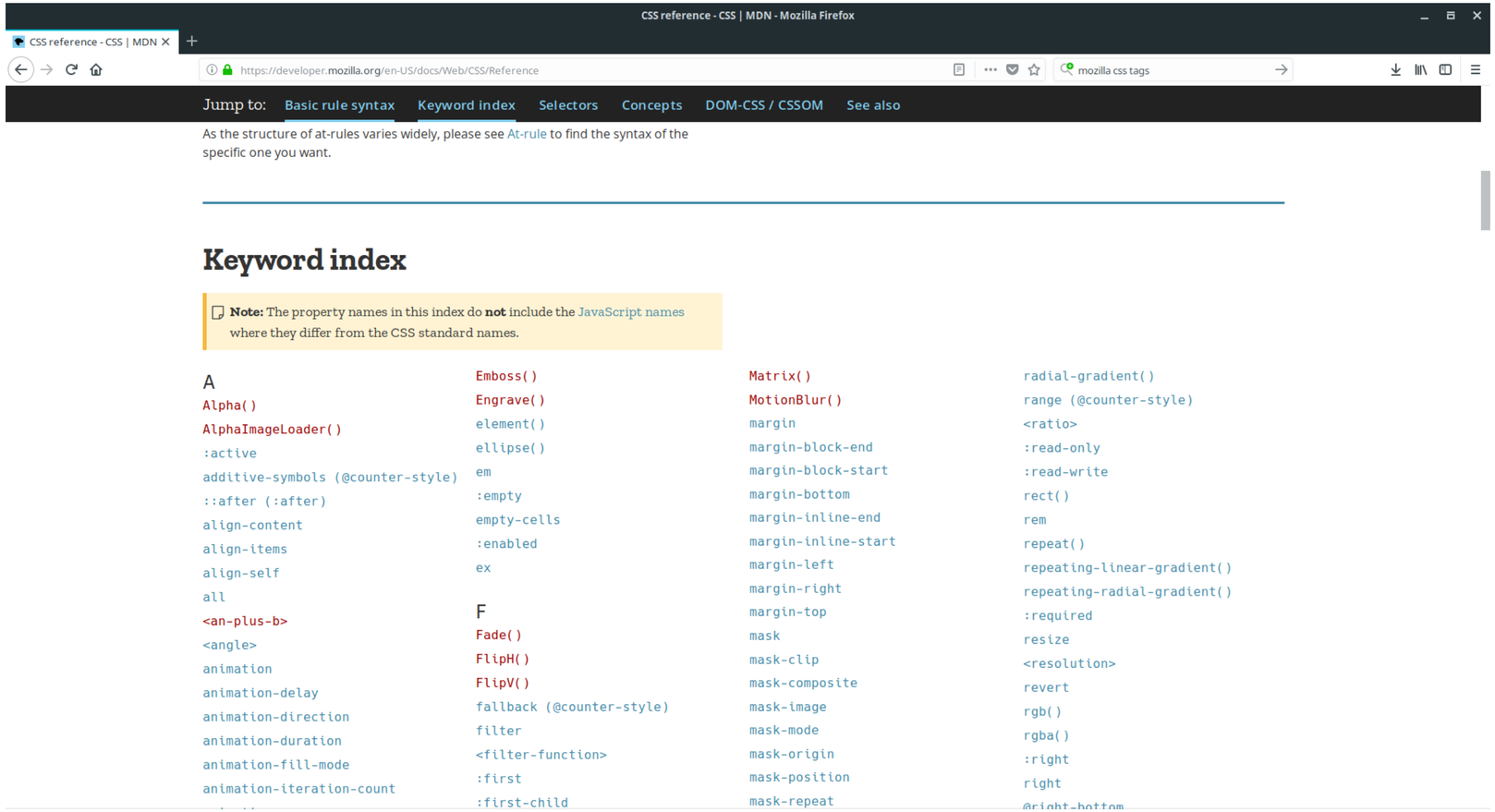
```
h1 {
    background-color: yellow;
    text-align: right;
}

h2 {
    margin: 25px;
    font-size: 150%;
}
```

