

# **HTML**

# **the language for the web**

**The basics**

# Introduction

- HTML is VERY easy to pick up.
- There are many good books as well excellent resources on-line
- Our goal is to teach you the basics so that you can pick up the rest on your own.

# Readings

- [https://developer.mozilla.org/en-US/docs/Learn/HTML/Introduction\\_to\\_HTML](https://developer.mozilla.org/en-US/docs/Learn/HTML/Introduction_to_HTML)
- <https://www.w3schools.com/html/>
- [http://www.cellbiol.com/bioinformatics\\_web\\_development/chapter-3-your-first-web-page-learning-html-and-css/](http://www.cellbiol.com/bioinformatics_web_development/chapter-3-your-first-web-page-learning-html-and-css/)

# What is HTML?

## Hypertext Markup Language

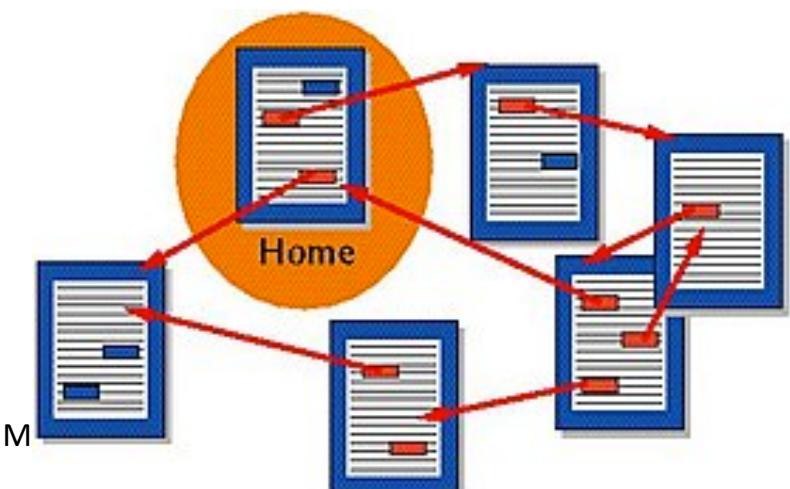
a simple data format used to create  
hypertext documents that are  
portable from one platform to  
another.



# Hypertext

**Hypertext** is text displayed on a computer display or other electronic devices with references (**hyperlinks**) to other text that the reader can immediately access.

Hypertext documents are interconnected by hyperlinks, which are **typically activated by user actions**, such as a mouse click, keypress set or by touching the screen.



# What is HTML?

HTML is an application of ISO Standard 8879:1986:

"Information Processing Text and Office Systems; Standard Generalized Markup Language" (**SGML**).

The HTML Document Type Definition (DTD) is a formal definition of the HTML syntax in terms of SGML.



# What is HTML?

- Defined in RFC 1866
- Logical markup language
- maximally portable
- **Graceful degradation of presentation**

“A philosophical rule was that **HTML should convey the structure of a hypertext document, but not the details of its presentation.**”

Since then, HTML has **evolved into a presentation language.**

HTML standards are developed under the authority of the World **Wide Web Consortium (W3C)**, headed by Tim Lee

<http://www.w3c.org>

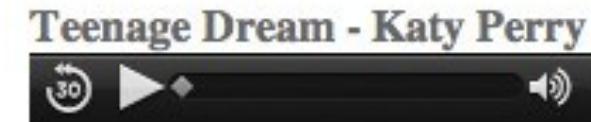


# Media - audio

(HTML 5)

```
<audio src=" teenage_dream.mp3"></audio>
```

```
<audio controls>
<source src="teenage_dream.mp3"/>
<source src="teenage_dream.ogg"/>
</audio>
```



Provides a download link for non-supporting browsers:

```
<audio src="teenage_dream.ogg" autoplay controls loop>
<a href=" teenage_dream.ogg">download</a>
</audio>
```

***“Graceful degradation of presentation”***

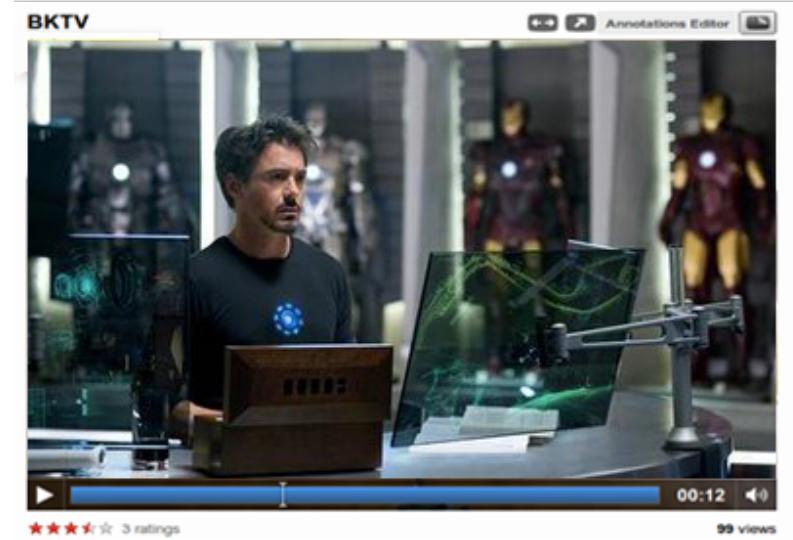
# Media - video

(HTML 5)

```
<video src=" ironman.ogg" />
```

Automatically show native controls

```
<video src="ironman.ogg" controls />
```



```
<video controls>
```

```
  <source src="ironman.mp4" />
```

```
  <source src="ironman.ogg" />
```

```
</video>
```



Specify multiple source elements to support more browsers

(i.e. mp4 will work in Safari, ogg will work in Firefox)

# Versions

| version         | Date        | Notes                                 |
|-----------------|-------------|---------------------------------------|
| HTML            | 1991        |                                       |
| HTML 2.0        | 1995        | First official version                |
| HTML 3.2        | 1997        |                                       |
| HTML 4.0 (4.01) | 1999 (2001) |                                       |
| XHTML 1.0       | 2000 (2001) | XML version of HTML 4                 |
| DHTML           |             | HTML 4 +JS + CSS + DOM                |
| XHTML 2.0       |             | Abandoned 2009                        |
| HTML 5 (5.2)    | 2014 (2017) | (2008 first draft, 2021 last version) |
| XHTML 5.1       |             | XML version of HTML 5                 |

Initially maintained by W3C

Since 2012 also defined by WHATWG (Web Hypertext Application Technology Working Group)

