ASSIGNMENT 1 FRONT SHEET

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number and title	10: Website Design & Development		
Submission date	22, June, 2020	**Date Received 1st submission**	
Re-submission Date		**Date Received 2nd 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	NGUYEN CHI HAI

Grading grid

P1	P2	P3	P4	M1	M2	M3	D1

❒ **Summative Feedback:**		❒ **Resubmission Feedback:**
Grade:	**Assessor Signature:**	**Date:**
Internal Verifier's Comments:		
IV Signature:		

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	2018 – 2019

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 Categories 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 realize 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 software's 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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<tr><th colspan="3">Learning Outcomes and Assessment Criteria</th></tr>
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D1 Justify the tools and techniques chosen to realize a custom-built website.</td></tr>
<tr><td>P1 Identify the purpose and types of DNS, including explanations on how domain names are organized 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.</td><td>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 optimization.</td></tr>
<tr><td colspan="2">LO2 Categories website technologies, tools and software used to develop websites</td></tr>
<tr><td>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).</td><td>M3 Evaluate a range of tools and techniques available to design and develop a custom-built website.</td></tr>
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P1: Identify the purpose and types of DNS, including explanations on how domain names are organized and managed.

1. DNS (Domain Name System):
    - The Domain Name System (DNS) is a naming database in which the Internet domain names are stored and converted into the Internet Protocol (IP) address. The domain name system compares the name people use to find the website to the IP address a device uses to find the website. (Searchnetworking, n.d.)
2. DNS Server type

2.1 Root Name Server

- A Root Name Server is a root domain name server that specifically answers requests for records in the root zone and also answers other requests, returning a list of specified authoritative domain names to the correct top-level domain; thus, the server to query when searching for a top-level domain name.

2.2 Local Name Server

- A local name server that only stores information for local clients after it has been extracted from an authoritative name server. The local server can effectively speed up the name queries for the local network by serving the names found in the previous queries, preventing a request for the domain of the host from being made to the authoritative server.

2.3 Recursive DNS server

- A recursive DNS search is where one DNS server communicates with several other DNS servers to search for an IP address and return it to the client. This is in contrast to the iterative DNS query, where the client communicates directly with each DNS server involved in the search. While this is a very technical definition, a closer look at the DNS system and the difference between recurrence and iteration should help to clear things up.

2.4 TLD (Top Level Domain): By essence, the TLD, also known as the domain extension, is what replaces the domain name in the query. Such extensions have been suggested as tools to help better differentiate and categorize domains. The purpose of a top-level domain was to help to identify a feature of a website, such as its function, its owner, or its geographical origin. TLDs can be divided into two additional categories: national top-level domain names (ccTLDs) and common top-level domain names (gTLDs) (Domain, n.d.)

2.5 Secondary Name Server: Secondary Name Server is a name server that installs the Domain Name System (DNS) archive of property information from a primary name server. The master name server may be either the main name server or a secondary name server. Main name servers extract their resource information from local archives called zone archives.

2.6 Primary Name Server: PNS (Primary Name Server) is a name server that manages its own local Domain Name System (DNS) resource information store. The primary name server shall have a master copy of the property records for each zone in which it has jurisdiction.

3. DNS purpose
    - DNS is just a mapping of the IP addresses to the name of the website. In web browsers, websites are identified by a set of numbers called IP addresses (Internet Protocol). Domain names are used to classify Internet infrastructure, such as devices, networks, and facilities, with a text-based symbol that is easier to memorize than the numerical addresses used in Internet protocols. A domain name can reflect the entire set of these tools or individual instances. Registered Web host computers use domain names as host identifiers, also known as hostnames. The word host-name is often used for leaf labels in the domain name scheme, typically without additional subordinate domain namespace. Hostnames serve as a part of the Uniform Resource Locators (URLs) for the Internet.

4. Domain name are organized and managed
    - The domain name should be simple and reminiscent of the purpose and scope of the domain owner organization's activities. Each domain name must have a maximum of 63 characters, including." "Domain names are specified with characters (a-z A-Z 0-9) and-" "characters. The full domain name shall not exceed 255 characters in length. The full domain name may not exceed 255 characters in length. Due to the value of the Domain Name System (DNS), management and maintenance are required. While the Internet does not have a central government, the assignment of "space" (IP, DNS, ASN) to the Internet is strictly managed. The Domain Name System is administered by the following organizations: (ICANN) Internet Corporation for Assigned Names and Numbers. Top-level-domain operators (like Verisign). Accredited registrars (like Goddy). The domain name structure is hierarchical, and the DNS root zone is at the top of the hierarchy. IANA manages the root DNS zone — with oversight provided by ICANN — by managing the root zone data on the root name servers. In addition to maintaining the Root Zone Register, ICANN also maintains the Root Zone Database (information published in WHOIS) and manages the Key Signing Key (KSK): which provides DNS protection via DNSSEC. ICANN develops a policy for root zone management through the advice of two technical bodies: the Root Server System Advisory Committee (RSSAC) and the Security and Stability Advisory Committee (SSAC).

