WEB DESIGN AND DEVELOPMENT

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Alliance with FPT Education

BTEC

ASSIGNMENT 1 FRONT SHEET

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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 tha
false declaration is a form of malpractice.

	Student's signature	

Grading grid

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❒ Summative Feedback:	❒ Resubmission Feedback:

Grade:	Assessor Signature:	Date:

Internal Verifier's Comments:

Signature & Date:

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I. An introduction to the basics of web design and development.

1. What is the web design?

a. What is Web?

Dictionary defines, “Web is a complex system of interconnected elements”.

Besides, web means – interconnected electronic – or called it is web pages.

b. What is Web Site?

A Web Site is a related collection of World Wide Web (WWW) Files that includes a beginning File called a Home page.

A company or an individual tells you how to get to their Web Site by giving you the address of their home page.

From the home page, you can get to all the other pages on their Site.

For example, the Web Site For IBM has the home page address of www.ibm.com .

Tim Berners-Lee invented the World Wide Web in1989. He Founded and Directs the World Wide Consortium (W3C) the Forum for technical development of the web.

c. What is Web Design?

Web design is the planning and creation of websites.

This includes many elements.

Web design includes:

- Information architecture
- User interface
- Site structure
- Navigation
- Layout
- Colors
- Fonts and imagery,

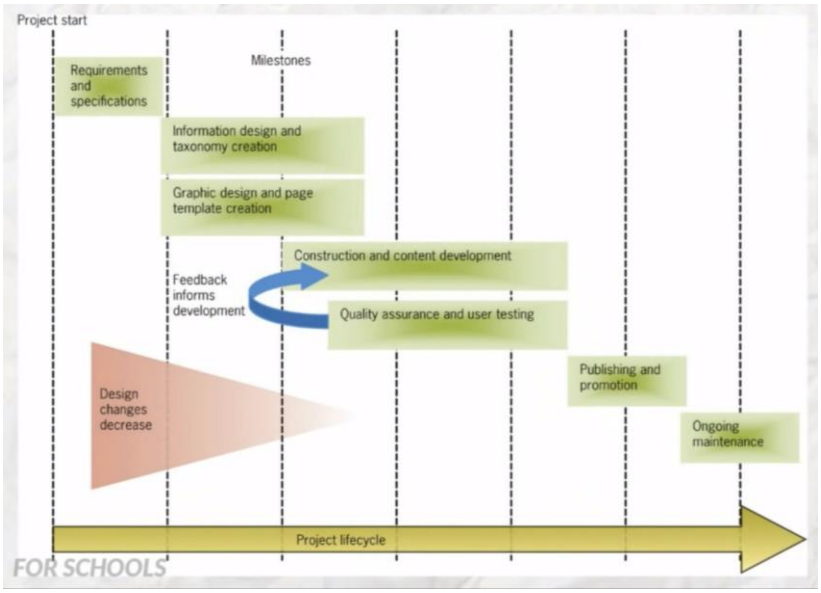
All of these are combined with the principles of design to create a website that meets the goals of the owner and designer.

Design is a Key Part of Web Design.

This includes both the design principles: balance, contrast, emphasis, rhythm and unity.

And the design elements: lines, shapes, texture, color and direction.

2. The steps or life cycle of web design.

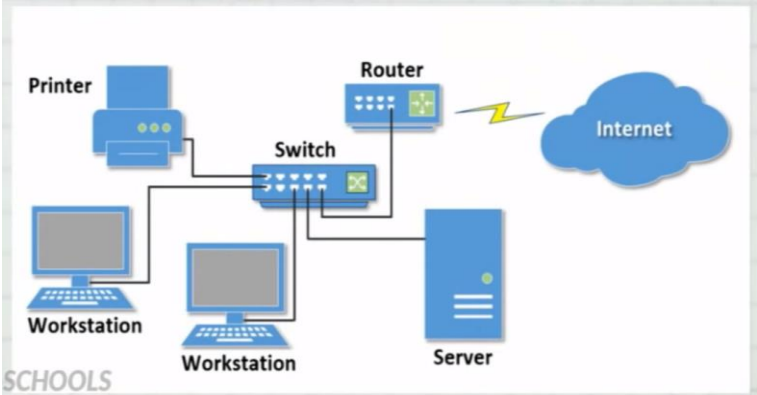


Web Design and Development life cycle

3. Web design technology.

Technical Architecture

Computer network: Two or more computers connected together for the purpose of communicating and sharing resources.



Computer network

Internet: Two more computer networks connected together for the purpose of communicating and sharing resources – Network is called Internet.

Internet infrastructure is a high capacity communication link that carries data gathered from smaller links that interconnect with it.

Internet and Internet Infrastructure

The client and server model: It can describe a relationship between two computer programs – the "client" and the "server".

The client: Client requests some type of service such as file or database access from the server.

The server: Server fulfills the request and transmits the results to the client over a network.

The client/Server model

The web client:

- Connected to the Internet when needed.
- Usually runs web browser (client) software such as Internet Explorer or Firefx.
- Uses HTTP (Hypertext Transfer Protocol).
- Requests web pages from server.
- Receives web pages and files from server.

