Course: MSc DS

Web Technologies

Module: **2**

Learning Objectives:

1. Understand the fundamental components and organisation of HTML and investigate the usage of tags to produce structured online content.

2. Develop the skill of web page style by using the force of CSS selectors and attributes for an aesthetically pleasing design.

3. Employ Bootstrap to explore the realm of responsive design, assuring the best viewing and interaction across a range of devices.

4. Develop a simple static website by learning how to improve web pages by using media and interactive aspects.

Structure:

2.1 Introduction to HTML

2.2 Styling with CSS: Selectors and Properties

2.3 Layouts and Responsiveness with Bootstrap

2.4 Integrating Media and Interactive Elements

2.5 Building a Simple Static Website

2.6 Summary

2.7 Keywords

2.8 Self-Assessment Questions

2.9 Case Study

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2.1 Introduction to HTML

The advent of the digital age ushered in a paradigm shift in the dissemination of information, characterised by the widespread sharing of material facilitated by the World Wide Web. HTML, also known as HyperText Markup Language, is the fundamental markup language that serves as the foundation for designing and organising web pages.

HTML is a foundational framework comprising a collection of components referred to as "tags," which serve the purpose of delineating, organising, and displaying material inside the online environment. When processed by a web browser, these tags convert plain text material into a visually structured representation that facilitates comprehension and accessibility for users. For example, the use of the <h1> tag signifies the designation of a principal heading, whilst the <p> tag signifies the demarcation of a paragraph.

Although HTML may first seem complex, its beauty rests in its straightforwardness and coherent organisation. The initiation of an HTML document is marked by a DOCTYPE declaration, which serves to tell the browser about the specific version of HTML that is being used. Subsequently, the <html> root element is presented, which encompasses the <head> and <body> parts. The <head> element serves to store information and establish connections to stylesheets or scripts, while the <body> element is responsible for housing the tangible material

that is visible to users and facilitates their interaction.

HTML encompasses more than the mere presentation of textual content. The platform provides support for various multimedia components, facilitates user input via forms, and offers seamless integration with complementary technologies like CSS (Cascading Style Sheets) and JavaScript, enabling the creation of interactive and adaptable web pages.

Acquiring proficiency in HTML serves as the first milestone in the realm of web development. The backbone of online content provides a wide range of options, including the creation of both basic personal blogs and intricate, data-driven websites. As one delves further into the realm of HTML, one will uncover its inherent variety and the significant capabilities it bestows upon individuals to manifest their digital concepts into reality.

2.2 Styling with CSS: Selectors and Properties

CSS (Cascading Style Sheets) is the primary governing factor in the presentation layer of websites, which is responsible for visual aesthetics and look. HTML provides the framework for organising material, whereas CSS enhances this framework by specifying attributes such as colour, layout, typeface, and other visual elements.

The CSS system is based on a fundamental idea wherein selectors are used to target certain HTML components, and

attributes are utilised to define the desired styling for the chosen elements. As an example, in order to apply a blue colour to all paragraphs included inside <p> tags, one would use the selector "p" and provide the "colour" attribute a value of blue. The CSS rule that would be generated is as follows: p { colour: blue; }.

Selectors are available in a range of different sorts, enabling the ability to target with great precision. In addition to the fundamental type selectors such as p and h1, there are class selectors, denoted by a prefix of ".", and ID selectors, denoted by a prefix of "#". These tools are especially useful for applying styles to individual items without impacting others in the same category. For example, the element with the class "highlight" may be selected by using the CSS selector ". highlight", but the element with the ID "header" would be selected by using the CSS selector "#header".

The properties inside CSS include a wide range of characteristics. While many characteristics, such as colour or font size, possess inherent clarity in their functionality, others, such as border-radius or box-shadow, provide the opportunity for elaborate design implementations. Every property inside the context anticipates a distinct collection of values, which may be either constant (such as 'centre') or variable (such as '15px').

One notable characteristic of CSS is its inherent cascading behaviour. In cases when numerous styles are applied to the

same element, CSS employs the principles of specificity and source order to ascertain the style that will be given priority. Developers are provided with the capability to establish default styles and modify them as necessary, hence offering a significant level of adaptability.

CSS may be regarded as the artistic element responsible for organising and styling the structured material inside HTML. Through a comprehensive comprehension of selectors and properties, web designers possess the ability to skillfully construct aesthetically fascinating experiences, guaranteeing that websites are not just informational but also possess the capacity to captivate and enthral consumers.

2.3 IP: Addressing and Functionality

In the contemporary era of digital technology, whereby individuals use a diverse range of devices with varied screen dimensions to visit websites, it is of utmost importance to prioritise the implementation of a flexible design. Bootstrap, a widely used front-end framework, has emerged as a viable option to address this particular difficulty by providing a comprehensive suite of tools that facilitate the creation of mobile-first and responsive web layouts with relative simplicity. The grid system offered by Bootstrap is a prominent feature that showcases its layout capabilities. The system partitions the screen into twelve columns, enabling developers to choose the

number of columns that a certain content block should fill on various devices. Developers have the ability to specify the layout of content on different screen sizes by using classes such as "col-md-6" or "col-lg-3". These classes allow for the content to occupy half of the screen width on medium devices or a quarter of the screen width on larger devices. The inclusion of granularity in the design guarantees that the arrangement maintains a constant and seamless appearance across all platforms, including mobile phones, tablets, and desktop computers.

