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Assignment - 2

Q.1) A progressive web app (PWA) is a type of web app that leverages modern web technologies to deliver a native app-like experience to user across different platform and devices. PWAs are designed to combine the best features of web and mobile app, providing users with fast, reliable and engaging experience while also offering during development a more efficient and feasible.

Key characteristic of PWA:

i) Progressive Enhancement:

PWAs are built with progressive enhancement in mind, meaning they can work for any user regardless of the browser / devices they are using. They utilize features like responsive design, service worker or graceful degradation to ensure that users get a consistent experience regardless of their device / network condition.

ii) Responsive Design:

PWAs are designed to adapt to different screen size and orientation, providing a seamless user experience across desktops, phones.

iii) Connectivity Independence:

PWA can work even in low / no network connectivity environment by utilizing

Service workers to cache content of enable offline access. This ensures that user can still access the app and its content even when they're offline / slow network.

In comparison to traditional mobile apps, PWAs offer several advantages:

#### ① Cross-Platform Compatibility:

Unlike native mobile apps, which require separate development efforts for different platform (iOS, Android) PWAs are built using web technologies and can run on any platform with a modern web browser.

#### ② No App Store Approval Process:

PWA can be deployed directly on the web without going through a lengthy app store approval process. This allows developer to push updates and new features more quickly and easily.

#### ③ Lower Development Costs:

Since PWA can be built using web technologies developer can leverage their existing skills and tools, reducing the development costs associated with learning platform.

Q.2) Responsive web design is an approach to web design that aims to create web pages that respond to the user's behaviour and environment based on screen size, platform and orientation. This is achieved through the use of flexible grids of layouts, images and CSS media. The goal is to provide an optimal viewing experience across a wide range of devices, from desktop computers to smartphones and tablets, without the need for separate mobile / desktop version of a website.

Now let's compare & contrast

① Responsive Web design:

- Responsive web design uses CSS media queries to dynamically adjust the layout of content of a website based on the characteristic of the device.
- Offers a fluid and flexible design that can adapt to different screen size and orientation.

② Fluid web design:

- Fluid web design also known as liquid layout involves designing a website layout using percentage for widths.

### (iv) Adaptive Web design:

→ Adaptive Web Design involves creating multiple fixed layout designs targeted at specific devices & breakpoints.

In summary responsive web design offers a flexible and adaptive approach to creating websites that can smoothly adjust to various screen sizes.

Q.3) The lifecycle of service worker involves several distinct phases, including registration, installation / activation.

#### ① Registration:

- The first step in the lifecycle of a service worker is registration.
- Registration occurs in the main JS file of a web app using the 'navigator.serviceWorker.register()' method.
- During registration the web browser attempts to download and parse the service worker script specified in the registration call.

#### ② Installation:

- Once a service worker is successfully registered, it enters the installation phase.

- During installation the browser installs the service worker script or cache any static assets specified in the services workers install event.
- The 'install' event is triggered when the service worker script is first installed or when there are changes to the file.

#### (ii) Activations:

- After the service worker script is successfully installed it enters the activation phase.
- During activation the browser activates the new service worker and removes any previous version of the service worker.

(Q4)

~~Indexed DB is a powerful client side storage mechanism available in modern web browsers. It provides a way for web apps, including those using service worker, to store large amount of structured data persistently.~~

#### ① Persistent Storage:

~~Indexed DB offers persistent storage mechanism, meaning the data stored~~

In DB remain available even after the web page is closed / the browser is restarted. This makes it suitable for storing data offline.

(ii) Async API: Indexed DB operates async allowing DB operation to be performed without blocking the main thread.

(iii) Structured Data Model: Indexed DB provides a robust & efficient mechanism for storing.

Overall Indexed DB provides a robust and efficient mechanism for storing data within service workers, enabling web app to deliver enhanced offline capabilities improved performance & better user experience.