

## PWA Lab

**Name: Sneha Utekar**

**Class: D15A**

**Roll no: 66**

### **Experiment No.-9**

**Aim:** To implement Service worker events like fetch, sync and push for E-commerce PWA.

### **Theory:**

#### **Service Worker**

Service Worker is a script that works on browser background without user interaction independently. Also, It resembles a proxy that works on the user side. With this script, you can track network traffic of the page, manage push notifications and develop “offline first” web applications with Cache API.

Things to note about Service Worker:

- A service worker is a programmable network proxy that lets you control how network requests from your page are handled.
- Service workers only run over HTTPS. Because service workers can intercept network requests and modify responses, “man-in-the-middle” attacks could be very bad.
- The service worker becomes idle when not in use and restarts when it’s next needed. You cannot rely on a global state persisting between events. If there is information that you need to persist and reuse across restarts, you can use IndexedDB databases.
- Service workers make extensive use of promises, so if you’re new to promises, then you should stop reading this and check out Promises, an introduction.

#### **Fetch Event**

You can track and manage page network traffic with this event. You can check existing cache, manage “cache first” and “network first” requests and return a response that you want.

Of course, you can use many different methods but you can find in the following example a “cache first” and “network first” approach. In this example, if the request’s and current location’s origin are the same (Static content is requested.), this is called “cacheFirst” but if you request a targeted external URL, this is called “networkFirst”.

- CacheFirst - In this function, if the received request has cached before, the cached

response is returned to the page. But if not, a new response requested from the network.

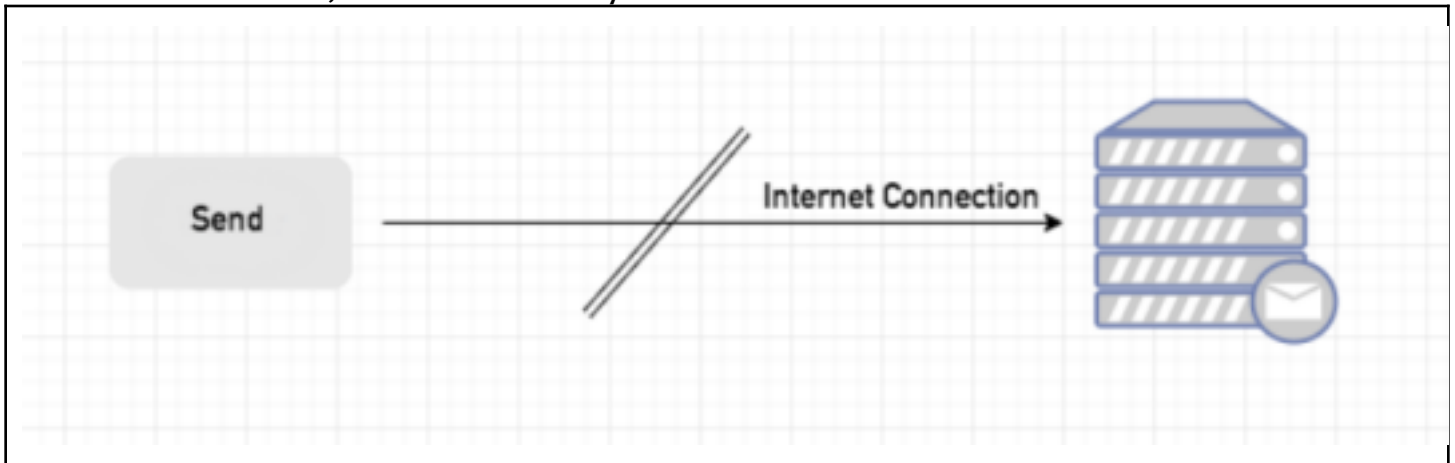
- NetworkFirst - In this function, firstly we can try getting an updated response from the network, if this process completed successfully, the new response will be cached and returned. But if this process fails, we check whether the request has been cached before or not. If a cache exists, it is returned to the page, but if not, this is up to you. You can return dummy content or information messages to the page.

