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Web Development

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Agenda

- What is Web development?
- Front-end development
- Front-end development technologies
- Back-end development
- Back-end development technologies
- Web developer
- Types of Web developer

- How the web works?
- Web developer vs. Web designer

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What is Web development?

- Web development is the work involved in developing a website for the Internet (WWW) or for an Intranet (private network)
- Ranges from developing a simple single static page of plain text to complex web-based applications, electronic business apps, and social network services.
- Also known as Web Programming.
- Usually refers to the main non-design aspects of building Web sites: writing markup and coding.

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Website vs Web Application

Website

It has static content, with the main focus of informing the user about the business vision/products/benefits.

Only Read Mode, the user is unable to manipulate the information.

The website does not need to be pre-compiled before deployment.

The website's function and purpose are quite simple.

The website doesn't require user authentication.

Web Application

It has dynamic content, designed specifically for interaction with the end-users.

Read and Write Mode, the user is able to read and manipulate the information.

This web app should be pre-compiled before the deployment.

The web application's function and purpose are rather complex.

Most web applications require user authentication.

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What is Web application?

- A web application is a computer program that utilizes web browsers and web technology to perform tasks over the Internet.

- Web applications are delivered on the World Wide Web to users with an active network connection.

- Examples of Web applications:
  - Social networking sites
  - E-commerce sites
  - Online forms, Word processors, Spreadsheets
  - Video and photo editors
  - File conversion and scanning
  - …

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Benefits of a web application

- Web applications run on multiple platforms regardless of OS or device as long as the browser is compatible

- All users access the same version, eliminating any compatibility issues

- They are not installed on the hard drive, thus eliminating space limitations

- They reduce software piracy in subscription-based web applications (i.e. SaaS)

- They reduce costs for both the business and end user as there is less support and maintenance required by the business and lower requirements for the end user's computer

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Web applications

- A web app consists of two parts:
  - The front end: users experience, user interface (visual aspects)
  - The back end: the invisible structure, business logic (functional aspects)

- Two broad vision of Web development
  - Front-end Development (or Client-side Development)
  - Back-end development (or Server-side Development)

- Different skillsets for each part.

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Front-end Development

- Refers to producing a web application so that a user can see and interact with them directly.
- Focuses on the visual elements (user-facing side) of a website.
- Front-end developers:
  - Ensure that visitors can easily interact with and navigate sites by using programming languages, design skills, and other tools.
  - Produce the drop-down menus, layouts, and designs for websites.
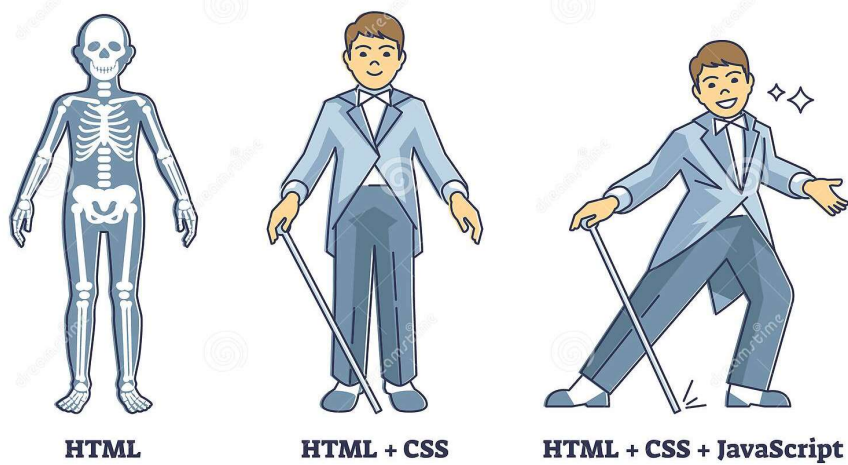 - Work with back-end developers, designers, and user experience analysts.

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Front-end Development Technologies

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Front-end Development Technologies

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Front-end Development

- How is this page built?
- Do you imagine how this page would look like without HTML?

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No HTML?

