

Higher Nationals in Computing

Unit 10: Website Design and Development

ASSIGNMENT 1

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Subject code: 1633

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Assignment due: 27 Nov/2022

Assignment submitted: 1 Dec\2022

ASSIGNMENT 1 FRONT SHEET

| | | | |
|--|--|-------------------------------------|-------------|
| Qualification | BTEC Level 5 HND Diploma in Computing | | |
| Unit number and title | 10: Website Design & Development | | |
| Submission date | 27 Nov 2022 | Date Received 1st submission | 27 Nov 2022 |
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| Student declaration I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice. | | | |
| | | Student's signature | |

Grading grid

| P1 | P2 | P3 | P4 | M1 | M2 | M3 | D1 |
|----|----|----|----|----|----|----|----|
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☐ **Summative Feedback:**

☐ **Resubmission Feedback:**

Grade:

Assessor Signature:

Date:

Signature & Date:

Assignment Brief 1 (RQF)

Higher National Certificate/Diploma in Computing

| | |
|--------------------------------|--|
| Student Name/ID Number: | LE THAI TRUNG TIN/GCS210085 |
| Unit Number and Title: | Unit 10: Website Design & Development |
| Academic Year: | 2021 – 2022 |
| Unit Assessor: | Phan Minh Tam |
| Assignment Title: | Web Technologies |
| Issue Date: | 21 March 2022 |
| Submission Date: | 1 Dec 2022 |
| Internal Verifier Name: | PHAN MINH TAM |
| Date: | 27 Nov 2022 |

Submission Format:

Format: The submission is in the form of two documents/files

- A ten-minute Microsoft® PowerPoint® style presentation which can be shared with your colleagues for feedback. The presentation can include links to performance data with additional speaker notes and a bibliography using the Harvard referencing system. The presentation slides for the findings should be submitted with speaker notes as one copy.
- An extended guidebook or detailed report that provides more thorough, evaluated or critically reviewed technical information on all of the topics covered in the presentation.

Submission

- Students are compulsory to submit the assignment in due date and in a way requested by the Tutor.
- The form of submission will be a soft copy posted on <http://cms.greenwich.edu.vn/>.
- Remember to convert the word file into **PDF file** before the submission on CMS.

Note:

- The individual Assignment *must* be your own work, and not copied by or from another student.
- If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference your sources, using the Harvard style.
- Make sure that you understand and follow the guidelines to avoid plagiarism. Failure to comply this requirement will result in a failed assignment.

Unit Learning Outcomes:

LO1 Explain server technologies and management services associated with hosting and managing websites.

LO2 Categorise website technologies, tools and software used to develop websites.

Assignment Brief and Guidance:

You currently work for a software training company that produces courses and topic presentations to established companies and, importantly, to new start-ups. MWS wishes to pursue a bespoke web-based e-commerce solution. As part of your role, you have been asked to create an engaging presentation to help inform and train staff members on the tools and techniques associated with front- and back-end development together with the technologies and services required to set up, host and manage a typical commercial website. You will find more information in the file *MWS-CaseStudy.docx*.

In addition to your presentation, you will also provide an extended guidebook containing further information for staff members or a detailed report containing a technical review of the topics covered in the presentation.

Your presentation should include:

1. Server technologies and the management services associated with hosting and managing websites.
2. A review of different website technologies supported with the tools and software used to develop websites (including the differences between online website creation tools and custom-built sites).

Your extended guidebook or detailed report should include a summary of your presentation as well as additional, evaluated or critically reviewed technical notes on all of the expected topics.

Learning Outcomes and Assessment Criteria (Assignment 1):

| Learning Outcome | Pass | Merit | Distinction |
|------------------|--|--|---|
| LO1 | <p>P1 Identify the purpose and types of DNS, including explanations on how domain names are organised and managed.</p> <p>P2 Explain the purpose and relationships between communication protocols, server hardware, operating systems and web server software with regards to designing, publishing and accessing a website.</p> | <p>M1 Evaluate the impact of common web development technologies and frameworks with regards to website design, functionality and management.</p> <p>M2 Review the influence of search engines on website performance and provide evidence-based support for improving a site's index value and rank through search engine optimisation.</p> | <p>D1 Justify the tools and techniques chosen to realize a custom built website.</p> |
| LO2 | <p>P3 Discuss the capabilities and relationships between front-end and back-end website technologies and explain how these relate to presentation and application layers.</p> <p>P4 Discuss the differences between online website creation tools and custom built sites with regards to design flexibility, performance, functionality, User Experience (UX) and User Interface (UI).</p> | <p>M3 Evaluate a range of tools and techniques available to design and develop a custom built website.</p> | |

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ASSIGNMENT 1 ANSWERS

P1. Identify the purpose and types of DNS, including explanations on how domain names are organised and managed.

1. What is DNS

The Domain Name System (DNS) is a hierarchical and egalitarian naming system for devices, utilities, and other resources connected to the Internet or private networks.

2. Purposes and types of DNS

2.1. Purposes of DNS

Recursive resolvers, root nameservers, TLD nameservers, and authoritative nameservers are the four types of DNS servers. In a normal DNS lookup (without caching), these four DNS servers collaborate to send the IP address for a particular domain to the client (the client is generally a stub resolver - a rudimentary resolver embedded into an operating system).

2.2. Types of DNS

DNS Query Types

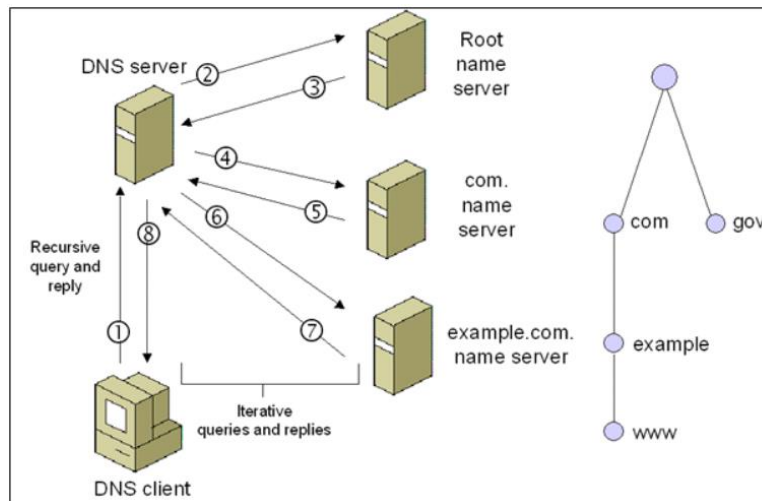


Figure 1: DNS Query Types

Recursive Query: In a recursive query, a DNS client provides a hostname, and the DNS Resolver “must” provide an answer—it responds with either a relevant resource record, or an error message if it can't be found. The resolver starts a recursive query process, starting from the DNS Root Server, until it finds the Authoritative Name Server (for more on Authoritative Name Servers see DNS Server Types below) that holds the IP address and other information for the requested hostname.

Iterative Query: In an iterative query, a DNS client provides a hostname, and the DNS Resolver returns the best answer it can. If the DNS resolver has the relevant DNS records in its cache, it returns them. If not, it refers the DNS client to the Root Server, or another Authoritative Name Server which is nearest to the required DNS zone. The DNS client must then repeat the query directly against the DNS server it was referred to.

Non-Recursive Query: A non-recursive query is one for which the DNS Resolver already has a solution. It either returns a DNS record quickly because it already has it in local cache, or it requests a DNS Name Server

that is authoritative for the record, indicating that it absolutely has the proper IP for that hostname. There is no requirement for extra rounds of questions in either scenario (as in recursive or iterative searches). Rather, the client receives a quick response. DNS Servers The primary DNS server is:

The addresses of all TLD domain servers are stored on the Root DNS servers. While attempting to retrieve an IP address from a hostname, a request first meets the Root DNS servers.

There are multiple servers at ground level handling the load.

Different organizations manage the Root DNS servers:

| List of Root Servers | | |
|----------------------|-----------------------------------|---|
| HOSTNAME | IP ADDRESSES | OPERATOR |
| a.root-servers.net | 198.41.0.4, 2001:503:ba3e::2:30 | Verisign, Inc. |
| b.root-servers.net | 199.9.14.201, 2001:500:200::b | University of Southern California, Information Sciences Institute |
| c.root-servers.net | 192.33.4.12, 2001:500:2::c | Cogent Communications |
| d.root-servers.net | 199.7.91.13, 2001:500:2d::d | University of Maryland |
| e.root-servers.net | 192.203.230.10, 2001:500:a8::e | NASA (Ames Research Center) |
| f.root-servers.net | 192.5.5.241, 2001:500:2f::f | Internet Systems Consortium, Inc. |
| g.root-servers.net | 192.112.36.4, 2001:500:12::d0d | US Department of Defense (NIC) |
| h.root-servers.net | 198.97.190.53, 2001:500:1::53 | US Army (Research Lab) |
| i.root-servers.net | 192.36.148.17, 2001:7fe::53 | Netnod |
| j.root-servers.net | 192.58.128.30, 2001:503:c27::2:30 | Verisign, Inc. |
| k.root-servers.net | 193.0.14.129, 2001:7fd::1 | RIPE NCC |
| l.root-servers.net | 199.7.83.42, 2001:500:9f::42 | ICANN |
| m.root-servers.net | 202.12.27.33, 2001:dc3::35 | WIDE Project |

Figure 2: List of DNS root servers

TLD domain server:

These are the ones classified according to the Top-Level Domain. They are usually the next ones which the iterative query hits after the Root DNS server. They store the TLD specific records for the hostname. Let's say if we are requesting an IP address of medium.com , then the TLD domain servers for “.com” TLD are queried. The TLD domain servers return the address of the Authoritative DNS servers to the Resolver.

| Nameserver |
|----------------------|
| ns6.wixdns.net |
| ns7.wixdns.net |
| ns1.digitalocean.com |
| ns2.digitalocean.com |
| ns3.digitalocean.com |

Figure 3: TLD Name servers pointing to the Authoritative Name servers

Authoritative DNS server:

These are queried iteratively in the end by the Resolver. They store the actual records for type A, NS,

CNAME, TXT, etc. Thus, they return the IP address of the hostname if available. If it is not available even in the

Authoritative DNS server, then they throw an error with the particular message and the process of searching IP addresses across the Nameserver ends.