Since 2019 maintained only by WHATWG

# Most desktop browsers still miss about 10% of features!

Maximum points: 555

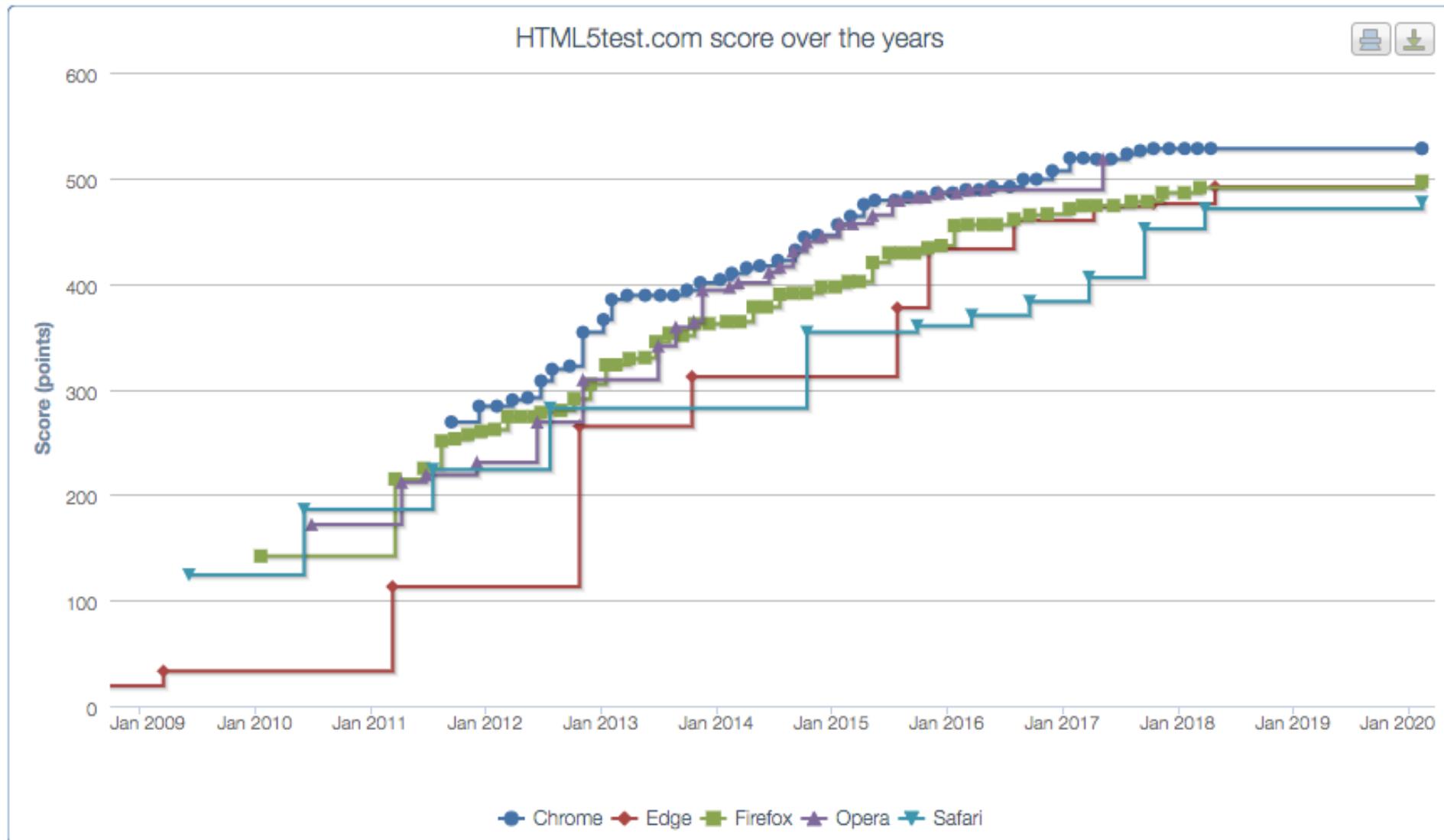
<http://html5test.com/results/desktop.html>

|          | Chrome   | Opera       | Firefox  | Edge              | Safari     |
|----------|----------|-------------|----------|-------------------|------------|
| Upcoming | 67 → 528 |             | 60 → 497 | 18 → 496          | 11.2 → 477 |
| Current  | 66 → 528 | 45 → 518    | 59 → 491 | 17 → 492          | 11.1 → 471 |
| Older    | 65 → 528 | 37 → 489    | 58 → 486 | 16 → 476          | 11 → 452   |
|          | 64 → 528 | 30 → 479    | 57 → 486 | 15 → 473          | 10.1 → 406 |
|          | 63 → 528 | 12.10 → 309 | 56 → 478 | 14 → 460          | 10.0 → 383 |
|          | 62 → 528 |             | 55 → 478 | 13 → 433          | 9.1 → 370  |
|          | 61 → 526 |             | 54 → 474 | 12 → 377          | 9.0 → 360  |
|          | 60 → 523 |             | 53 → 474 | Internet Explorer | 8.0 → 354  |
|          |          |             |          | 11 → 312          |            |

Mobile and Tablets are even worse...

# HTML5 over the years

<http://html5test.com/results/desktop.html>



# A step back: the web...

The web was born as a

- distributed document delivery system
- Using a client-server model
- Based on the notion of Hypertext
- With HTML as the *main* presentation language  
(markup-based)