- Without any markup to give your page content structure, the browser renders unformatted and unstyled text

Amazon Your Account | Help Sign In What is your e-mail address? My e-mail address is: Do you have an Amazon.com password? No, I am a new customer. Yes, I have a password: Forgot your password? Sign In Help Forgot your password? Get password help. Has your e-mail address changed? Update it here. Conditions of Use Privacy Notice © 1996-2015, Amazon.com, Inc. or its affiliates

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Add HTML Tags

```
<form name="signIn" method="POST" id="ap_signin_form">
    <div id="ap_signin1a_pagelet">
        <div id="ap_signin1a_pagelet_title">
            <h1>Sign In </h1>
        </div>
        <div id="ap_signin1a_email_section_title">
            <h2>What is your e-mail address?</h2>
        </div>
        <div id="ap_signin1a_email_row">
            <span>
                <label for="ap_email">My e-mail address is:</label>
            </span>
            <span>
                <input id="ap_email" name="email" size="30" maxlength="128" tabindex="1" type="email">
            </span>
        </div>
        <div id="ap_signin1a_password_section_title">
            <h2> Do you have an Amazon.com password? </h2>
        </div>
        <div id="ap_signin1a_new_cust_radio_row">
            <span id="">
                <input name="create" id="ap_signin_create_radio" value="1" tabindex="6" type="radio">
            </span>
            <span id="">
                <label for="ap_signin_create_radio">No, I am a new customer.</label>
            </span>
        </div>
```

- HTML = HyperText Markup Language
- HTML tags give structure and meaning to your content.
  - <p></p> : Organize text into paragraphs
  - <table></table>: Display table
  - <form></form>: Define form for user input
  - <img/>: Add and display image

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With HTML, No CSS

- Much better !!!
  - Readable
  - Clear hierarchy

- But still not good …

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Styling the page

- CSS = Cascading Style Sheet
- Set of rules defining how an HTML element will be presented in the browser.
- Used to format:
  - Color
  - Font
  - Background
  - Spacing
  - Size
  - Borders

```
13
14  body {
15      width: 100%;
16      height: 100%;
17      font-family: 'Open Sans', sans-serif;
18      font-weight: 300;
19      color: #666;
20      background-color: #ddd;
21      font-size: 16px;
22      line-height: 1.6em;
23  }
24
25  html {
26      width: 100%;
27      height: 100%;
28  }
29
```

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CSS is applied

- Look nice, right ?

- Wait !!! What about validation?
  - Email is invalid
  - User forgot to enter the password
  - …

amazon   Your Account | Help

Sign In
What is your e-mail address?

My e-mail address is:

Do you have an Amazon.com password?
○ No, I am a new customer.
● Yes, I have a password:
                                    Forgot your password?

Sign in using our secure server ►

Sign In Help
Forgot your password? Get password help.
Has your e-mail address changed? Update it here.

Conditions of Use Privacy Notice
© 1996-2015, Amazon.com, Inc. or its affiliates

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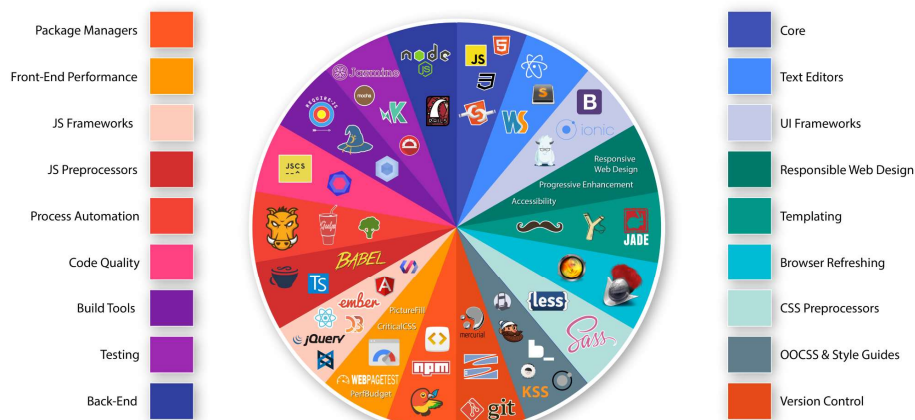
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Scripting Language

- JavaScript was originally designated to manipulate web pages.

- Enable us to create dynamically updating content, control multimedia, animate image, …

- JS can change or update both HTML and CSS

- Nowadays JS is used for a variety of purposes.