3. How domains name are organized

Domains are managed by using a worldwide system of domain registrars and databases. The Domain Name System (DNS) provides a mapping between human-readable computer hostnames and the IP addresses used by networking equipment. An understanding of DNS and domain registrar basics will help Account Administrators manage domains for SaaS applications and services, including Google Apps for Business and Microsoft Office 365 for professionals and small businesses. It's helpful to have a basic understanding of DNS and the difference between domain registrars and domain hosting services. Understanding these terms to understand how to register and manage domains. Domain names are used in URLs and email addresses. Domain names are constructed in levels.

For example, mail.contoso.com is a domain name with the following three levels:



Figure 4: Domain names are organized and manager

- ❖ .com is the top-level domain.
- ❖ contoso is the second-level domain.
- ❖ mail is the third-level domain.

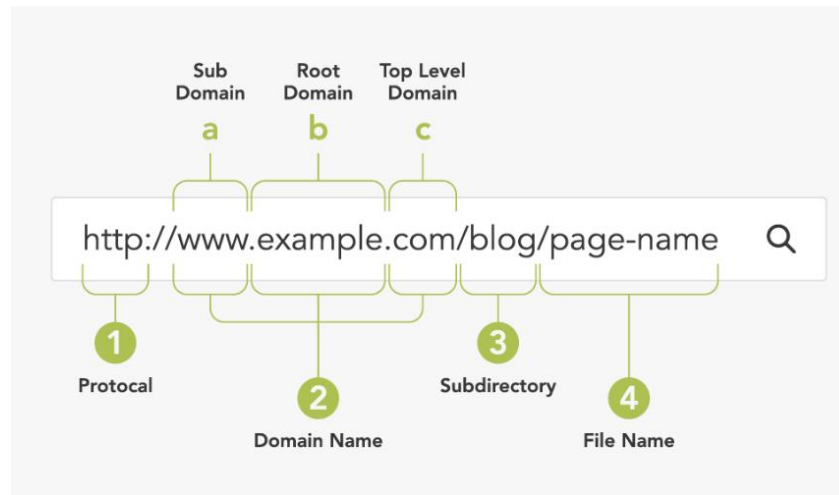


Figure 5: Structure of a Domain Name

Every domain consists of at least two parts: the actual domain name and the TLD or Top Level Domain. In our domain.me example, “.ME” is the TLD of Montenegro and the “domain” part is a domain name or domain label we chose for our site. Some other top-level domains like .COM, .NET, .ORG, .INFO, .US etc. Domains are under the jurisdiction of ICANN, the Internet Corporation for Assigned Names and Numbers which is responsible for creating new and maintaining current top-level domains. Domain name consists of an actual name and the TLD suffix. There is also something called a subdomain, which is the third-level of a domain.

P2. Explain the purpose and relationships between communication protocols, server hardware, operating systems and web server software with regards to designing, publishing and accessing a website.

1.Communication protocol

1.1. Definition

Communication protocols are formal descriptions of digital message formats and rules.

Communication protocols are accurate descriptions of digital communication formats and regulations. The basic function of these protocols is to convey messages from one computer system to another. These are essential in telecommunications networks because they regularly provide and receive messages.

Error detection and repair, as well as signaling and authentication, are all addressed by these protocols. They can also explain semantics and syntax and link analog and digital communications. These protocols can be implemented in hardware as well as software. As a result, there are hundreds of distinct types of communication protocols used all over the world in analog and digital modes. They are required for communication and computer networks to function.

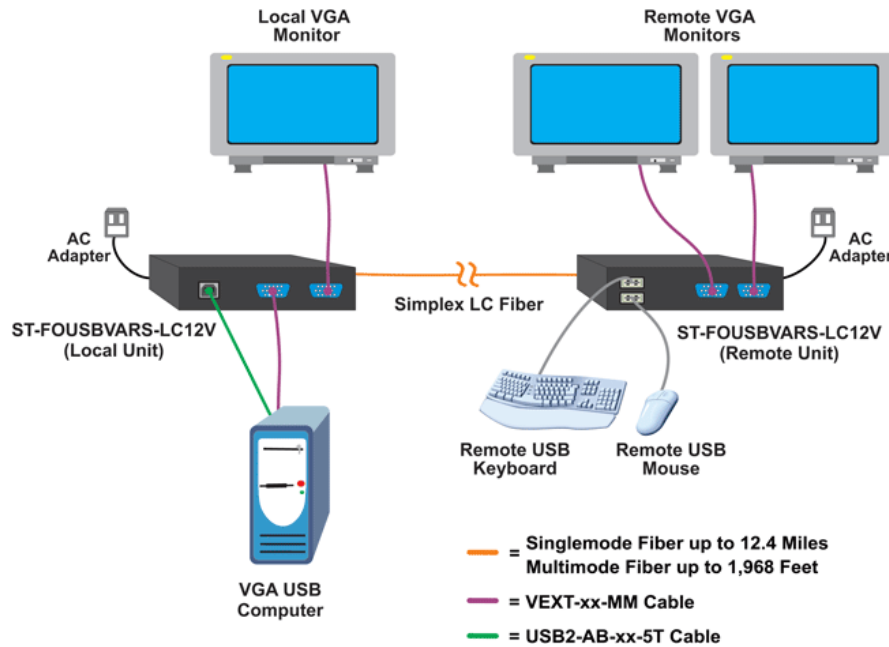


Figure 6: Communication Protocols

1.2. Types of protocol web

Popular protocols include: File Transfer Protocol (FTP), TCP/IP, User Datagram Protocol (UDP), Hypertext Transfer Protocol (HTTP), Post Office Protocol (POP3), Internet Message Access Protocol (IMAP), Simple Mail Transfer Protocol (SMTP),...

TCP/IP

TCP/IP (Transmission Control Protocol/Internet Protocol): TCP/IP is a flow protocol. This indicates that a connection has been established between a client and a server. It is a lossless protocol since any data transferred between these two destinations is guaranteed to arrive. Because the TCP protocol (as it is sometimes abbreviated) can only connect two endpoints, it is also referred to as a peer-to-peer protocol.

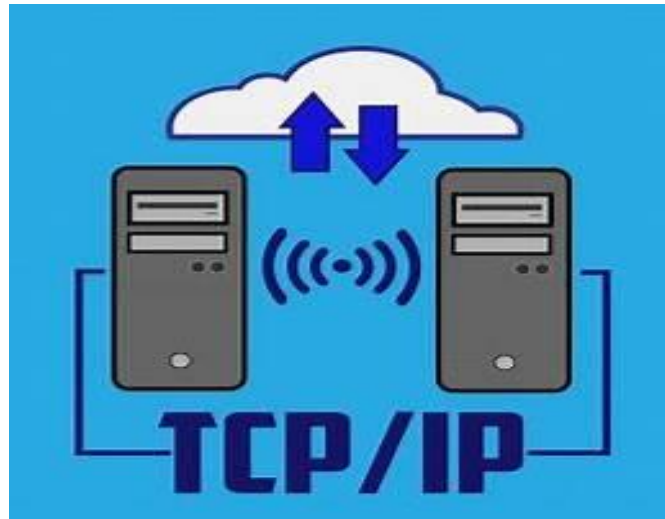
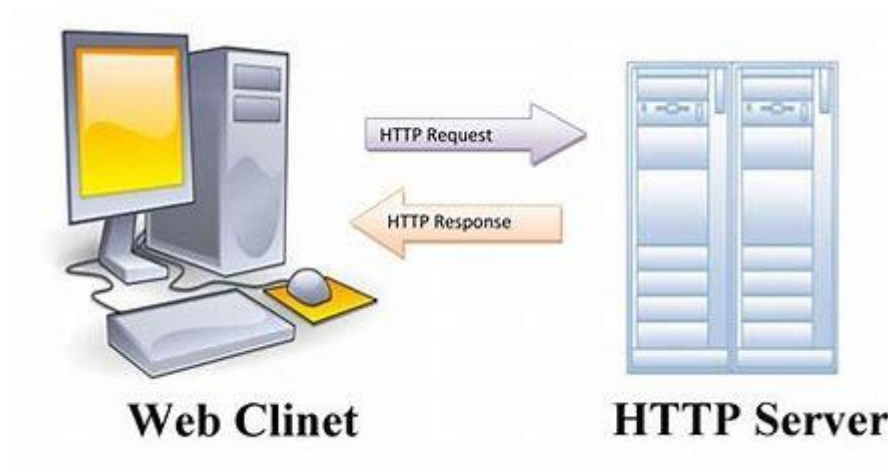


Figure 7: TCP/IP

HTTP

Hypertext Transfer Protocol (HTTP) is the protocol that allows all data on the World Wide Web to be sent. There is text, multimedia, and visuals. It's the protocol used to communicate HTML, the language that powers all of your browser's flashy extras. It is TCP/IP-based.



HTTPS

Hypertext Transfer Protocol Secure (HTTPS) is a protocol that protects communication and data transmission between a user's web browser and a website. HTTPS is HTTP's secure version.



Figure 8: HTTPS

Users are protected from eavesdroppers and man-in-the-middle (MitM) attacks by the protocol. It also safeguards legitimate domains against DNS spoofing attacks.

