Assignment - II

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20/03/25 MPL

Q1. Define Progressive web App(PWA) and explain its significance in modern dev. Diff PWAs from traditional M. Apps

Ans 1 A PWA is a web Application PWAs from traditional mobile Apps that Combines the both web And mobile Apps to deliver a seamless. PWA works offline, load quickey and provide an app like experience in mo.

→ Platform Independence
→ Improved Performance
→ offline Functionalitity.
→ No App store dependencies
→ Engaging user Experience

Key Characteristics

i) Installation :- Installed from browser, traditional mobile apps are downloaded from mobile Apps.

ii) Platform dependencies

iii) offline Support

iv) updates

v) Performance

- PWA are faster due to caching and lightweight assets.

Q2 Define responsive web design and explain its importance in context of PWA. Compare and contrast responsive, fluid and adaptive web design approach.

Ans Its an approach that ensures web pages adapt to different screen signs and orientations using flexible grids.

→ Ensures a consistent user Experience across different devices

→ Elimates need for multiple codebases for different devices

→ Enhances usability by making content reachable on screen

- Comparison Responsive web v/s Fluid VS Adaptive web

Feature	Responsive	Fluid	Adaptive
Definition	uses CSS media queries to adjust layout dynami-cally	uses % for elements to scale	uses predefined layout for different screen size.
Flexibility	Highly flexible	Complexity flexible	Fixed at specific breakpoints
Performance	Efficient but requires more CSS adjustments	Smooth Scaling	may cause layout shifts
Best use case	website and PWAS for all screen	App requires seamless scaling	website with predefined layouts.

Q3 Describe the lifecycle of service workers, including regions installation and activation phases.

Ans3 Lifecycle phases:

i) Registration

```
if ('Service worker' in navigator){
  navigater. service workers. register ('/SN .js')
  then(i) => Console . log ('Service worker registred')
```

(ii) Installation

→ Occurs when the service worker is first downloaded

```
Eg. self. add Event Listeners ('install', event)=>{
        event. wait until(
              caches open ('v') then cache => {
      return cache and All
      });
```

(iii) Activation

→ Runs after installation and insures old caches cleared if necessary Eg ⇒ Self . add Event Listner ('activate', event)=>

```
{
  Event wait until(
        caches Keys() , then (Keys => {
     return Promise.all [Keys. filter (Key => Key != 'v')]
   });
}
```

iv) Fething and updates

→ The service worker intercepts network requests

```
Eg: self. add Eventlistener ('fetch' event =>{
      event. respond with(
          Catch . match (event. request).
    });
  });
```

Q4 Explain the use of Indexed DB in the service worker for data storage

Ans Indexed DB is a low-level NOSQL database, in the browser that allows web apps to store and retrieve

Use of Indexed DB in service workers?:

i) Offline storage → saves user data when offline and system it when.

ii) Persistent data → unlike local storage, Indexed DB is asynchrons.

iii) Background sync → Service worker can use Indexes to store data and sync it later.