ASSIGNMENT 1 FRONT SHEET

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number and title	10: Website Design & Development		
Submission date	8/12/2020	**Date Received 1st submission**	
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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	CAONGUYEN

Grading grid

P1	P2	P3	P4	M1	M2	M3	D1

☼ **Summative Feedback:**   ☼ **Resubmission Feedback:**

Grade:	Assessor Signature:	Date:
Signature & Date:		

ASSIGNMENT 1 BRIEF

Qualification	**BTEC Level 5 HND Diploma in Computing**
Unit number	10: Website Design & Development
Assignment title	Web Services Presentation and Guidebook
Academic Year	
Unit Tutor	
Issue date		**Submission date**	
IV name and date	

Submission Format:
Format: Two ten-minute Microsoft® PowerPoint® style presentations to be presented to your colleagues *Submission* Students are compulsory to submit the assignment in due date and in a way requested by the Tutors. The form of submission will be a soft copy posted on http://cms.greenwich.edu.vn/ *Note:* The Assignment *must* be your own work, and not copied by or from another student or from books etc. 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 know how to reference properly, and that understand the guidelines on plagiarism. *If you do not, you definitely get failed*
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 work as a full-stack web team leader for a leading creative web solutions and marketing company. Your team is about to have a big contract to develop an online shopping mall.

One of the preparation tasks is to choose appropriate tools and techniques to realise a custom built website.

As part of your role, you have been asked to create an engaging presentation to help train junior staff members on basic web technologies including hosting and website management as well as server technologies. Your presentation should not only explain basic knowledge in the domain but also points out the impact of these technologies to website design, functionality, management or performance.

You also need to present more technical presentation to senior staff members to discuss about front-end, back-end technologies as well as other tools, techniques and softwares used to develop website from simple (online website creation tools) to complicated (custom built). Your presentation will be used as guidance of choosing suitable tools and techniques for the next project.

Learning Outcomes and Assessment Criteria		
Pass	**Merit**	**Distinction**
LO1 Explain server technologies and management services associated with hosting and managing websites		
P1 Identify the purpose and types of DNS, including explanations on how domain names are organised and managed. **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.	**M1** Evaluate the impact of common web development technologies and frameworks with regards to website design, functionality and management. **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.	**LO1 & 2** **D1** Justify the tools and techniques chosen to realise a custom built website.
LO2 Categorise website technologies, tools and software used to develop websites		
P3 Discuss the capabilities and relationships between front-end and back-end website technologies and explain how these relate to presentation and application layers. **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).	**M3** Evaluate a range of tools and techniques available to design and develop a custom built website.	

Contents

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

I. What is DNS

∗ DNS Definition:

- The domain name system (DNS) connects URLs with their IP address. With DNS, it's possible to type words instead of a string of numbers into a browser, allowing people to search for websites and send emails using familiar names. When you search for a domain name in a browser, it sends a query over the internet to match the domain with its corresponding IP. Once located, it uses the IP to retrieve the website's content. Most impressively, this whole process takes just milliseconds.[1]

II. DNS Function

- DNS Function Each website has a name and IP address (domain name or URL: Universal Resource Locator). Four classes of numbers separated by dots consist of an IP address (Ipv4). When you open a web browser and enter the name of the website, the browser goes directly to the website without having to enter the IP address of the website. A DNS server is responsible for the task of "translating" a domain name into an IP address to make the browser understand and access the website. To translate the "IP" address into "name" and vice versa, the aid DNS goes back and forth. Users can only recall "names" and no IP addresses need to be recalled.

- The Domain Name System (DNS) is a top-down hierarchy of names for computers, utilities, and other tools that locate devices using TCP/IP, such as the Internet. Using the name "user-friendly" calculate and facilities. When a user enters a computer's DNS name in an application, the DNS server looks up that computer's name and provides other information, such as the IP address and services provided by the computer on the network. This process is called the resolution of names.

- The function of DNS is name resolution. When a user tries to access another computer on a network, regardless of the size of the network, an architecture must be in place to map names to addresses. Many name resolution methodologies exist on a Windows 2000 computer, but the default hostname resolution methodology is DNS. In this chapter, we discuss DNS as it relates to the Active Directory. DNS is the only name resolution tool that works with the Active Directory. An AD without a properly configured DNS is a standalone AD. You can install the AD on a Windows 2000 server without configuring DNS, but the AD will be almost completely nonfunctional.