FTP

FTP is a protocol that is used to transfer files between computers linked by a TCP/IP network, such as the Internet.

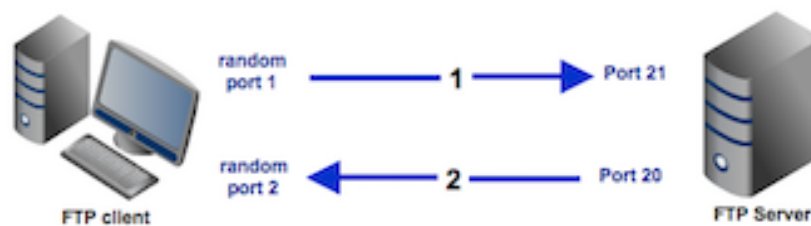


Figure 9: FTP

2. Server hardware

2.1. Definition

Server hardware is a special computer designed for technical or scientific applications, provides functionality for other programs or devices called "clients". A single server can serve multiple clients, and a single client can use multiple servers. A client process may run on the same device or may connect over a network to a server on a different device. Hardware can be defined as the physical components that a computer system needs to function, including:

- Motherboard
- Central Processing Unit (CPU)
- Power Supply
- Random Access Memory (RAM)
- Hard Disk Drive (HDD)
- Video Card



Figure 10: Server hardware of PC

2.2. Types of server hardware

Tower servers

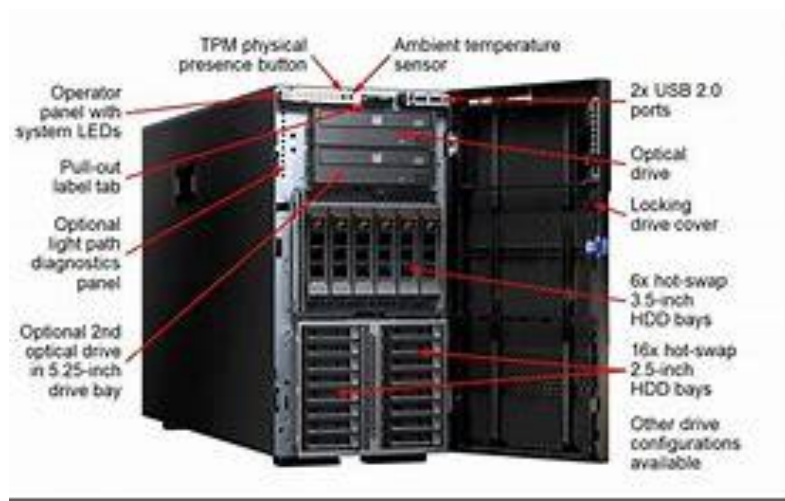


Figure 11: Tower servers

Rack servers



Figure 12: Rack servers

Blade servers

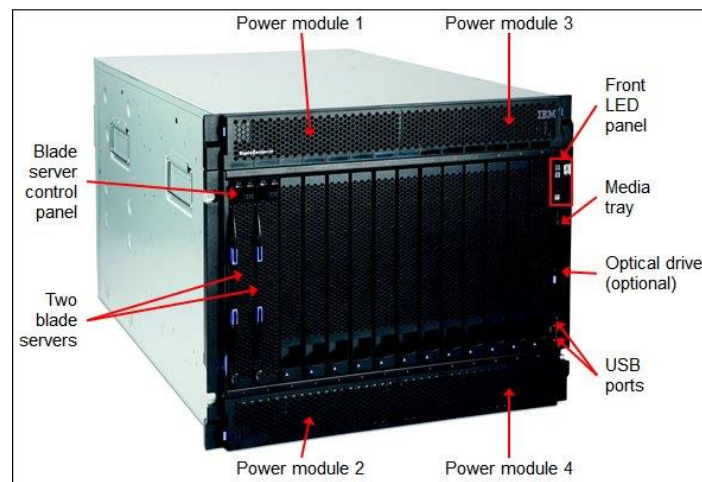


Figure 13: Blade server

3. Operating systems

3.1. Definition

An operating system (OS) is a piece of software that connects computer hardware and the user. Every computer system must have at least one operating system in order to execute additional programs.

Browsers, Microsoft Office, Notepad Games, and other apps require an environment to run in.

The operating system enables you to communicate with the computer even if you do not comprehend its language. A user cannot operate a computer or mobile device without an operating system.

3.2. Server operating system



Figure 14: Operating system server

A server operating system, also called a server OS, is an operating system specifically designed to run on servers, which are specialized computers that operate within a client/server architecture to serve the requests of client computers on the network.

The server operating system, or server OS, is the software layer on top of which other software programs, or applications, can run on the server hardware. Server operating systems help enable and facilitate typical server roles such as Web server, mail server, file server, database server, application server and print server.

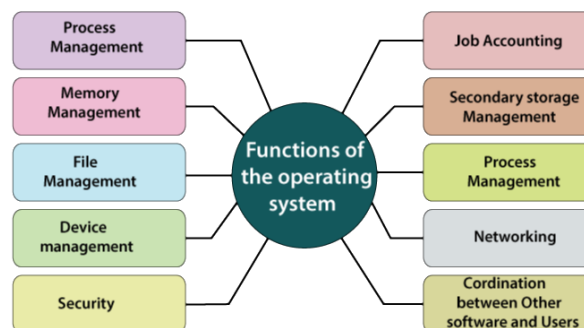


Figure 15: Operating system functions include memory management, file/folders management, processes management, etc.

Device Management: Device management tracks all devices. This module, which is also in charge of this duty, is known as the I/O controller. It is also in charge of device allocation and de-allocation.

File/Folders management: includes all file-related operations such as file organization, storage, retrieval, naming, sharing, and protection.

Process management: Process management allows the operating system to create and remove processes. It also contains tools for process collaboration and communication.

Memory management: The memory management module is in charge of assigning and de-allocating

memory space to applications that require it.

Security: A security module protects a computer system's data and information from malware threats and unauthorized access. This module understands instructions and processes them using system resources.

I/O System Management: One of the primary goals of any operating system is to conceal the idiosyncrasies of the hardware components from the user.

Secondary-Storage Management: Storage levels in systems include primary storage, secondary storage, and cache storage. Instructions and data must be placed in primary storage or cache so that they can be accessed by a running program.

Networking: A distributed system is a collection of processors that do not share memory, hardware, or a clock. The network allows the processors to communicate with one another.

Job accounting: Keeping track of the time and resources used by different jobs and users.

Communication management: Coordination and assignment of compilers, interpreters, and other software resources among computer system users

MOST POPULAR SERVER OPERATING SYSTEMS

Windows Server



Figure 16: Windows Server (Windows 11 2022)

Linux Server



Figure 17: Linux Server

MAC OS X Server



Figure 18: MAC OS X Server

3.3. Web server software

Definition

Web server software is deployed on mainframe computers that are connected to a huge computer network. This is a type of internet server; each server has its own IP address and can read languages like *.htm and *.html... In a word, the server serves as a repository for all data saved on the system.

The world wide web It has been handed managerial authority. Web server software must be installed on a computer with a large capacity and extremely fast speed in order to store and operate a data warehouse on the internet. It will seamlessly manage an internet-connected computer system via each server's unique connection ports. These web servers must run continually in order to keep their computer network's data supply running.

A server with additional capabilities than a web server meant to store data for a subset of an internet-connected network of devices All internet services rely on this server to function.



Figure 19: Web Server Software

Every Website sits on a computer known as a Web server. This server is always connected to the internet. Every Web server that is connected to the Internet is given a unique address made up of a series of four numbers between 0 and 255 separated by periods. For example, 68.178.157.132 or 68.122.35.127. When register a web address, also known as a domain name, such as example.com, developer have to specify the IP address of the Web server that will host the site. They can load up with Dedicated Servers that can support their web-based operations. There are four leading web servers – Lighttpd, IIS, apache and Jagsaw.

Apache HTTP Server

This is the most popular web server in the world developed by the Apache Software Foundation. Apache web server is an open source software and can be installed on almost all operating systems including Linux, Unix, Windows, FreeBSD, Mac OS X and more. About 60% of the web server machines run the Apache Web Server.