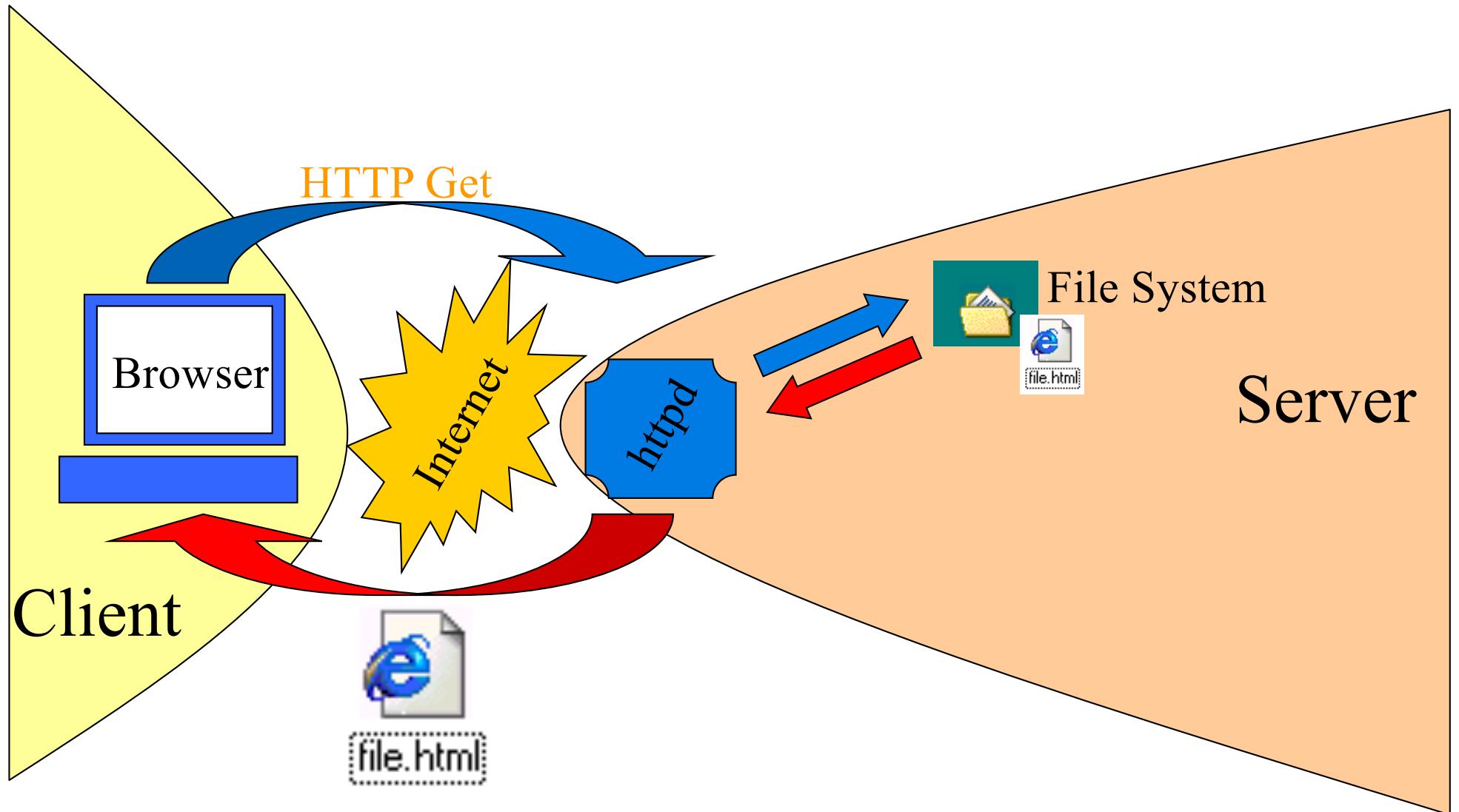
**Document sharing**

Without

- the possibility of triggering processes

**No on-line shopping,  
No e-banking,  
No social media...**

# The original web architecture: static pages



**Initial idea: get (static) interlinked documents**



# Content/Aspect separation

## HTML1

### Contents + Aspect

(HTML directly defines the aspect of the various sections/parts of the page)

#### HTML code

```
<FONT SIZE="+2" COLOR="red"><B>Upload failed!</B></FONT>
```

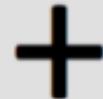
## HTML 4.01 and HTML 5

### Contents

(nature/meaning of the various sections/parts defined by HTML)

#### HTML code

```
<span class="warning">Upload failed!</span>
```



### Aspect of contents

(defined by CSS)

#### CSS code

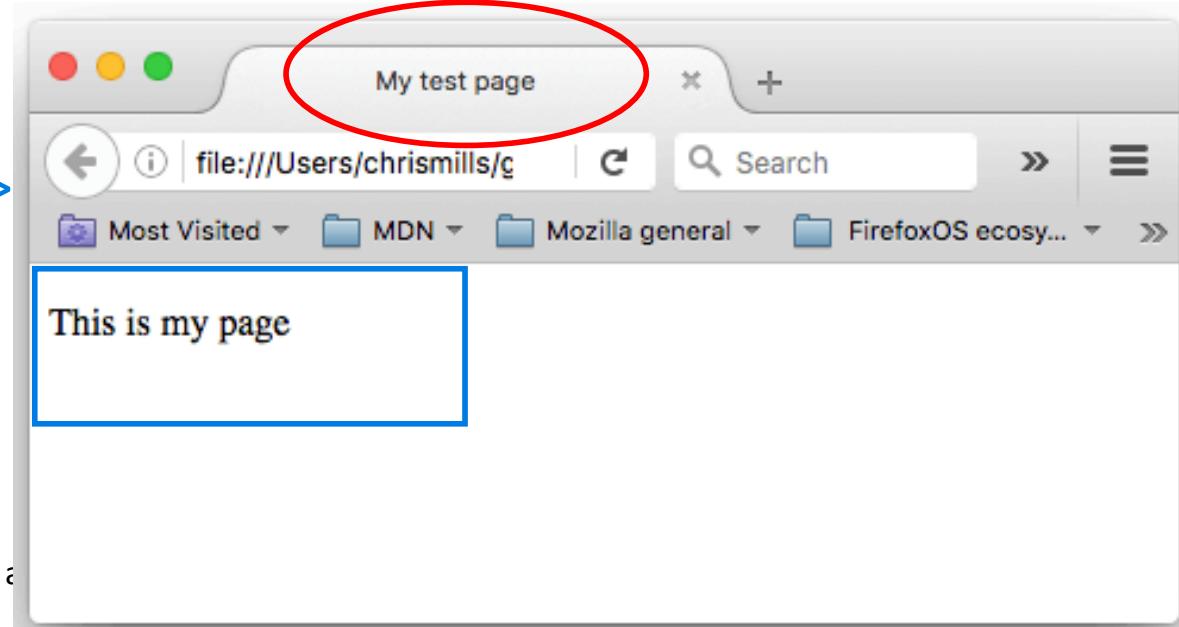
```
.warning {font-size : 20px; color : red; font-weight : bold; }
```

This image is part of the Bioinformatics Web Development tutorial at: [http://www.cellbiol.com/bioinformatics\\_web\\_development/](http://www.cellbiol.com/bioinformatics_web_development/) © cellbiol.com, all rights reserved

Da [http://www.cellbiol.com/bioinformatics\\_web\\_development](http://www.cellbiol.com/bioinformatics_web_development)

# Structure of an HTML doc

```
<!DOCTYPE html>  
<html>  
  <head>  
    <meta charset="utf-8">  
    <title>My test page</title>  
  </head>  
  <body>  
    <p>This is my page</p>  
  </body>  
</html>
```



# Structure of an HTML doc

- HEAD: contains information about the document (metadata):
  - Title of the page (which appears at the top of the browser window)
  - Meta tags: used to describe the content (used by Search engines)
  - Statements or references to JavaScript and StyleSheets code
- BODY: Contains the actual content of the document
  - This is the part that will be displayed in the browser window



# DocType declaration

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0  
Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-  
transitional.dtd">
```

Today (simplified in HTML 5.0):