- A domain name is a combination of words separated by dots (.). For example, the full name in the description: www.sales.mda.com. [2]

III. Type of DNS

1. Recursive DNS servers

- When you type a website address into your browser address bar, it might seem like magic happens. In reality, the DNS system makes effortless internet browsing possible. First, your

browser connects to a recursive DNS server. There are many thousands of recursive DNS servers in the world. Many people use the recursive DNS servers managed by their Internet Service Provider (ISP) and never change them. If you're a Cisco Umbrella customer, you're using our recursive DNS servers instead.

- Once your computer connects to its assigned recursive DNS server, it asks the question "what's the IP address assigned to that website name?" The recursive DNS server doesn't have a copy of the phone book, but it does know where to find one. So it connects to another type of DNS server to continue the search.

2. Root Servers

- Root servers are positioned at the top or root of the DNS hierarchy and maintain data about each of the top-level zones. The root servers are maintained by the NIC and have been moved to a common domain for consistent naming purposes. The root servers are named as A.root-servers.net., B.root-servers.net., and so on.

3. Authoritative Name Server

- The second type of DNS server holds a copy of the regional phone book that matches IP addresses with domain names. These are called authoritative DNS servers. Authoritative DNS nameservers are responsible for providing answers to recursive DNS nameservers about where specific websites can be found. These answers contain important information for each domain, like IP addresses.

- Like phone books, there are different authoritative DNS servers that cover different regions (a company, the local area, your country, etc.) No matter what region it covers, an authoritative DNS server performs two important tasks. First, it stores lists of domain names and their associated IP addresses. Second, it responds to requests from a recursive DNS server (the person who needs to look up a number) about the correct IP address assigned to a domain name. After getting the answer, the recursive DNS server sends that information back to the computer (and browser) that requested it. The computer connects to the IP address, and the website loads, leading to a happy user who can go on with their day.

4. Top-Level Domain (TLD) name servers

- Name servers read from right to left and direct you to the Top Top-Level Domain (TLD) extension name server (.com or another). These TLD servers will finally lead you to servers with the correct information. [3]

IV. How domain names are organized

Domain names are organized hierarchically from right to left. The right-most portion of a domain name is called the top-level domain (TLD). The .com TLD is probably the most well known, but there are many others, such as .net, .org, .edu, and .mil. (Country codes, such as .us and .fr, are also TLDs.) When you register a domain name, you can choose which TLD to use (though some TLD's, such as .edu and .gov, are restricted to certain types of organizations). [4]

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.

I. Communication protocol.

- Communication protocols are formal descriptions of digital message formats and rules. They are required to exchange messages in or between computing systems. Communication protocols are important in telecommunications systems and other systems because they create consistency and universality for the sending and receiving of messages.

- Communications protocols can cover authentication, error detection and correction, and signaling. They can also describe the syntax, semantics, and synchronization of analog and digital communications.

- Communication protocols are implemented in hardware and software. There are thousands of communications protocols that are used everywhere in analog and digital communications. Computer networks cannot exist without them.

- FTP: (File Transfer Protocol): allows file transfer over the Internet.

- HTTP: It stands for Hyper Text Transfer Protocol, the format of messages, their transmission, and web actions associated at client and server-end are managed by this protocol. Worldwide web uses it. Runs on port 80.

- HTTPS: It stands for Hyper Text Transfer Protocol Secure, so it seems to be an enhancement of HTTP only. This is used for secure communication hence whenever you are out of the local host world then go by this.

- TLS: It stands for Transport Layer Security, this is a cryptographic protocol that provides end to end communications security over networks, commonly used in transactions, the security is maintained by forgery prevention, data leak prevention, etc. [5]

II. Server hardware.

What is Server Hardware?

- The server is a dynamic device responsible for the centralized storage of data sources and for the processing of access to information through the Internet from other computers. The full configuration of the server hardware equipment is identical to that of the laptop (also known as a PC). However the server's reliability and efficiency is much greater than that of traditional computers.

- Hardware for servers is a computer's hardware, the components that make up a complete device. Devices like mice, keyboards, displays, hard players, DVD drives, etc. with PCs They're computers with hardware.

How does server hardware work?

- A server doesn't have a screen or keyboard. And although your computer stores files and data you've put on it, a server stores all the data associated with the websites that are hosted by it and shares that info with all computers and mobile devices that need to access them.