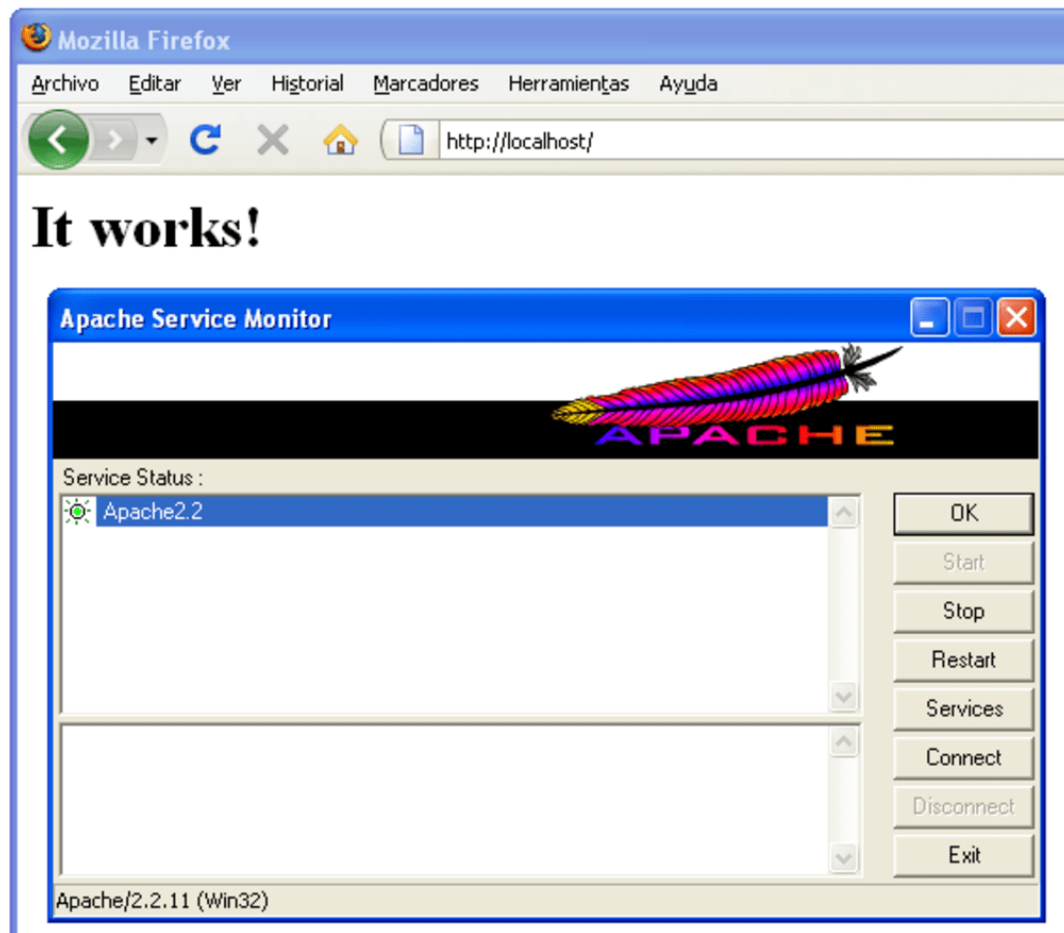


Figure 20: Apache HTTP Server

The Internet Information Server (IIS)

The Internet Information Server (IIS) is a high performance Web Server from Microsoft. This web server runs on Windows NT/2000 and 2003 platforms (and may be on upcoming new Windows version also). IIS comes bundled with Windows NT/2000 and 2003; Because IIS is tightly integrated with the operating system so it is relatively easy to administer it.

Lighttpd: The lighttpd, pronounced lighty is also a free web server that is distributed with the FreeBSD operating system. This open source web server is fast, secure and consumes much less CPU power. Lighttpd can also run on Windows, Mac OS X, Linux and Solaris operating systems.

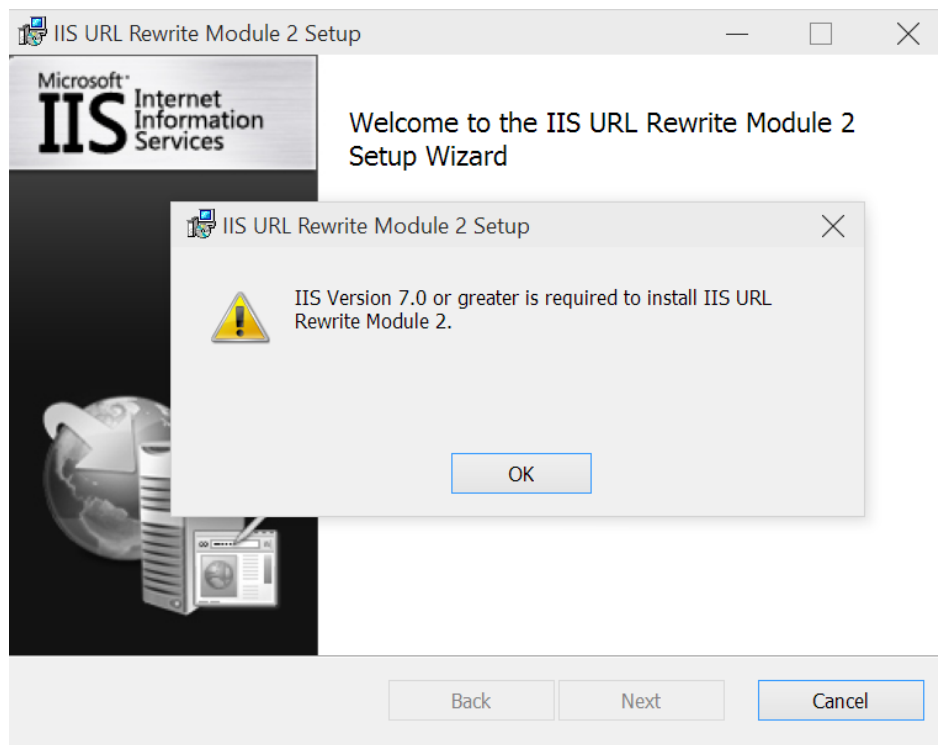


Figure 21: The Internet Information Server (IIS)

Sun Java System Web Server

This web server from Sun Microsystems is suited for medium and large websites. Though the server is free it is not open source. It however, runs on Windows, Linux and Unix platforms. The Sun Java System web server supports various languages, scripts and technologies required for Web 2.0 such as JSP, Java Servlets, PHP, Perl, Python, Ruby on Rails, ASP and Coldfusion etc.



Figure 22: Sun Java System Web Server

Jigsaw Server

Jigsaw (W3C's Server) comes from the World Wide Web Consortium. It is open source and free and can run on various platforms like Linux, Unix, Windows, Mac OS X Free BSD etc. Jigsaw has been written in Java and can run CGI scripts and PHP programs.

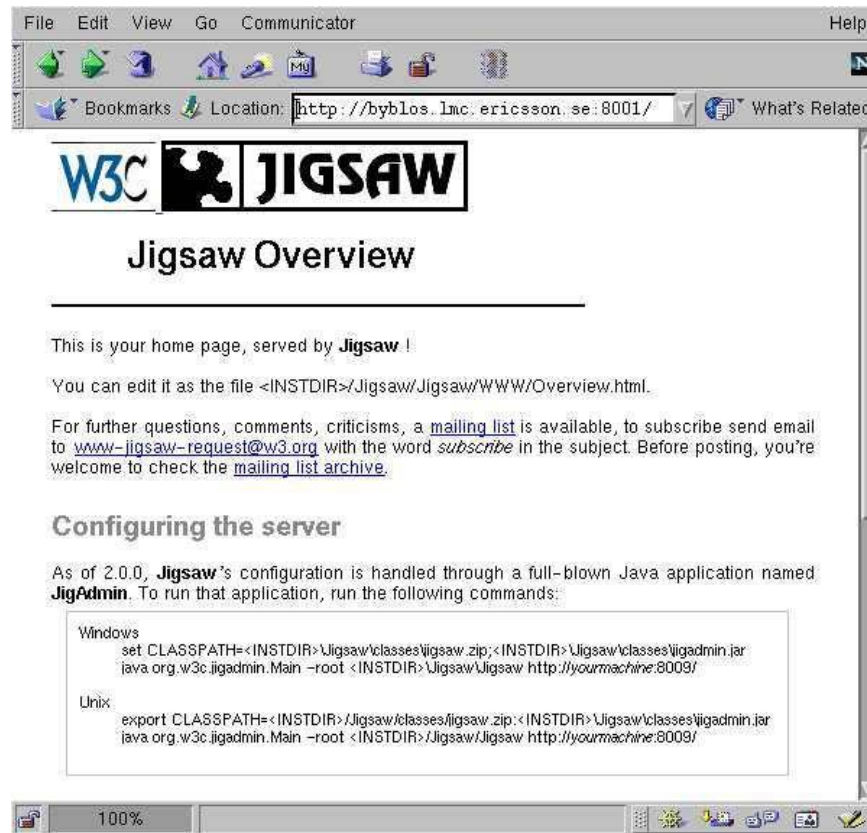


Figure 23: Jigsaw Server

4. Explain the relationship between Communication protocol, Server hardwares, Operating systems, Web server software

4.1. The purpose

Communication protocols: Inter-network protocol, information exchange protocol, and interaction protocol are all terms used to describe communication protocols. In the world of information technology, this is referred to as a protocol. The goal of the communication protocol is to link subnets together for data transfer, signal transmission, authentication, data representation, and data error detection. The structure of data packets as a single and essential unit of data transfer on the Internet is defined by data transmission between the transport layer and the network layer, allowing computers and devices to connect and share information.

Server equipment: The hardware component of a computer is what we can see, grasp, and touch. A monitor, mouse, keyboard, wires, CPU, RAM, and other components comprise the computer's hardware. Hardware is produced by computer manufacturing companies. components that will be used to run the program

Operating systems: Software is essentially instructions that may be stored and executed by hardware.

Software on a computer refers to apps that operate inside the computer and cannot be handled or touched. A computer has a lot of software. Each piece of software performs a certain purpose.

Software for web servers:

- ✓ Organize communication between users and between systems.
- ✓ Provide program resources and information on how to coordinate their execution.
- ✓ Set up data storage on external memory and provide tools for finding and retrieving data.
- ✓ Examine and support peripheral devices with software to make them more easy and effective to use. System utilities help with interlocations.
- ✓ Interlocations are supported by system utilities.

4.2. Relationship between them

Communication protocol: The protocol provides communication rules, syntax, semantics, synchronization, and error recovery mechanisms. Protocols can be implemented using hardware, software, or a combination of both.

Server Hardwares: Hardware refers to all of the tangible things that can be touched and seen that have been merged and constructed into a single entity known as a Personal Computer (PC). In this case, it may be a laptop or one of your smart gadgets.

Operating system: The operating system (OS) runs on top of the hardware. The operating system (OS) is the software that provides the interface for communicating with the hardware. Of course, there's more to it than that. The operating system communicates with the kernel through device drivers, which deliver "commands" to the hardware to do the tasks that you specify.