```
<!DOCTYPE html>
```

# The HTML DTDs!

<https://www.w3.org/TR/REC-html40/sgml/dtd.html>

<https://www.w3.org/TR/html401/sgml/dtd.html>

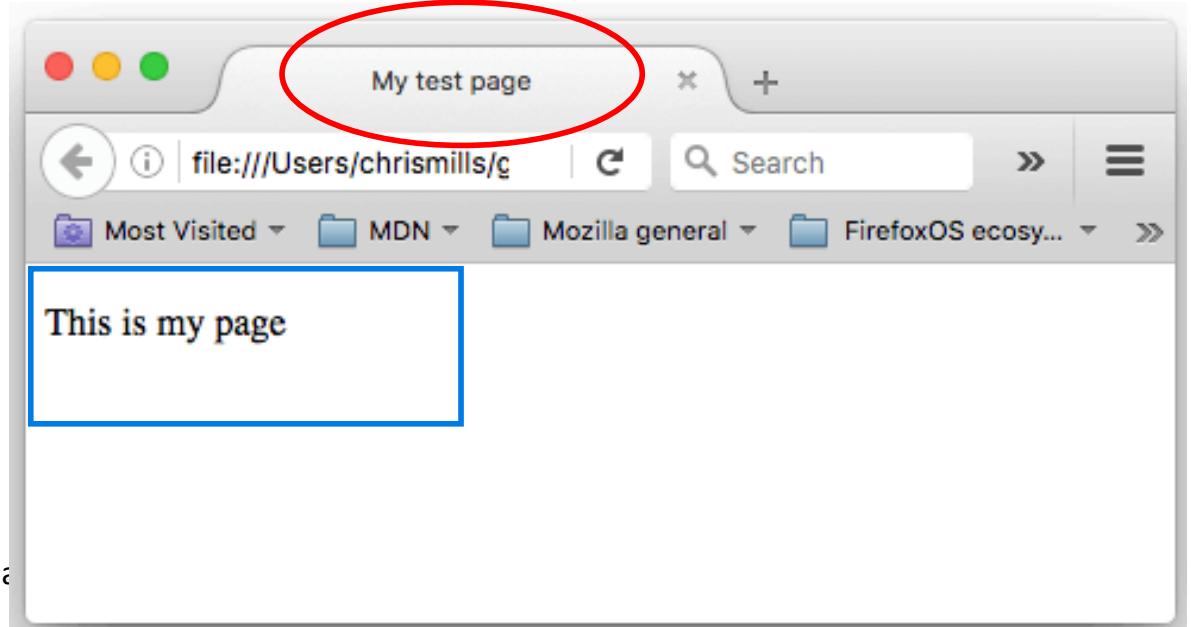
[https://www.w3.org/TR/xhtml1/dtds.html#a\\_dtd\\_XHTML-1.0-Strict](https://www.w3.org/TR/xhtml1/dtds.html#a_dtd_XHTML-1.0-Strict)

There is no HTML5 DTD!

# Structure of an HTML doc

```
<!DOCTYPE html>  
<html>  
  <head>  
    <meta charset="utf-8">  
    <title>My test page</title>  
  </head>  
  <body>  
    <p>This is  
      my page</p>  
  </body>  
</html>
```

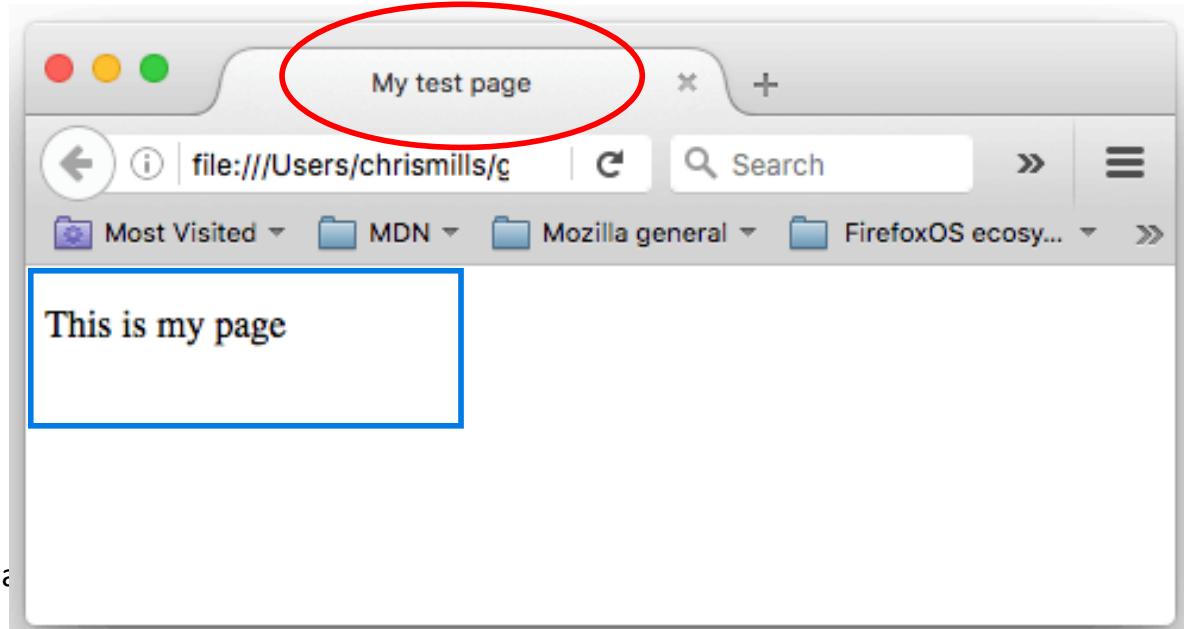
Indentation is irrelevant!  
Multiple spaces, line breaks, tabs  
Are mapped into a single space.



# Structure of an HTML doc