- Before starting and releasing remote management services, servers also do memory checks.
- The hard drive controller then periodically boots the drives, rather than all at once. With a progressive start, the goal is not to overwhelm the power supply. They then start operating on the RAID system which needs checking to ensure that the backup device works correctly.
- Compared to a machine that only takes a few minutes to boot, this process can take a long time. Often for months or years, rebooting can not be necessary.
- In order to boot and load the operating system, several server hardware settings take a long time.

Components of the server hardware.

Basically, like a standard PC, a physical server is made of a server system. However, there are also some variations in the components of server and PC hardware.
- Server board
- Processor (CPU)
- Memory (RAM)
- Hard drive (HDD)
- RAID controller
- Power supply unit (PSU)

Operating system for web server

- There are 2 types of operating commonly used for web hosting: Windows and Linux/Unix.
- Linux is a free and open-source operating system based on Unix standards. It provides a programming interface as well as a user interface compatible with Unix-based systems and provides large variety applications. A Linux system also contains many separately developed elements, resulting in a Unix system which is fully compatible and free from proprietary code.
+ A traditional monolithic kernel is employed in Linux kernel for performance purpose, but its modular feature allows most drivers to dynamically loaded and unloaded at runtime. Linux protects processes and is a multiuser system. Interprocess communication is supported by both mechanisms such as message queue, shared memory, and semaphore.
- Windows is a licensed operating system in which source code is inaccessible. It is designed for the individuals with the perspective of having no computer programming knowledge and for business and other commercial users. It is very simple and straightforward to use.
+ Windows is extensible, portable and assists multiple operating environments, symmetric multiprocessing and client-server computing. It offers integrated caching, virtual memory, and preemptive scheduling. [6]

III. Server software.

What is server software?

Server software is a type of software that is designed to be used, operated, and managed on a computing server. It provides and facilitates the harnessing of underlying server computing power for use with an array of high-end computing services and functions.

Techopedia explains Server Software.

+ Server software is primarily built to interact with a server's hardware infrastructure, including the processor, memory, storage, input/output (I/O), and other communication ports. Depending on the type or usage of the server, the server software may be classified into various forms, such as the following:

- Web server software
- Application server software
- Database server software
- Cloud computing server software
- File server software

+ Each of the above types of server software utilizes the server for different functions and services, but all focus their primary objective on using inherent computer capacity and resources. Moreover, the server software may be for a physical or virtual/cloud server built on a physical server. [7]

IV. Server operating system.

- 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.

- The fundamental function of the web server is to store, process, and distribute users' web pages. This interconnection is achieved using the Hypertext Transfer Protocol (HTTP). These web pages are mostly static material, including HTML documents, images, style sheets, tests, etc. The web server supports the Basic Mail Transfer Protocol (SMTP) and File Transfer Protocol (FTP) protocols for email and file transfers.

- Certain applications that usually run on servers:

+ Web server: Hosts web pages. A web server is what makes the World Wide Web possible. Each website has one or more web servers.

+ Database server: Maintains and shares any form of database (organized collections of data with predefined properties that may be displayed in a table) over a network.

+ DNS server: Is a hierarchical decentralized naming system for computers, services, or other resources connected to the Internet or a private network. [8]

V. Web server (Apache, IIS).

+ **Apache:** Apache is the most widely used web server software. Developed and maintained by Apache Software Foundation, Apache is an open source software available for free. It runs on 67% of all webservers in the world. It is fast, reliable, and secure. It can be highly customized to meet the needs of many different environments by using extensions and modules. Most WordPress hosting providers use Apache as their web server software. However, WordPress can run on other web server software as well.

+ **IIS:**

- Internet Information Services, created by Microsoft, is an extensible web server used with the Windows NT family. IIS supports HTTP, HTTP/2, HTTPS, FTP, FTPS, SMTP and NNTP.

- When we talk about web servers, we usually think of Apache or Nginx; however, another "big one" that has millions of users is IIS, Microsoft's web server.

- IIS is a set of services that transform a Microsoft Windows system into a server capable of offering Web, FTP, and SMTP services, among others.

- Initially launched as an Internet-oriented service group for Windows NT 3.51 in 1995, it was not until the following year that (ASP) for Windows NT 4.0 with IIS 3.0 came to light.