The web server:

- Continually connected to the Internet.
- Runs web server software such as Apache or Internet Information Server.
- Uses HTTP (Hypertext Transfer Protocol).
- Receives request for the web page.

- Responds to request annd transmits status code, web page and associated files.

HTTP - Hypertext Transfer Protocol:

- A set of rules for exchanging files such as text, graphic images, sound, video and other multimedia files on the web.
- Web browsers send HTTP requests for web pages and their associated files.
- Web servers send HTTP responses back to the web browsers.

Domain name:

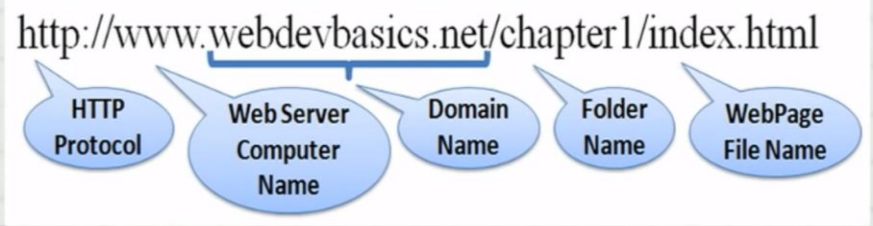
- Locates an organization or other entity on the innternet.
- For example, we already mentioned: www.ibm.com .

Domain name system:

- Divides the internet into logical groups and understandable names.
- Associates unique computer IP Addresses with the text-based domain names you type into a web browser.
- For example, browser: http://google.com And IP Address: 74.125.225.78

URI and URL:

- URI – Uniform Resource Identifies a resource on the internet.
- URL – Uniform Resource Locator a type of URI which represents the network location of a resource such as a web page, a graphic life, or an MP3 file.



Domain name system

Client – server side development:

- Markup Language
- Programming Language
- Scripting Language
- Databases

HTML – Hypertext Markup Language: The set of markup symbols or codes p;aced in a file intended for display on a web browser.

HTML5:

- HTML is a markup language designed to structure information for presentation as web pages.
- HTML5 is latest version.

CSS:

- Cascading Style Sheets (CSS) control how web pages are displayed in the browser and allow the separation of presentation from structure and content.
- CSS help ansure that web pages are presented in an accessible way to all visitors, over a wide range of media.

Javascript is a lightweight scripting technology which is used alongside HTML documents to make websites more interactive.

PHP is a fast, server-side scipting language that is sued to create interactive, dynamic web sites. It is particularly well-suited to integrating with a range of databases.

XML is a software and hardware independent markup language designed for describing and transmitting information. It is set to become the most common tool for all data manipulation and data transmission.

CGI-PERL:

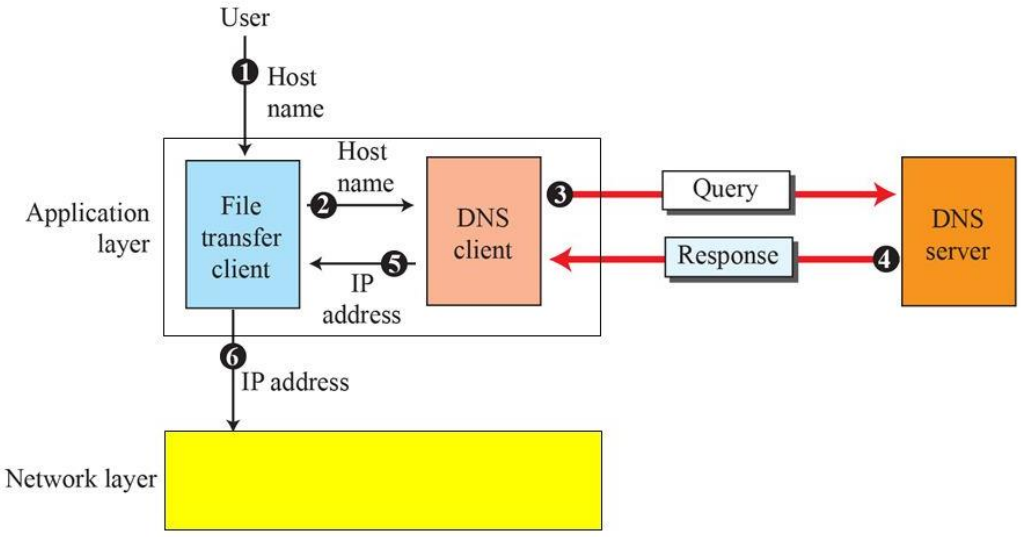
- Perl is a programming language that can handle input and output from a web server, uaually through the Common Gateway Interface.
- It is modt commonly used to process information through forms.

MYSQL:

- MySQL is a fast, open-source Relational Database Management System that uses the popular SQL (Structured Query Language).
- It is perfect for most websites that need database functionality and works hand-in-hand with PHP.