CSS tags

Many tags

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

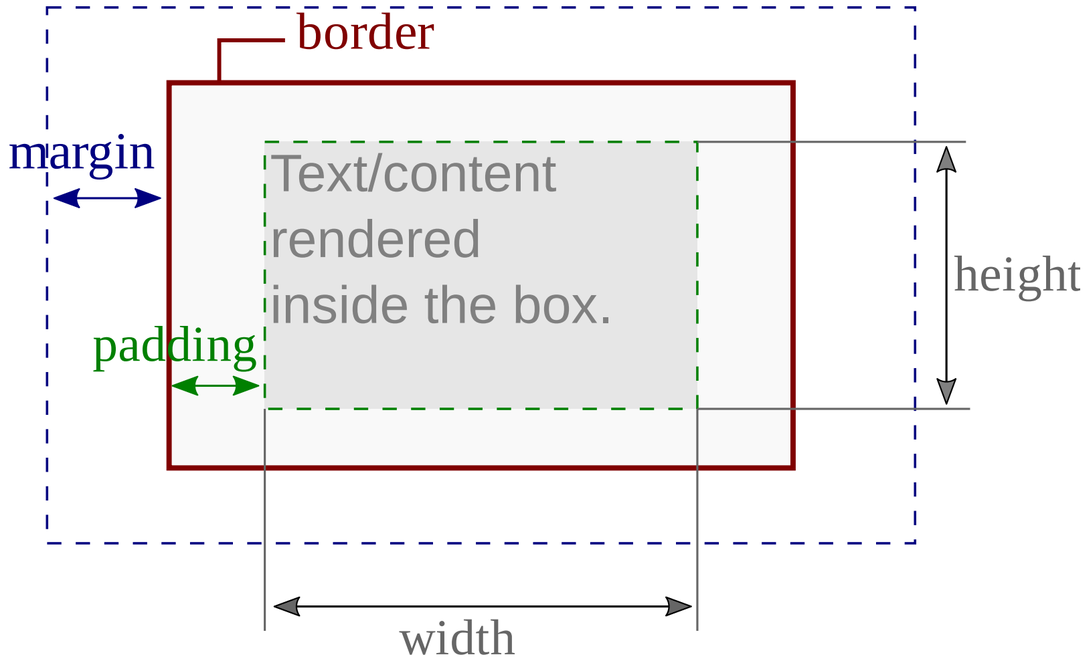
https://www.w3schools.com/cssref/



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)

elements have relation of parenting (parent/child), and siblings.

<h1> this is important </h1>

* element **is a child** of <h1> element.*

<h1> element is the parent of element.

<body> <h1> this is important </h1> </body>

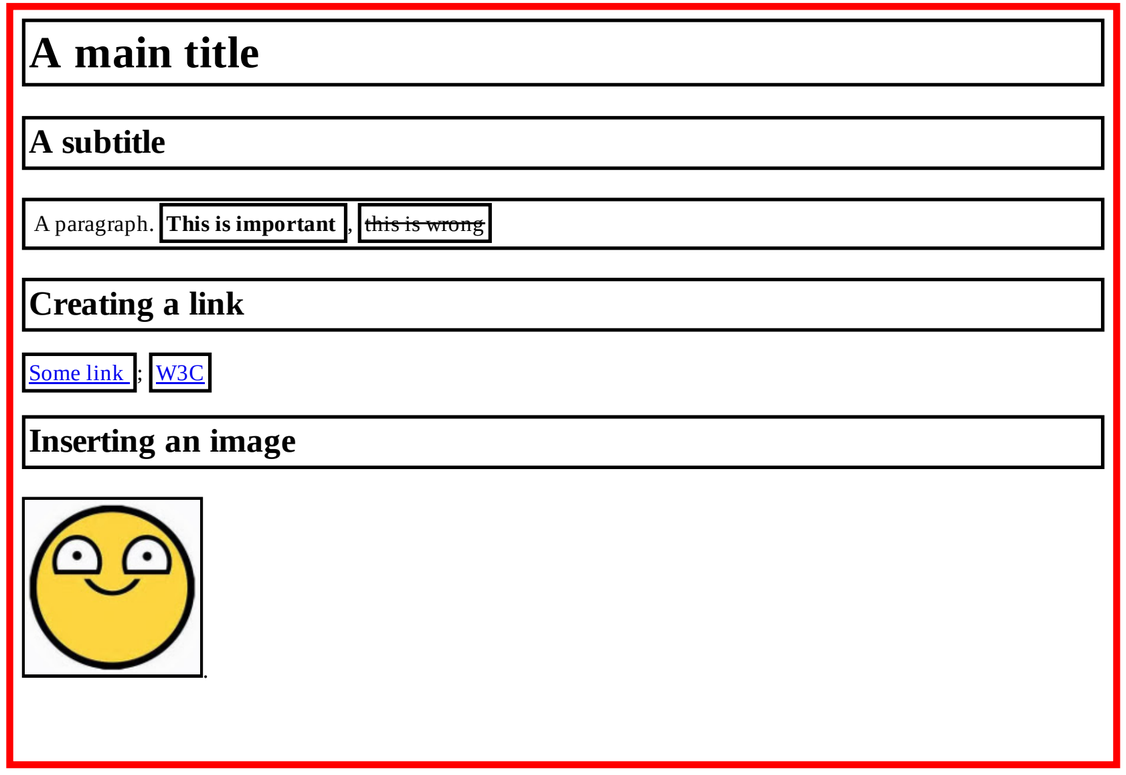
<body> is the parent of <h1> and grand-parent (so it is "a parent") of .