Web server software: Web Server Software is also just a piece of software. It is installed and operates on a computer - the server serves as a Web Server, and users can access Web site information from another computer on the network (Internet, intranet) ... Web servers can send Web clients over the Internet (or Intranet) using the HTTP protocol.

5. How to publishing and accessing a website on Internet

The following actions must be taken before publishing on the internet:

- **Step 1:** Create the content for your website.
- **Step 2:** Create and launch your website in step two.
- **Step 3:** Locate a web host
- **Step 4:** Do a quality assurance audit in step four.
- **Step 5:** Use Web flow to publish your website.

The actions listed below must be taken in order to visit a website:

- **Step 1:** Obtaining Internet access



Figure 24: Access to the internet

- **Step 2:** After having the Internet, we open web browsers such as: Google Chrome, Microsoft Edge, Firefox,



Figure 25: Web browsers

- **Step 3:** Enter the keyword of the website we need to find in the search bar of the web browser

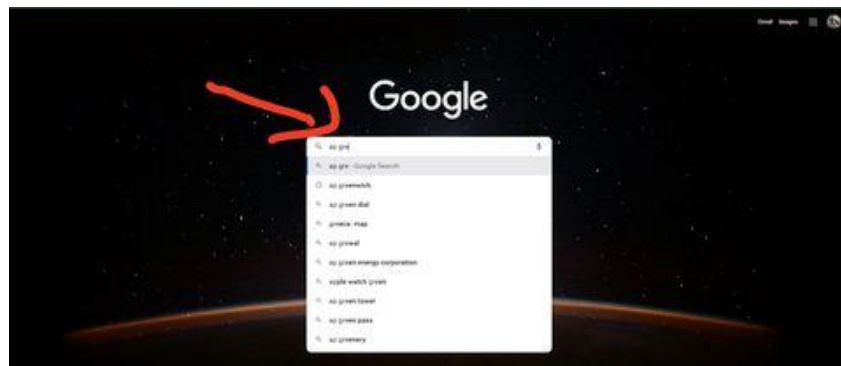


Figure 26: Enter the keyword

- **Step 4:** After searching the browser will give us different results and we just need to click on the top websites

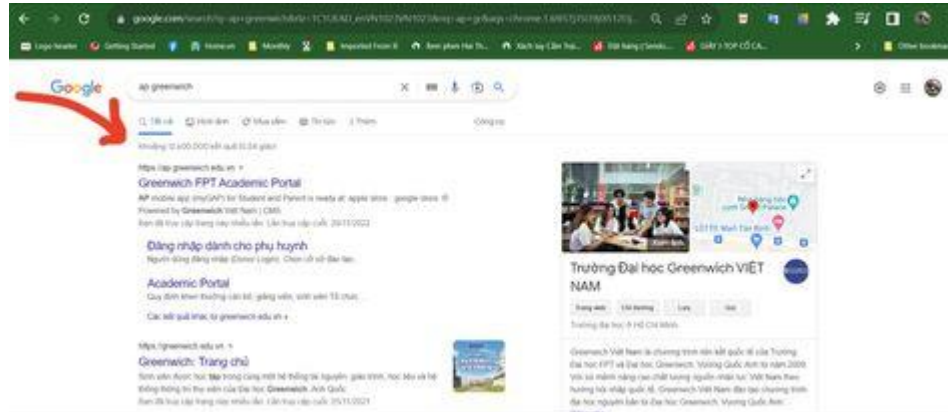


Figure 27: Search result

P3. Discuss the capabilities and relationships between front-end and back-end website technologies and explain how these relate to presentation and application layers.

1. Front – End

1.1. What is a Front – End

Front-end development is the part of web development that the end user sees. As a result, front-end developers are primarily responsible for creating user interfaces (UIs) with which users can interact.

Front-end development is converting back-end code into something that the user can simply navigate using a graphical interface.

While back-end development is largely concerned with servers, databases, and other internal structures, front-end development guarantees that an application or website can be used efficiently.

You could be looking at an awful muddle of code right now if you didn't have front-end web development. To ground Trio's association, you have structured text with suitable headings and an appealing blue motif.

Front-end development requires a variety of important abilities. For example, mobile-first and responsive web design (RWD) are two design approaches that aim to fit design elements suitably to different screen sizes.

This is vital to keep in mind if you want web apps or websites to be available via mobile devices as well as web browsers.

In general, accessibility, speed, and performance are critical goals for front-end development.

To build front-end behavior, web development, in particular, necessitates a specialized set of essential tools. Front-end web development is built on the foundations of HTML, CSS, and JavaScript.

Work that back-end web developers do includes:

- ❖ Building code.
- ❖ Troubleshooting and debugging web applications.
- ❖ Database management.
- ❖ Framework utilization.

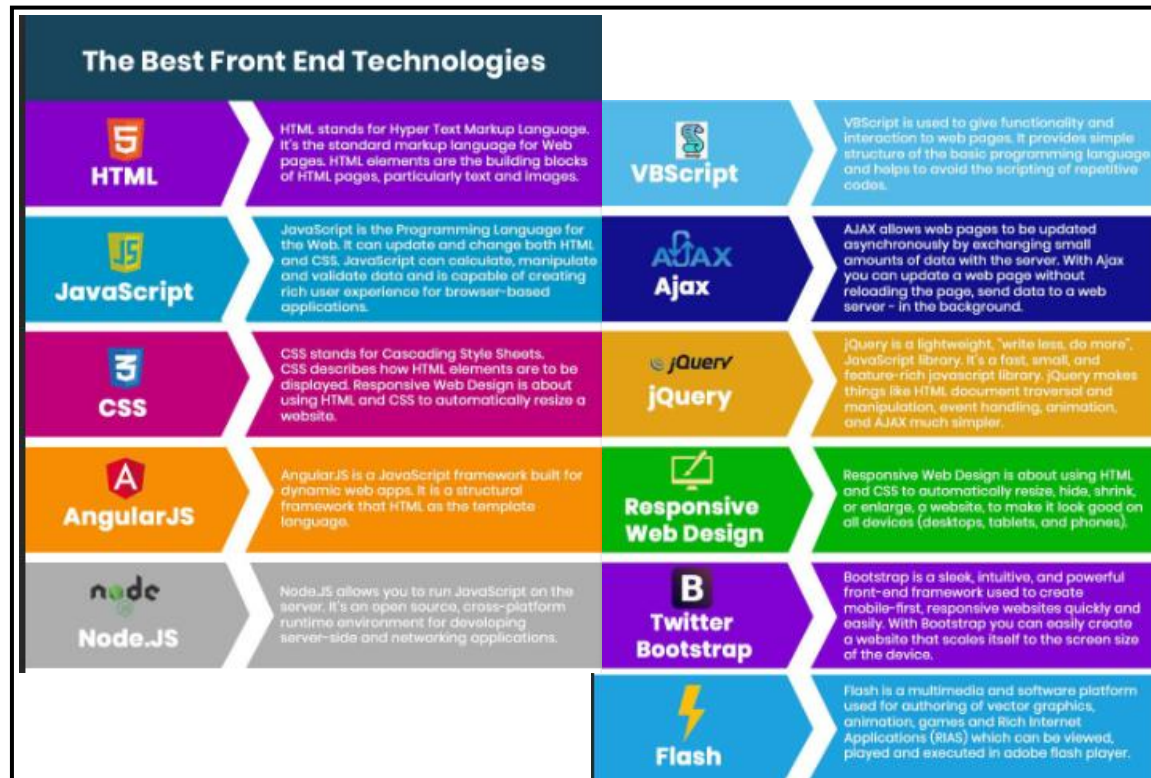


Figure 28: Front-End

1.2. Front-End technologies

JavaScript

JavaScript has been around for roughly a quarter-century. The programming language is well-known for transforming the web due to its dynamic features. The term dynamic refers to malleable content, whereas static refers to inflexible content. The web as a whole was static prior to the introduction of JavaScript. A web page was essentially a block of text. Then came JavaScript, which enabled interactivity such as scrolling and clicking, among other things. JavaScript is now used on the vast majority of websites and serves as the foundation for the vast majority of front-end frameworks, many of which will be discussed briefly today.

