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Course : BSIT 2-1N

subject : Web development

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1) Identify and discuss essential best practices in web development, such as code optimization security measures, and accessibility standards.

a) code optimization : Involves in enhancing performance, maintainability, and scalability of web applications through techniques like manipication, caching, lazy loading, asynchronous code execution, and efficient database queries. these practices helps reduce loads times, improve page speed, and ensure a smooth user experience.

b) security Measures: Ensuring web security is crucial in safeguarding applications and user data from hacking, breaches, and malicious attacks. Measures like SSL ITLS encryption protects data in transit, input validation prevents like SQL injections and cross-site scripting, CSP mitigates XSS risks, strong authentication methods enhance user security, and regular updates patch vulnerabilities in libraries and frameworks. These practices helps in maintaining a secure online environment for both application and users.

c) Accessibility standards: Ensuring website accessibility is vital for making sites usable by all, including those with disabilities, and often a legal requirement in many regions. Practices like using semantics HTML elements for proper content interpretation by assistive technologies, implementing ARIA attributes for dynamic content accessibility, enabling keyboard navigation users with mobility impairments, ensuring adequate color contrast and text size for better visual readability, adding descriptive alt text for images for visually impaired users, and employing responsive design for seamless user experience across various devices are crucial steps in meeting

accessibility standards and providing an inclusive online environment for all users.

2) Explore emerging trends and technologies in web development (e.g., progressive web Apps, web Assembly). How are these trends reshaping the landspace of web development and what opportunities do they present for developers?

Progressive web Apps (PWAs): Are application that you can build using web technologies that can run on all devices. PWAs provide a native-like experiences on various supporting devices. And they adapt to the capabilities supported by each devices and they can also run in web browsers, like websites.

Web Assembly: Is a type of code that can run with modern web browsers. It is a low-level assembly like language and runs with the near-native performance and provides languages such C/C++, C# and Rust with a compilation target so that they can run on the web.

To conclude, the following tools (PWAs and web Assembly) helps in reshaping the web development landscape by improving performance (adding features while ensuring baseline experience for users), improving user experience (provides a native-like experience, and expanding the capabilities of web applications. By integrating and using this tools developers can leverage to new abilities and stay ahead to rapidly evolving field.

3) Explain the concept of backend development and its role in handling server-side logic and data storage.

Back-end development focuses on the maintenance of mechanisms that process data and enchances website performance. Unlike front-end development, which centers in controling the visual presentation of website. Back-end development involves data storage, security, and other essential functions

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that run in the background. In back-end development, we use code that helps browsers communicate with databases, allowing them to store, understand, and delete data.

4) Compare and contrast different server-side technologies (e.g., Node.js, PHP, Python Django) in terms of performance, scalability, and ease of use. How do these technologies interact with frontend frameworks.

a) Node.js

* Performance:
  - Known for its high performance, especially in handling concurrent connections.
  - Allows to manage many requests without consuming excessive resources.
  - Great choice for real-time applications like chat systems and gaming platforms.
* Scalability:
  - Can handle numerous request
  - well-suited for scalable, data-intensive applications.
* Ease of use:
  - Ease to adapt since they can use the same language for both frontend and back-end.
  - Can pose learning curve for beginners.
* Interaction with Front-end frameworks:
  - Work with React, Angular, and Vue.js

PHP

* Performance:
  - Generally has a slower performance due to its synchronous execution model.
  - Can be improved with optimization techniques.
* Scalability:
  - Effective for smaller projects.
  - Modern PHP frameworks like Laravel can offer better scalability options.
* Ease of use:
  - Known for beginner-friendly.
  - Ideal use for small to medium-scale projects.
* Interaction with Frontend Frameworks:
  - Commonly paired with frontend libraries like Vue.js for full-stack development.

Python Django

* Performance:
  - Not as fast as Node.js in handling asynchronous task but offers excellent performance for database-driven application.
* Scalability:
  - Scales well for large applications, particularly when data integrity and security are essential.
* Ease of use:
  - Its clear structure is appealing to both beginners and experience developers.
* Interaction with Front-end Frameworks:
  - Integrates smoothly with front-end frameworks through Django REST framework for API development.

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5) Define HTML (Hypertext Markup Language) and explain its role in web development.

HTML is a markup language, not a programming language, it focuses on the presentation of text on web pages. simply put, it defines the structure of your content. For example, if you want to structure your content in a series of paragraph, add titles to each paragraph using headers, and include images, you would use HTML elements. HTML is a crucial aspect of web development, acting as a placeholder for our content, enabling better organization.

6) Discuss the importance of semantics markup in HTML and provide examples of semantics elements. How does semantic markup contribute to accessibility and search engine optimization (SEO)?

Semantics HTML or semantics markup are elements that use to convey additional meaning by defining the roles and importants of different parts of web pages. By doing so it make web page much more comprehensive for audience as it define various section and layout in efficient way.

For example, instead of using an id attribute to define an element as header we can use header tag. Other semantics tags aside from header are articles, footer, section, aside, main and many more. Using semantics does not all about giving emphasize with the content, but its use by SEO (Search Engine Optimization) for efficient accessibility. As this SEO give importance or weigh of keywords by placement them in HTML hierachy. For such content that wrap around headers give more emphasize than paragraph. This is a way of telling the SEO what is the web pages all about by using semantics.

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