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

1. What is DNS and the purpose of DNS.



Purpose of DNS

a. The **Domain Name System** (**DNS**) is a hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet or a private network. It associates various informations with domain names assigned to each of the participating entities. Most prominently, it translates more readily memorized domain names to the numerical IP addresses needed for locating and identifying computer services and devices with the underlying network protocols. By providing a worldwide, distributed directory service, the Domain Name System has been an essential component of the functionality of the Internet since 1985.

b. The Domain Name System delegates the responsibility of assigning domain names and mapping those names to Internet resources by designating authoritative name servers for each domain. Network administrators may delegate authority over sub-domains of their allocated name space to other name servers. This mechanism provides distributed and fault-tolerant service and was designed to avoid a single large central database.

c. The Domain Name System also specifies the technical functionality of the database service that is at its core. It defines the DNS protocol, a detailed specification of the data structures and data communication exchanges used in the DNS, as part of the Internet Protocol Suite.

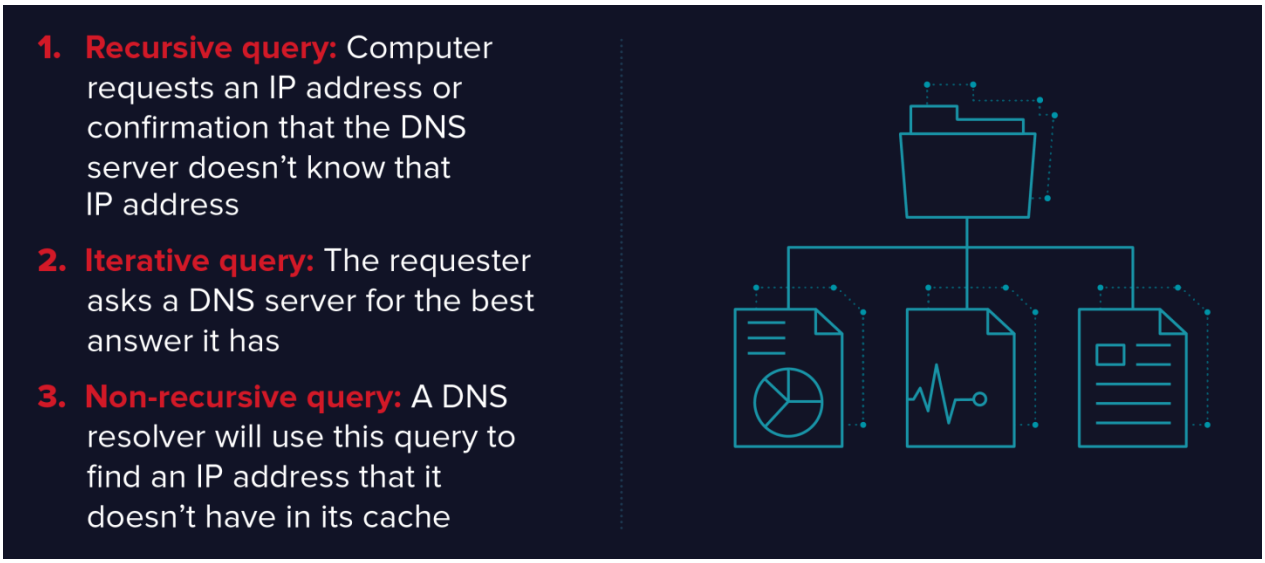
d. The Internet maintains two principal namespaces, the domain name hierarchy and the Internet Protocol (IP) address spaces. The Domain Name System maintains the domain name hierarchy and provides translation services between it and the address spaces. Internet name servers and a communication protocol implement the Domain Name System. A DNS name server is a server that stores the DNS records for a domain; a DNS name server responds with answers to queries against its database.

e. The most common types of records stored in the DNS database are for Start of Authority (SOA), IP addresses (A and AAAA), SMTP mail exchangers (MX), name servers (NS), pointers for reverse DNS lookups (PTR), and domain name aliases (CNAME). Although not intended to be a general purpose database, DNS has been expanded over time to store records for other types of data for either automatic lookups, such as DNSSEC records, or for human queries such as *responsible person* (RP) records. As a general purpose database, the DNS has also been used in combating unsolicited email (spam) by storing a real-time blackhole list (RBL). The DNS database is traditionally stored in a structured text file, the zone file, but other database systems are common.

2. Types DNS.

***There are three types**

a. Three types of queries in the DNS system:



Types of DNS queries

- 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 that holds the IP address and other information for the requested hostname.