```
<!DOCTYPE html>  
<html>  
  <HEAD>  
    <meta charset="utf-8">  
    <title>My test page</title>  
  </head>  
  <BOdy>←  
<p>This is  
    my page</p>  
</body>  
</html>
```

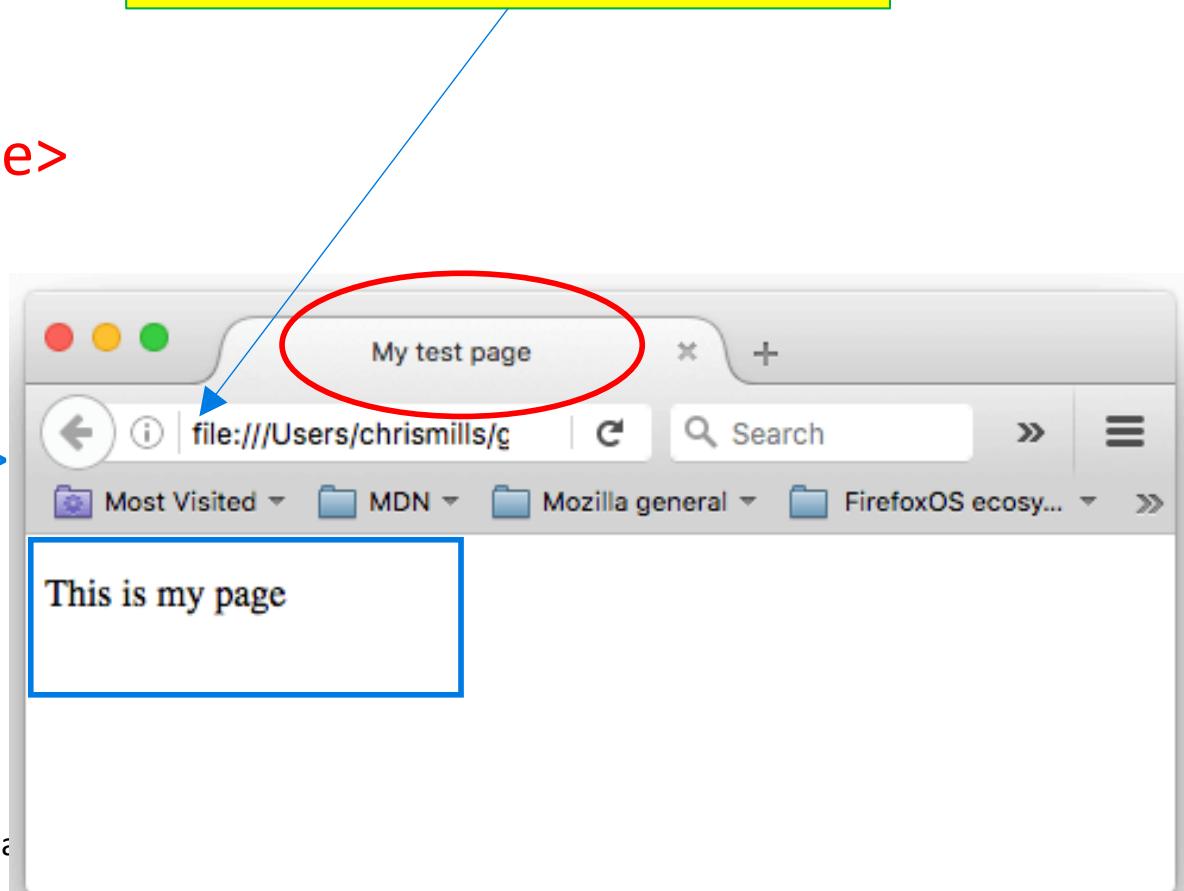
Uppercase and lower case do not matter in tags. (It does in XHTML!)  
Using lowercase is recommended.



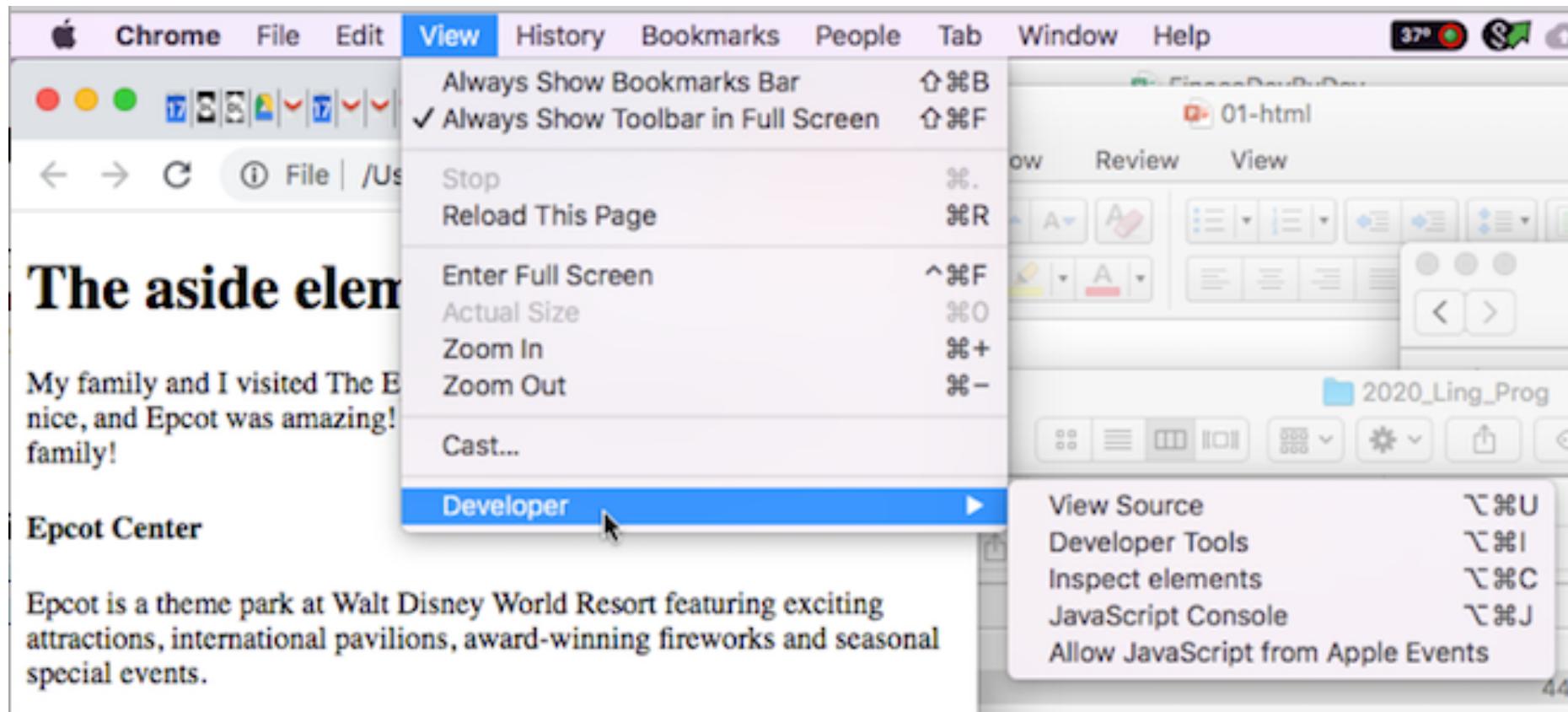
# Structure of an HTML doc

