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Assignment 2

Q.1. Define Progressive web App (PWA) and explain its significance in modern web development. Discuss the key characteristics that differentiate PWAs from traditional mobile apps

⇒ A progressive web App (PWA) is a type of web application that utilizes modern web capabilities to deliver an app like experience to users across various platforms such as desktops, smartphones and tablets.

Significance in modern development-

1. Cross Platform Compatibility - PWAs work seamlessly across different devices and platforms.

2. Improved Performance - PWAs are optimized for speed and performance, allowing for faster loading times and smoother UX.

3. Define functionality - PWAs can cache essential resources and content, enabling users to access the app even when they're offline or experiencing poor network conditions.

Key Characteristics :

1. Cross Platform Compatibility - PWAs are built using web technologies and can run on any device with a modern web browser, while traditional apps are typically developed seperately.

2. Installation- PWAs can be installed directly from the browser without the need to go through an app store, whereas traditional mobile apps need to be downloaded.

3. Offline support - PWAs can work offline or with limited network connectivity

Q.2. Define responsive web design and explain its importance in the context of Progressive web apps. Compare and contrast responsive, fluid, and adaptive web design approaches

⇒ Responsive web design is an approach on web development that aims to create websites that adapt seamlessly to various screen sizes and devices

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Importance of Responsive Web Design-

1. Cross Device Compatibility - PWAs are designed to work on different devices including desktops, smartphones and tablets.

2. Enhanced User Experience - By dynamically adjusting the layout and content based on screen size, it helps to ~~predict~~ provide a consistent UX across devices

Responsive web design	Fluid Web Design	Adaptive Web Design.
1. Adapts website layout and content based on viewport size using CSS media queries.	1. Utilizes flexible layouts and fluid grids that smoothly adjust screen sizes.	1. Creates multiple versions of a website for specific device size, serving app versions
2. Offers flexibility in design across various viewport sizes	2. Prioritizes Proportional resizing	2. Provides flexibility through predefined layouts for diff. dev.
3. Responds to viewport size changes through CSS media queries.	3. Utilizes fluid grids to adjust layouts smoothly without detection	3. Detects the user's device and serves the app. version accordingly.

Q.3. Describe lifecycle of services workers, including registration, installation, and activation phases.

⇒ The lifecycle of service workers comprises three main phases registration installation and activation. Initially, a service worker is registered within the event script of a web app using the 'navigator. service worker. register()' method, specifying path to the service worker file.

- once downloaded the service worker script progresses to the installation phase. Here, the script is parsed and executed triggering the 'install' event within this event listener, developers typically cache static assets and resources necessary for offline functionality.

- Upon Successfully installation, the service worker enters the activation phase. During activation, it becomes active and capable of controlling web pages

- overall the lifecycle of service workers enables web applications to leverage features like catching, push notifications and background sync.

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Q.4. Explain the use of Indexed DB in the service worker for data storage.

⇒ IndexedDB is a lowlevel API provided by modern web browsers for client side storage of structured data.

1. Persistant storage - IndexedDB provides persistant storage, meaning the stored data remains available even after browser is closed and reopened.

2. Asynchronous API - IndexedDB operates asynchronously allowing database operations to be performed without blocking the main thread.

3. Structured Data storage - IndexedDB stores data in a structured format typically using objects stores to hold JS objects.

4. Data Caching - Service workers can use indexedDB to cache data fetched from the network enabling offline access to resources such as HTML, CSS, and JS files and even dynamic data from APIs.