Fundamentals of Front - End Development

DataBases and Web development

Genís Bayarri, Josep Lluis Gelpí
Molecular Modeling and Bioinformatics Group. IRB Barcelona.

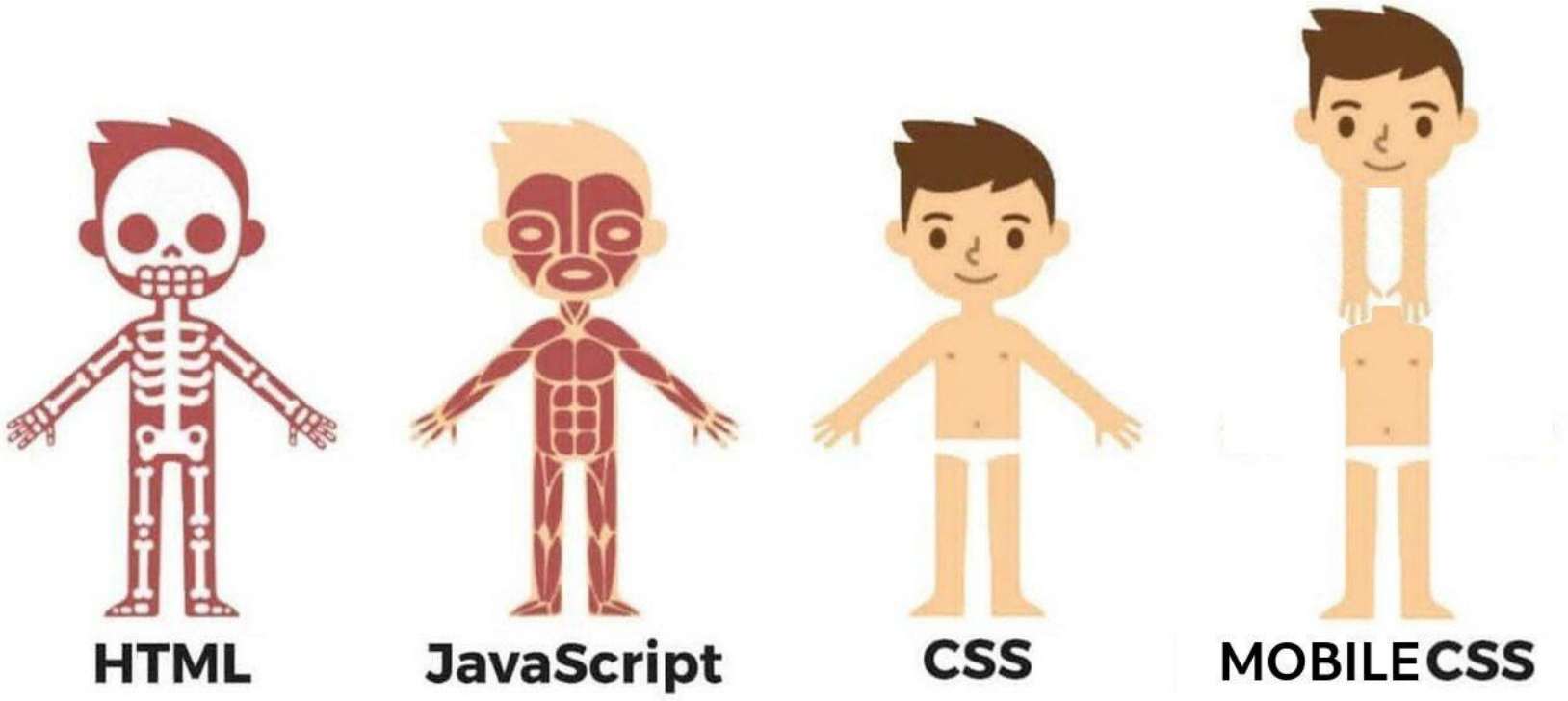
MMB

Website front - end

- The front-end of a website is all the browser shows to us: colors, images, text, etc.
- Three main languages: HTML, CSS & JS.
- The browser takes the HTML and CSS files stored in the server and turns them into pixels on the screen (Document Object Model).
- Additionally, JS allows us to improve interaction with the HTML + CSS elements. JS can manipulate the DOM.

MMB

Front - end layers



MMB

Website front - end (HTML + CSS)

- HTML (1991) is the language for describing the structure of Web pages.
- CSS (1994) describes how HTML elements must be displayed on screen.
- Page with css: http://mmb.irbbarcelona.org/webdev/bootstrap/home.html
- Page without css: http://mmb.irbbarcelona.org/webdev/bootstrap/no-css.html

MMB

Website front - end (JS)

- JavaScript (1993) is a scripting language, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code.
- JavaScript is an interpreted language. Thus, it doesn't need to be compiled.
- JavaScript renders web pages in an interactive and dynamic fashion. This allows the pages to react to events, exhibit special effects, accept variable text, validate data, create cookies, detect a user’s browser and far more.