One of the notable features of Bootstrap is its collection of pre-styled components. These various elements, which include navigation bars and modal pop-ups, are equipped with inherent responsiveness. By including these components in their development process, developers may effectively save time consumption and guarantee a cohesive appearance and functionality of their parts across various device kinds.

In addition, Bootstrap provides utilities that facilitate spacing, alignment, and presentation, enhancing the efficiency of the design workflow. For example, classes such as mt-3 or d-none provide developers with the capability to modify margins or conceal items without the need for further CSS code. These utilities have the potential to increase productivity by decreasing the need for personalised styles.

Nevertheless, it is crucial to exercise prudence while using

Bootstrap, despite its many advantages in terms of style. The excessive dependence on established frameworks may result in the production of designs that lack distinctiveness. Therefore, the incorporation of modification and occasional divergence from the prescribed framework are crucial elements in the development of online experiences that are both distinctive and memorable.

Bootstrap serves as a robust framework that provides a solid basis for the development of web designs that are responsive in nature. By virtue of its grid architecture, pre-styled components, and utility classes, this framework enables developers to construct websites that exhibit both aesthetic consistency across various devices and expedited development processes, therefore promoting an efficient and adaptable online ecosystem.

2.4 Integrating Media and Interactive Elements

The integration of media and interactive features has become vital in the evolution of websites since it plays a pivotal role in enhancing user engagement. These components serve not only to increase the visual attractiveness of a website but also to facilitate user engagement and encourage user retention.

Media assets, such as photographs, films, and audio samples, provide a more comprehensive and multifaceted context compared to written text in isolation. As an example, rather

than using verbal descriptions to convey information about a product or process, the use of a concise film or infographic may efficiently and vividly communicate the same content. The introduction of HTML5 brought the inclusion of elements such as <video> and <audio>, which facilitated the integration of media content directly into web pages, therefore streamlining the process. Furthermore, the inclusion of HTML elements such as <canvas> and <svg> facilitates the integration of dynamic visual information, hence allowing the incorporation of animations and interactive graphics, which are of paramount importance in contemporary web design.

On the contrary, interactive aspects aim to cultivate user involvement. Possible options for implementing interactive elements on a digital platform include using interactive forms, sliders, carousels, or even gamification elements. By using technologies like JavaScript and jQuery, developers have the ability to generate dynamic content that responds to user interaction. Examples of interactive components that enhance the interactivity of websites and contribute to a more immersive user experience include hover animations, drop-down menus, and pop-up modals.

Nevertheless, it is essential to give precedence to user experience while incorporating these components. Media assets, particularly those with high resolutions, such as photographs and videos, possess a substantial size that might

result in prolonged loading durations for webpages. Methods such as lazy loading, compression, and the use of suitable file formats have the potential to enhance performance while maintaining the desired level of quality. In a similar vein, it is worth noting that interactive components have the potential to augment user engagement. However, it is crucial to exercise caution in their implementation, as excessive or too intricate use of such features may have a counterproductive effect, deterring users instead. The relationship between usefulness and beauty is a perpetual equilibrium.

The incorporation of media and interactive components has significant importance in contemporary web design; nonetheless, it is crucial to use them judiciously. Developers may enhance the aesthetic attractiveness and user engagement of web pages by assuring the relevance, optimisation, and user-friendliness of these aspects. Additionally, such efforts enable the web pages to be extremely responsive to the demands of the users.

2.5 Building a Simple Static Website

Within the domain of web development, a rudimentary static website serves as the fundamental cornerstone for novice individuals seeking to acquire essential knowledge. In contrast to dynamic websites, which dynamically modify information

in response to user interactions or database updates, static websites consistently display the same material to all viewers. Websites are mostly constructed using three fundamental technologies, namely HTML, CSS, and sometimes JavaScript, hence offering a direct means to develop an online presence.

HTML, also known as HyperText Markup Language, functions as the foundational framework for webpages. Consider it as a framework in which developers use diverse tags to delineate headers, paragraphs, links, and other elements, akin to scaffolding that supports the structure of content. An HTML file usually starts with a declaration specifying the kind of document (doctype) and is thereafter organised into distinct head and body parts. The header often contains metadata and references to other sources, while the main text is included inside the body.

In contrast, CSS, also known as Cascading Style Sheets, assumes the role of the stylistic conductor. HTML is responsible for organising the material, whereas CSS is responsible for enhancing its visual appearance by specifying attributes such as colours, fonts, spacing, and general arrangement. Selectors are used by developers to specifically target HTML components and implement style attributes, guaranteeing that the website aligns with its desired aesthetic and branding.

Although a simple static website is capable of functioning without JavaScript, the use of JavaScript may significantly

enhance the user experience. JavaScript enhances the level of interaction by allowing the inclusion of components such as picture sliders, interactive forms, and basic animations.