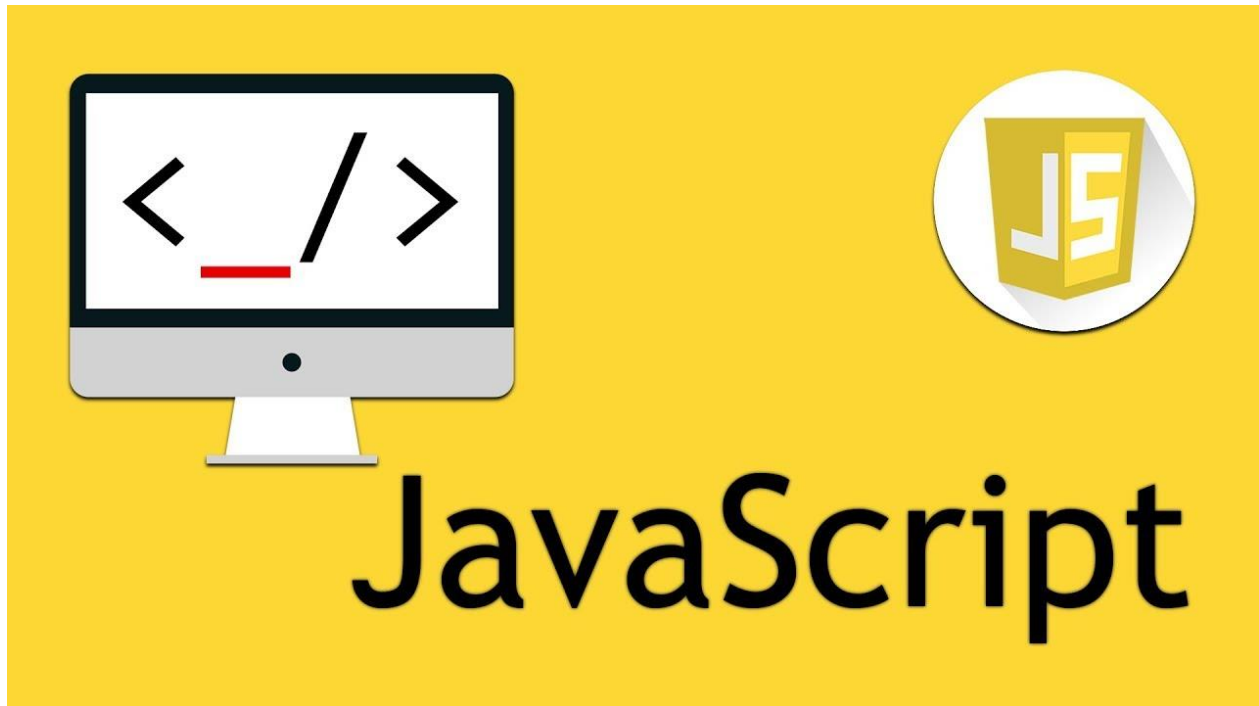


Figure 29: JavaScript

HTML

Hypertext Markup Language (HTML), along with JavaScript and CSS, is a fundamental web technology. Its primary function is to organize content by preparing documents for web page display. HTML5, which was released in 2014, allowed HTML to integrate multimedia components such as video and audio natively. This advancement effectively eliminated the need for Adobe Flash Player and similar plug-ins. HTML is used on every online page because it tells a web browser how to display text, graphics, and other content on a page.



Figure 30: HTML

CSS

Cascading Style Sheets (CSS) denotes the styling and presentation of a document. For instance, any HTML document counts on CSS to manage the visual details of the web page. Layouts, colors, and fonts are all under the jurisdiction of CSS. And CSS3 — the latest edition of CSS as of 2001 — modularized CSS specifications, giving developers more flexibility overall.



Figure 31: CSS

Angular

Angular is a JavaScript framework for writing web interfaces (Front-end), developed by Google. Angular helps developers build single-page applications using HTML and TypeScript faster.

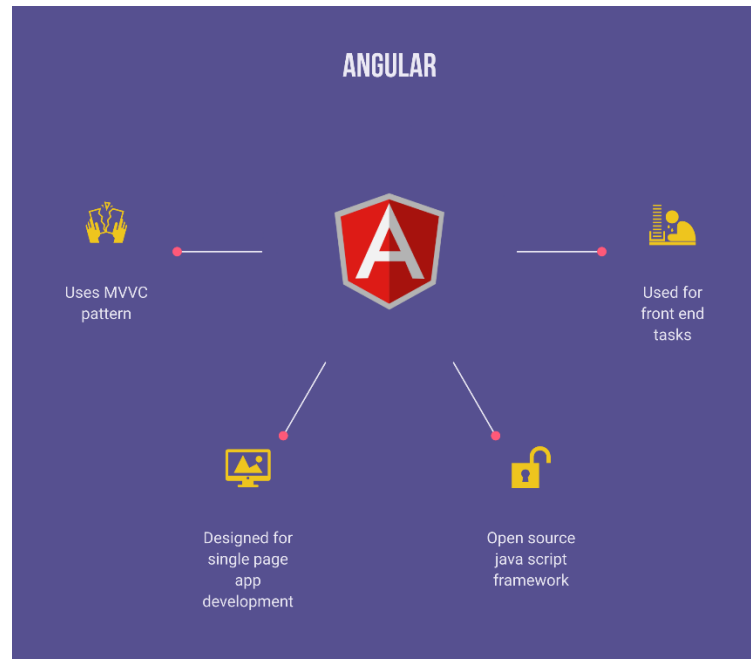


Figure 32: Angular

2. Back-End

2.1. What is a Back – End

Back-end development is server-side programming, which contains libraries that aid in website server configuration. It is not visible to users, yet it is important to the project's success. It is vital for the project to employ the finest back-end frameworks.

The back-end of any application comprises of tools, backend logic, databases, servers, APIs, code libraries, and other technologies necessary to construct server-based logic. The back-end consists of three parts: a server, a database, and an application that executes the logic.

Back-end development is crucial for developers as well as the overall system. It acts as the application's basis for future development. It acts as a propeller, driving the entire system forward.

The following are the key benefits of a powerful backend:

- ❖ Saving time on development
- ❖ Better quality of product
- ❖ Scalability and robustness
- ❖ Enhanced security and seamless integration

BACK END



Figure 33: Back-end

2.2 Back-End technologies

Net Core

Net Core +.NET Core is a multi-purpose open source development platform maintained by Microsoft and the.NET community on GitHub. It is cross-platform (it works with Windows, macOS, and Linux) and can be used to create device, cloud, and IoT apps.

Cross-platform: It is compatible with Windows, macOS, and Linux.

Be consistent across architectures: your source code should behave consistently across numerous system architectures, including x64, x86, and ARM.

Command-line tools: This section contains simple command-line tools that may be used for local development as well as in continuous integration settings. + Parallel installation is feasible with flexible deployment (user-wide or system-wide installation). It is compatible with Docker containers.

Through the.NET Standard,.NET Core is interoperable with the.NET Framework, Xamarin, and Mono.

The.NET Framework is open source. Core Platform is free and open source, licensed under the MIT and Apache licenses. .NET Core is a project of the.NET Foundation. + Microsoft Supported: According to.NET Core Support, Microsoft supports.NET Core.



Figure 34: Net Core(3.0)

PHP

PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages.

PHP is a widely-used, free, and efficient alternative to competitors such as Microsoft's ASP.

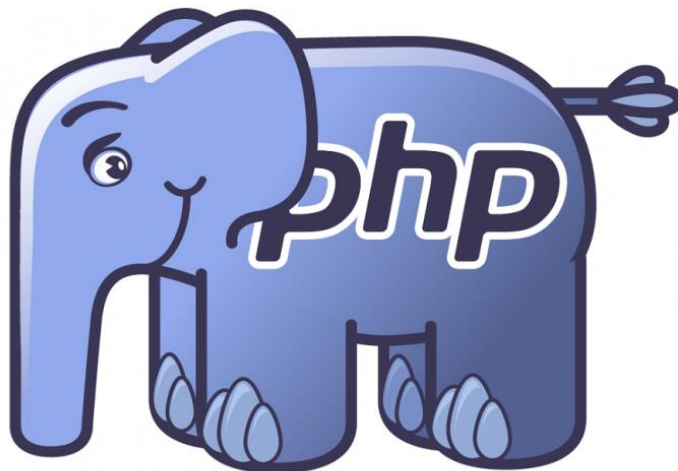


Figure 35: PHP Logo

Java

Java has emerged as the object-oriented programming language of choice. Some of the important concepts of Java include:

- ✓ A Java virtual machine (JVM), which provides the fundamental basis for platform independence
- ✓ Automated storage management techniques, such as garbage collection
- ✓ Language syntax that is similar to that of the C language

The result is a language that is object-oriented and efficient for application programming.



Figure 36: Java

3. Relationship between front-end and back-end

The user interface is referred to as the "front-end," while the server, application, and database operate behind the scenes to give information to the user. The user submits a request using the interface. It is then checked and relayed to the server, which retrieves the required data from the database and returns it to the user.

Frontend and backend development are quite distinct, although they are both facets of the same scenario. The frontend is what users see and interact with, whereas the backend is where everything happens.

The frontend is the component of the website that users can see and interact with, such as the graphical user interface (GUI) and command line, as well as the design, navigation menus, messages, texts, images, videos and other elements.

The backend, on the other hand, is the component of the website that visitors cannot view or interact with.

Frontend refers to the visual parts of the website that visitors can see and experience. Everything that happens in the background, on the other hand, may be assigned to the backend.

Front-end languages include HTML, CSS, and JavaScript, whereas back-end languages include Java, Ruby, Python, and .Net.

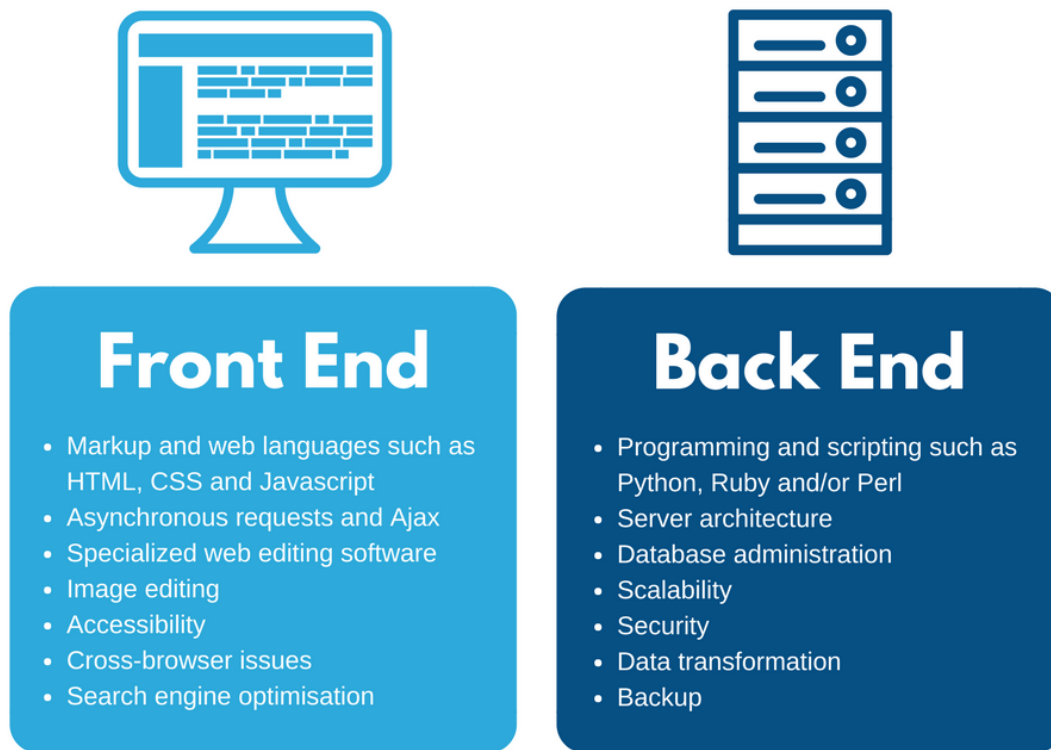


Figure 37: The relationship between Front-end and Back-end

P4 Discuss the differences between online website creation tools and custom-built sites with regards to design flexibility, performance, functionality, User Experience (UX) and User Interface (UI).