```
<!DOCTYPE html>  
<html>  
  <head>  
    <meta charset="utf-8">  
    <title>My test page</title>  
  </head>  
  <body>  
    <p>This is my page</p>  
  </body>  
</html>
```

HTML also works without a server!



# View source



# W3school resources

## Example

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

```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>

<h1>This is a Heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

Try it Yourself »



The screenshot shows a web-based HTML editor interface. On the left, there's a toolbar with icons for home, menu, save, refresh, and run. To the right of the toolbar is a green "Run" button. Below the toolbar, the HTML code is displayed in a code editor window. The code is identical to the one shown on the left. To the right of the code editor is a preview pane. The preview pane displays the rendered HTML, showing a large black **This is a Heading** and a regular black **This is a paragraph.**.

```
<!DOCTYPE html>
<html>
<head>
<title>Page Title</title>
</head>
<body>

<h1>This is a Heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

# HTML Tags

All HTML tags are made up of a tag name, sometimes followed by an optional list of attributes.

**Nothing within the brackets will be displayed by the browser** (unless the HTML is incorrectly written and the browser interprets the tags as part of the content).



# Tags

- A tag is a keyword enclosed by angle brackets ( Example: <B> )
- The opening and closing tags use the same command except the closing tag contains an additional forward slash /
- Example: <B> Warning </B>  
causes the word ‘Warning’ to appear in bold face on a Web page
- Learning HTML essentially means learning a vocabulary of tags.



# Tags – void elements

- There are opening and closing tags for many but not all tags; The affected text is between the two tags.
- See: <https://html.spec.whatwg.org/multipage/syntax.html#void-elements>
- <BR> for instance does not strictly require a closing tag – *in principle* it would be better to use <BR></BR> or the **self-closing tag** <BR/>

## Is the Ending Slash Optional?

HTML5: the slash is optional.

HTML4: the slash is technically invalid.

However, it's accepted by W3C's HTML validator.

XHTML: The slash is REQUIRED.



# Nested Tags

- Whenever you have HTML tags within other HTML tags, you *should* close the most inner tag first
- Example:

The diagram illustrates nested HTML tags with colored arrows. A blue double-headed arrow spans the entire line of code. A red double-headed arrow is positioned above the opening and closing **</>** tags of the **B** tag. Two green double-headed arrows are placed below the opening and closing **I** tags, with the word "Bold italic" written above the first one and "italic" written above the second one.

```
<|> <B> The winner is: Marta Bassino! </B>Congratulations! </I>
```

*Bold italic*      *italic*

- However, this is legal (NOT in XHTML):

The diagram illustrates nested HTML tags with colored arrows. A red double-headed arrow spans the entire line of code. A blue double-headed arrow is positioned above the opening and closing **I** tags of the **B** tag. Three green double-headed arrows are placed below the opening and closing **I** tags, with the words "Bold", "Bold italic", and "italic" written above them respectively.

```
<B> The winner is: <|> Marta Bassino! </B>Congratulations! </I>
```

*Bold*      *Bold italic*      *italic*



# Attributes

```
Name      Value  
<body bgcolor="green" text="#000000" link='blue'>
```

Double quotes      Single quotes

Attributes: Name-value pairs which refine or extend tag's functions

- You can add multiple attributes within a single tag.
- Some attributes only have name (no associated value).
- Values are limited to 1024 characters in length.
- Attributes values are within single or double quotes.



# HTML content model

- <!-- HTML has two basic content models:
  - %inline; character level elements and text strings
  - %block; block-like elements e.g. paragraphs and lists -->

```
<!DOCTYPE html>
<html>
<body>
<h1>this is H1</h1>
<h2>this is H2</h2>
<h3>this is H3</h3>
<h4>this is H4</h4>
this is normal text<br>
<b>this is bold text</b><br>
<em>this is emphasized text</em><br>
<strong>this is strong text</strong>
<br>
<cite>this is a citation</cite><br>
</body>
</html>
```

**this is H1**

**this is H2**

**this is H3**

**this is H4**

this is normal text

**this is bold text**

*this is emphasized text*

**this is strong text**

*this is a citation*

# Basic formatting tags

- Headings `<h1>...<h6>`
- Emphasis `<em>,<strong>,<b>,<i>`
- Subscript, superscript `<sub><sup>`

```
<!DOCTYPE html>
<html>
<body>
<h1>this is H1</h1>
<h2>this is H2</h2>
<h3>this is H3</h3>
<h4>this is H4</h4>
this is normal text<br>
<b>this is bold text</b><br>
<em>this is emphasized text</em><br>
<strong>this is strong text</strong>
<br>
<cite>this is a citation</cite><br>
</body>
</html>
```

**this is H1**

**this is H2**

**this is H3**

**this is H4**

this is normal text

**this is bold text**

*this is emphasized text*

**this is strong text**

*this is a citation*

# Basic formatting tags

## ■ Lists <ol>, <ul>, <li>

<ol>

<li>...</li>

<li>...</li>

</ol>

### OL - Ordered List

1. First item
2. Second item
3. Third item

### UL - Unordered List

- First item
- Second item
- Third item

# Basic formatting: blocks

- Line breaks: <br>
- Paragraphs and blocks: <p>, <div>, <span>
- P and DIV have *semantic* difference
  - <div> describes a container of data (*with graphic separation*: it has a line-break before and after it)
  - <span> is a logical, in-line grouping *without graphic evidence*. It's mostly used for a small chunk of HTML inside a line
- <p> describes a paragraph of content (with graphic separation). *It cannot contain block-level elements (P, DIV) but can contain SPAN*.

***Don't mark up your document based on how it should look - mark it up based on what it is.***

# Basic formatting: blocks

- This works (because HTML is tolerant) but is conceptually **WRONG**.

```
<!DOCTYPE html>
<html>
<body>
<p>
This is a paragraph
<P> this is within an inner P</P>
This is the rest of the paragraph
</p>
</body>
</html>
```

This is a paragraph

this is within an inner P

This is the rest of the paragraph

## Comments

Comments <!-- This is a comment -->

# Advanced formatting

- Quotation <blockquotes> <q>
- Description lists <dl><dt>
- Details – summary <detail> <summary> (HTML 5)
- Abbreviation <abbr> (HTML 5)
- Address <address>
- Computer code <code>, <pre>, <var>, <kbd>, <samp>
- Time <time>

# Images

```

```

Figure and Figure caption (HTML 5)

```
<figure> Cool Ninja Guy  
    
  <figcaption>Cool Ninja Guy</figcaption>  
</figure>
```



*How are images indexed by search engines?*

# File paths

| <img<br>src="http://machine.domain/images/picture.jpg"> | Absolute Path  |
|---|--|
|                                  | picture.jpg is located in the same server, same folder as the current page |
|                           | picture.jpg is located in the images folder in the current folder          |
|                          | picture.jpg is located in the images folder at the root of the current web |
|                               | picture.jpg is located in the folder one level up from the current folder  |

# Hyperlinks

