

*MPL Assignment 02 *

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

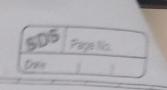
=> A progressive web App (PWA) is a type of web application that works like a mobile app but runs in a browser. It can be installed on a device, works offline, and provides a fast and smooth user experience.

significance of PWA in modern web Development:
1. cross-Platform compatibility - Works on both
mobile and desktop with a single codebase.

2. Offline support - can function without the internet using cached data.

3. Fast Performance - Loads quickly, even on slow networks 4. No App store Required - Users can install it directly from the browser.

5. Lower Development cost-one PWA can replace separate Android and ios apps.



Key Differences Between PWA and Traditional Mobile
Apps:

Traditional Mobile
APP
Download from
APP 5 tore.
Usually requires
internet.
ice Faster but reeds
installation
Manual updates
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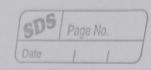
PWAS combine the best of web and mobile apps, making them efficient and user-friendly.

Q. 2 Define responsive web lesign and explain its import once in the context of progressive web apps.

Compare and contrast responsive, fluid, and adaptive web design approaches.

=> Responsive Web design (RWD) is a technique that

Responsive Web design (RWD) is a technique that makes web pages adjust automatically to different screen sizes and devices. It ensures a good user experience on mobiles, tablets and desktops without needing separate versions of a website.



Importance of Responsive Design in PWAs:

1. Better User Experience - PWAs work smoothly on any Device.

2. Faster Load time - Optimized design improves speed.

3.5E0 Benefits-Google ranks responsive sites

4. COST-Effective-No need to build multiple versions for different screens.

comparison of Web Design approaches:

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+	Approach	Mow It Works	7005	cons
-			A LAMBOUR	018
	Responsive	Uses flexible grids	wko on all	(- 10 -
	23. 112.	and case and in		can be
1		and CSS media	devices, impr-	complex bo
	The state of the s	queries to adjust	oves SEO.	design.
	Self Cort	layout.	(= 10113) dadas.	
		1		
	Fluid	uses percent-ba-	works well on	loos control
	1.00			less control
		sed widths	different screen	over layout on
		instead of fixed	sizes, easy to	large screens.
		Pixels, 50 eleme-	implement.	O
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-	Lanasas		Almaniani Ani	
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-	Adaptive	Uses tiked tayous	Optimized for	More effort
		that charges at	known screen	required to
		specific specific	sizes.	design for
		Uses fixed layouts that charges at specific breakpoints.		each screen
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Q. 3 Describe the lifecycle of services workers, including registration, installation, and activation phases.

Lifecycle of service workers:

A service worker is a script that runs in the background and helps a web app work offline, load faster, and send push notifications. Its lifecycle has three main phases:

1. Registration Phase:

- The browers registers the service Worler using Javoscript.

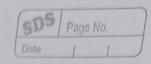
code Example:

if ('service Worker' in navigator) {
 navigator. service. worker.register ('/sw.js')
 . then (() => console.log ('service Worker Registered'))
 . catch (error => console.log('Registocation Faired:',error));
}

This tells the browser to install and activate the service worker.

2. Installation Phase

- The service worker downloads necessary files and stores them in cache.
- If successful it moves to the octivation phase.



code Example:

self. add Eventlistner ('install', event => {

event. wait Until (

caches. open ('app-cache'). then (catch => {

meturn cache. add All ([,'1','lindex.html',

'/styles.csi]);

3);

3);

- This ensures the apploads even without the internet.

3. Activation Phase

- The old service worker is replaced with the new one.
- Unused cache files from the previous version are deleted.

code Example:

self.odd Event Listener ('activate', event =) {

event.wait Until (

caches.key 6 ().then (keys =) {

return Promise.all(keys.map(key =) {

if (key! == 'app-cache') {

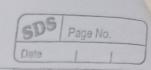
return Caches.delete (key);

}

3));

);

3)



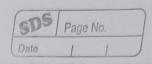
Final step: Fetch & sync Once activated, the service worker intercepts network requests, serves cached files, and syncs data when the internet is available

The lifecycle makes PWAS faster, more reliable, and capable of working offling.

Q-4 Explain the use of IndexedDB in the service Worker for data storage.

- => Use of Indexed DB in service workers for Data 5 torage: - Indexed DB is a browser database that stores large amounts of structured data like Ison objects. It helps PWAS work offline by saving and retrieving data officiently.
 - Why Use Indexed DB in service Workers & 1. Offline support-stores data when offline and syns it later.
 - 2, Efficient storage Saves structured data like user settings, cart items, or forms inputs.
 - 3. Faster Access-Retrieves data quickly without
 - needing a network request.

 4. Persistent Data Data remains saved even after the brower is closed.



Opening the Database

let db;

let request = indexed DB. open ('MyDatabase', 1);

request onsuccess = function (event) {
 db = event baget result;
 %;

creating astore & Adding Data.

request-on upgradenecded = function (event) {

let db = event.torget-result;

let store = db.createObject 5tore ('users', ikey Path: "id'
3);

Store edd ({ id : 1, name : 'John Doe', age : 253);

Fetching Data in Service Worker

Let transaction = db. transaction ('users', 'readonly');

Let Store = transaction, objectstore ('users');

Let getUser = 5tore, get(1);

get User. On success = function () {
console log (get User. result);
3;