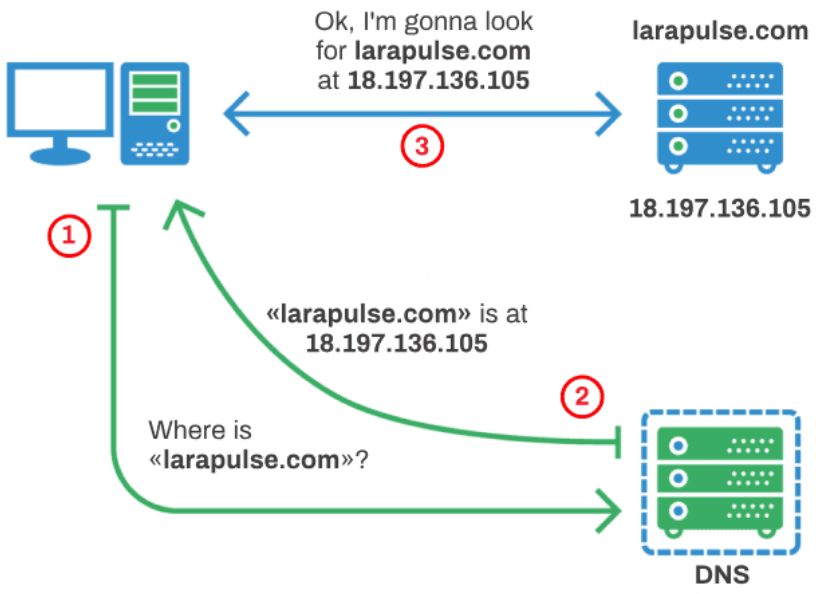
- Iterative Query

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 a query in which the DNS Resolver already knows the answer. It either immediately returns a DNS record because it already stores it in local cache, or queries a DNS Name Server which is authoritative for the record, meaning it definitely holds the correct IP for that hostname.

b. The most common DNS server types that are used to resolve hostnames into IP addresses.



DNS server work

- DNS Resolver

A DNS resolver (recursive resolver), is designed to receive DNS queries, which include a human-readable hostname such as “www.example.com”, and is responsible for tracking the IP address for that hostname.

- DNS Root Server

The root server is the first step in the journey from hostname to IP address. The DNS Root Server extracts the Top Level Domain (TLD) from the user’s query — for example, www.example.com — and provides details for the **.com** TLD Name Server. In turn, that server will provide details for domains with the .com DNS zone, including “example.com”.

- Authoritative DNS Server

Higher level servers in the DNS hierarchy define, meaning that it holds the up-to-date information for that hostname. The Authoritative Name Server is the last stop in the name server query—it takes the hostname and returns the correct IP address to the DNS Resolver (or if it cannot find the domain, returns the message NXDOMAIN).

d. 10 Top DNS Record Types

Types	DESCRIPTION
A	Address Record
CNAME	Canonical Record Name
MX	Mail Exchange Record
AAAA	IPV6 Address Record
TXT	Text Record
PTR	Pointer Record
SRV	Service locator
SPF	Sender policy framework
NS	Name Server Record
SOA	Start of authority Record

10 top DNS record types.

DNS servers create a DNS record to provide important information about a domain or hostname, particularly its current IP address.

III. 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.

In computing, a communication protocol refers to the set of rules that computers use to communicate with each other. The protocol defines the signals that the computers will give each other, and other details such as how communication begins or ends.

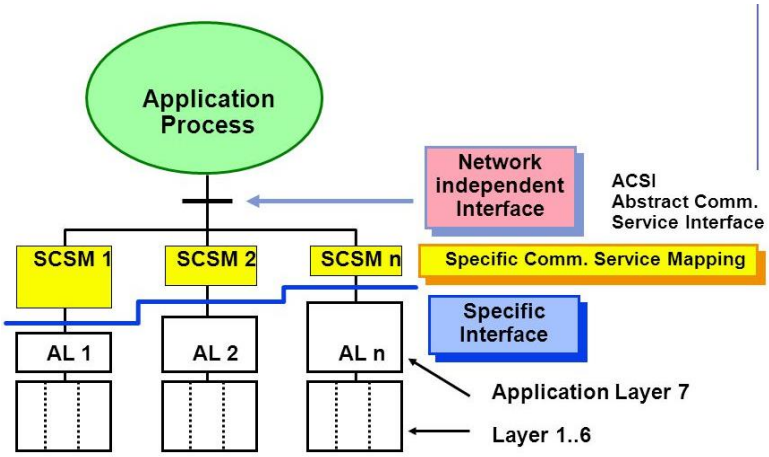
Types of Protocol:

- Hypertext Transfer Protocol (HTTP), is used for accessing and receiving Hypertext Markup Language (HTML) files on the internet.
- Simple Mail Transfer Protocol (SMTP), is used for transferring e-mail between computers.

➢ Post Office Protocol version 3 (**PoP3**) is the most common account type for personal e-mail. Messages are typically deleted from the server when you check your e-mail.

➢ Internet Message Access Protocol (**IMAP**) is a protocol for e-mail retrieval and storage developed in 1986 at Stanford University as an alternative to POP.

