

Web / BD

Introduction to Web Programming
2025-2026

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Organization of this part

- **4 x 1 hour - Lectures**
- **3 x 2 hours - Labs**
 - Front-end: HTML / CSS
 - Back-end: Python/Flask/Database
- **1 x 2 hours – Evaluation Lab (including some Database)**
 - **January 2026**

Motivations

```
~/s/g/o/oclif > ↵ master > oclif --help  
oclif: create your own CLI
```

VERSION

oclif/1.12.1 darwin-x64 node-v10.11.0

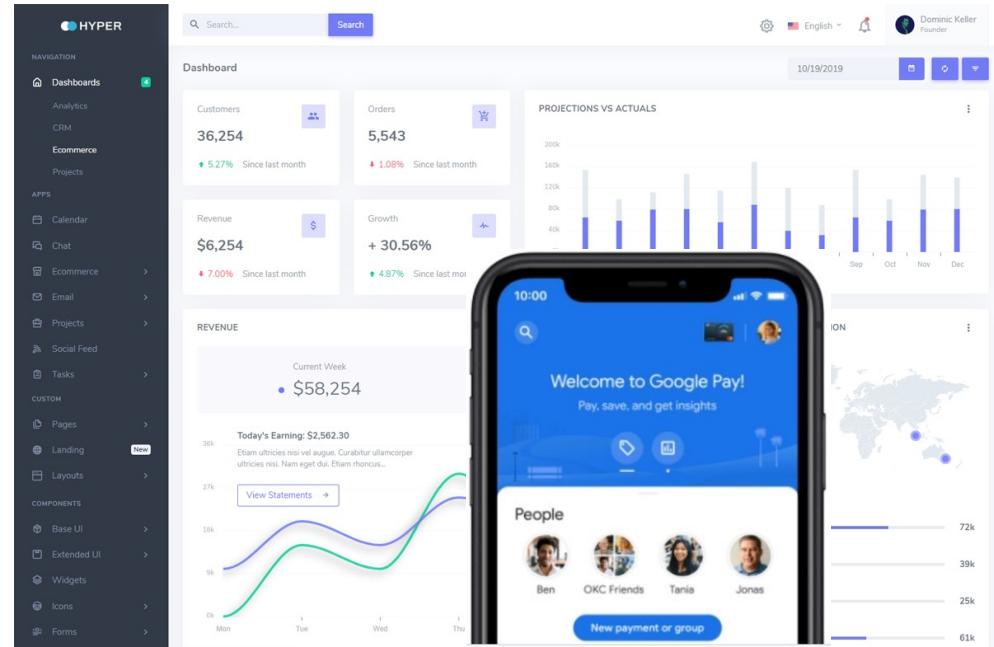
USAGE

```
$ oclif [COMMAND]
```

COMMANDS

command	add a command to an existing CLI or plugin
help	display help for oclif
hook	add a hook to an existing CLI or plugin
multi	generate a new multi-command CLI
plugin	create a new CLI plugin
single	generate a new single-command CLI

```
~/s/g/o/oclif > ↵ master > ↵
```



Command line interface (CLI)

