**UNIVERSITY OF THE SOUTHERN CARIBBEAN**

**P.O. BOX 175, PORT OF SPAIN**

**Assignment 1: Web Development**

An Assignment

Presented in Partial Fulfillment

Of the Requirements for the Course

CPTR321: Database Design and Development

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By

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Approval ……………………………

**Question 1**

Provide a detailed definition/explanation of the following terms: the minimum acceptable definition is three lines. Where applicable, provide an example and discuss its significance in web development.

|  |  |
| --- | --- |
| * 301 Redirect * Bandwidth * DNS (Domain Name System) * Framework * Metadata * Search Engine Friendly URLs * Search Engine Optimization (SEO) * Subdomain * Wireframe * Canonical URL | * XML Sitemap * Time to Live (TTL) * Content Delivery Network (CDN) * Web Application Frameworks * GDPR * RESTful API * SSL/TLS * Responsive Design * Progressive Web App (PWA) * Microdata |

**301 Redirect** - A 301 redirect is a permanent redirection from one URL to another, used to maintain search engine rankings and user access when a webpage's URL changes. It signals to search engines and browsers that the original URL has been permanently replaced with a new one. - <https://www.semrush.com/blog/301-redirects/>

**Bandwidth** - Network bandwidth is a measurement indicating the maximum capacity of a wired or wireless communications link to transmit data over a network connection in a given amount of time. Typically, bandwidth is represented in the number of bits, kilobits, megabits or gigabits that can be transmitted in 1 second. - <https://www.techtarget.com/searchnetworking/definition/bandwidth>

**DNS (Domain Name System) -** 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). - <https://www.techtarget.com/searchnetworking/definition/domain-name-system>

**Framework** - In computer systems, a framework is often a layered structure indicating what kind of programs can or should be built and how they would interrelate. Some computer system frameworks also include actual programs, specify programming interfaces, or offer programming tools for using the frameworks. - <https://www.techtarget.com/whatis/definition/framework#:~:text=In%20computer%20systems%2C%20a%20framework,tools%20for%20using%20the%20frameworks>.

**Metadata** - Metadata is **data that describes other data**, providing a structured reference that helps to sort and identify attributes of the information it describes. Metadata summarizes basic information about data, which can make it easier to find, use and reuse particular instances of data.

For example, author, date created, date modified and file size are examples of very basic document file metadata. Having the ability to search for a particular element (or elements) of that metadata makes it much easier for someone to locate a specific document.

In addition to document files, metadata is used for:

* Computer Files
* Images
* Relational Databases
* Spreadsheets
* Videos
* Audio Files
* Web Pages

The use of metadata on web pages can be very important. The metadata contains descriptions of the page's contents, as well as keywords linked to the content. This metadata is often displayed in search results by search engines, meaning its accuracy and details could influence whether or not a user decides to visit a site. This information is usually expressed in the form of [meta tags](https://www.techtarget.com/whatis/definition/meta-description-tag).

Search engines evaluate meta tags to help decide a web page's relevance. Meta tags were used as the key factor in determining position in a search until the late 1990s. The increase in search engine optimization ([SEO](https://www.techtarget.com/whatis/definition/white-hat-SEO)) towards the end of the 1990s led to many websites to keyword stuffing their metadata to trick search engines, making their websites seem more relevant than others.

- <https://www.techtarget.com/whatis/definition/metadata>

**Search Engine Friendly URLs** - SEO-friendly URLs are web addresses that are designed to be easily read by both users and search engines. These URLs include descriptive keywords, use hyphens to separate words, and are kept short and simple. They help improve search engine rankings and enhance user experience. - <https://world.siteground.com/kb/what_are_search_engine_friendly_urls_sef/>

**Search Engine Optimization (SEO)** - Search engine optimization is the science of improving a website to increase its visibility when people search for products or services. The more visibility a website has on search engines, the more likely it is that brand captures business.

