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PWA Assignment 02

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Q.1) Define Progressive Web App (PWP) and explain its significance in modern web app developement Discuss key characteristics that differentiate PWA's from traditional mobile apps in short-

→ A progressive web app (PWA) is a type of web application that leverages modern web technologies to provide users with an experience similar to that of native mobile apps. PWAs are designed to work seamlessly across different devices and platforms, offering features such as functionality push notification and access to device hardware like cameras and geolocation.

Characteristics:

1) Cross platform compatibility:
PWAs are built using web application technologies (HTML, CSS, javascript) and are accessible through web browsers, making them compatible various platforms like desktops, smartphones without the need for separate versions for platforms.

2) Responsive design:
PWA's are responsive and can adpat to different screen sizes and orientations and providing a consistent user experience across devices.

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3) Offline functionality:
PWAs are responsive and adapt different screen sizes and orientations, providing a consistent experience. They can work offline connectivity by utilizing services workers, catching and local storage to access content even when they are offline.

4) Fast loading:
PWAs are designed to load quickly even on slow networks through techniques.

5) App-like experience:
They provide applike experience with feature such as homescreen installations, push notifications, smooth navigations and transitions.

6) Improved discoverability: They can be discovered through web search, shared URL and indexed by search engines.

Q.2) Define responsive web design and explain its importance in the context of progressive web app. and contrast responsive, fluid & adaptive web design approaches.

→ Responsive web app design is an approach to web developement that aims to create web pages that respond or adapts to user's device and screen size, providing an optimal viewing experience across a wide rang of devices.

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In context of progressive web apps (PWA) responsive web design is crucial because PWAs designed to be accessible across various devices and screen sizes.

1) Responsive web design:

- Responsive web design uses a combination of flexible grids, layouts to dynamically adjust the size based on the screen sizes and orientation.
- It provides a consistent user experience across different devices by ensuring screen sizes.
- Responsive design is considered the most flexible and future proof approach.

2) Fluid Web design:

- This is also known as liquid layout, involves designing web pages.
- Elements on the page resize proportionally to the size of the browser window.
- While fluid design helps maintain consistency across different screen sizes.

3) Adaptive web design:

- Adaptive web design involves creating multiple versions of a website optimized for specific device size or breakpoints.
- Instead of fluidly adjusting to diffrent screen

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Instead of fluidly adjusting to different screen sizes, adaptive designs detect user's device characteristics and serve a predefined layout optimized for that specific device.

Q.3) Describe the lifecycle of service workers, including registration, installation and activation phase.

→ The lifecycle of service workers consists three main phases as follows:

1) Registration:
- The first step is using service worker is to register it in main java file of your web application.
- Registration typically occurs in the 'navigator.serviceWorker.register()' method.
- During registration you specify path of service worker file.

2) Installation:
- After the serviceWorker file is downloaded the browser installs it.
- During this phase the file is parsed, and its 'install' event is triggered.
- It is essential note that new service worker doesn't take contol immediatly. It remains in waiting state.

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3) Activation:
- Once the installation is complete, the service worker enters the activation phase.
- The activate event is triggered.
- By default new service work doesn't take control of the pages immediatly.
- Once activated and controlling the relevant pages, it is fully functional and performing other tasks as programmed.

Q.4) Explain the use of indexed DB in the service worker for data storage in short.

→ Indexed DB is powerful is a clientside storage mechanism available in web browser that allows web applications, including those service workers, to storage structured data peristentatly utilization.

1) Initialization:
Within service worker's installation phase, developers can open or create indexed DB databases using the 'indexDB.open()' method.

2) Database structure:
Developers define structure of indexed DB database by creating object stores which are essentially containers for data.

3) Data storage:

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service workers can store data in indexed DB by adding, updating deleting using indexed DB's API

4) Asynchronous operations:
Means developers must use promises or call backs to handle data retrieval and manipulation.

5) Offline capabilities:
service workers can cache data retrived from the network and store it in IndexedDB

6) Efficient data handling:
IndexedDB is suitable for handling large amounts of structured data efficiently requiring complex data structure and retrieval.

Overall, indexed DB in service workers enables web applications to manage data locally, providing offline support, especially in scenarios where network connectivity may be unavailable.

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