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Helpful Tools for Front-End Developer

THE FRONT-END SPECTRUM

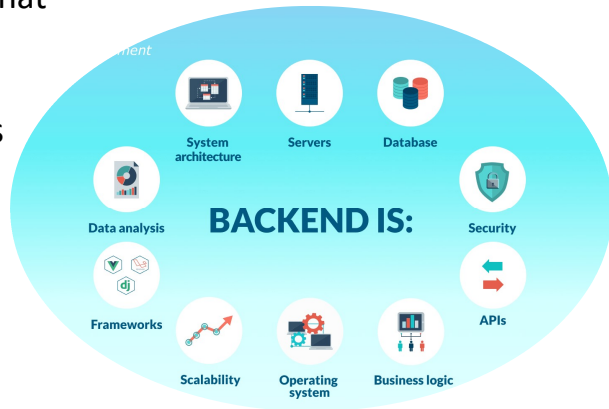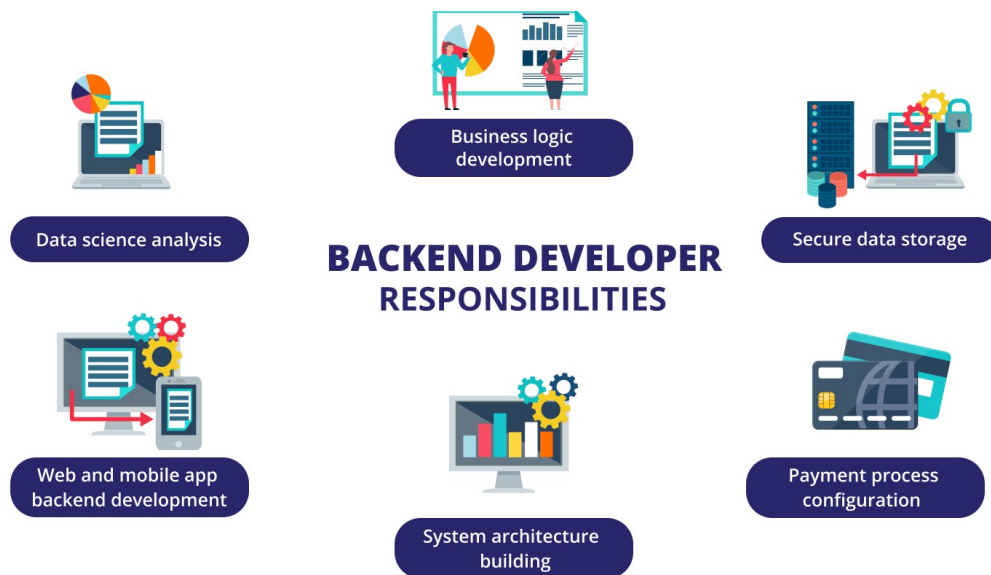| Package Managers | | Core |
Front-End Performance		Text Editors
JS Frameworks		UI Frameworks
JS Preprocessors		Responsible Web Design
Process Automation		Templating
Code Quality		Browser Refreshing
Build Tools		CSS Preprocessors
Testing		OOCSS & Style Guides
Back-End		Version Control

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Back-end Development

- Back-end development controls what goes on behind the scenes of the web applications.
- Backend usually consists of 3 parts
  - A server
  - An application
  - A database
- Users can't see how the backend works.
- Back-end developers focus on the server side of websites.

BACKEND IS:

System architecture · Servers · Database · Data analysis · Security · Frameworks · APIs · Scalability · Operating system · Business logic

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BACKEND DEVELOPER RESPONSIBILITIES

- Data science analysis
- Business logic development
- Secure data storage
- Web and mobile app backend development
- System architecture building
- Payment process configuration

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Who is a Web developer?

- A web developer is a programmer who specializes in the development of World Wide Web applications using a client-server model.

- Web developers typically do the following:
  - Meet with clients or managers to discuss the needs and design of a website
  - Create and test applications
  - Write code using programming languages such as HTML, CSS, C#, PHP, …
  - Work with other team members to determine website's content & structure
  - Work with graphics and other designers to determine the layout
  - Integrate graphics, audio, video into the website
  - Monitor web traffic
  - Optimize the web app for maximum speed
  - …

Types of Web Developer

FRONT-END DEVELOPER

Focuses on layout, graphics, animations, content organization, navigation, user experience, end-device compatibility, responsiveness

HTML, CSS, JS, ...

BACK-END DEVELOPER

Focuses on building code, debugging, database management, integration, security, service orchestration, response times, failure rates

DB, Node.js, Python, C#, ...

FULL-STACK DEVELOPER

Who can work with both FE và BE of a web application.