- ICANN assigns organizations to manage Top Level Domains (such as the Com Domain) and accredits registrars who purchase and manage namespace — on behalf of companies and individuals — within these Top Level Domains. The Global Policy for Top Level Domains has been developed by two ICANN organizations: Generic Names Supporting Organization (GNSO) and Country Code Names Supporting Organization (ccNSO).
- Although ICANN is the supreme authority for managing the Domain Name System (DNS), it does so by delegating administrative responsibility to several policy-makers through guidance from a variety of committees, some of which include members from national governments and super-national bodies.

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. Server
   - The server is a complex system that is responsible for centralized storage of data sources, processing access to information from other computers via the Internet. The server hardware devices for complete setup are similar to the desktop. However, the reliability and performance of the server are much higher than those of conventional computers. A server is made up of many different components such as the motherboard, processor (CPU), RAM, hard drive (HDD, SSD), Raid controller, Power supply unit (PSU), etc.The word "Server" is derived from the algorithms "Quere" and "Black-Box." This is an algorithm based on the principle that when input data is processed and finished products are returned to the user.
   - In the client/server programming model, a server system is waiting and responding to requests from client programs that may be running on the same or other computers. A certain application on the computer can act as a client with service requests from other programs and as a request server from other programs.
2. Server Hardware
   - The servers consist of several different components and sub-components. At the hardware level, servers usually consist of a power mounting bracket, a system board, one or more CPUs, memory, storage, network interfaces, and power.
   - The chassis includes the main electronic components, including the motherboard (with spaces for installing or replacing microchips for the main and possibly specialized processors and random-access memory (RAM) and spaces for attaching optional adapters (e.g. for audio or video capabilities). Usually, space is fitted with a hard disk drive and a CD-ROM player.

- Type of server hardware:
  - Tower servers: A tower server is a computer that is built in an upright cabinet that stands alone and is designed to function as a server. The cabinet is known as a tower, and several tower servers can execute various tasks and processes simultaneously. Tower servers are common due to scalability and redundancy benefits, as limitless servers can be attached to the current network primarily due to the autonomous existence of individual tower servers. (Dealna, n.d.)

Figure 1: Tower Server

  - Rack servers: A rack server, also known as a rack-mounted server, is a customized desktop computer built to be housed in a cabinet called a rack. The rack includes several mounting slots called bays, each designed to house a piece of hardware protected by screws. A low-profile rack server, as opposed to a tower server, is built into a stand-alone, upright box. (Dealna, n.d.)

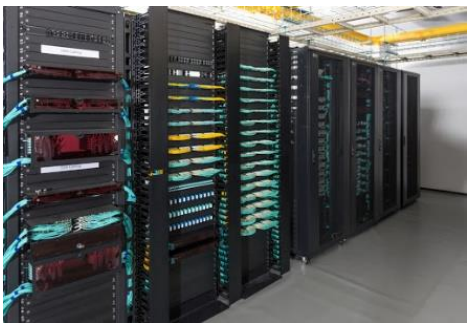

Figure 2: Rack Servers

- Blade servers: A single board has components such as processor, memory, and network links that are also present on several boards. The server blades are designed to slide into existing servers. Server blades are simpler, smaller and use less power than conventional box-based servers. (Dealna, n.d.)

Figure 3: Blade Servers

3. Server Software
   - Server software is a category of the program designed to be used, run, and maintained on a cloud computer. It enables and encourages the use of the basic processing resources of the system for use of a variety of specialized computer facilities and functions. Server software is mainly designed to communicate with server hardware resources, including CPU, memory, power, input/output (I / O), and communication ports.
   - Based on the type of use of the application, the application program can be divided into several different categories, such as the following:
     - Server operating system: Prevalent server operating systems include Windows Server, Mac OS X Server and Linux versions such as Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server.
     - Web server software: A web server consists of several parts that control users accessing files stored on an HTTP server. The HTTP server is a piece of software that can understand website addresses (URLs) and the browser protocol used to view websites (HTTP). Whenever a browser needs a file stored on the server, the browser sends that file request via HTTP. When the request comes to the right server (hardware), HTTP (software) sends the requested document back via HTTP. Some kind of web server as Apache, IIS, etc.
       - Apache HTTP Server: Apache HTTP Server is a software application that communicates via the HTTP protocol and runs on most operating systems. Apache is a server running software that establishes a connection between a server and a user browser, such as Firefox, Google Chrome, Safari, etc., and then transmits and exchanges a two-dimensional file

structure as a client-server format. Apache is free, open-source web server software. The Apache HTTP Server is being run and developed by the Apache Software Foundation. Apache's mission is to help website owners put content on the internet. Apache is thus known as a "web-server" program.

