**ASSIGNMENT 1 FRONT SHEET**

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| **Qualification** | **BTEC Level 5 HND Diploma in Computing** | | |
| **Unit number and title** | 10: Website Design & Development | | |
| **Submission date** |  | **Date Received 1st submission** |  |
| **Re-submission Date** |  | **Date Received 2nd submission** |  |
| **Student Name** |  | **Student ID** |  |
| **Class** |  | **Assessor name** |  |
| **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**

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| P1 | P2 | P3 | P4 | M1 | M2 | M3 | D1 |
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| **❒ Summative Feedback: ❒ Resubmission Feedback:** | | |
| **Grade:** | **Assessor Signature:** | **Date:** |
| **Signature & Date:** | | |

**ASSIGNMENT 1 BRIEF**

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| **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** |  | | |

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| **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. |

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| **Learning Outcomes and Assessment Criteria** | | |
| **Pass** | **Merit** | **Distinction** |
| **LO1** Explain server technologies and management services associated with hosting and managing websites | | **LO1 & 2**  **D1** Justify the tools and techniques chosen to realise a custom built website. |
| **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. |
| **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. |

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

**I.** **What is DNS?**

- The Domain Name System (DNS) is the phonebook of the Internet. Humans access information online through domain names, like nytimes.com or espn.com. Web browsers interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers can load Internet resources.

- Each device connected to the Internet has a unique IP address which other machines use to find the device. DNS servers eliminate the need for humans to memorize IP addresses such as 192.168.1.1 (in IPv4), or more complex newer alphanumeric IP addresses such as 2400:cb00:2048:1::c629:d7a2 (in IPv6).

**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](http://www.sales.mda.com).

**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.

1. **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.

* **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).

**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.

**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.

**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.

**IV. Server operating system.**

- The server operating system, is the software layer on top of which the hardware server can run other software programs or apps. Server operating systems help to allow and promote traditional server functions, such as web servers, mail servers, file servers, database servers, application servers, and print servers.

- 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.