1. What is UX?

UX is an abbreviation for User Experience, which meaning "user experience." Simply simply, user experience (UX) is the evaluation of users while using a product. such as: Is your website or app easy to use, and is such a layout possible? Is the product's intended purpose met?

A **UX Designer** is someone who works on user experience. UX Designers will investigate and assess client patterns and behaviors before evaluating specific website/App items. Here, use and assessment are essentially matters of convenience and efficiency when the system works.

EXAMPLE: You are now browsing this post on the website Greenwich.com.vn, and you are seeking for any website facts and wisdom, but if Greenwich adds too many intrusive advertising, it impacts you. When it comes to discovering your information, which causes you to lose concentration, the UX or user experience on the website Greenwich.com.vn is poor. As a result, Greenwich strives to strike a balance between UI/UX so that readers enjoy the greatest possible experience on the Greenwich.com.vn website.

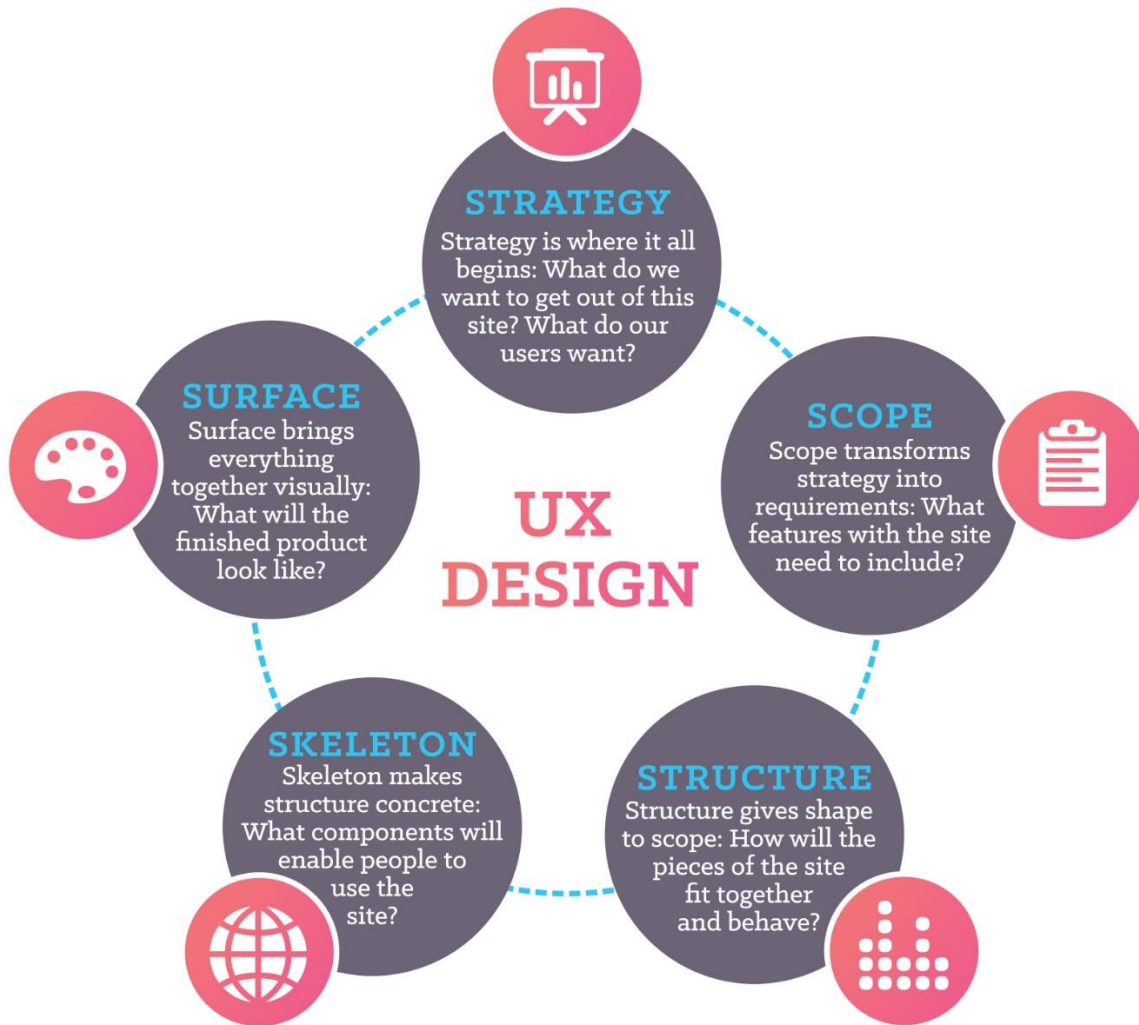


Figure 38: UX Design

2. What is UI?

UI is an abbreviation for User Interface, which meaning user interface. In its most basic form, UI contains everything that the user can see, such as web colors, layout layout, what typefaces the web/app employs, and appealing images on the web. or not, ...

UI is a design element that transmits messages from designers, service providers, and goods to consumers. Simply said, the designer functions like a programmer or constructor to ensure that their product is understandable and usable by everybody.

AN EXAMPLE: When you create a bed as a carpenter, the thing you make must first appear like a bed; can't the bed be like a table? Then, similarly, UI is understood here.



Figure 39: UI Design

3. Online website creation tools

3.1. Definition

A website builder is a tool meant to make the difficult process of establishing a successful website easier to understand.

Specifying how each page hosted by a provider would work in order to construct an online presence for a person or organization required a large amount of code prior to the advent of website builders. Instead, there are now choices for constructing simple, low-code, visually attractive websites.

There are several website builders available, each with its unique set of features and functions.

Using drag-and-drop builders, some products enable businesses to create visually appealing portfolio webpages with a large amount of content. Others have more open-source and versatile coding environments. You can even use website builders to create websites where you can sell goods and services.

According to current regulations, tool software is one of five types of software products exploited and used today. Current types of software products include:

- System software
- Application software
- Utility software
- Tool software

- Other software

3.2 Web creation tools

Blogger

Blogger is a service of google. The advantage of this tool is that it is free, has many beautiful interfaces, and because it belongs to google, of course, websites created with this tool are also "preferred" in the google search bar.

The basic steps to build a website with Blogger are as follows:

- **Step 1:** Go to the address: blogger.com and log in to your Gmail account.
- **Step 2:** Fill in some information about the title and address of the website. Click create blog to create a website
- **Step 3:** Choose a theme (interface) for your website and post it on your website. Next, you just need to write content for your website.



Figure 40: Blogger

WEEBLY

Weebly is also a trusted free web design tool. With just the following simple steps, you can design your own website just like professional web programmers:

- **Step 1:** Visit website: <https://www.weebly.com/> and create a free account
- **Step 2:** Choose the type of website that suits your individual needs: Blog, Site or Store (if you want to use the store, it usually costs money).
- **Step 3:** Choose a theme (interface) for the website
- **Step 4:** Set a domain name for your website

➤ **Step 5:** Now, you can start publishing posts on your website.

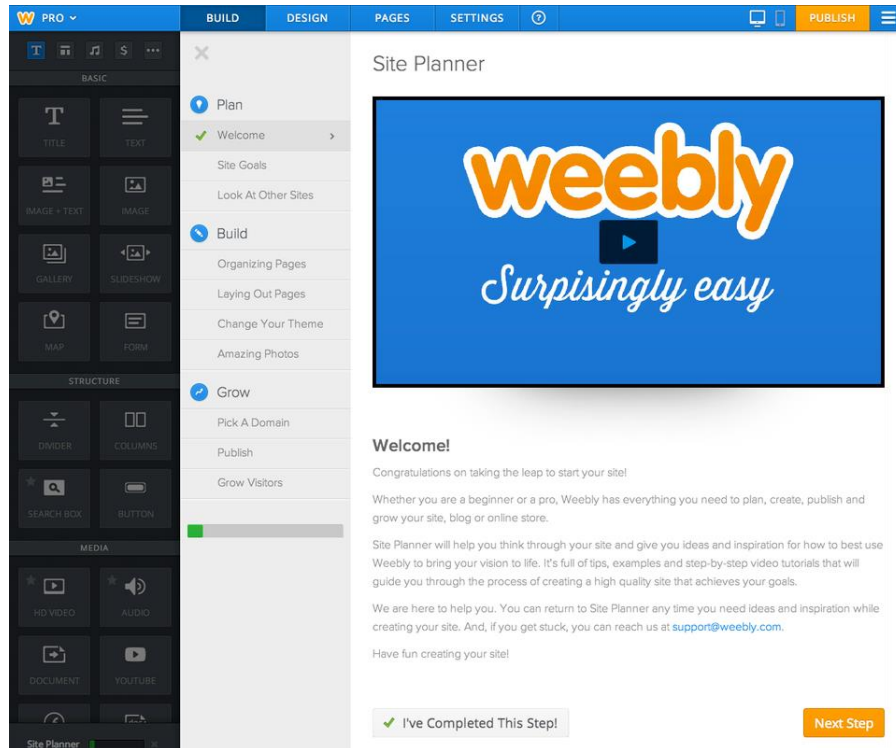


Figure 41: Weebly

4. Custom build site

4.1. Definition

A custom-built website is created from the ground up. It is coded to meet your company's needs. There is no template that will limit your options.