- IIS (Internet Information Services): IIS is a web server running on the Microsoft.NET platform on Windows OS. Although it is possible to run IIS on Linux and Macs using Mono, it is not recommended and is likely to be unstable. (There are other options, which I will present later). It is flexible and reliable and has been widely used in production for many years. The two main process models for web servers are either to handle all requests on a single thread or to generate a new thread for each request. Although a single-thread model (Node.js, for example) has several worker threads open, it typically only uses them for certain types of work, such as file system access. The thread-per-request model that IIS uses can catch a thread from the thread pool for each request. Other built-in security features include TLS certificate management and binding to enable HTTPS and SFTP on your sites, request filtering for whitelisting or blacklisting traffic, authorization rules, request logging, and a rich set of FTP-specific security options.

- Database server software: As a program, a database server is the back-end component of a database framework that fits the conventional client-server paradigm. This back-end portion is sometimes referred to as the instance. It may also apply to the actual machine used to run the database. The database server is usually a specialized top end computer that houses the database.
- Cloud server software: The term cloud server refers to infrastructure that acts as an internet server through cloud computing. Cloud server concept is growing as digital technology to meet recent demand. In the past, the server was a physical server that was accessed through the internet. It was similar to your home computer, but you leased through the provider. Due to high demand, the server is expanded and divided into several virtual servers. Therefore, one physical computer has some kind of virtualization computing. Each of them is leased to a personal customer. As a result, the cloud server consists of two types.

➢ Each of the above types of server software uses servers for different functions and services, but they all focus on their primary goal of using inherent computing resources and capabilities. Besides, the server software can be a

physical or virtual server/cloud server built on a physical server. (Techopedia, n.d.)

4. Communication protocol
   - A set of basic rules for data interpretation, signaling, authentication, and error detection. The protocols used to transmit digital signal information on computer networks have many features to ensure reliable data exchange over an imperfect channel of communication. There are theoretical protocol models that are relatively respected by the information technology industry, such as the OSI model. There are also commonly implemented and used protocols such as TCP, IP, HTTP, etc. (Learn, n.d.)
   - There are many protocols used to communicate or communicate information on the Internet, below are some of the typical protocols
     - TCP (Transmission Control Protocol): It is one of the core protocols of the TCP / IP protocol suite. Using TCP, programs on networked servers may make "connections" with each other from which data or packets can be shared.
     - IP (internet Protocol): This is the unique address that electronic devices are currently using to identify and communicate with each other on a computer network using an Internet protocol. The IP address of the Internet Protocol version 4 (IPv4) is defined as a 32-bit number. However, due to the development of the Internet and the exhaustion of available IPv4 addresses, the IP version New (IPv6) uses 128 bits for the IP address.
     - HTTP (Hypertext Transfer Protocol): Is the hypertext transfer protocol used in www to transfer data from a web server to a web browser and vice versa. This protocol mostly uses port 80.

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

A. Website
   - The website consists of a series of websites that can include text, photographs, audio, and video. A home page is the first page of the website. -- website has a special URL (Internet Address) to must enter to access a website in your browser. The website is hosted on one or more servers and accessible through the computer network through its homepage.

1. Static web
   - A static website includes fixed content web pages. Each page is HTML encoded and each visitor receives the same information. Static web pages contain set code, each page content does not adjust except when the webmaster changes it

manually. This works very well for small sites, but it can make it difficult to maintain large websites with hundreds or thousands of pages. Larger websites therefore frequently use dynamic pages to be updated by altering database records. Static web sites with several sites typically have templates built for this purpose. This allows multiple pages to be revised concurrently and also enables the website to be properly set out. (Christensson, 2009)

2. Dynamic Web
   - A dynamic website is a collection of dynamic web pages that dynamically change their content. The database or Content Management System (CMS) provides content access. A dynamic website uses scripts on the client or the server, or both to generate dynamic content. Scripting on the client generates user input-based content on the client's computer. The web browser downloads and uses the web page code to provide the user with information. The software works on the server when the script is on the server, and processing in the server is complete.
3. Between Static, and Dynamic Website:

Static Website	Dynamic Website
Prebuilt content is same every time the page is loaded.	Content is generated quickly and changes regularly.
It uses the **HTML** code for developing a website.	It uses the server side languages such as **PHP,SERVLET, JSP, and ASP.NET** etc. for developing a website.
It sends exactly the same response for every request.	It may generate different HTML for each of the request.
The content is only changed when someone publishes and updates the file (sends it to the web server).	The page contains "server-side" code which allows the server to generate the unique content when the page is loaded.
Flexibility is the main advantage of static website.	Content Management System (CMS) is the main advantage of dynamic website.