Website visibility is commonly measured by the placement -- or ranking -- of the site on search engine results pages (SERPs). And companies always vie for the first page, where they are most likely to garner the most attention. - <https://www.techtarget.com/whatis/definition/search-engine-optimization-SEO>

**Subdomain** - A subdomain is an extension of your domain that helps you organize content and expand your business offerings. It allows you to create standalone pages or functions, such as a blog or online store. For example, you can visit hubspot.com to view and access the tools and services offered. Or, you can visit blog.hubspot.com to access the section of our website that serves blog content. Although the URL changes slightly, you’re still on HubSpot’s website, under HubSpot’s domain. - <https://www.semrush.com/blog/what-is-a-subdomain/>

**Wireframe** - Wireframing is a way to design a website service at the structural level. A wireframe is commonly used to layout content and functionality on a page which takes into account user needs and user journeys. Wireframes are used early in the development process to establish the basic structure of a page before visual design and content is added. - <https://www.experienceux.co.uk/faqs/what-is-wireframing/>

**Canonical URL** - A canonical URL is the version of a webpage chosen by search engines like Google as the main version when there are duplicates. And is prioritized to avoid showing repetitive content that doesn’t provide unique value in search results.

Consider these two URLs:

* Canonical URL: https://example.com/blog/
* Non-canonical (alternate) URL: https://example.com/blog/?page=1

In this example, Google will likely choose the canonical URL for indexing and ranking.

The canonical page can also be called the “principal,” “primary,” or “representative” version. - <https://www.semrush.com/blog/canonical-url-guide/>

**XML Sitemap** - An XML (Extensible Markup Language) sitemap is a text file that lists a website's pages to help search engines crawl and index them. XML sitemaps allow search engines like Google to find a website and understand its structure, including its pages, sections, hierarchy, and links. They also provide information such as the frequency of updates and the relative importance of each page in comparison to others on the same website. These details help search engines determine what pages to crawl and index first. <https://webflow.com/glossary/sitemapxml#:~:text=An%20XML%20(Extensible%20Markup%20Language,sections%2C%20hierarchy%2C%20and%20links>.

**Time to Live (TTL)** - Time-to-live (TTL) is a value for the period of time that a packet, or data, should exist on a computer or network before being discarded.

The meaning of TTL, or packet lifetime, depends on the context. For example, TTL is a value in an Internet Protocol (IP) packet that tells a network router when the packet has been in the network too long and should be discarded. - <https://www.techtarget.com/searchnetworking/definition/time-to-live>

**Content Delivery Network (CDN)** - A content delivery network (CDN) is a geographically distributed group of servers that caches content close to end users. A CDN allows for the quick transfer of assets needed for loading Internet content, including HTML pages, JavaScript files, stylesheets, images, and videos. - <https://www.cloudflare.com/learning/cdn/what-is-a-cdn/>

**Web Application 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, as well as to develop application programming interfaces ([APIs](https://www.techtarget.com/searchapparchitecture/definition/application-program-interface-API)). Web development frameworks are also referred to as web application frameworks or simply web frameworks.

Web development frameworks enable developers to build applications that can run on well-known technology [stacks](https://www.techtarget.com/searchapparchitecture/definition/software-stack) such as the [Linux](https://www.techtarget.com/searchdatacenter/definition/Linux-operating-system), [Apache](https://www.techtarget.com/whatis/definition/Apache), [MySQL](https://www.techtarget.com/searchoracle/definition/MySQL) and [PHP](https://www.techtarget.com/whatis/definition/PHP-Hypertext-Preprocessor) ([LAMP](https://www.techtarget.com/whatis/definition/LAMP-Linux-Apache-MySQL-PHP)) stack. Most frameworks provide a wide range of features and functionality that help streamline application development. For example, they might include any of the following components:

<https://www.techtarget.com/searchcontentmanagement/definition/web-development-framework-WDF>

**GDPR -** The General Data Protection Regulation (GDPR) is a legal framework that sets guidelines for the collection and processing of personal information from individuals who live in and outside of the [European Union](https://www.investopedia.com/terms/e/europeanunion.asp) (EU).

