04/05

Page No.
Date

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Assignment -2.

Q1] Define Progressive Web App (PWA) & explain its significance in modern web development. Discuss the key characteristic that differentiate PWAs from traditional mobile app.

→ a] PWA is a type of web app that utilizes modern web capabilities to provide a user experience similar to that of native mobile apps.

b] PWAs are designed to be reliable, fast & engaging of user's network condition or device capabilities.

c] They are built using standard web technologies like HTML, CSS & Java script but offers features traditionally associated with native apps, such as offline functionality, push notifications & access to device hardware.

d] Key characteristics that differentiates PWAs from traditional mobile apps :-

1] Cross Platform Compatibility :- PWAs can run on any device with a compatible web browser, whereas traditional mobile apps are typically developed separately for different platforms.

2] Installations :-
PWAs can be directly installed from the browser into user's device, whereas traditional mobile apps require installation from app store.

3] Updates :- PWAs are updated automatically, ensuring users always have access to latest version without requiring manual updates.

2] Define responsive web design & explain its importance in the context of PWA. Compare & contrast responsi Fluid & adaptive web design approaches.

→ a] Responsive web design is an approach to web deve that aims to create websites that provide an op viewing experiencing across a wide range of dev & screen sizes.

b] This is achieved by designing & coding web to respond & adapt to the user's ~~design~~ de orientation & viewport size, ensuring that the content & layout adjust dynamically to provide best possible user experience.

c] Its importance in the context of PWA lies its ability to ensure that PWAs are accessible & usable across various devices & screen

d] Responsive Web Design:-

a) Responsive designs adjust layout, content & typo based on the user's device & viewport size.

b] It is crucial for PWAs to ensure the accessible & usable across different devices contributing to seamless UX.

e) Fluid Web Design:-

a) Fluid designs use percentages rather than units (pixels) for layout elements, allowing to adapt dynamically as viewport size cha

b) It enables layouts to adjust fluidly to screen sizes, ensuring a consistent exp across devices.

Page No.
Date

F] Adaptive web design :-

a) Adaptive designs use predefined layouts targeted at different screen sizes, offering tailored experiences optimized for specific devices or breakpoints.

b) ~~Comparis~~ While adaptive design provides tailored experiences for specific devices, it requires creating & maintaining multiple layouts, which can be more complex & resource-intensive compared to responsive design.

3) Describe the lifecycle of Service Workers, including registration, installation & activation phases.

→ The lifecycle of service worker, a key component of PWAs responsible for handling network requests & caching resources, involves three main phases : registration, installation & activation.

a) Registration :-

1) The service worker is first registered within the scope of web application. This typically occurs in the main Js file of application.

2) It is ~~done~~ ~~visiting~~ initiated using the 'navigator.serviceWorker.register()' method.

3) The browsers then attempts to fetch & parse the service worker script.

b) Installation :-

1) If the service worker script is successfully fetched & parsed the browser proceeds with the installation phase.

2) During installation, the 'install' event handler is cache static assets, such as HTML, CSS, Js files

2) Once the installation process is complete, the worker becomes installed but not yet activ

c) Activation :-

1) After installation, the service worker enters activation phase.

2) Developers can include logic in the 'a event handler to perform tasks like cleaning outdated caches, ensuring the service worker's compatibility with the latest version of web app.

3) Once the activation process is complete, the service worker becomes active & begins con the pages within its scope.

Q4) Explain the use of IndexedDB in the service worker for data storage.

→ a) IndexedDB is a low-level, asynchronous API storing & retrieving large amount of struc data in the browser, making it an ideal choice for data storage within a service Work

b) Service Worker often utilize IndexedDB to ca data & resources, enabling offline functiona improving performance & enhancing overall user experience.

c) IndexedDB allows Service Workers to storage across multiple origins, making it possible to ca resources from third party domains & inte with external APIs while maintaining data isolation & security.

d] It operates asynchronously, which is well-suited for the non-blocking nature of service workers. Async operations prevent the service worker from blocking the main thread, ensuring smooth performance & responsiveness of the web application.

e] By storing data in IndexedDB, service workers can serve chached content to users even when they are offline.