Figure 4: Static and Dynamic Website (Javatpoint, n.d.)

B. Front-End
   - Front-End is a software program that allows users to communicate with the application directly. Front-End is the process of using HTML, CSS, JavaScript, framework to design and build interfaces for websites or web applications with which users can interact. But that's not enough, the front-end concept not only handles the website interface but also handles the entire interface that displays the Clients device.
   - Front-end Technology:
     - **HTML** (Hyper Text Markup Language): HTML is a markup language designed to create web pages containing pieces of information on the World Wide Web. Hypertext is the way that you travel across the web-by clicking on a special text called a hyperlink that will take you to the next page. The fact that super just means that it's not linear-that is, you can go anywhere on the Internet whenever you want by clicking on a link there's no order to do that. HTML has created a technical trinity for the World Wide Web. HTML is defined as a simple

application of SGML and is used in organizations that require complex publishing requirements. HTML became an Internet standard maintained by the World Wide Web Consortium (W3C). (YourHTML, 2012)

- **CSS** (Cascading Style Sheets): The CSS manages the look and sound of the web page. You can control the text color, font style, the spacing of paragraphs, the size and layout of columns, the background images or colors, layout designs, and display variations on various appliances and screen dimensions and a variety of other effects using CSS. (Tutorialspoint, n.d.)
- **JavaScript**: The JavaScript is a cross-platform, object-oriented scripting language used to render webpages interactive (e.g. complex animations, clickable buttons, pop-up menus, etc.). There are also more advanced server-side versions of JavaScript, such as Node.js, which allow you to add more features to your website than simply downloading files (such as real-time collaboration between multiple computers). Inside the host environment (for example, a web browser), JavaScript can be connected to the environment objects to provide programmatic control over them. JavaScript includes a standard object library, such as Array, Date, and Math, and a core collection of language elements, such as operators, control structures, and statements. Core JavaScript can be expanded for several purposes by adding additional artifacts to it. (Developer, n.d.) JavaScript frameworks (including AngularJS, Backbone, Ember, and ReactJS) have a JavaScript code structure. There are many different frameworks suitable for different requirements, but the four frameworks mentioned above are of the highest priority. These frameworks help speed up programming and can be used together with libraries like jQuery to reduce the need for re-coding from the start.

C. Back-End

- The back-end is typically made up of three parts: server, client, and database. Back-end Developer is primarily responsible for the server of web-based applications, which is easier to understand than activities that are not visible in the browser. Backend technologies often include languages such as PHP, Ruby, Python,
- Back-end Technology
  - **PHP** (Personal Home Page): Is a scripting language or type of script used mainly for the development of server-written, open-source, general-purpose applications. It is well suited to the web and can easily be embedded in HTML pages. PHP is a very popular scripting language used to create websites, and now has a lot of strong frameworks like Zend Framework, Symphony, Yii Framework, CodeIgniter ... The PHP Framework is designed to the specifications of the MVC model (Model-View-Controller) and provides multiple layers of support for security handling, authorization, captcha, view helper, module manager, database, service ... It will then build and develop websites easily and quickly.
  - **Ruby**: Ruby is a basic object-oriented programming language. It was founded in 1993 by the Japanese Yukihiro Matsumoto. Ruby is open source and freely available on the Internet, but is subject to a license. Ruby may be embedded in

the Hypertext Markup Language (HTML). Ruby has a rich set of built-in features that can be used directly in Ruby scripts. (Tutorialpoint, n.d.)

- **Python**: Python is currently the most widely used multipurpose programming language. Allows programming in object-based and procedural models. Python programs are also smaller than other programming languages, such as Java. Programmers must type relatively less and require indentation of the language, making it readable at all times. The biggest power of Python is the large collection of standard libraries that can be used for the following items: Machine Learning, GUI Applications, Web Frameworks such as Django, Image Processing, Web Scraping, Test Frameworks, Multimedia, Scientific Computing. (GeeksFoGeeks, n.d.)