Approved in 2016 and put into effect in 2018, the GDPR is the toughest security and privacy law in the world. It aims to give consumers control over their own personal data by holding companies responsible for the way they handle and treat this information.1

The regulation applies regardless of where websites are based, which means it must be heeded by all sites that attract European visitors, even if they don't specifically market goods or services to EU residents. - <https://www.investopedia.com/terms/g/general-data-protection-regulation-gdpr.asp>

**RESTful API** - A RESTful [API](https://www.techtarget.com/searchapparchitecture/definition/application-program-interface-API) is an architectural style for an application programming interface that uses [HTTP requests](https://www.theserverside.com/blog/Coffee-Talk-Java-News-Stories-and-Opinions/HTTP-methods) to access and use data. That data can be used to GET, PUT, POST and DELETE data types, which refers to reading, updating, creating and deleting operations related to resources. - <https://www.techtarget.com/searchapparchitecture/definition/RESTful-API#:~:text=A%20RESTful%20API%20is%20an,deleting%20operations%20related%20to%20resources>

**SSL/TLS** - SSL (Secure Sockets Layer) encryption, and its more modern and secure replacement, TLS (Transport Layer Security) encryption, protect data sent over the internet or a computer network. This prevents attackers (and Internet Service Providers) from viewing or tampering with data exchanged between two nodes—typically a user’s web browser and a web/app server. Most website owners and operators have an obligation to implement SSL/TLS to protect the exchange of sensitive data such as passwords, payment information, and other personal information considered private. - <https://www.f5.com/glossary/ssl-tls-encryption>

**Responsive Design** - An approach to web design in which the interface adapts to the device's layout to facilitate usability, navigation and information seeking. Responsiveness is possible thanks to media queries, allowing the design to adjust automatically to the browser space to ensure content consistency across devices, and design elements being sized in relative units.

<https://www.interaction-design.org/literature/topics/responsive-design#:~:text=Responsive%20design%20is%20an%20approach,usability%2C%20navigation%20and%20information%20seeking>.

**Progressive Web App (PWA)** - A progressive web app (PWA) is an app that's built using web platform technologies, but that provides a user experience like that of a platform-specific app.

Like a website, a PWA can run on multiple platforms and devices from a single codebase. Like a platform-specific app, it can be installed on the device, can operate while offline and in the background, and can integrate with the device and with other installed apps. - <https://developer.mozilla.org/en-US/docs/Web/Progressive_web_apps>

**Microdata** - Microdata is a way to annotate HTML content with additional tags that provide information about the content on the page. Search engines can use this information to better understand the content of the page and provide more accurate search results. - <https://www.link-assistant.com/seo-wiki/microdata/>

**Question 2 ( 30 marks )**

Write a no more than 1-page essay on how a web client such as your mobile phone, tablet, or computer serves up/displays a web page when it is requested. Your answer must include the following terms and explain their roles in the process:

1. Web Server
2. IP Address
3. Domain
4. Framework
5. Programming Language
6. HTTP/HTTPS
7. Browser Rendering Engine

**The Web Page Lifecycle: From Request to Render**

The internet has transformed our world into a virtual village. Benefits such as communication with loved ones and strangers alike across the globe are made possible through the internet. Behind the devices we use to access the internet for entertainment, research, communication, and development, there is a complex process that makes these conveniences possible, which will be discussed briefly in the below essay.

The first step begins with a user typing out a webpage’s URL (Uniform Resource Locator - a web address that provides a unique, specific location for a particular resource on the internet.)

Firstly, the browser breaks down the URL into different parts. The domain name such as “[www.XYZ.com](http://www.XYZ.com)”, is extracted. This domain is then transformed into a numerical IP address (Internet Protocol Address) using the Domain Name System (DNS). The domain name system is a naming database in which internet domain names are located and translated into Internet Protocol (IP) addresses. The domain name system maps the name people use to locate a website, to the IP address that a computer uses to locate that website. (Bhavare, 2023)

After obtaining the IP address, the browser sends a request over HTTP *(Hypertext Transfer Protocol - is the collection of guidelines for sending multimedia items, including text, photos, sound, and video, over the internet. An individual uses HTTP indirectly the moment they launch their web browser)* to the web server linked to that IP address. This request includes information about the specific page being requested, the browser's capabilities, and other relevant details. After the browser receives data from the server, it parses it, converting the unstructured data into a format that it can understand. This entails recognizing JavaScript code, CSS, and HTML tags. (Chai, 2021)

The web server is a is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. The main job of a web server is to display website content through storing, processing and delivering webpages to users. It retrieves the requested page from its storage, along with any necessary resources like images, CSS stylesheets, and JavaScript files.

