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CSCI 111

Web Programming and Problem Solving

Lecture 2: Basics of HTML

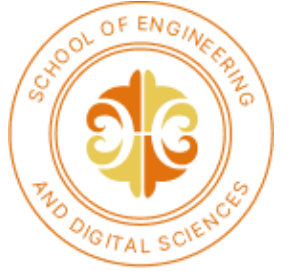
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Credits to Adai Shomanov



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Outline



- Introduction
- History of HTML
- What is HTML?
- HTML Document
- HTML Elements
- HTML Attributes
- Document Object Model
- Useful HTML Resources

Introduction

- To access a website:
 - Retrieve IP by Domain name (DNS)
 - Access the Web server by IP

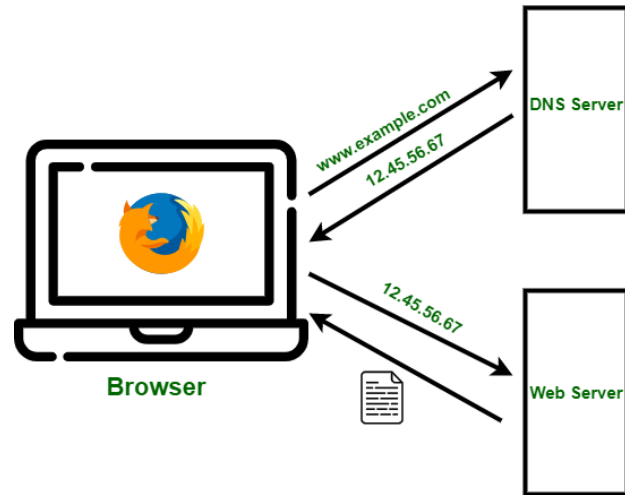


Fig.1 - Before reaching the web server

- To serve the website:
 - Implement **Frontend**: HTML, CSS, JS

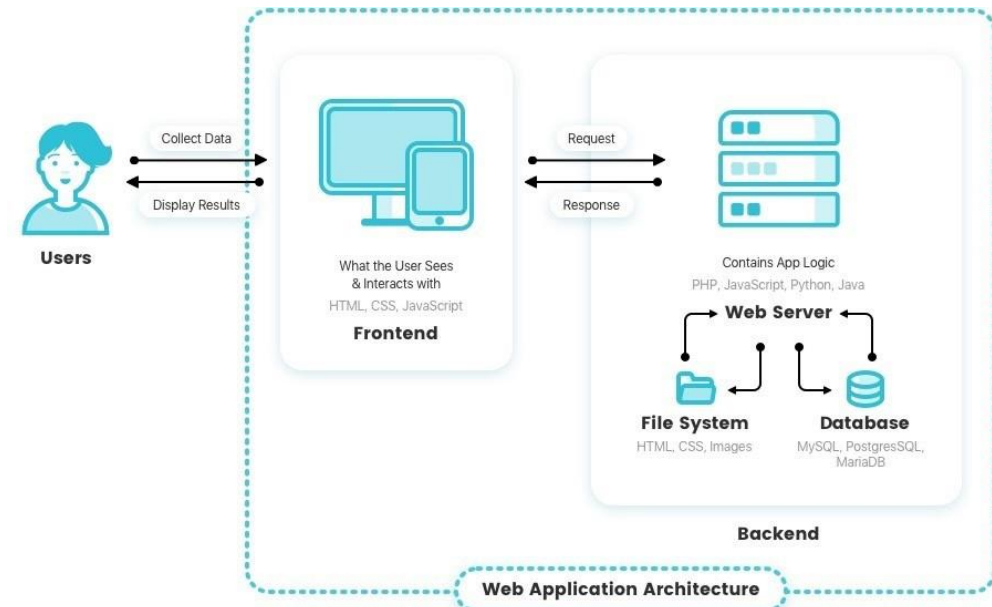


Fig.2 - After reaching the web server



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HTML, CSS, Javascript



- **Hyper-Text Markup Language (HTML)** is the standard markup language for documents designed to be displayed in a web browser.
 - It describes the **structure** of the web page
- **Cascading Style Sheets (CSS)** is a stylesheet language used to describe the presentation of a document written in HTML.
 - It describes the **style** of the web page
- **JavaScript (JS)** is a lightweight and interpreted programming (or scripting) language for Web pages.
 - It adds **behavior** to the web page