```
<a href="URL">testo del link</a>
```

- Also URLs with other protocols:

```
<a href="mailto:marco.ronchetti@unitn.it">write to me!</a>
```

```
<base href="https://www.mydomain.com/" target="_blank">
```

```
<!DOCTYPE html>
<html>
<body>
<h2>The inner target</h2>
<a href="#pippo" >GO TO PIPPO!</a>
<p>one of many lines...</p>
...
<p>one of many lines...</p>
<a name="pippo"/>
<H1>PIPPO IS HERE!</H1>
<p>one of many lines...</p>
...
<p>one of many lines...</p>
</body>
</html>
```

# Hyperlinks – inner target

# Iframes

```
<iframe src="demo_iframe.htm"></iframe>
```

```
<iframe height="300px" width="100%" src="demo_iframe.htm"  
name="iframe_a"></iframe>
```

```
<p><a href="https://www.w3schools.com"  
target="iframe_a">W3Schools.com</a></p>
```

**Warning:**

if the site you are trying to access  
limits embedding  
(via iframe, frame, embed, object) to  
the same origin using the X-Frame-  
Options header, you can not include it!

# Character Encoding

Describes the mapping between chars and integer numbers

- **ASCII** was the first **character encoding standard** (also called character set). 128 different alphanumeric characters: {numbers (0-9), English letters (A-Z), some special characters e.g. ! \$ + - ( ) @ < >, some non printable ones like ESC}.
- **ISO-8859-1**: default character set for HTML 4. This character set supported 256 different character codes.
- **ANSI (Windows-1252)**: the original Windows character set. Added 32 extra characters to ISO-8859-1.
- **UTF-8 (Unicode)** was supported by HTML4, is the default character set for HTML5.

# Entities

| Result | Description                        | Entity Name | Entity Number |
|--------|------------------------------------|-------------|---------------|
|        | non-breaking space                 | &nbsp;      | &#160;        |
| <      | less than                          | &lt;        | &#60;         |
| >      | greater than                       | &gt;        | &#62;         |
| &      | ampersand                          | &amp;       | &#38;         |
| "      | double quotation mark              | &quot;      | &#34;         |
| '      | single quotation mark (apostrophe) | &apos;      | &#39;         |
| ¢      | cent                               | &cent;      | &#162;        |
| £      | pound                              | &pound;     | &#163;        |
| ¥      | yen                                | &yen;       | &#165;        |
| €      | euro                               | &euro;      | &#8364;       |
| ©      | copyright                          | &copy;      | &#169;        |
| ®      | registered trademark               | &reg;       | &#174;        |

# URL Encoding

| Character | From Windows-1252 | From UTF-8 |
|-----------|-------------------|------------|
| space     | %20               | %20        |
| !         | %21               | %21        |
| "         | %22               | %22        |
| #         | %23               | %23        |
| \$        | %24               | %24        |
| %         | %25               | %25        |
| &         | %26               | %26        |
| '         | %27               | %27        |
| (         | %28               | %28        |
| )         | %29               | %29        |

- See also [https://www.w3schools.com/tags/ref\\_urlencode.asp](https://www.w3schools.com/tags/ref_urlencode.asp)

# Metadata (head)

```
<meta charset="UTF-8">
<meta name="description" content="Free Web tutorials">
<meta name="keywords" content="HTML,CSS,XML,JavaScript">
<meta name="author" content="John Doe">
```

```
<meta http-equiv="refresh" content="30">
```

<meta charset="utf-8"> Charset declaration

- Link CSS/JS

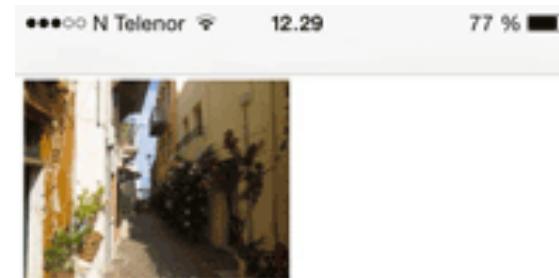
# Metadata (head)

<meta name="viewport" content="width=device-width, initial-scale=1.0">

With viewport, on phone



Without viewport, on phone



Etiam ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Nam liber tempor cum soluta nobis

45  
Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi. Nam liber tempor cum soluta nobis

# What I expect you to know...

Ignore (for now) references to “styles”

| HTML Tutorial          | <del>HTML CSS</del>        | HTML Computercode     |
|------------------------|----------------------------|-----------------------|
| HTML HOME              | HTML Links                 | HTML Entities         |
| HTML Introduction      | HTML Images                | HTML Symbols          |
| HTML Editors           | HTML Tables                | HTML Charset          |
| HTML Basic             | HTML Lists                 | HTML URL Encode       |
| <b>HTML Elements</b>   | HTML Blocks                | <del>HTML XHTML</del> |
| HTML Attributes        | <del>HTML Classes</del>    | <b>HTML Forms</b>     |
| HTML Headings          | <del>HTML Id</del>         | HTML Forms            |
| HTML Paragraphs        | HTML Iframes               | HTML Form Elements    |
| <del>HTML Styles</del> | <del>HTML JavaScript</del> | HTML Input Types      |
| HTML Formatting        | HTML File Paths            | HTML Input Attributes |
| HTML Quotations        | HTML Head                  |                       |
| HTML Comments          | <del>HTML Layout</del>     |                       |
| HTML Colors            | <del>HTML Responsive</del> |                       |

# Tables

<table> defines the tabella

<th> or <tr> define the rows

<td> defines every single cell

<caption> defines the caption (didascalia)

The attributes

- colspan="n"
- rowspan="n"

define the cell span over columns and rows.

# Tables

## Example