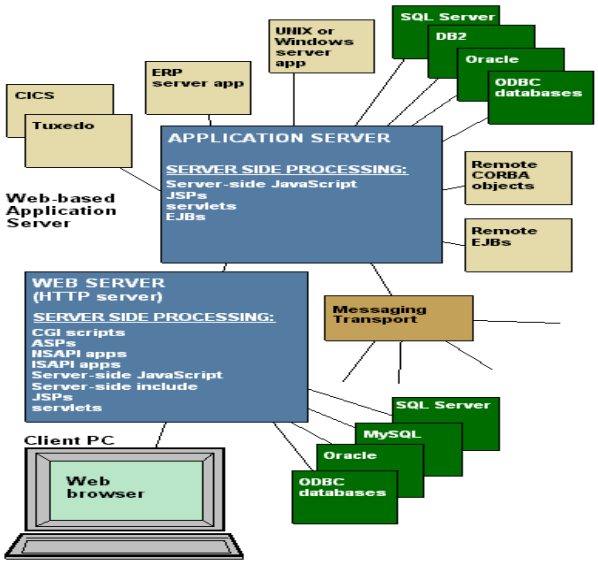
- File Transfer Protocol (FTP), is used for showing files to be copied between devices.
- Transmission Control Protocol (TCP), ensures the delivery of information packets across networks.
- Internet Protocol (IP), is responsible for logical addressing called "IP address" to route information between networks.
- In computer networking, Point-to-Point Protocol (PPP) is a data link (layer 2) protocol used to establish a direct connection between two nodes.
- The packets and device protocol(TPADP) makes sure that the other protocols have a back up route.



Communication protocol

2. Server hardware.

The word “server” is sometimes a little confusing because a server can refer computer hardware or the programs that run on that hardware. Here we are talking about the actual hardware itself. Servers are computers designed to wait for any requests from users or other computers and then act on that request. Their main purpose is to be there for you, to share data and perform tasks to keep your workflow smooth and productivity elevated.



Web server Fudamentals.

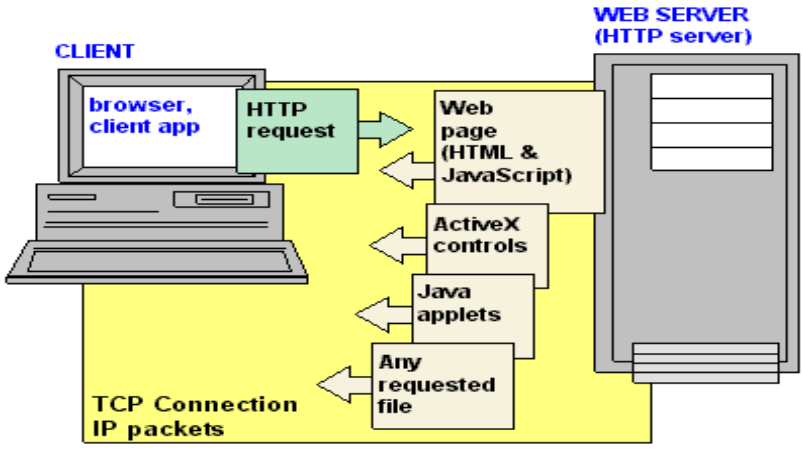
In computing, a server is a computer program or a device that provides functionality for other programs or devices, called "clients". This architecture is called the client–server model, and a

single overall computation is distributed across multiple processes or devices. Servers can provide various functionalities, often called "services", such as sharing data or resources among multiple clients, or performing computation for a client. 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. Typical servers are database servers, file servers, mail servers, print servers, web servers, game servers, and application servers.

Server hardware

❖ Built into hardware too:

Web servers are not only on the Web. HTTP server software is commonly built into hardware to provide a control panel for configuring the device from any Web browser. Most network devices such as routers, access points and print servers actually contain a mini website for this purpose (see embedded Web server).



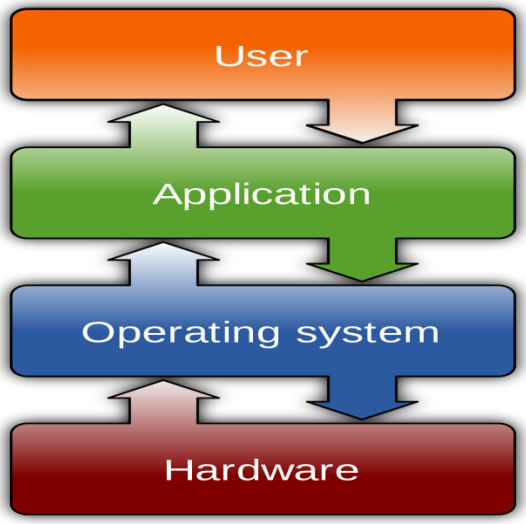
Built into hardware too.

3. Operating systems.

An operating system (**OS**) is system software that manages computer hardware and software resources and provides common services for computer programs.

Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing, and other resources.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware, although the application code is usually executed directly by the hardware and frequently makes system calls to an OS function or is interrupted by it.



Operating system

4. Web server software.

The inside and front of a ***Dell PowerEdge*** *web server,*
A computer designed for ***rack mounting.***

A **web server** is server software, or hardware dedicated to running said software, that can satisfy World Wide Web client requests. A web server can, in general, contain one or more websites. A web server processes incoming network requests over HTTP and several other related protocols.

The primary function of a web server is to store, process and deliver web pages to clients. The communication between client and server takes place using the Hypertext Transfer Protocol (HTTP). Pages delivered are most frequently HTML documents, which may include images, style sheets and scripts in addition to the text content.

Multiple web servers may be used for a high traffic website;
Here, Dell servers are installed together being used for the Wikimedia Foundation.

A user agent, commonly a web browser or web crawler, initiates communication by making a request for a specific resource using HTTP and the server responds with the content of that resource or an error message if unable to do so. The resource is typically a real file on the server's secondary storage, but this is not necessarily the case and depends on how the web server is implemented.