- For many years IIS was a CD-ROM separate from the Operating System called Option Pack. Only with Windows 2000 was it incorporated into the system installer as a more installable package, varying the limitations depending on the version of Windows.[9]

M1 Evaluate the impact of common web development technologies and frameworks with regards to website design, functionality and management.

1. **What is Web Technology? List common web technology?**

+ **What is Web Technology?**

Since computers can't communicate with each other the way people do, they require codes instead. Web technologies are the markup languages and multimedia packages computers use to communicate.

+ **List common web technology?**

➢ Browsers.

Browsers request information and then they show us in the way we can understand. Think of them as the interpreters of the web. Here are the most popular ones:

Google Chrome – Currently, the most popular browser brought to you by.

Google Safari – Apple's web browser.

Firefox – Open-source browser supported by the Mozilla Foundation.

Internet Explorer – Microsoft's browser.

➢ Programming Languages.

- PHP: used by WordPress to create those WYSIWYG editors that everyone is using now. It's also used by Facebook, Wikipedia, and other major sites.
- Javascript: used by all web browsers, Meteor, and lots of other frameworks.
- Python: used by the Django framework as well as in the majority of mathematical calculations.

> Protocols.

- HTTP: Thanks to this protocol, each website can get to the browser. The protocol requests the website from Google's server and then receives a response with the HTML, CSS, and JavaScript of the website.
- DDP: Uses WebSockets to create a consistent connection between the client and the server. As a result of that, you get website updates in real-time without having to refresh the browser.

2. Web Development Frameworks?

- A web development framework is a set of resources and tools for software developers to build and manage web applications, web services and websites.
- Such a framework includes templating capabilities for presenting information within a browser, the programming environment for scripting the flow of information and the application programming interfaces (APIs) for accessing underlying data resources. The framework also provides the foundations and system-level services for software developers to build a content management system (CMS) for managing digital information on the Web. Developers can use the framework to define the 'out-of-the-box' content management capabilities, user authentication features, and administrative tools.
- A web development framework can be built upon a pre-defined infrastructure such as the Linux, Apache, MySQL and PHP (LAMP) stack.Once defined and implemented the core CMS features and functions can be difficult to modify.

→ **Advantage:**
- Most of the popular frameworks are open-source (or available to use for free). They often also come with licensing that is not restrictive and allows to build a commercial product.
- Integration: for building almost any type of application (including a website) where you want to store some data, you will typically use a database. There also exist many other tools that link to web development. Many frameworks will thus make it easier to link to these tools and also communicate with them.

→ **Disadvantage:**

→ **List common Web Development Frameworks:**
+ Backbone: Backbone is a lightweight framework for using and developing single-page applications. Backbone.js is a free and open-source library. Backbone follows the MVC pattern.

+ jQuery: In 2006, jQuery was introduced. jQuery is a javascript framework designed to simplify HTML, as well as CSS. jQuery is open-source. With the help of jQuery, you can design creative apps and change the dull layouts.

+ Node.js: Node.js is written in C, C++, and the help of javascript. Node.js open-source, cross-platform and javascript environment that executes javascript code outside of a web browser. Node.js is a combination of the runtime environments and javascript libraries. Node.js is very fast to execute to code, also single-threaded but highly scalable. [10]

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.Explanation of static and dynamic web.

→ Static Web

- A static Web page is a page that is built using HTML code and features the same presentation and content, regardless of user identity or other factors. Static Web pages are easier to code and assemble than dynamic Web pages, which may feature customizable content according to a user's identity or other factors.

- Static Web page is just a simple purveyor of information. Designers often use a combination of text and images, controlled by HTML tags, to render something that is a lot like a newspaper page. It has typesetting and layout, but it does not change from one load to another.

- Another way to understand static Web pages is to contrast them with dynamic Web pages. The latter have controls and forms that are deep coded, so that the page displays differently to different users or in different situations.

- For example, a dynamic Web page may access a database to find out about a user's identification and history, or to display custom items like the user's name or his/her collected preferences. In contrast, a static Web page does not provide this kind of customization.[11]

→ Dynamic web

- A dynamic web page is a page that changes based on the user. It responds to the user's needs, and provides relevant information to meet them, by accessing information in a connected database. This type of web page allows users to go beyond reading text and looking at graphics. It allows for an interactive experience, with the user being in control of the information he views.