MMB

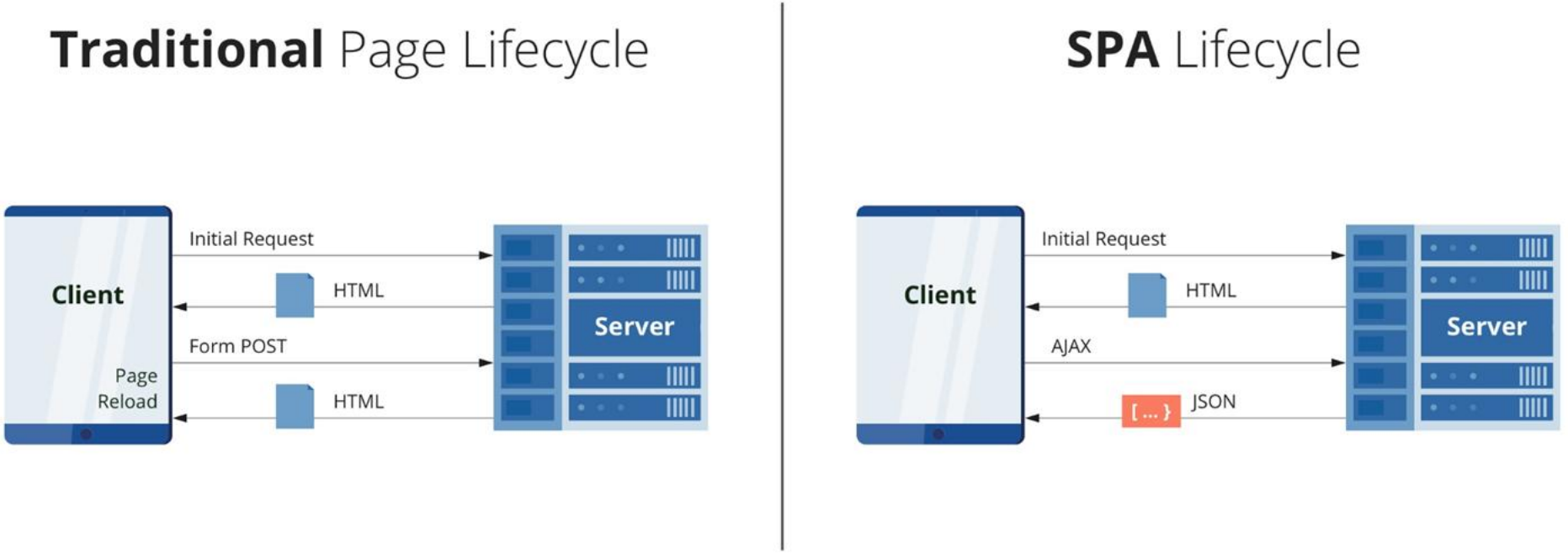
Website front - end (HTML + CSS + JS)

- How it works?

  The browser downloads the HTML, CSS and JS files (and the rest of the media as images and fonts) from the server, interprets that info and shows it to us as a web page.

MMB

Traditional vs Single-Page Application (SPA) Lifecycle



MMB

Website front - end

- (Traditional) A traditional page lifecycle consists of loading entirely all the pages of the website when a request is made to the server.

- (Single-page application) The application interacts with the user by dynamically rewriting the current web page with new data from the web server, instead of the default method of the browser loading entire new pages.

MMB

HTML

- The HyperText Markup Language, or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.
  - https://en.wikipedia.org/wiki/HTML

MMB

Most Common HTML Tags

<!DOCTYPE> Defines the document type
<html> Defines an HTML document
<head> Defines information about the document
<title> Defines a title for the document
<body> Defines the document's body
<h1> to **<h6>** Define HTML headings
<a> Defines a link
<p> Defines a paragraph
**
** Inserts a single line break
<i> or **** Italic font
<b> or **** Bold font
<ul> / **<ol>** & **<li>** Ordered / Unordered list & List item
<img> Image
** ** Layer
<!-- text to comment **-->** Defines a comment

MMB

CSS

- Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.
  - https://en.wikipedia.org/wiki/CSS

MMB

CSS Reference

.name_of_class Defines a class (used over more than one element in the document)

#name_of_id Defines an id (used over a single element)

body, html, table, tr, td, etc. Used over all the html items in the document

CSS measurement units: %, px, em, rem, cm, in, vh, vw, etc.