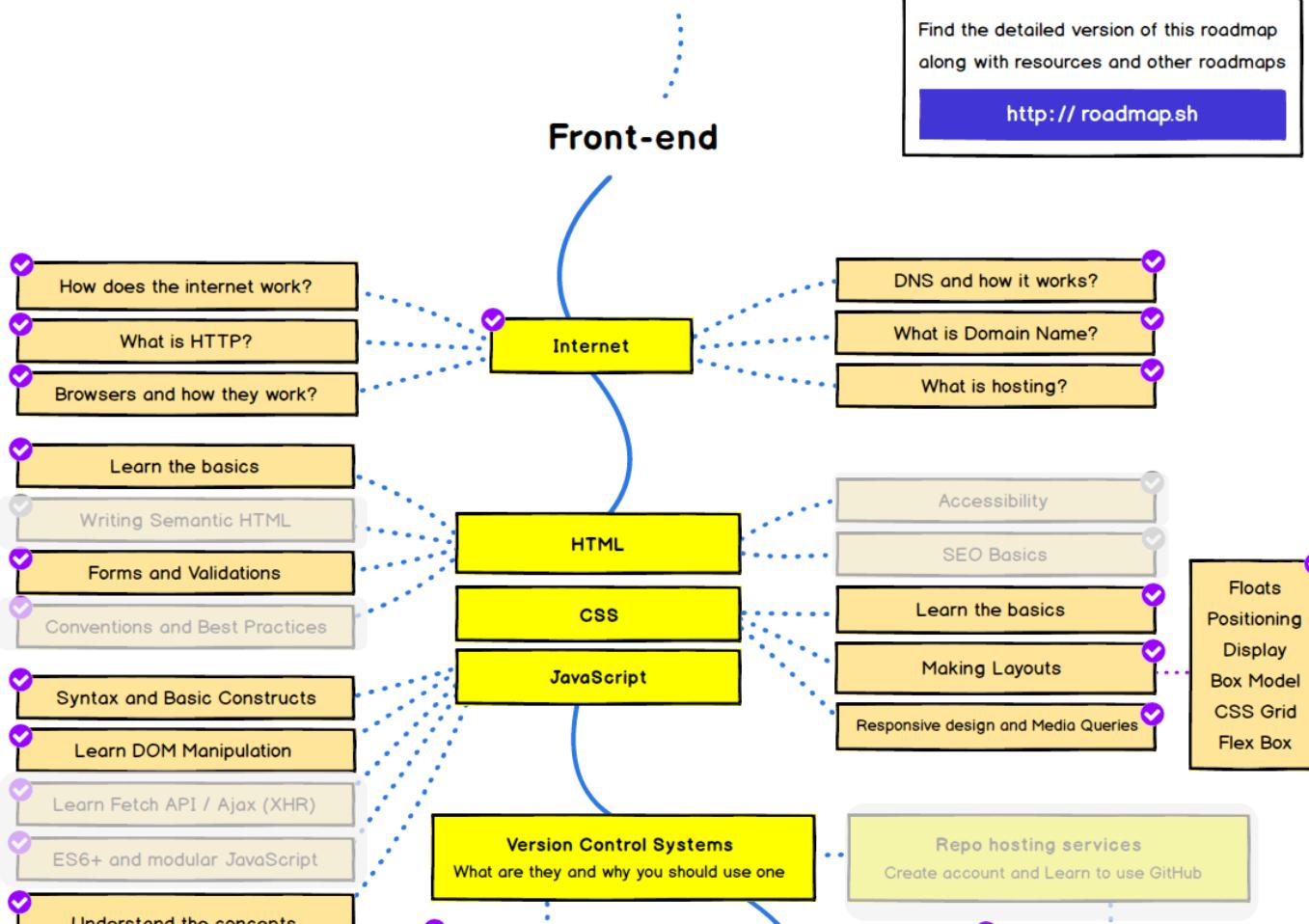
(nowadays) Applications

Disclaimer

- **NOT** a detailed course about Web Programming
- Demystification of Internet/Web
- Learn the concepts and the basics of web programming

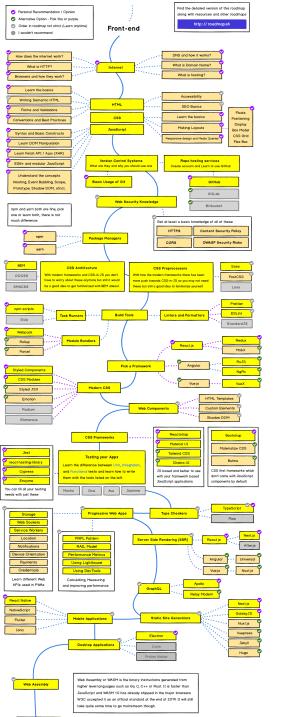
This is just an introduction...