While the primary function is to serve content, a full implementation of HTTP also includes ways of receiving content from clients. This feature is used for submitting web forms, including uploading of files.

Many generic web servers also support server-side scripting using Active Server Pages (ASP), PHP (Hypertext Preprocessor), or other scripting languages.

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

Frontend	Backend
Frontend refers to the client-side of the application.	Backend refers to the server-side of the application.
It is the part of the website users can see and interact with.	It constitutes everything that happens behind the scenes.
It typically includes everything that attributes to the visual aspects of websites.	It generally includes a web server that communicates with a database to serve requests that the frontend presents.
It forms the basis of what users can touch and experience on their web browsers.	It is the brain of the website that is never visible to the end users.
The essentials of frontend web development include HTML, CSS, and JavaScript.	The essentials of backend development include Ruby, Python, Java, .Net, etc.

Difference between front-end and back-end.

Websites can be divided into two distinct parts – the front-end and the back-end. A professional web developer needs to be able to develop for both.

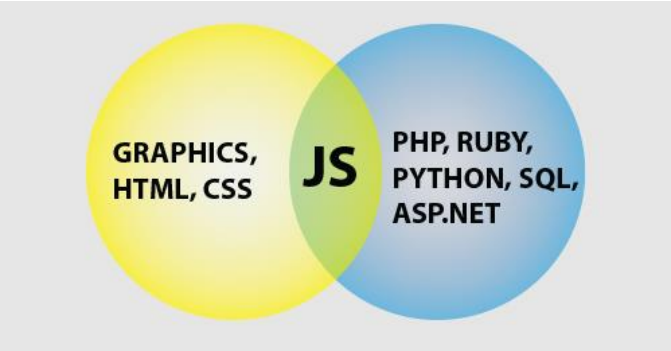
The front end of a website is the part a user sees and directly interacts with. The front end is built with languages like:

- HTML (HyperText Markup Language) is the backbone of the Web.
- CSS (Cascading Style Sheets) is what controls the way the HTML looks on the page.
- avaScript lets you add in interactivity, more complex animations, and even makes it possible to build fully featured Web applications.

Back-end, also referred to as the “server-side”, is the part of the website which you cannot see and interact with. Basically, everything that happens behind the scenes can be attributed to the backend web development. It is all about how the website works; it’s more like an indirect service provider for the frontend development. It runs on the server side but communicates with the frontend to ensure everything works fine.

They facilitate communication between the presentation layer and the business layer. They play a crucial role in web development and their role is highly collaborative as opposed to the frontend web designers.

The presentation layer mainly translates data between the application layer and the network format. Data can be communicated in different formats via different sources. Thus, the presentation layer is responsible for integrating all formats into a standard format for efficient and effective communication.



Front-end and Back-end.

V. 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).

Problem	Template website	Custom-built website
Advantages	-Template sites are significantly less expensive than custom sites. -Template sites are quite fast to implement. -Templates are getting more sophisticated.	-There are no limitations on graphics and functionality. -Custom-built sites are flexible and can grow with you. -Custom-built sites are easier to update as Word Press is updated. -Search engine optimization is better in custom-built sites. -Custom-built sites are necessary for e-commerce.
Disadvantages	-Your site may look like everyone else's. -You're limited in your graphics design and navigation capability. -Some templates aren't especially well-made or maintained. -Functionality can be limited in	The process to create a website from scratch also takes longer.

	template sites. -Security can be an issue.	
User Experience (UX)	A template site is often a great option if the project is simple – for example, a website that's basically an online brochure.	Your branding will be much stronger when a site is designed to fit you, rather than trying to get a template to fit your brand. So the single most important point about a custom-built website is that your site is designed and built to specifically to support your established brand in a consistent way.
User Interface (UI)	Specialization in web design involves the controls that people use to interact with a website or application, including a button display and a duplicate gesture control, which is not creative and can not be answered meet the needs of the company.	Specialization in web design involves the controls that people use to interact with a website or application, including button display and creative gesture control and can be modified to suit respond to the needs.

The differences between online website creation tools and custom built sites.

VI. Evaluate the impact of common web development technologies and frameworks with regards to website design, functionality and management.

The World Wide Web is always evolving as technology improves. There are a number of different web technologies and frameworks in use today and these are constantly changing with newer and improved versions being introduced. Some are better than others and they are not always suitable for every type of task.

Impact of technologies and web development framework on website design, functionality and management:

- Technologies that increase the user experience with the Website, meet the intended use.
- The frames make the website easier to use and more interesting. In addition, it helps build unique features for the website.

Technologies and frameworks also help your manage web pages more easily and quickly. A special feature, the frame has security and integration capabilities. You can edit or add functions to meet all needs. Not only that, when using it, the graphics will become more creative and sophisticated. Want your website to be handy, beautiful and clean, the technologies and frames are the best help.

VII. 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.

It takes some effort for any website to get noticed amidst many others on the Internet. Knowledge of SEO (Search Engine Optimisation) is important for any web developer.