History of HTML



1989

1993

1994

2000

2004

2007

2011

- Invention of WWW, HTTP, HTML
 - **Tim Berners-Lee** (CERN)
- Release of WWW software (CERN)
- World Wide Web Consortium (W3C)
- XHTML 1.0 based on XML (W3C)
- WHATWG (Mozilla, Opera, and Apple)
- HTML5 release (WHATWG, W3C)
- HTML5.1, HTML5.2 and HTML5.3



Sir Timothy John Berners-Lee

(8 June 1955), TimBL, is an English computer scientist, professor at MIT, and the director of the World Wide Web Consortium (W3C).

<http://info.cern.ch/>

The WorldWideWeb (W3) is a wide-area hypermedia[1] information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary[2] of the project, Mailing lists[3] , Policy[4] , November's W3 news[5] , Frequently Asked Questions[6] .

What's out there?[7]Pointers to the world's online information, subjects[8] , W3 servers[9], etc.

Help[10] on the browser you are using

Software Products[11] A list of W3 project components and their current state. (e.g. Line Mode[12] ,X11 Viola[13] , NeXTStep[14] , Servers[15] , Tools[16] , Mail robot[17] , Library[18])

Technical[19] Details of protocols, formats, program internals etc

<ref.number>, Back, <RETURN> for more, or Help: █



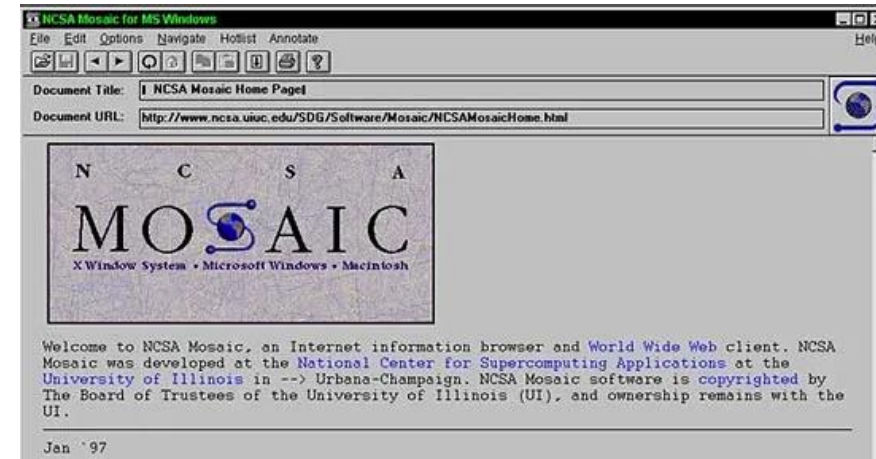
History of HTML



Timeline of popular large
tech company Websites:
Yahoo (1994), **Amazon** (1995),
eBay (1995) and **Google** (1998)



T.B. Lee model **Next**
computer



Mosaic (1993) - The first Web
browser



the first Google page

What is HTML?

Hyper-Text Markup Language

- **Hyper-Text** – a document with hyperlinks (references) to other documents
- **Markup** – a system (set of tags) of text annotation to control its structure, formatting and relationships between its parts

MS Word:

Markdown:

LaTeX:

HTML:

WhatsApp:



Bold Text

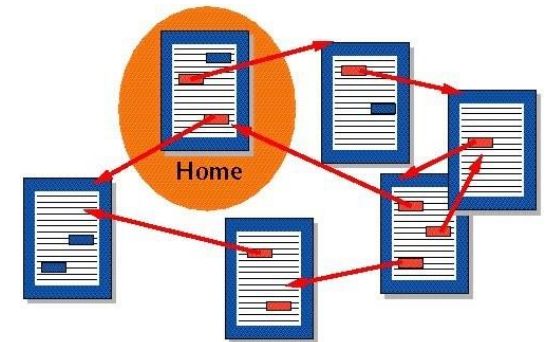
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** Bold Text **

Bold text

- **Language** - a structured system of communication with its alphabet, vocabulary and a grammar (specific set of rules)



What is a HTML document?