D. The relationship between front-end and back-end

- Front-end developers do everything created in your web browser or client-side. Back end developers, on the other hand, create server-side systems, making everything on the build interface work. The main tools and support of a front-end developer are HTML (Hyper Text Markup Language), CSS (Cascading Style Sheets), and JavaScript. HTML is a markup language used to build web page frames. CSS is a way to let the browser know what everything looks like, style it. JavaScript is used to add animations, transitions, and functions to on-screen elements. To help build the site, there are libraries and frameworks like Angular.js, React.js, Boot-Strap, etc., which help streamline the process and allow reuse of the tools available to use. Although you can build a website using only HTML, CSS, and JavaScript, they will have unnecessary work for an experienced front end developer. For example, anything you see on this site right now can be done by a front-end developer. The designer creates logos and graphics, the photographer produces images, the copywriter writes contents. But the front-end developer combines all the pieces and converts them into a web language, creating the experience you have while browsing through each page. To get a specific example, scroll the mouse up and down on the ABC website homepage. It's the work of a front-end developer. If Front End Developer has the power to create the beauty of websites, then Back End Developer is the person who handles all the complex business logic hidden in the background, helping the system work smoothly. User data, analysis algorithms, etc. are all located in the back-end. To make servers, applications, and databases interoperable, back-end developers use server-side languages such as PHP, Ruby, Python, Java, and.Net to build an application, and tools such as MySQL, Oracle, and SQL Server to search, store, or change data and serve it back to the front-end user. Back-end developer positions also include familiarity with PHP frameworks such as Zend, Symphony, and Cake-PHP; familiarity with version management software such as SVN, CVS, or Git; and experience with Linux in system development and deployment. For example, when you navigate to this site, ABC servers send information to your computer or mobile device, which is then converted to the site you are currently viewing. This method is the product of the work of the back-end developer. Besides, whether you sign up for an ABC course or an ABD course, store your personal information, and the fact that any time you go back to the site and log in, your data will be retrieved-this is part of a back-end developer 's work. Before writing the

code, however, it is necessary to coordinate with business stakeholders to understand specific needs, translate them into technical requirements, and to offer the most effective architectural solutions. Back End Developer decides how the website is run. A very important person.

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. An online creation tool (Websitebuilder.com)
   A. Websitebuilder provides you with a comprehensive guide on how to build your website from your homepage in a simple, easy way. Just like other website design websites, Website Builder allows you to log in to the function and also has an interface for users to freely search and build, 5 support packages corresponding to the various rates of authority used on the web (Starter, Premium, Business, Ecommerce).

   B. Different between Template Websites and Custom Websites
      - **Template Website**: The most common way to start a website is to set up a WordPress website and apply a template that has been purchased from ThemeForest, Monster Model, or Elegant Themes. There are also services, such as Websitebuilder, that also provide a theme and allow you to edit within the context of the site. It will help you get a website up quickly and easily. Nonetheless, there are limitations to the options available for more complicated features such as forms or e-commerce capabilities.
      - **Custom website**: Custom designed websites are part of a community behind your company. Begin with a creative method to consider who your target market is, who you want to meet, how you want/need a website, and how you want to navigate the internet. There are guidelines to be followed while creating a website, and not all subjects are likely to obey such laws. That's why custom-built websites are so much better, that developers can customize the site during the development process to allow google and other search engines to read each page and provide end-users with more accurate search results, thus naturally offering custom-built websites a better system ranking. Custom-built websites tend to take longer than the subject because everything is being built and caters to a specific business. It will save time in the long run, because when built from scratch, it's much easier to customize your site to make sure your site does exactly what you want. Custom designs allow your site to adapt to all devices (such as phones, tablets, laptops, etc.) and browsers.

C. Comparison table

	Online creation tools	Custom built website
Design flexibility	It could not be customized according to your needs. The fitting of web elements such as images, videos, and text is challenging with web templates.	Strong and versatile. The combination of web-based elements, such as images, videos, text, effects, is customized when exchanging with the author.
Performance	To increase the performance of the website is difficult or impossible to customize	Can be adapted to improve the performance of the website
Functionality	Some templates are not built to be search engine friendly. May not work 100% on all devices.	The site will be built to search engine friendly. Website tested to work on all browsers. There is a factor of scalability with custom websites and they grow as business grows
UX	A website that is programmed to follow a certain sentence will not feel like a new and different experience compared to other websites.	Good user experience is a refreshing page design that is more flexible than websites created with a certain form.
UI	User-friendliness based on flexibility, layout, and reasonable layout of each type of object is challenging with web templates.	User-friendliness is something that custom builds can do by being able to arrange, allocate the layout to suit each site's target audience.

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