**<h1> this is </h1> important **

* element is **not** a child of <h1> element, only siblings.*

<a href="https://google.com" > click here <a>

*href is **not** a child of <a> element. It is parameter.*



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**

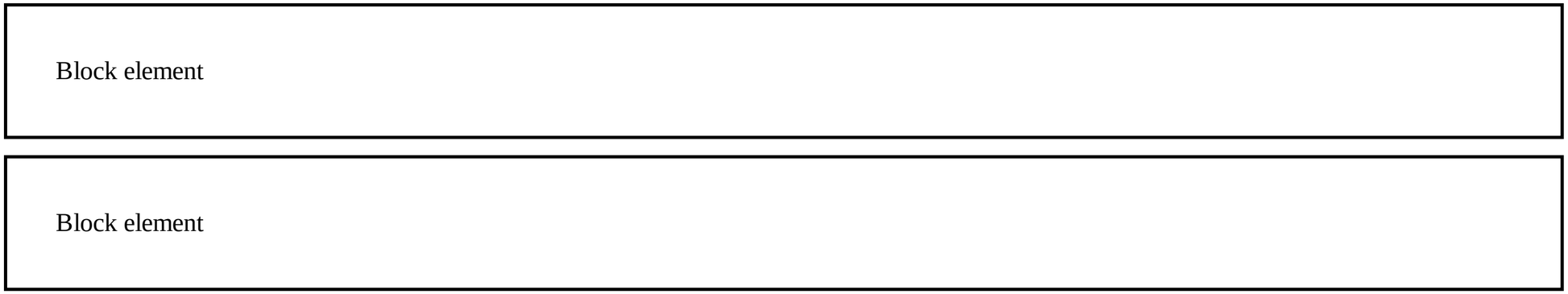
Block

CSS

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

HTML

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



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

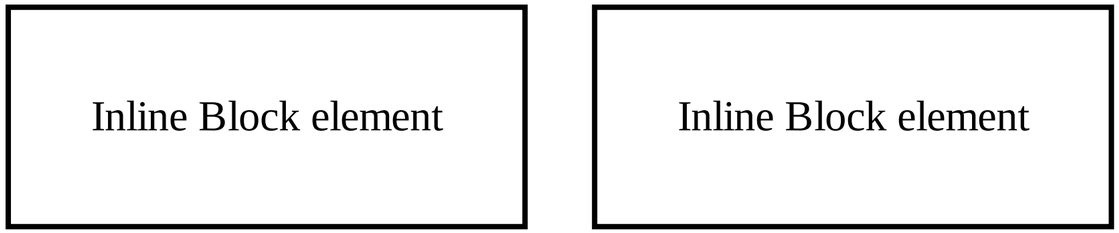
Inline-Block

CSS

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

