Experiment 08

Aim: To code and register a service worker, and complete the install and activation process for a new service worker for the E-commerce PWA

Theory:

A **Service Worker** is a background script that acts as a proxy between a web application, the browser, and the network. It enables advanced features like **offline access**, **caching**, **push notifications**, and **background sync**, which are essential for building **Progressive Web Apps (PWAs)**.

Key features of a PWA include:

- Offline support
- Improved performance through caching
- App-like behavior
- Ability to work independently of network conditions

Service workers follow a **lifecycle**, consisting of the following main events:

1. **Install**
2. **Activate**
3. **Fetch**

Implementation:

1. `navigator.serviceWorker.register():` This method registers the service worker when the page loads. It checks if service workers are supported in the browser and then registers `sw.js` located at the root level.

2. `self.addEventListener('install'):` Triggered when the service worker is first installed. This is where assets are typically cached for offline use. In this case, we simply log the installation and immediately activate using `self.skipWaiting()`.

3. `self.skipWaiting():` Forces the newly installed service worker to activate immediately rather than waiting for the old one to be terminated.

4. **`self.addEventListener('activate'):`** Triggered after the service worker is installed. This event is used to clean up old caches or perform updates. In our code, it's used to log activation status.

5. **`self.addEventListener('fetch'):`** Intercepts every network request. This is where caching or fallback responses are generally served. In our implementation, it simply logs each fetch request.

Code: const CACHE_NAME = 'ecommerce-pwa-v1';

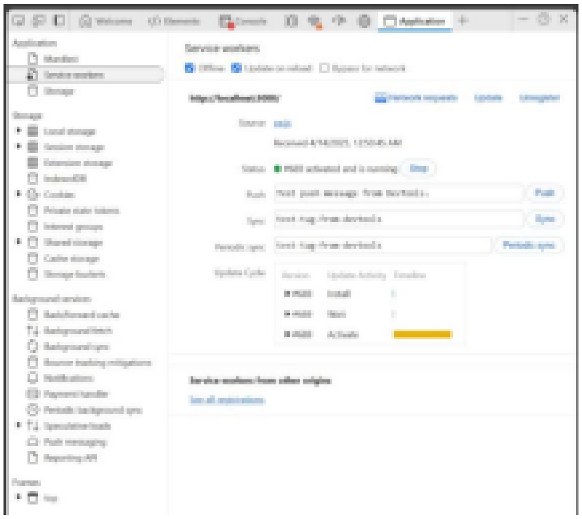
```
const ASSETS_TO_CACHE = [
  '/',
  '/index.html',
  '/offline.html',
  '/css/style.css',
  '/img/offline.jpg',
  '/img/fav-144.png',
  '/pwa-manifest.json'
];


// Install Event
self.addEventListener('install', event => {
  console.log('[SW] Install event');
  event.waitUntil(
    caches.open(CACHE_NAME).then(cache => {
      console.log('[SW] Caching app shell');
      return cache.addAll(ASSETS_TO_CACHE);
    })
  );
  self.skipWaiting();
});

// Activate Event
self.addEventListener('activate', event => {
  console.log('[SW] Activate event');
  event.waitUntil(
    caches.keys().then(keyList =>
      Promise.all(
        keyList.map(key => {
          if (key !== CACHE_NAME) {
            console.log('[SW] Removing old cache:', key);
            return caches.delete(key);
          }
        })
      )
    )
  );
  self.clients.claim();
```

```
});


// Fetch Event

self.addEventListener('fetch', event => {

  event.respondWith(

    fetch(event.request)

      .catch(() => caches.match(event.request).then(response =>

        response || caches.match('/offline.html')

      ))

  );

});
```

Output:

We tested the application using:

- **Chrome DevTools > Application Tab** to inspect service worker status • **Simulated offline mode** in DevTools to check behavior when network is turned off
- Verified whether assets were served from the cache or network



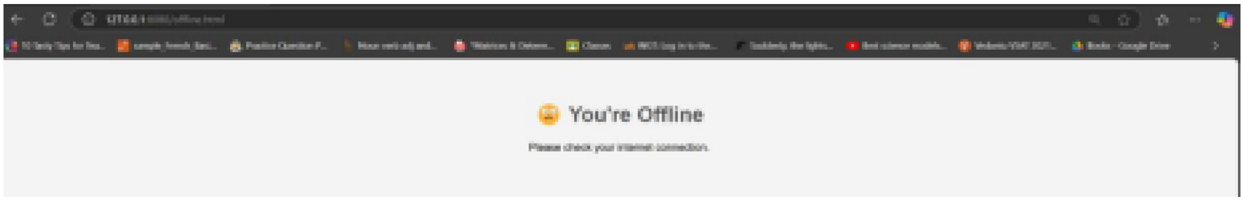
Service workers

☑ Offline ☑ Update on reload □ Bypass for network

http://localhost:8080/

Received 4/14/2025, 12:50:45 AM

Status: #600 activated and is running



You're Offline

Please check your internet connection.

Conclusion:

Through this implementation, we successfully:

- Registered and activated a service worker
- Understood and used lifecycle events: install, activate, fetch
- Observed basic PWA behavior through browser DevTools
- Laid the foundation for caching strategies and offline support in PWAs

This setup ensures that our PWA behaves more like a native app and provides a better user experience, especially in low or no connectivity environments.