The web server then sends a response back to the browser, containing the HTML code of the page and any associated resources. The HTML code is essentially a blueprint that describes the structure and content of the page. (Chai, 2021)

The browser's rendering engine, a specialized component responsible for interpreting and displaying web content, takes over at this point. It parses the HTML code, building a Document Object Model (DOM) tree that represents the page's structure. The browser then applies CSS styles to the DOM elements to determine the appearance and layout. The browser arranges the elements of the page according to the render tree. This entails figuring out each element's size and placement within the viewport to make sure it is placed correctly and produces an aesthetically pleasing page. (Bhavare, 2023)

Should the page include the JavaScript programming language, the browser's JavaScript engine executes it. JavaScript can dynamically modify the DOM, create interactive elements, and handle user interactions. (Mozilla Developer Network, n.d.)

Lastly, the browser renders the page on the screen, displaying the content according to the DOM structure and applied styles. The user can now interact with the page, clicking on links, entering text, and performing other actions.

**Bibliography**

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**Question 3 (30 marks)**

In the realm of digital marketing, a landing page stands alone as a dedicated web page meticulously crafted for marketing or advertising endeavors. It serves as the destination where a visitor arrives after clicking a link embedded in an email or various online advertisements, such as those on Google, Bing, YouTube, Facebook, Instagram, Twitter, and similar web platforms.

You are required to create a landing page using HTML5. Your HTML must conform to HTML standards and include the following elements:

* A <header> section with a logo and navigation menu.
* A <main> section with a hero image, a call-to-action button, and a brief description of the product/service.
* A <section> for customer testimonials.
* A <footer> with contact information and social media links.

You are not required to use any CSS, but your HTML should be well-structured and semantically correct.

Question 3

Please refer to the below link or QR code containing the requirements for question 3.

<https://drive.google.com/drive/folders/12vfMrqWkqJQmZuKFpnOv4lJG_O2B6gja?usp=sharing>



**LANDING PAGE**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<meta name="description" content="Landing page for General Insurance">

<title>iCOVERu Insurance Landing Page</title>

</head>

<body>

<!-- Header Section -->

<header>

<div class="container">

<div id="logo" style="text-align: center;">

<img src="logo.jpg" alt="Company Logo" style="width: 150px; height: auto;" />

</div>

<nav style="background-color: black;">

<ul style="display: flex; justify-content: space-around; list-style-type: none; padding: 15px 0; margin: 0;">

<li><a href="#home" style="color: white; text-decoration: none;">Home</a></li>

<li><a href="#about" style="color: white; text-decoration: none;">About</a></li>

<li><a href="#services" style="color: white; text-decoration: none;">Services</a></li>

<li><a href="#testimonials" style="color: white; text-decoration: none;">Testimonials</a></li>

<li><a href="#contact" style="color: white; text-decoration: none;">Contact</a></li>

</ul>

</nav>

</div>

</header>

<!-- Main Section -->

<main>

<div class="container">

<section id="hero">

<img src="hero2.jpg" alt="Hero Image" style="width: 100%; height: auto;" />

<div>

<h1>Welcome to Our Insurance Company</h1>

<p>Discover the best solutions for your needs with Our top-notch Insurance Policies.</p>

<a href="#cta" id="cta-button">Get Started</a>

</div>

</section>

</div>

</main>

<!-- Testimonials Section -->

<section id="testimonials">

<h2>What Our Customers Say</h2>

<article>

<blockquote>

"This service completely transformed the way we do business. Highly recommended!"

</blockquote>

<p>- John Doe</p>

</article>

<article>

<blockquote>

"Exceptional quality and customer service. We couldn't be happier."

</blockquote>

<p>- Jane Smith</p>

</article>

</section>

<!-- Footer Section -->

<footer>

<section id="contact-info">

<h3>Contact Us</h3>

<p>Email: info@company.com</p>

<p>Phone: (123) 456-7890</p>

</section>

<section id="social-media">

<h3>Follow Us</h3>

<ul>

<li><a href="https://facebook.com/company">Facebook</a></li>

<li><a href="https://twitter.com/company">Twitter</a></li>

<li><a href="https://instagram.com/company">Instagram</a></li>

</ul>

</section>

</footer>

</body>

</html>