*... you will have to **learn by yourself at lot more***



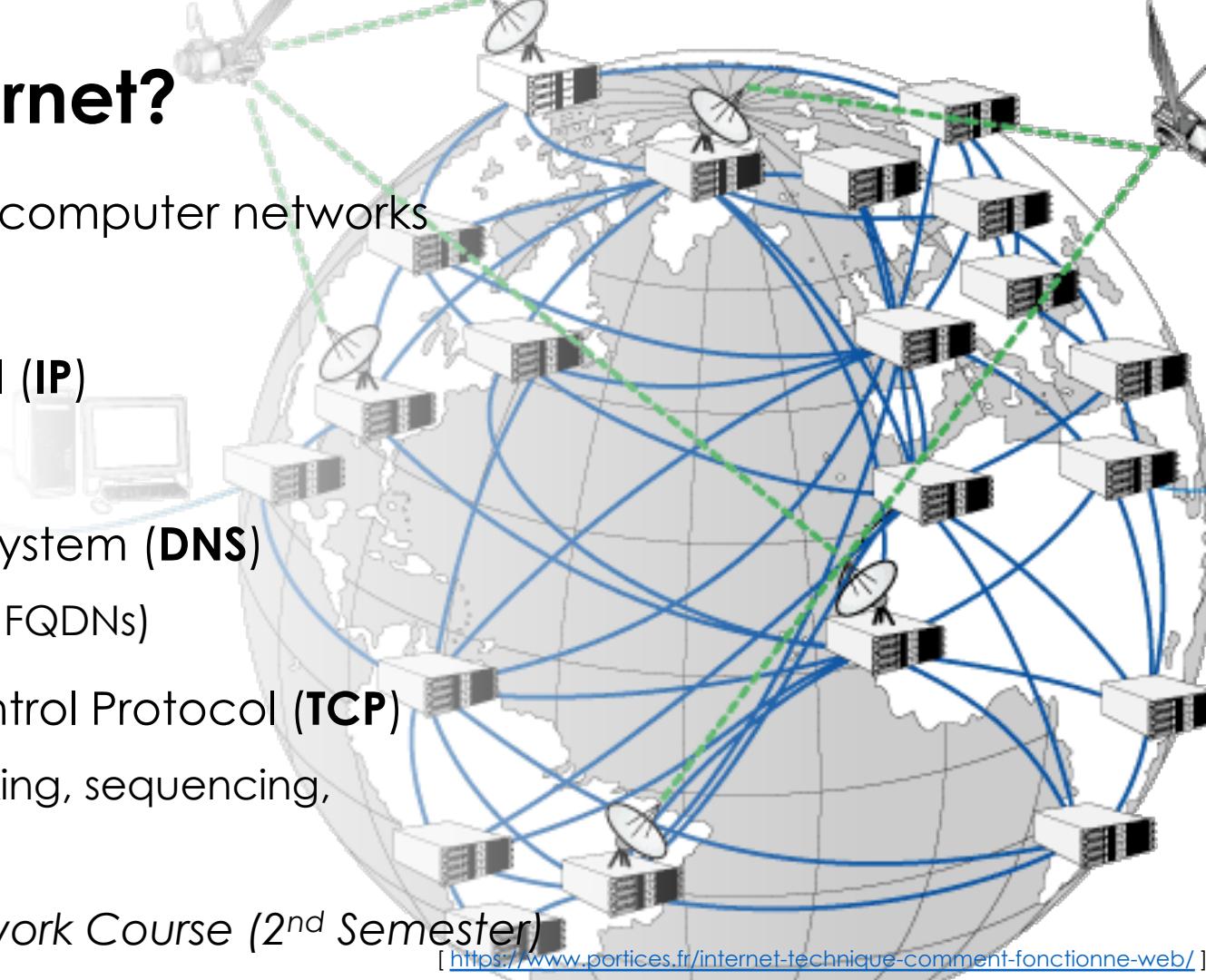
[<https://roadmap.sh/frontend>]

[<https://roadmap.sh/backend>]



What is Internet?