- Dynamic Web Pages are written in languages such as CGI, AJAX, ASP, ASP.NET, etc.
In dynamic web pages, the Content of pages is different for different visitors. It takes more time to load than the static web page. Dynamic web pages are used where the information is changed frequently.[12]

2. Drive to front-end and back-end technologies.

→ Front-end

- Front-end is what you see with what you interact with on the website or in a software that is essentially the design and how it communicates with you, and that's what front-end developers do to build interactive web pages or web apps, they use languages such as HTML, CSS, JavaScript and Jquery.

- In addition to basic information, however, front-end developers need to become familiar with frameworks such as Bootstrap to ensure that content can be viewed well for enhancement on all various platforms, different browsers and AngularJS. The speed of interactivity and the inclusion of beautiful motion carried out impressed the web application more smoothly.

- HTML, CSS, JavaScript and Web Assembly are the only 4 languages that modern web browsers can understand, the most popular being HTML, CSS and JavaScript.

→ Back-end.

- But what makes a website's front-end work? Where is all the data going to be stored? That's the job at the back end. A server, an application, and a database constitute the back end of a web page. The infrastructure that drives those components is designed and managed by a back-end developer, enabling the site's user interface to exist.

- The Back-End developer is the one who manages all the complex business logic in the background to make the system run smoothly, if the Front-End developer has the power to build the beauty of the website, the back-end typically consists of three parts: a server, application and a database.

- Back-end programming has multiple languages: PHP, ASP.NET, Java, Python... allow you to write code (source code) that will be compiled and executed at Web server, then paid results on clients in the form of HTML, CSS and JavaScript. [13]

3.The capabilities and relationship front-end and back-end.

- Front-End Web Development and Back-End Web Development have quite a few differences. While front-end is heavily based on designing to make your website as attractive as possible, back-end deals with all the complicated and messy stuff that actually makes your website run (like database operations, user authentication, application logic, etc). This is the reason that front-end is often known as client-side while the back-end is commonly known as server-side for a web application.

- In spite of the differences between Front-End Web Development and Back-End Web Development, they are actually two sides of the same coin!!! Both of them are equally important and a website only works correctly when they work in tandem.

- Front-end and back-end have incredibly similar relationships to have a full website. Wanting a good website needs both an eye-catching and a consistency inside.[14]

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). [15]

→ **Online creation tools.**

- Setting up a WordPress site and adding a template purchased from ThemeForest, Template Monster, or Elegant Themes would be the most common method of starting a website. These websites provide a broad range of website templates of various kinds available for purchase. Not all the themes/models are 100 percent available there.

- In the sense of the website, there are also services such as Wix or Squarespace that also have a theme and allow you to edit. This will allow you to get a site up relatively quickly and easily. Nonetheless, the methods available for more complicated applications such as modes or e-commerce features have disadvantages. For example, traditional applications are online development tools such as wix.com, WordPress, and Squarespace.

→ **Custom built website:**

- Custom designed websites have a team behind your business. It begins with a creative process to consider who your target audience is, who you want to meet, how you want the website to work and how you want it to appear on the web.

- Custom websites tend to take longer than themes, since something is being designed and a specific company is being catered for. In the long run, it can save time and it's much easier to configure the platform when it's built from the ground up to ensure the site does exactly what you want it to do. Custom designs allow all devices (such as phones, tablets, laptops, etc.) & browsers to be sensitive to your web.

→ **Comparison table:**

	Online creation tools	Custom built website
Design flexibility	For limited budgets, models are ideal. The price upfront is	The website will have a fully distinctive design that will

	cheaper and you are limited to how much a platform can be configured. What you see is everything. Many models are not designed to provide access to a search engine. To suit your business, you need to tailor them.	incorporate the logo of the organization and will be focused on your business needs. Has a long development time.
Performance	Templates demonstrate a shorter period of development. The same template will be used by several other firms, which means your website does not stand out as much. Not all will work on all devices.	Works on several platforms well.
Functionality	Like a custom-built website, sample pages would hardly have a strong support system. Many features and easy updates are available. Functionality may be limited to sample sites.	A web developer can install technologies that fit with those ideas if you know how the website is going to work in the future. There are many functions and easy updates.
UX	Quite definitely, prototype sites do not have a support network as effective as a designed custom site.	The company that builds your website is there to help if you need it.
UI	It will drive the consumer into a template. Fine-tuning constraints until they are fixed and must meet the proposed framework requirements of the web.	In the most convenient way possible, the interface is structured. Enable consumers to experience a simpler experience.

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