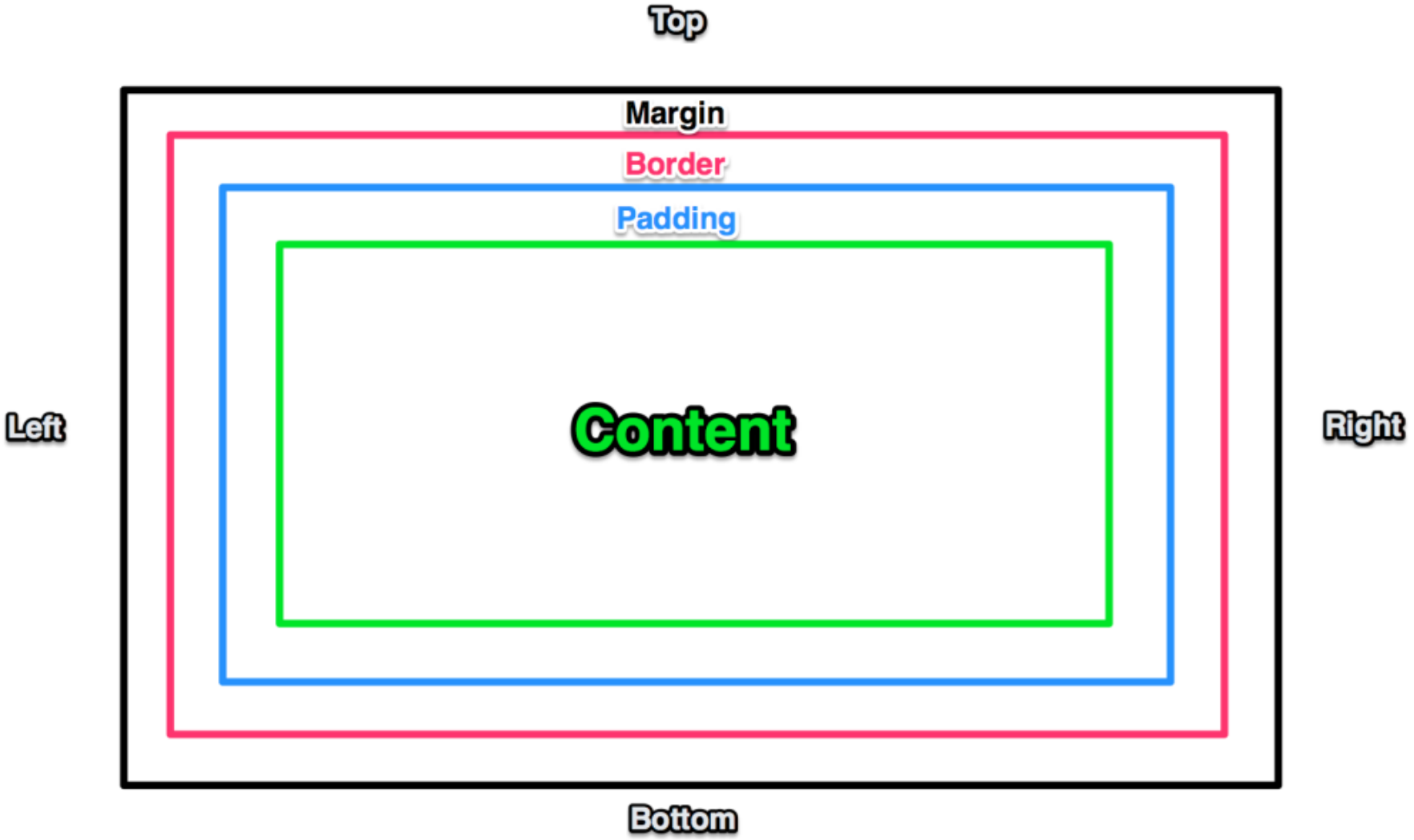
Syntax example:

```
.some_class {
    color: red;
    text-align:center;
}
```

```
#some_id {
    color: red;
    text-align: center;
}
```