Search engines have a huge impact on website performance. In addition, it also provides and supports to improve index value and website ranking by search engine optimization.

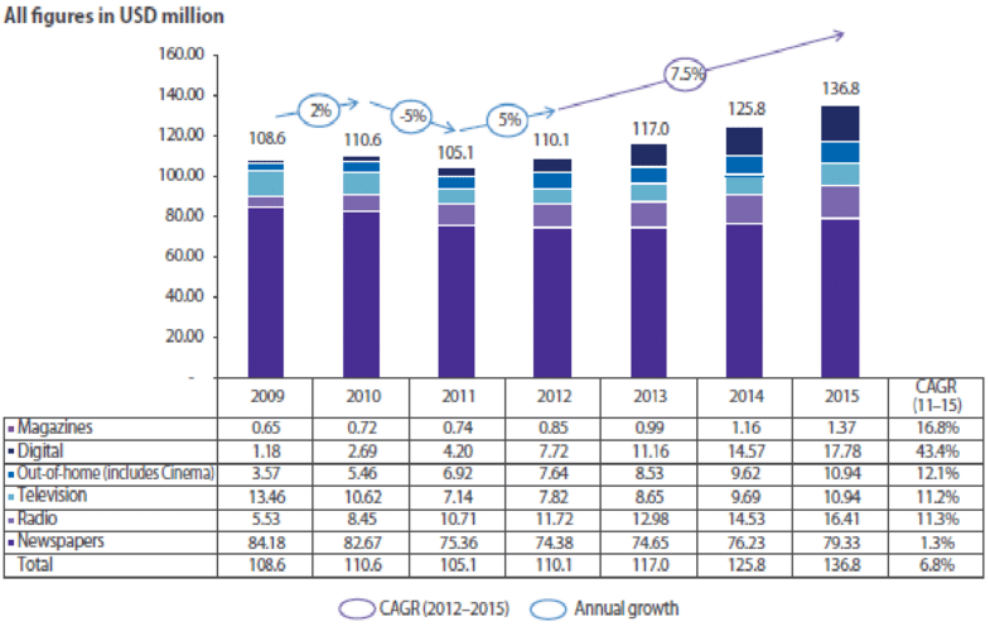
Search Engine Optimization (SEO) is an Internet marketing strategy that used widely for improving the volume and quality of customer traffic to a company website through search engines.

When use SEO, your company can be ranked in top 10 without any fuss. SEO is a good investment on the long run. Using SEO save much time and money and can stay longer than other tools - Search Engine Advertisement SEA and pay per click advertising PPC. SEO leads to the increased brand visibility for your site.

Website Optimization is about making important modifications to almost concerned sections of the website. Though it is viewed individually, some of the changes might seem like gradual incremental improvements. SEO is a process which requires considerable time.

Improving webpage visibility in search engines by enhancing keyword density, using improved on-page optimization technique.

For best results, companies should also be interested in creating quality content in other marketing channels. That is one of the most popular ways to attract consumers is search advertising.



	2009	2010	2011	2012	2013	2014	2015	CAGR (11–15)
Magazines	0.65	0.72	0.74	0.85	0.99	1.16	1.37	16.8%
Digital	1.18	2.69	4.20	7.72	11.16	14.57	17.78	43.4%
Out-of-home (includes Cinema)	3.57	5.46	6.92	7.64	8.53	9.62	10.94	12.1%
Television	13.46	10.62	7.14	7.82	8.65	9.69	10.94	11.2%
Radio	5.53	8.45	10.71	11.72	12.98	14.53	16.41	11.3%
Newspapers	84.18	82.67	75.36	74.38	74.65	76.23	79.33	1.3%
Total	108.6	110.6	105.1	110.1	117.0	125.8	136.8	6.8%

Jordan net advertising projections.

For example: A questionnaire was distributed personally on 121 companies in Jordan. Out of 121, only 102 companies completed and returned the questionnaire, which give 72% response rate.

VIII. Evaluate a range of tools and techniques available to design and develop a custom built website.

Different websites have different requirements.

Website designing requires many important tasks like discipline production in website and website maintenance. While designing a simple or modern web page, you must have many things in your mind. There are different tools and techniques used for designing webpage. It does not mean that all members in a team use the same tools and techniques for designing a webpage.

Javascript happens to be a very popular programming language on the internet.

JS Libraries.

Some Famous JS Libraries:

- Underscore.js - Working programming helpers with no extending built-in objects.
- Moment.js - Manipulate, display dates, validate, and parse in JavaScript.
- Lodash - The latest utility library is offering modularity, extras, and performance.
- jQuery - Tiny but simple and feature full JavaScript library.
- BackBoneJS- You can add JS app a backbone using events, views, models and collections.
- D3.js - JavaScript library helps manipulating documents related to data.
- React - Facebook's Javascript library build for creating user interfaces.
- jQuery UI – Group of user interface widgets, effects, themes, and interactions that are collected.
- jQuery Mobile – A user interface that is HTML5 related and used for building responsive sites

Front-end frameworks.

Front-end frameworks include a group which is built by other folders and files, like CSS, Javascript, and HTML You will also find various stand-alone frameworks there. Many love the Bootstrap where a robust framework could become the critical tool for web developers.