Custom-built websites are adaptable to changes and will grow with your company. Personalized sites, as opposed to templated ones, are easier to alter.

Pros:

- ❖ Custom-fit to the business
- ❖ Unlimited designs
- ❖ Can be updated anytime
- ❖ Flexible when businesses grow
- ❖ Highly responsive and optimized for mobile

Cons

- ❖ Expensive
- ❖ Time-consuming

- ❖ The website is dependent on the skill of the developer

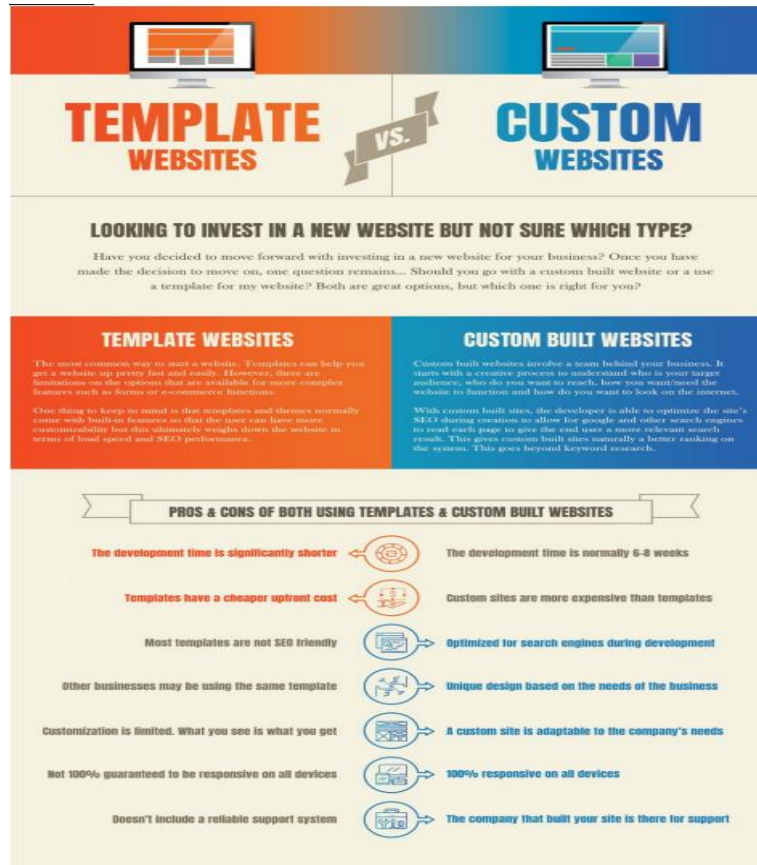


Figure 42: Comparison table custom build site

4.2 Custom build site technologies

BOOTSTRAP STUDIO

BOOTSTRAP STUDIO is an application website building tool that provides pre-installed functions and solutions. Specialized in helping web developers create websites quickly using Bootstrap framework.

In addition, BOOTSTRAP STUDIO with its intuitive, clear interface and drag-and-drop functions help you create a beautiful, user-friendly website and adjust every little detail in your website.

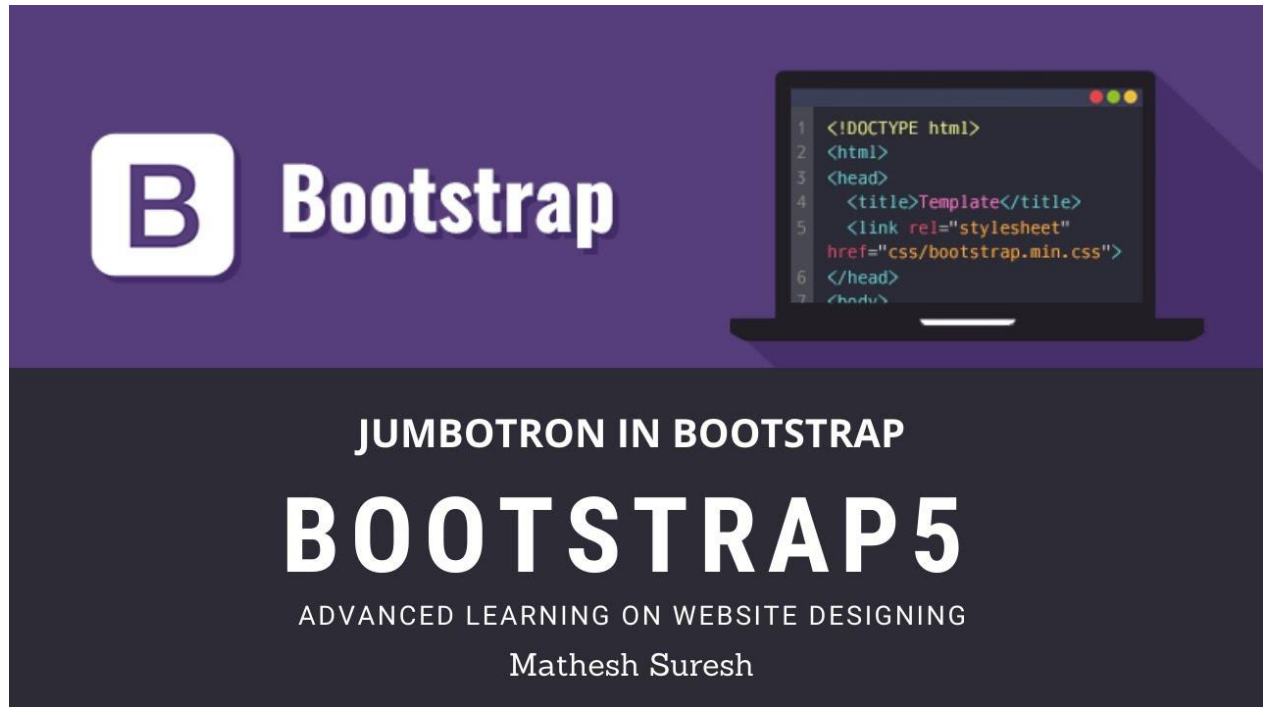


Figure 43: Bootstrap

HTML To WordPress

HTML TO WORDPRESS is the leading and most optimized website building tool. Specialized in converting static HTML websites into WordPress by automating a lot of manual processes. All you need to do is upload a website to this tool and in just a few seconds it will convert the website into WordPress. Featured with a quality interface, full of features installed and activated.



Figure 44:HTML to Wordpress

ONEPAGER

ONEPAGER is an open-source website builder that allows you to quickly edit everything on your website and tweak the look and feel exactly to your liking.

With this tool, you can easily build a multi-device and SEO-friendly website using the built-in settings.

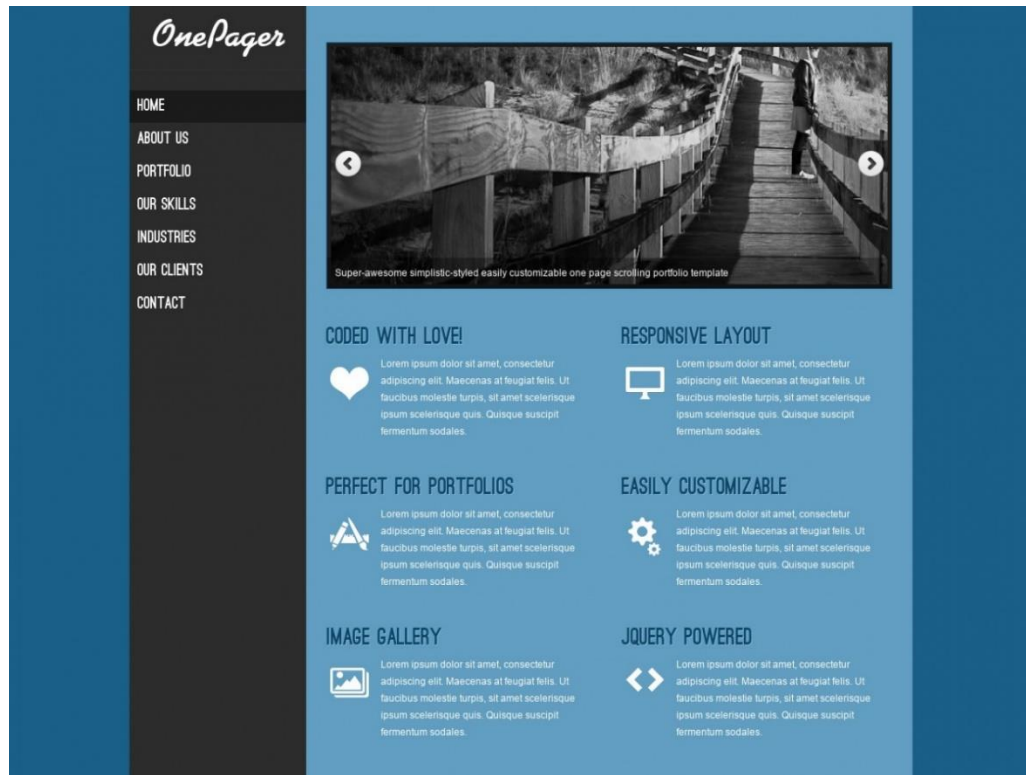


Figure 45: Onepager

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