- Interconnected computer networks
 - Clients/Servers
- Internet Protocol (**IP**)
 - Routing
- Domain Name System (**DNS**)
 - Naming (IP <-> FQDNs)
- Transmission Control Protocol (**TCP**)
 - Packets: chunking, sequencing, resending, etc.



MORE details in the Network Course (2nd Semester)

[<https://www.portices.fr/internet-technique-comment-fonctionne-web/>]

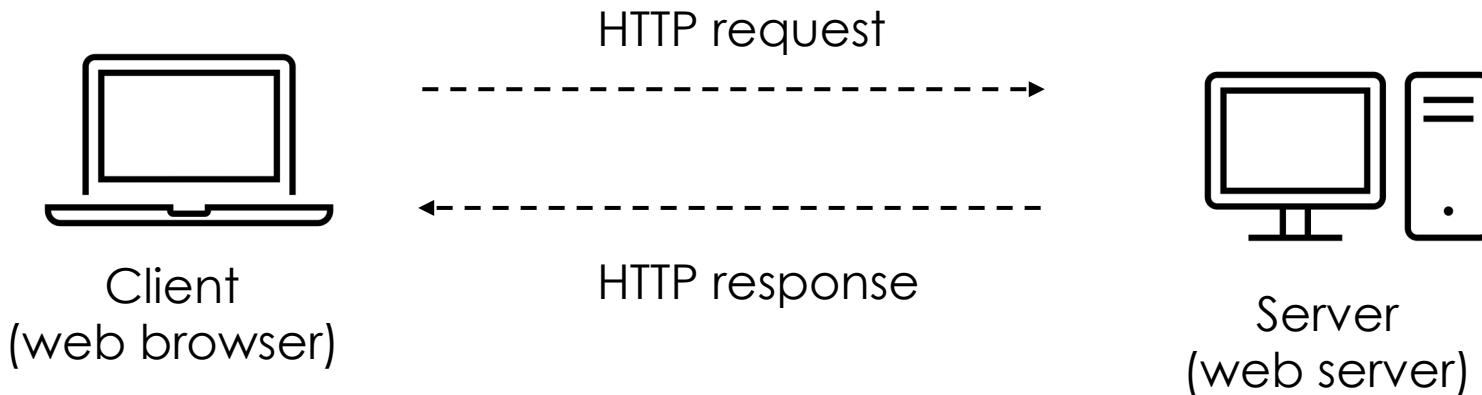
What is the Web?

The **World Wide Web** -- commonly referred to as WWW, W3, or the Web -- is an **interconnected system of public webpages** accessible through the **Internet**.

The Web is not the same as the Internet: the Web is one of many applications built on top of the Internet.

[https://developer.mozilla.org/en-US/docs/Glossary/World_Wide_Web]

World Wide Web (WWW)



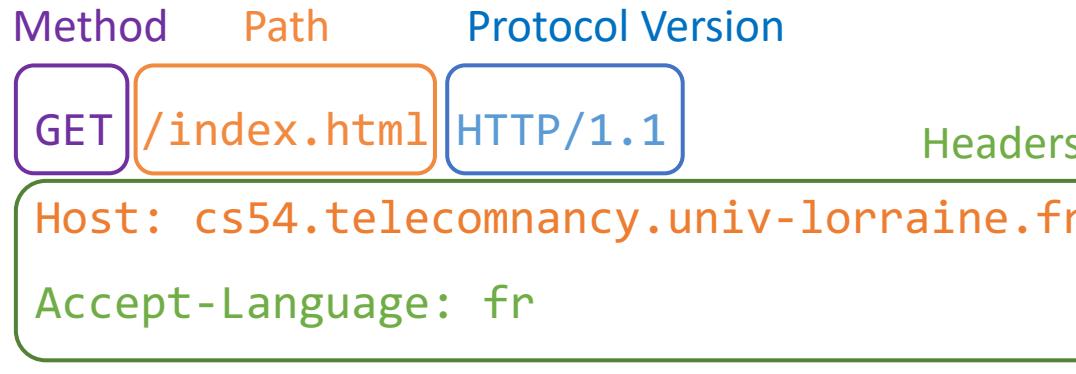
Uniform Resource Locator (URL):