```
<h2>Cell that spans two columns</h2>

<table style="width:100%">
  <tr>
    <th>Name</th>
    <th colspan="2">Telephone</th>
  </tr>
  <tr>
    <td>Bill Gates</td>
    <td>555 77854</td>
    <td>555 77855</td>
  </tr>
  <tr>
    <td>Donald Duck</td>
    <td>945 2626</td>
    <td>0471 23706</td>
  </tr>
</table>
```

### Cell that spans two columns

| Name        | Telephone |
|-------------|-----------|
| Bill Gates  | 555 77854 |
| Donald Duck | 945 2626  |

# HTML Editors

HTML editors are called “**WYSIWYG**” (Uizziuaig)

- *What You See Is What You Get!*

Some free, multiplatform HTML Editors:

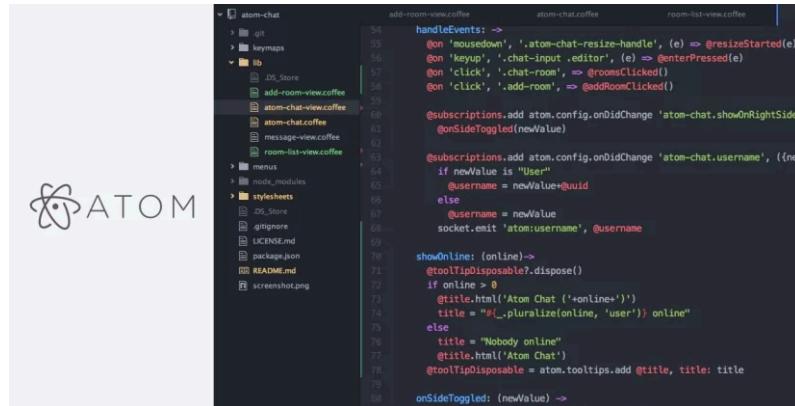
- Aptana
  - Atom
  - Bluefish
  - Netbeans
- (see next slides)



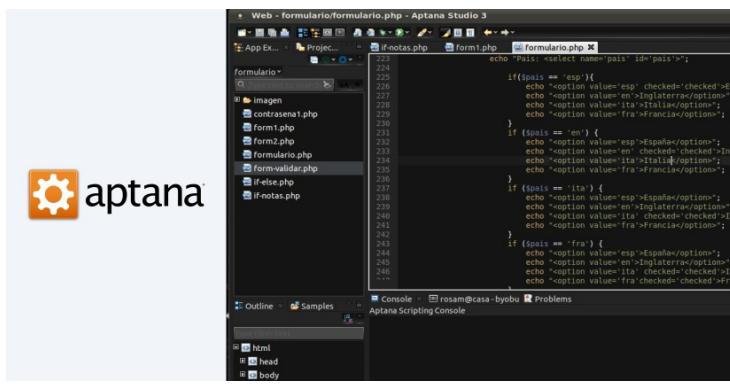
# **Multiplatform, free HTML editors - 1**



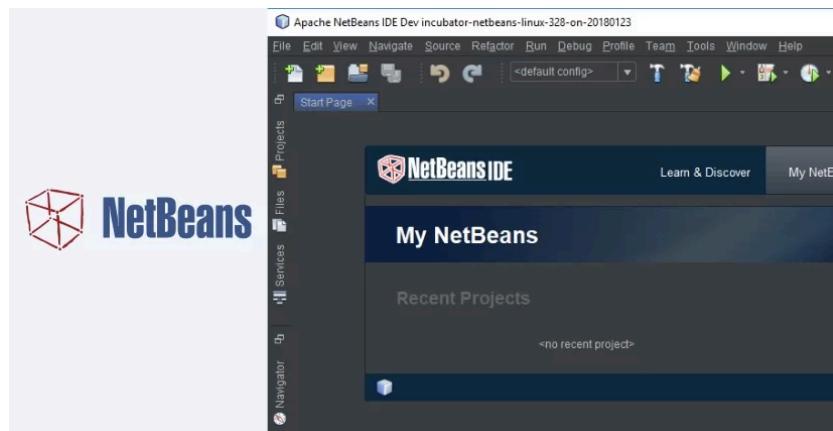
# Brackets - open source text editor.



[Atom](#) - open source web application IDE.



## Aptana Studio 3 - open source web application IDE.



[NetBeans](#) contains a free and open source HTML editor.

# HTML Editors pros and cons:

- Pros

- Good for beginners
  - You do not have to know much HTML to use editors
  - It is easy to create complex tables, image maps, and use advanced functions such as Style Sheets and JavaScript
  - Easy for design due to the WYSIWYG interface

- Cons

- They do not always generate clean HTML
  - Add redundant tags
  - Add their own tags
- They do not offer good graphic tools to manipulate images
- It can be hard to fix HTML tags since every time you open a document, code is added.



# Homework -1

Create a webpage that looks like this: 

The image can be retrieved from

[https://latemar.science.unitn.it/segue\\_userFiles/2021ProgrammazioneWeb/2.jpg](https://latemar.science.unitn.it/segue_userFiles/2021ProgrammazioneWeb/2.jpg)

The index items should point to the corresponding sections below.

The final link should connect to

<https://piazza.com/unitn.it/spring2021/programmazioneweb/home>

## Indice

1. [Images](#)
2. [Formatting](#)
3. [Lists](#)
4. [Links](#)

## Images



## Formatting

This is an example of **bold**, *italic*, ***bold italic***,

## Lists

List of tags used in the body of this page

- `<h1>, <h2>`
- `<ol>, <ul>, <li>`
- `<a>`
- `<b>, <i>`
- dragonfruit

## Links

[The web site of this course on Piazza](#)

# Homework -2

Change the webpage so that it takes the following aspect:

## My First Website

### Indice

1. [Images](#)
2. [Formatting](#)
3. [Lists](#)
4. [Links](#)

### Images



### Formatting

This is an example of **bold**, *italic*, ***bold italic***,

### Lists

List of tags used in the body of this page

- <h1>, <h2>
- <ol>, <ul>, <li>
- <a>
- <b>, <i>
- dragonfruit

### Links

[The web site of this course on Piazza](#)

# Homework -3

Create a webpage that looks like this:

## Cells that spans over rows and columns

|     |      |     |      |     |     |     |     |     |      |
|-----|------|-----|------|-----|-----|-----|-----|-----|------|
| 1,1 | 2,1  | 3,2 | 4,1  | 5,1 | 6,1 | 7,1 | 8,1 | 9,1 | 10,1 |
| 1,2 | 2,2  |     | 4,2  | 5,2 | 6,2 | 7,2 | 8,2 | 9,2 | 10,2 |
|     | 2,3  |     | 4,3  | 5,3 | 6,3 | 7,3 | 8,3 | 9,3 | 10,3 |
|     | 2,4  |     | 4,4  |     |     | 7,4 | 8,4 | 9,4 | 10,4 |
|     | 2,5  |     | 4,4  |     |     | 7,5 | 8,5 | 9,5 | 10,5 |
|     | 2,6  |     | 4,4  |     |     | 7,6 | 8,6 | 9,6 | 10,6 |
|     | 2,7  |     | 4,7  |     |     | 7,7 |     |     |      |
|     | 2,8  |     | 4,8  |     |     | 7,7 |     |     |      |
|     | 2,9  |     | 4,9  |     |     | 7,7 |     |     |      |
|     | 2,10 |     | 4,10 |     |     | 7,7 |     |     |      |
|     |      |     |      |     |     |     |     |     |      |

Suggestion: bgcolor="red"