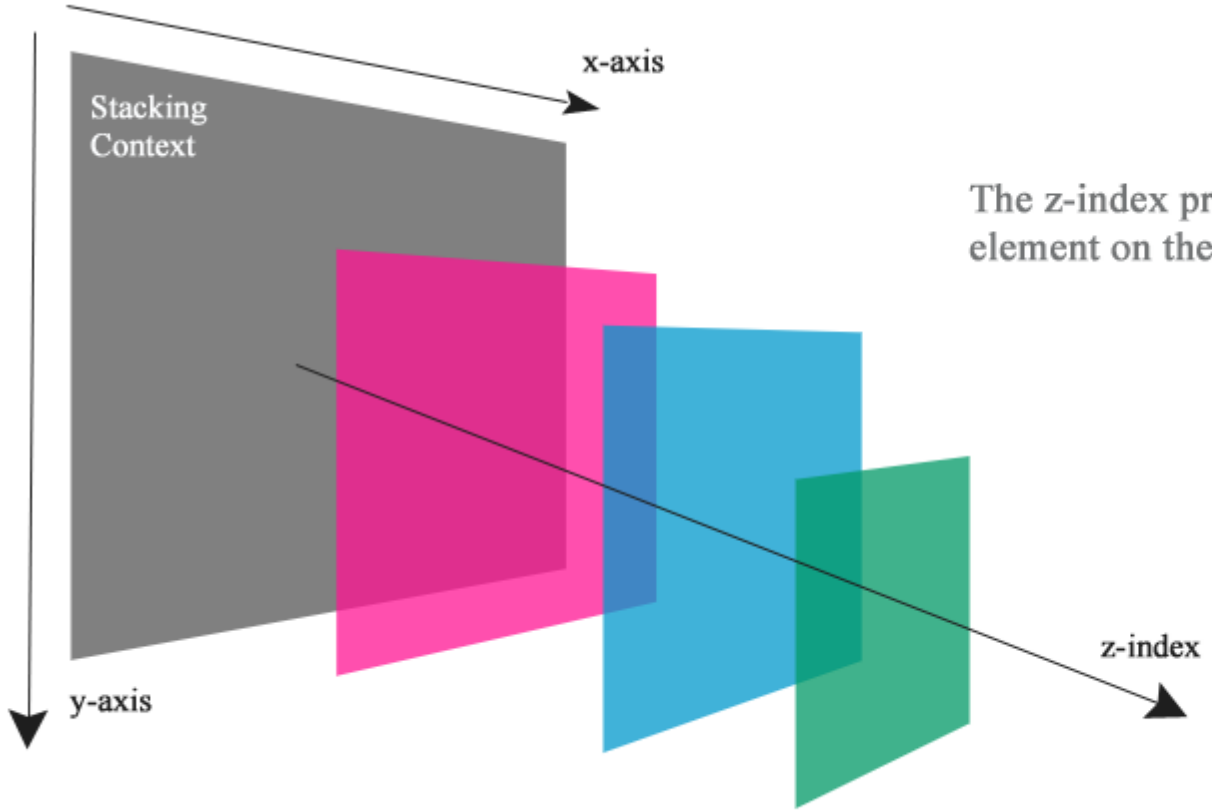
MMB

The CSS box model



MMB

Nesting HTML layers



The z-index property determines the order of the element on the z-axis of the stacking context.

MMB

Front-end tools

- Code Editor or IDE (Visual Studio Code, Webstorm, Atom, Sublime Text...)
- Version control (git / GitHub / GitLab)
- Front-end toolkit (Bootstrap, Tailwind CSS, Bulma, UI Kit...)
- Front-end framework (React JS, Vue JS, Angular JS, Embed JS...)
- Google Fonts
- Font icons (Font Awesome, MDI)
- Chrome/Firefox Dev Tools
- Chat GPT / GitHub Copilot

MMB

Simple Page Example

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">
  <title>Title of your webpage</title>
  <meta name="description" content="Description of your webpage">
  <meta name="author" content="Your Name">
  <link rel="stylesheet" href="css/styles.css">
</head>
<body>
  <div id="layer1">Hello world!</div>
  <script src="js/scripts.js"></script>
</body>
</html>
```

https://www.sitepoint.com/a-basic-html5-template/

MMB

What is Bootstrap?

- It is an HTML, CSS and JavaScript framework that you can use as basis for creating web sites or web applications.

- A framework provides a standard way to build and deploy applications. It’s a universal, reusable software environment.

MMB

Why Bootstrap?

- It's easy
- It's free
- It saves a lot of work
- It's responsive
- http://getbootstrap.com/
- https://startbootstrap.com/

MMB

Yes, but...

MMB

Let’s start!

- https://github.com/jlgelpi/dbw_web

MMB

Website examples

- https://mmb.irbbarcelona.org/3dRS
- https://mmb.irbbarcelona.org/MCDNA
- https://vre.multiscalegenomics.eu
- https://mmb.irbbarcelona.org/biobb
- https://mmb.irbbarcelona.org/biobb-wfs
- https://mmb.irbbarcelona.org/BCE
- https://openebench.bsc.es

MMB

Useful links

- https://css-tricks.com
- http://www.w3schools.com/
- http://stackoverflow.com/
- https://getbootstrap.com/docs/5.3/examples/

MMB