`https://www.telecommancy.univ-lorraine.fr/index.html`

Protocol Domain and subdomains Top Level Domain (TLD) Path

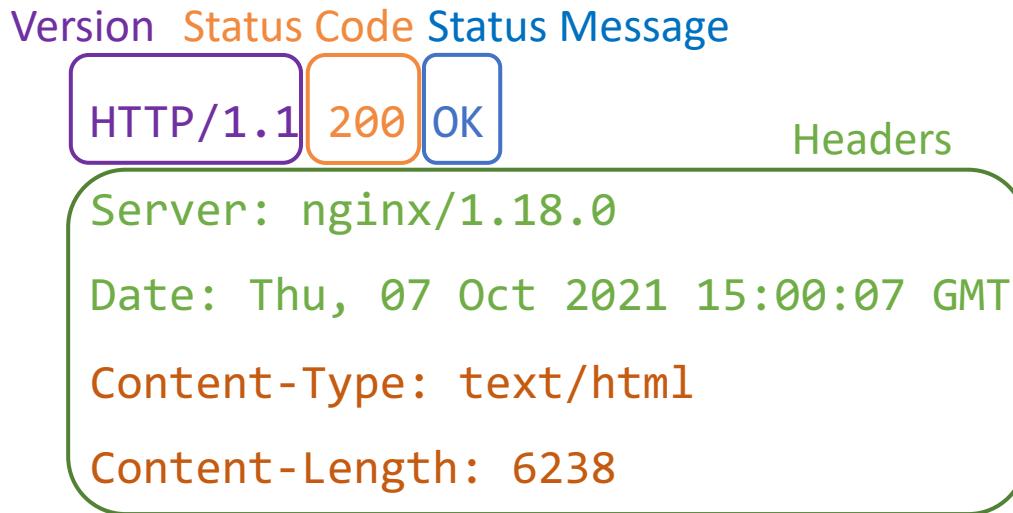
HyperText Transfer Protocol (HTTP)

- Protocol that defines:
 - Methods Request / HTTP Verbs : **GET**, **POST**, PUT, DELETE, HEAD, ...



