

MAD Assignment No. 2

Q1. Define Progressive web App (PWA) and explain its significance in modern web development. Key characteristic that differentiate from traditional mobile app

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- (1) Responsive design: PWA adapt to different screens and orientation providing consistent user experience across device
 - (2) Connectivity Independence: PWA can function offline or with limited connectivity, cache content & enable offline access
 - (3) App like Experience: PWA feels and behave like native mobile app with smooth animation, gesture & interaction
 - (4) Discoverability: PWA are discoverable through search engines & can be easily shared via URL eliminating app stores.
 - (5) Push Notification: PWA can send push notification to engage user & keep them informed even when app is not open.
 - (6) Security: PWA are served over HTTPS ensuring data security & protecting user from malicious attack.

7) Fast Loading: PWA are optimized providing instant loading & smooth performance.

The Significance of PWA in modern web development lies in ability to bridge the gap between web and mobile experience. They offer developer cost effective way to reach wider audience across different platform while providing user seamless engaging experience without any need for traditional app installation.

2) Define Responsive web design and explain its importance in the context of PWA. Compare and contrast responsive, fluid, and adaptive web design approaches.

→ Responsive web design is an approach to web design that ensures a website layout & content adapt to different screen sizes & devices, providing an optimal viewing experience for users across various platform.

In the context of PWA responsive web design is crucial because PWA aim to deliver seamless.

(1) Responsive Design: Fluidly adjust layout and content based on the screen size, offering consistent user experience across device.

(2) Fluid design: Similar to responsive design, but focuses more on fluid in layout element, allowing them to resize smoothly with screen adjustment.

(3) Adaptive design: Adapt the layout based on predefined breakpoints, delivering tailored experience for specific device categories. This approach may involve smooth resizing, while adaptive design provides tailored experience but may require more maintenance for multiple device categories.

3) Describe the life cycle of Service workers, including registration, installation & activation phases.

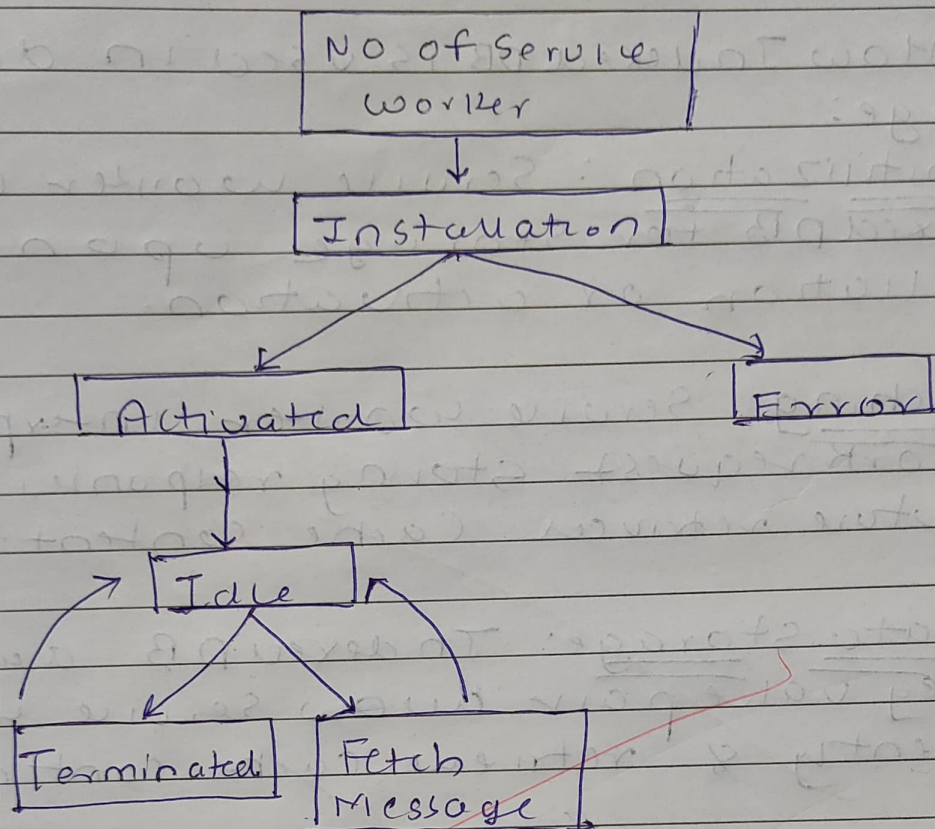
→ Service workers are crucial component in modern web development, enabling advanced features like offline capabilities, push notification, background synchronization.

The lifecycle process consist of 3 key phases:-

(1) Registration: Service worker are registered by web page Javascript using navigator.serviceWorker.register() method. This tells the browser where the service worker Javascript is located.

(2) Installation: Once registered the browser downloads & install the service worker script. This occur the service worker is first registered or been updated.

(3) Activation: After installation the service worker is activated. During activation it can control the client and manage resources like caches. Activated service worker can intercept network, handle push notification and perform other background task.



- (u) Explain MongoDB use in Service worker for data Storage
- Indexed is low level API for client side storage of significant amount of structured data including files / blobs. In the context of Service worker, Indexed DB provides powerful mechanism for caching data locally enabling offline functionalities and enhancing performance by reducing reliance on network request.

Steps How Indexed DB is used in data Storage:

(a) Initialization: Service worker initializes IndexedDB for storage upon installation or activation.

(b) Caching: Service worker intercepts network request storing responses in for future retrieval. Cache content.

(c) Data Storage: IndexedDB data is key value pair allow service work efficiently & retrieve cache content.

(d) Handling Updates & Expiration: Service worker manages updates & expiration cache data, cache relevance and version control.

(e) Offline functionality: IndexedDB ensure Service worker to serve cache content even when offline ensures access to essential resources.

(f) Performance optimization: By caching data locally, service worker improve performance by latency & speed up content delivery.