HTML

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



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

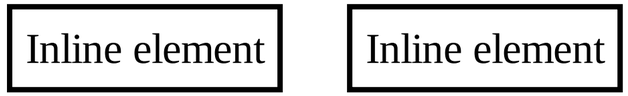
Inline

CSS

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

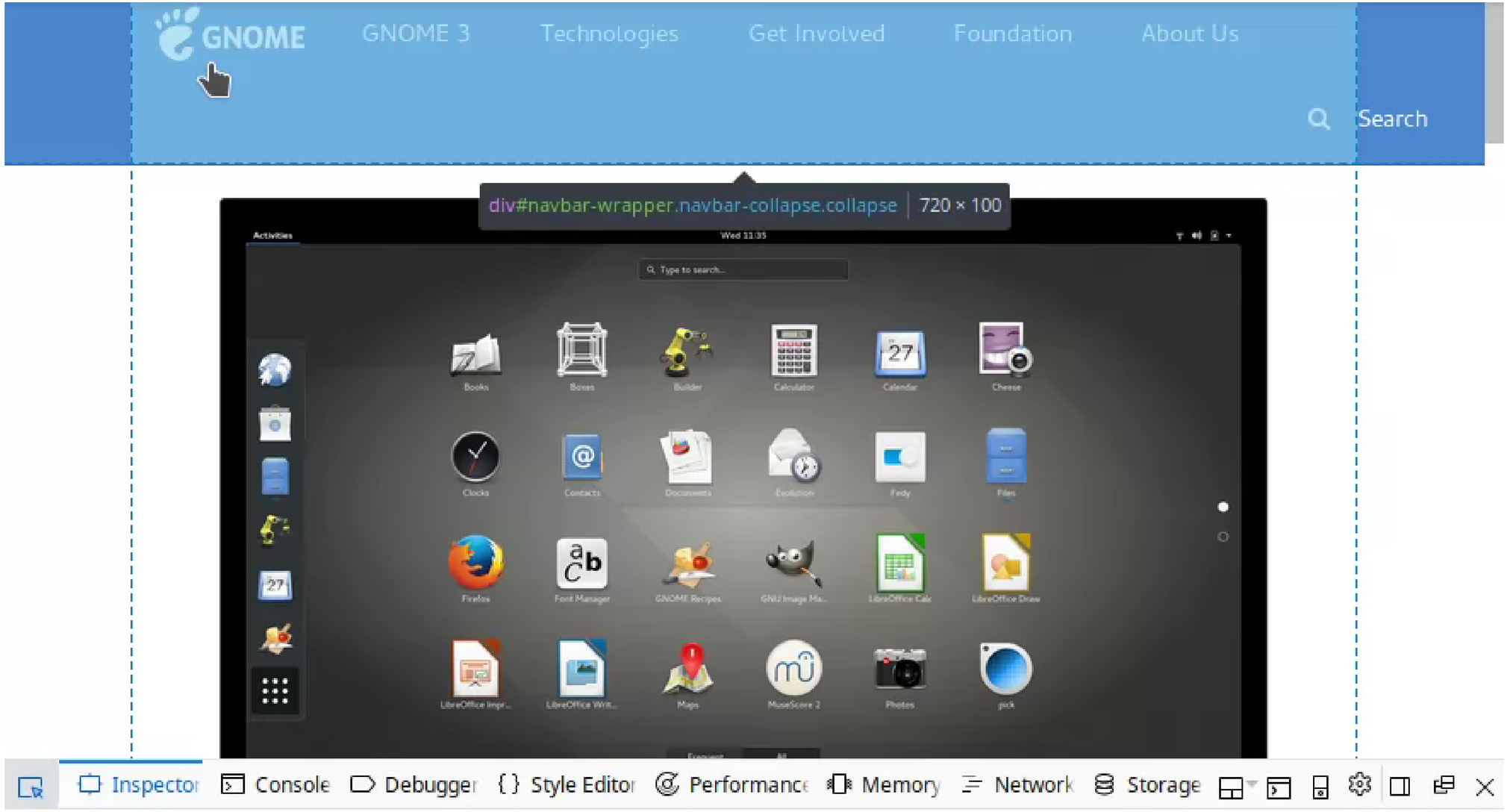
HTML

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



- 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.)

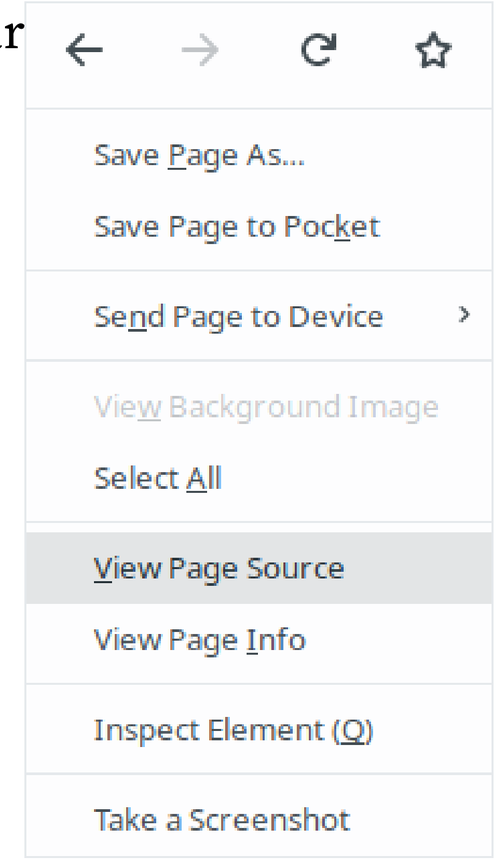
Boxes on a real website



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 debuging tools (developer mode)
- Firefox, Chrome : access using F12 key