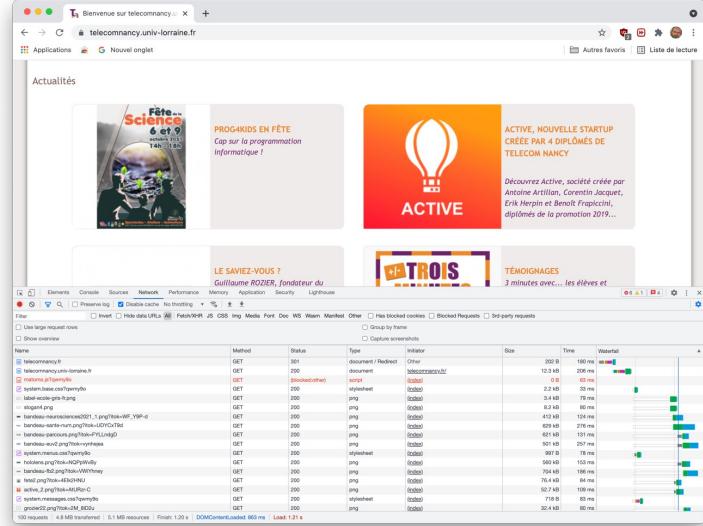
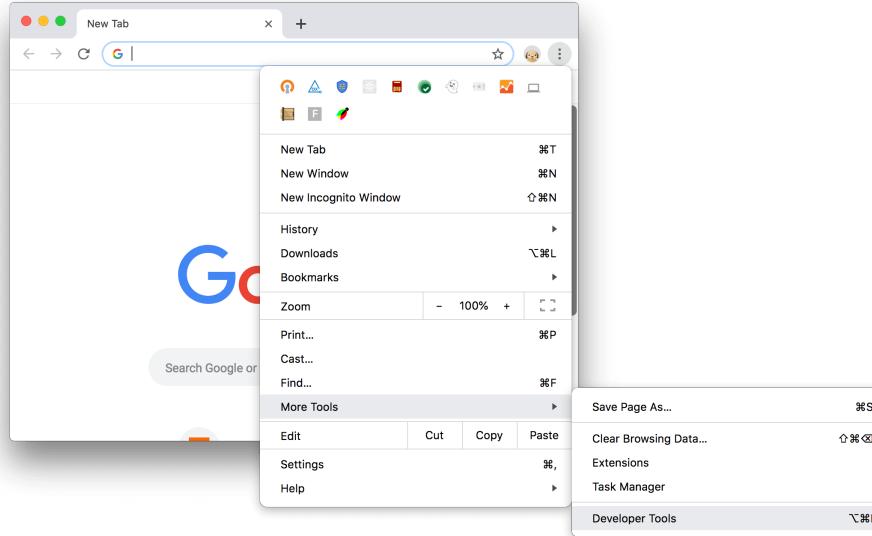
HyperText Transfer Protocol (HTTP) [cont.]

- Protocol that defines:
 - HTTP Responses



Web Developers Tools (demo)

- CURL : `$ curl -I http://www.google.fr/teapot`
- (Chrome) Web Developers Tools



HTTP Status Code

200 OK

Information

301 Moved Permanently

302 Not Found

Redirection

304 Not Modified

307 Temporary Redirect

401 Unauthorized

403 Forbidden

404 Not Found

418 I'm a Teapot

Client Errors

500 Internal Server Error

Server Errors

503 Service Unavailable

[<https://datatracker.ietf.org/doc/html/rfc2616>]

[<https://developer.mozilla.org/en-US/docs/Web/HTTP>Status>]

URL Parameters

GET /search?q=cats HTTP/1.1
Host: www.google.com

? : separator between path/parameters
parameter_name = parameter_value

GET /search?q=olivier+festor&tbm=isch HTTP/1.1
Host: www.google.com

& : separator between parameters

Names and values are *URL encoded!*

Cha%C3%A9ne%20pas%20tr%C3%A8s%20visible%20%3B%29

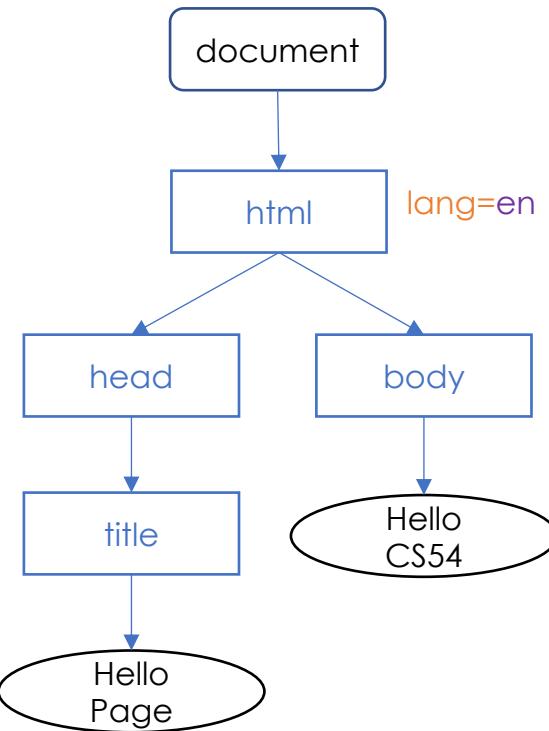
Hyper Text Markup Language (HTML)

- Markup language:
 - Tags: <`html`> ... </`html`>
 - Attributes: <`html lang="fr"`> ... </`html`>
- Anatomy of basic web page

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>Hello Page</title>
  </head>
  <body>
    Hello CS54
  </body>
</html>
```

Hyper Text Markup Language (HTML) [cont.]

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>Hello Page</title>
  </head>
  <body>
    Hello CS54
  </body>
</html>
```



Document Object Model (DOM)

Hyper Text Markup Language (HTML) [cont.]