- **Text file** with an extension “.htm” or “.html”
- Can be created in a **text editor**
 - Notepad, TextEdit, Sublime, VS Code, WebStorm
- Contains **markup tags (elements)** which direct how a page is to be displayed by browsers
- Must have proper text **encoding** (UTF-8)
- HTML is **not** case sensitive (head = HEAD)

Example: *index.html*

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>My Website</title>
  </head>
  <body>
    <h1>Hello, World!</h1>
  </body>
</html>
```


HTML document consists of **elements**

- **DOCTYPE** – type of document
 - `<!DOCTYPE html>` – stands for HTML5
- **html** – root element of a HTML document
- **head** – section for **meta** information
(encoding, display settings, other resources)
- **title** – title of a document, shown in browser's Tab
- **body** – section for main content of a webpage
- **h1** – defines a heading (**h1-h6**)
- **p** – defines a paragraph

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8">
    <title>My Website</title>
  </head>
  <body>
    <h1>Hello, World!</h1>
    <p>Some paragraph</p>
  </body>
</html>
```

HTML elements must follow specific **structure** and **rules** to be correctly processed and shown in browsers

- Elements consist of **opening** tag, **content** and **closing** tags (except for some elements):
 - `<h1>Hello, World!</h1>` - no spaces after `<` and `</`
 - `<hr>`, `
` `<meta>` - no closing tags, no content
- Elements must be correctly **nested**
 - **CORRECT:** `<body> <h1> Hello, World! </h1> </body>`
 - **WRONG:** `<body> <h1> Hello, </body> </h1>`
World!
- Special element for **comments**: `<!-- Browsers don't show this content -->`

HTML Attributes



- Elements may have **attributes** that come in **name="value"** pairs
 - `<meta charset="UTF-8">`
- Attributes provide **additional information** about elements
- Attributes are always specified in the **opening** tag
 - `<h1 color='blue'> Hello, World! </h1>`
- Attribute values must be in **quotes** (single or double)

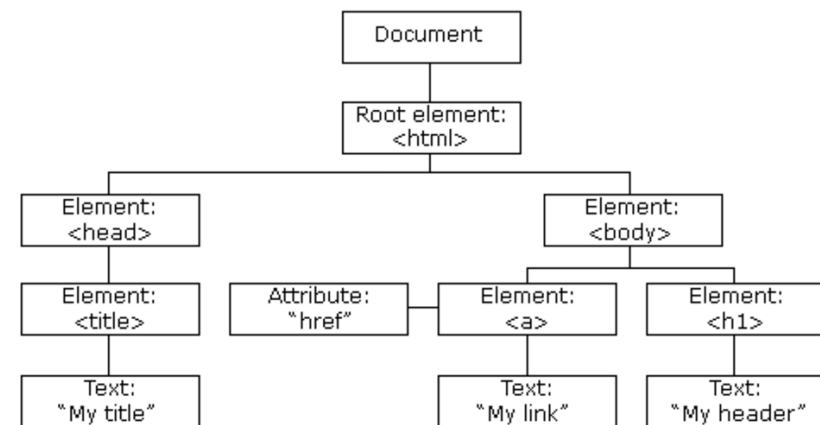


Document Object Model



- When a web page is loaded, the browser creates a **Document Object Model (DOM)** of the page.
- The HTML DOM model is constructed as a **Tree of Objects**.
- HTML Elements can be found and accessed with JavaScript:
 - Finding elements by id
 - Finding elements by tag name
 - Finding elements by class name
 - Finding elements by CSS selectors

The HTML DOM Tree of Objects





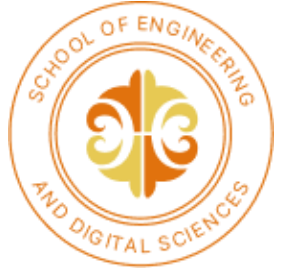
HTML Resources



- HTML Living Standard: <https://html.spec.whatwg.org/multipage/>
- W3C Markup Validation Service: <https://validator.w3.org/>
- W3Schools Code Editor:
https://www.w3schools.com/tryit/tryit.asp?filename=tryhtml_default
- Can I use (Browser compatibility): <https://caniuse.com/>



Summary



- Key takeaways:
 - Web technology (frontend) is based on HTML5, CSS3 and JavaScript
 - HTML Documents are specially written text files
 - HTML elements and attributes direct browsers how to display a web page
 - Document Object Model is a tree like structure associated with HTML document