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Assignment 2

[Q.1]

Define PWA and explain its significance. Discuss the key characteristics that differentiate PWAs.

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A Progressive Web App (PWA) is a type of web app that utilizes modern web technologies to provide users with an experience similar to native mobile apps.

Significance of PWA :-

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PWAs combine the best features of web and mobile apps, providing a smoother user experience.

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They offer offline functionality, enabling users to access content even when they're not connected to the internet.

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PWAs can be installed on users' devices directly from the browser, eliminating the need for app store downloads and updates.

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They improve engagement through features like push notifications, enabling businesses to re-engage users effectively.

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PWAs are cost-effective compared to developing separate native apps for different platforms.

Key Characteristics:-

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PWAs are built using web technologies like HTML, CSS, and Javascript, while traditional mobile apps are typically developed using platform-specific.

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PWAs are accessible via a web browser and do not require installation from an app store, whereas traditional mobile apps need to be downloaded and installed.

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PWAs can be accessed offline and offer a seamless experience even in low or no network conditions, which is a significant advantage over traditional mobile apps.

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PWAs can be easily updated by developers without requiring users to download updates manually, whereas traditional mobile apps often rely on app store updates.

[Q.2]

Define responsive web design and its importance.

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Compare responsive, fluid and adaptive approaches.

Responsive web design is an approach to web design that aims to provide an optimal viewing and interaction experience across a wide range of devices and screen sizes. This is achieved by using flexible layouts, images, and CSS media queries to adapt the layout and design of a website to the viewport size of the device being used.

Importance in the context of Progressive Web Apps:

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Responsive web design is crucial for PWAs to ensure they adapt seamlessly to different devices, including desktops, tablets and smartphones.

* PWAs need to provide a consistent user experience across various screen sizes to maintain usability and engagement.

* Responsive design allows PWAs to scale and adjust their layout and content dynamically enhancing accessibility and user satisfactions.

Comparison with fluid and adaptive web design approaches:

* Fluid web design: Fluid design focuses on using relative units like percentages for layouts elements, allowing them to resize proportionally based on the viewpoint sizes.

* Adaptive web design: Adaptive web design involves creating multiple fixed layouts targeted at specific devices sizes or breakpoints. When a user accesses the website, the server detects the device's characteristics and serves the appropriate layout. While adaptive design can be effective, it requires creating and maintaining separate layouts for different devices, which can be time-consuming and less flexible compared to responsive design.

[Q.3] Describe the lifecycle of service workers, including registration, installation and activation phases.

→ Lifecycle of Service workers:

* Registration: Service workers are JavaScript files that control the caching and network requests for a web application. They are registered in the main JavaScript file of the application.

* Installation: During the installation phase, the service worker is downloaded by the browser and cached for future use. This phase allows the service worker to set up the necessary resources and assets required for offline functionality.

* Activation: After installation, the service worker enters the activation phase. Here, it takes control of the pages within its scope and begins intercepting network requests. The old service worker is replaced by new one.

[Q.4] Explain the use of IndexedDB for data storage?

→ IndexedDB is a low-level API for client-side storage of significant amounts of structured data in web applications. It allows web applications to store data locally in the user's browser. Service workers can utilize IndexedDB for efficient data storage.

Usage of IndexedDB in service Worker:

- * Service workers can intercept network requests and cache responses using IndexedDB to store the data.
- * IndexedDB provides a way to store structured data, making it suitable for storing various types of application data.
- * Service workers can efficiently manage data synchronization between the IndexedDB storage and the server.
- * By storing data in IndexedDB, PWAs can provide a consistent user experience regardless of network connectivity, improving usability and engagement.

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