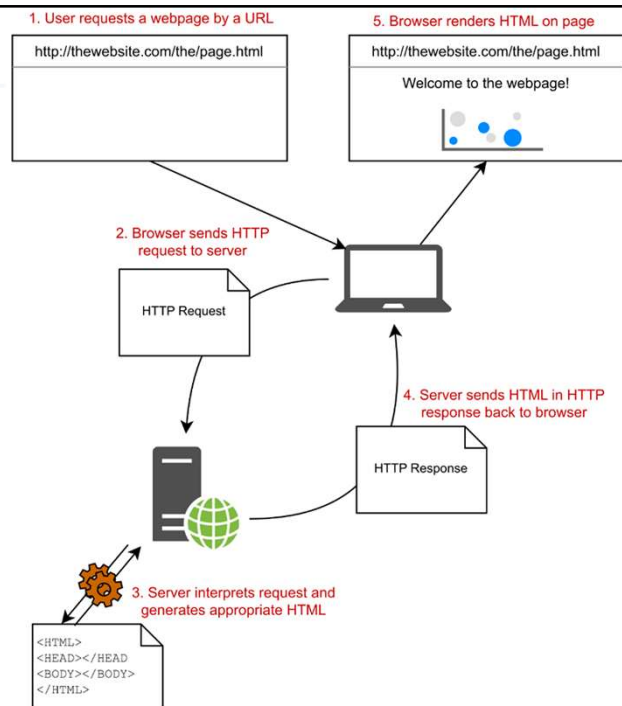FE & BE languages, DB, Frameworks & Libraries, Problem Solving

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How the web works?

- Basic concepts:
  - Client
  - Server
  - Web browser
  - DNS
  - HTTP
  - URI/URL
  - Domain (Hostname)
  - Path
  - HTTP
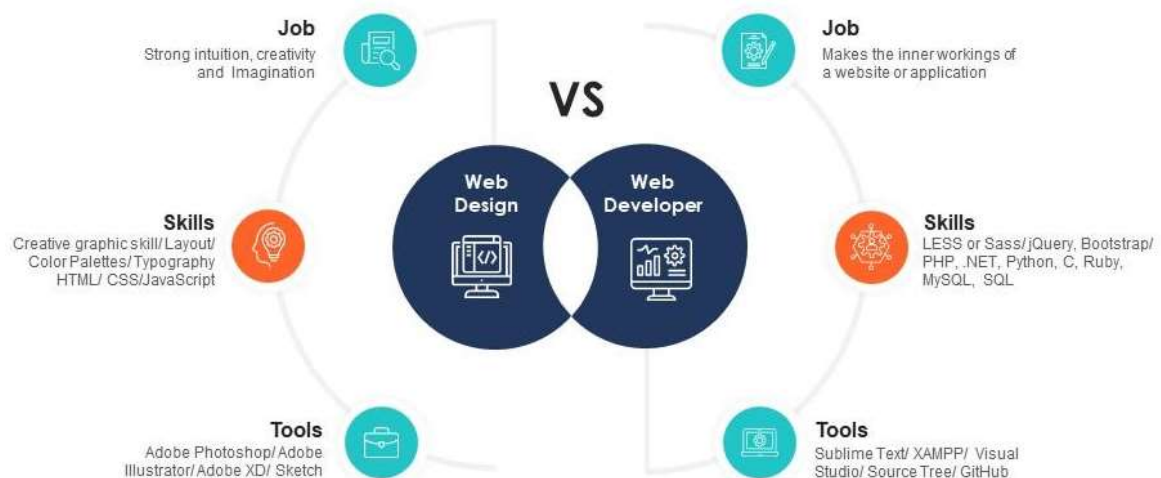 - Cookies

1. User requests a webpage by a URL

http://thewebsite.com/the/page.html

5. Browser renders HTML on page

http://thewebsite.com/the/page.html

Welcome to the webpage!

2. Browser sends HTTP request to server

HTTP Request

4. Server sends HTML in HTTP response back to browser

HTTP Response

3. Server interprets request and generates appropriate HTML

```
<HTML>
<HEAD></HEAD>
<BODY></BODY>
</HTML>
```

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Learn more …

- https://developer.mozilla.org/en-US/docs/Learn/Getting_started_with_the_web/How_the_Web_works
- https://academind.com/tutorials/how-the-web-works
- https://www.freecodecamp.org/news/how-the-web-works-a-primer-for-newcomers-to-web-development-or-anyone-really-b4584e63585c/
- https://github.com/vasanthk/how-web-works

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Web Designer vs. Web Developer

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