- Bootstrap - CSS, JS, and HTML framework for building responsive, mobile projects on the internet.
- Semantic UI - Helps create beautiful, responsive designs by simple HTML and is a development framework.
- Uikit - A modular and lightweight front-end framework for creating powerful and fast elegant interfaces in the internet.
- Foundation - Group of responsive front-end frameworks which make designing beautiful responsive apps, emails, and websites accessible, which look awesome on every device.
-

Frameworks for web application.

It is the software framework build to remove difficulties involved while developing web services and apps.

- Ruby- Framework which has everything required to build database-backed web apps, and the pattern for MVC.
- Express –Node.js based Minimalist and fast web framework.
- Meteor - JavaScript application platform which designs all the parts that you require to make modern mobile and web apps, using one codebase JavaScript and is full-stack.
- Django - High-level Python Web framework which allows neat, working design and rapid development.
- ASP.net - Fully supported and free web app framework which allows you to build standards connected Web solutions.

- CakePHP - a great PHP framework which allows building web applications faster.
- Flask - Micro-framework related to Jinja 2 and Werkzeug from Python.
- CodeIgniter - Lightweight and powerful PHP framework made for developers who want a straightforward and neat toolkit to build fully featured web apps.
- AngularJS - Allows extend HTML vocabulary for web apps and is quite lightweight and also called as a library.
- Ember.js - A framework for designing ambitious web applications.

Task runners.

It helps automate the workflow. You can build, automate and complete its minimisation of JavaScript. Later make and integrate functions to speed up the creation. Package managers maintain and check all the packages that are used and also update the particular version which is the requirement.

- Gulp - Easy to use and helps manage complex tasks, while enhancing and automating the workflow.
- Grunt - Task runner helps secure automation based on JavaScript.

Package managers.

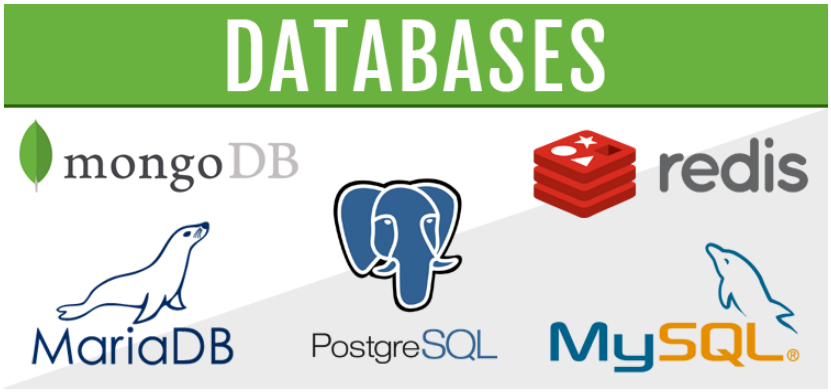
- Npm - JavaScript pack manager.

- Bower - Package manager that helps control components, which have CSS, JavaScript, image files, fonts, and HTML.

Programming languages.

It is a formally constructed language made for linking with the system and creates programs in which you check the mannerisms.

- PHP - Great scripting language which especially suits web development.
- HTML5 - Mark-up language, and the latest kind among XHTML and HTML.
- Python - Allows faster work and combine systems precisely.
- Ruby - An open source and dynamic programming language focussing on productivity and simplicity.
- Scala - Object-oriented language helps smooth migration towards the working style and is purebred.
- CSS3 - Latest CSS sheets utilized by front-end developers for apps and sites.
- SQL – For Relational database and is structured query language.
- Golang - Programming language which makes building easier, efficient, reliable software and is an open source.
- Rust – Faster, blocks segfaults, and allows the safety of thread and is a systems programming language.
- Elixir - Functional and dynamic language built for creating scalable apps that and maintains well.
- NodeJS - Event-driven I/O server-side JavaScript environment based on V8.
- Javascript - Programming language of the web and HTML.



Databases.

It is a collected group of information so that they can be updated, managed and retrieved.

- MariaDB - Becoming quite popular like a database server that is open source and made by the true developers of MySQL.
- MongoDB - Lets you build applications that were impossible and is considered future generation database.
- Redis - In-memory data structure store, utilized as a message, cache and database broker and open source.
- PostgreSQL - Database system and powerful object related.
- MySQL - Leading open source database.

CSS Preprocessors.

It is a scripting language that stores it into general CSS and extends CSS.

- Less - Extension of CSS and is backward works fine with CSS. Easy to learn and allows you to fall back on vanilla CSS.
- Sass – Reliable extension of professional CSS.
- Stylus - Modern language, allows an expressive, dynamic and efficient way to build CSS. Supports regular CSS style and indented syntax.

Icons.

Finally, all web developers require icons for their project.

- Font Awesome – Vector icons that are scalable which are customizable, change drop shadow, size, and colour, and do everything with the powerful CSS.
- IconMonster – Superior quality, enormous and steadily growing source of easy icons.
- Icons8 - A good list of easily customizable icons and is also made by one design team.

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