After the completion of the content, style, and optional interaction layers, the website may be deployed to a server. There are many hosting systems available that expressly cater to static websites, providing efficient deployment and speed optimisation features as part of their standard offerings.

Fundamentally, the process of constructing a basic static website entails the amalgamation of elements such as structure, style, and, if desired, interactivity. Websites of this kind not only exhibit expedited development processes but also demonstrate enhanced loading speeds, offering an optimum alternative for personal portfolios, landing pages, or informative websites. With the continuous advancement of technology, developers are presented with a wide range of tools that may effectively streamline and augment the development process.

2.6 Summary

❖ Module 2 explores the fundamental aspects of web design, starting with the structural core of webpages, namely HTML. Students are provided with an introduction to the fundamental structure of HTML pages, gaining comprehension of the manner in which various tags provide the foundation for online content.

❖ The module then delves into the domain of CSS, which is

widely recognised as the influential stylistic component of the internet. Through the exploration of selectors and properties, students are able to get a deeper understanding of the process of aesthetically customising web components. This knowledge enables them to establish a unified identity and maintain design consistency across various sections of a website. The ongoing progression involves Bootstrap, a widely used front-end framework that streamlines the procedure of creating adaptable designs, guaranteeing that websites exhibit exceptional visual appeal across a diverse range of gadgets.

❖ The module places emphasis on the integration of media and interactive features, resulting in heightened user engagement and an enhanced user experience as aesthetics and utility converge. Ultimately, the accumulated knowledge is used in a pragmatic endeavour: constructing a rudimentary static website. This practical exercise enhances the process of acquiring knowledge, enabling students to use their recently acquired abilities within a practical setting.

2.8 Keywords

- **HTML:** The commonly used markup language for the creation of web pages.

- **CSS Selectors:** Patterns used to select and style HTML elements.

- **Bootstrap:** A front-end framework that facilitates the

creation of responsive and mobile-first websites.

- **Responsive Design:** Guarantees that online content is visually appealing and operates well across a range of device sizes.

- **Media Integration:** The incorporation of visual and auditory components, such as photos, videos, and audio, inside the structure of web pages.

- **Static Website:** A website that uniformly presents its content to all visitors without including any dynamic modifications in response to user input.

2.9 Self-Assessment Questions

1. What does HTML's main function in web design include, and how does it vary from CSS?

2. What distinguishes a CSS class selector from an ID selector? Give an example of each.

3. How does the use of Bootstrap improve the creation of responsive websites? Identify at least two Bootstrap elements that support the development of mobile-first designs.

4. What property should be used when including a video element on a website to prevent the video from starting when the page loads?

5. Give examples of a static website's features. When it comes to content distribution and user engagement, how does it

vary from a dynamic website?

2.10 Case Study

Title: The Rebranding of "Nature's Delight"

Introduction:

In the contemporary day, when the online presence of a company has significant weight, the need to possess a proficient, visually appealing, and adaptable website has become of utmost significance. The organic food business known as "Nature's Delight" has lately made the strategic decision to undergo a rebranding process with the aim of enhancing its appeal to a younger demographic.

Case Study:

For more than twenty years, "Nature's Delight" has established itself as a reputable brand in the realm of organic goods. Nevertheless, due to increased competition and the growing number of technologically proficient millennials as the key customer base, the company's antiquated website, which lacks contemporary aesthetics and responsiveness, has emerged as a significant issue.

Background:

The first iteration of the "Nature's Delight" website was developed during the early 2000s. The website used basic HTML coding, had a fixed structure, showed a deficiency in adaptability for mobile devices, and failed to include interactive media components, resulting in a diminished level of user engagement. In contrast, the rivals exhibited contemporary websites characterised by user-friendly interfaces, interactive functionalities, and mobile compatibility.

Your Task:

The individual has been employed in the capacity of a web designer with the objective of revitalising the existing "Nature's Delight" website. The organisation aims to combine contemporary web design ideas, use CSS for sophisticated style, guarantee mobile adaptability with Bootstrap, and integrate rich media components to enhance user engagement.

Questions to Consider:

1. How would you organise the new HTML layout to guarantee both readability and contemporary style?

2. Which CSS methods will be used to optimise the user experience and facilitate navigation?

3. Which Bootstrap components would be most advantageous for a restaurant chain website to preserve responsiveness?

4. How can you include media components without having the website take longer to load?

Recommendations:

In order to revitalise the digital picture titled "Nature's Delight," it is recommended to implement a coherent and modular HTML framework. The use of CSS grids and Flexbox may contribute to the development of a user-friendly design. The use of Bootstrap's navbar, cards, and carousel components might provide advantageous features for the website. In order to enhance user experience, media assets should be optimised for online use, prioritising quicker loading speeds while maintaining high quality.

Conclusion:

The digital presence of a brand, particularly its website, serves as a direct manifestation of its underlying values and principles within the contemporary context. Through the process of modernising the "Nature's Delight" website, the aim is not only to attract a younger demographic of customers but also to reinstate the brand's position as a cutting-edge and progressive industry frontrunner in the realm of organic food products.

2.11 References

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