- Live coding:
 - Local coding:
 - `file://` protocol
 - HTTP Server:
 - `python3 -m http.server 8080`
 - Visual Studio Code
 - IDE + **Live Server Extension**

Hyper Text Markup Language (HTML) [cont.]

- Paragraphs: <p>...</p>
- Headings: <h1>, <h2>, ...
- Lists (unordered / ordered): , , , ...
- Table (rows, data): <table>, <tr>, <td>, ...
- Images

```

```

- **Links (relative / absolute + protocol)** <a>

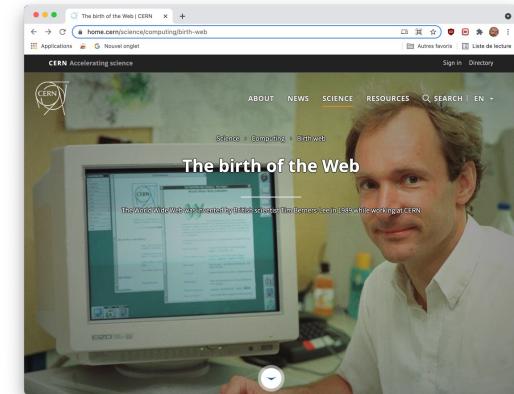
```
<a href="anotherworld.html"/>
```

```
<a href="https://thispersondoesnotexist.com/image"/>
```

- Warning: Phishing issues

The First Web Site (1989)

The screenshot shows a Mac OS X-style window titled "The World Wide Web project". The address bar says "Non sécurisé | info.cern.ch/hypertext/WWW/TheProject.html". Below the address bar are standard browser controls (back, forward, search) and a toolbar with icons for applications like Mail and Safari. The main content area displays the original homepage of the World Wide Web. It features a large title "World Wide Web" and a paragraph describing W3 as a wide-area [hypermedia](#) information retrieval initiative. It includes links to an [executive summary](#), [Mailing lists](#), [Policy](#), [W3 news](#), and [Frequently Asked Questions](#). The page is filled with various sections and links related to the project's development and components.



More information at
<https://home.cern/science/computing/birth-web>

Cascading Style Sheet (CSS) 101

```
a {  
    color: blue;  
    font-size: 5em;  
}  
  
a:hover {  
    color: red;  
    font-size: 5em;  
}
```

Cascading Style Sheet (CSS) [cont.]

- Inlined as attributes of any tag using `style`
- Included in HTML file using `<style>` tag
- Included from an external file using `<link>`
 - `<link href="style.css" rel="stylesheet"/>`

Cascading styles

- Properties `font-size: 24px;` there exists a lot of CSS properties
- Type selectors `p { ... }` applied to all `<p>` attributes
- Class selectors `.warning { ... }` applied to tag with attribute `class="warning"`
- ID selectors `#player { ... }` applied to tag whose `id= "player"`

[<https://developer.mozilla.org/fr/docs/Web/CSS/>]

HTML Forms

Method, either post or get (more on that later)

HTML Form

```
<form action="https://music.youtube.com/search" method="get">  
  <input name="q" type="search"/>  
  <input type="submit" value="Search"/>  
</form>
```

Form Element

A large, blue, fuzzy monster with three white eyes and a wide, toothy grin is holding a large chocolate chip cookie in its right hand. Cookie碎屑散落在它周围。

Coming next...

- Backend using Flask