### Sync Event

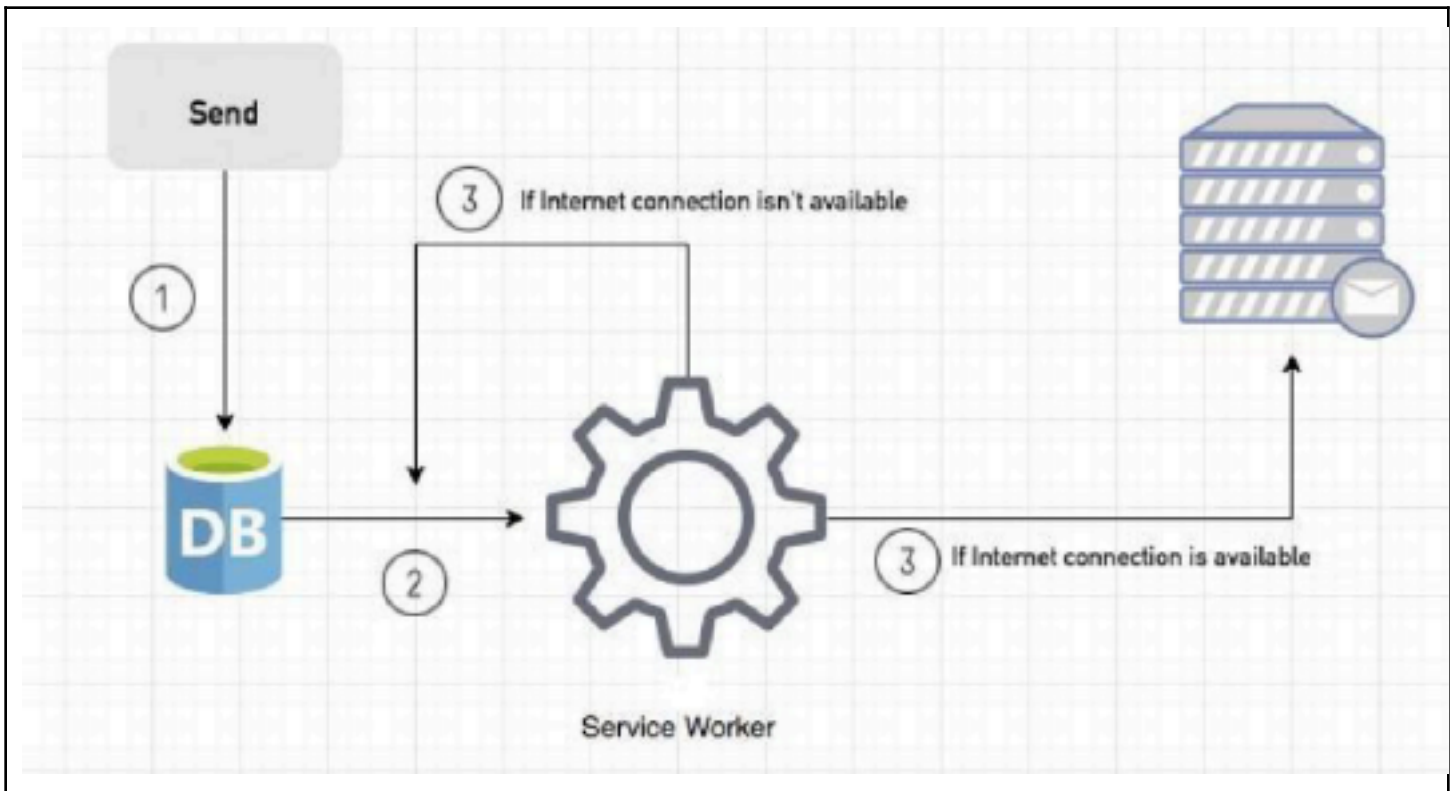
Background Sync is a Web API that is used to delay a process until the Internet connection is stable. We can adapt this definition to the real world; there is an e-mail client application that works on the browser and we want to send an email with this tool. Internet connection is broken while we are writing e-mail content and we didn't realize it. When completing the writing, we click the send button.

Here is a job for the Background Sync.

The following view shows the classical process of sending email to us. If the Internet Connection is broken, we can't send any content to Mail Server.



Here, you can create any scenario for yourself. A sample is in the following for this case.



1. When we click the “send” button, email content will be saved to IndexedDB.
2. Background Sync registration.
3. If the Internet connection is available, all email content will be read and sent to Mail Server.  
If the Internet connection is unavailable, the service worker waits until the connection is available even though the window is closed. When it is available, email content will be sent to Mail Server.

You can see the working process within the following code block.

#### Event Listener for Background Sync Registration

#### Event Listener for sw.js

#### Push Event

This is the event that handles push notifications that are received from the server. You can apply any method with received data.

We can check in the following example.

“Notification.requestPermission();” is the necessary line to show notification to the user. If you don’t want to show any notification, you don’t need this line.

In the following code block is in sw.js file. You can handle push notifications with this event. In this example, I kept it simple. We send an object that has “method” and “message” properties. If the method value is “pushMessage”, we open the information notification with the “message” property.

## CODE AND OUTPUT:

### Index.html:

```
<!DOCTYPE html>
<html>
<head>

<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">

<meta http-equiv="X-UA-Compatible"
      content="ie=edge">

<title>Driving Website</title>

<meta name="apple-mobile-web-app-status-bar" content="#aa7700">
<meta name="theme-color" content="black">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta2/dist/css/bootstrap.min.css" rel="stylesheet"
      integrity="sha384-BmbxuPwQa2lc/FVzBcNJ7UAyJxM6wuuqIj61tLrc4wSX0szH/Ev+nYRRuWlolflfl"
      crossorigin="anonymous">

      <!-- Font Owesome icon -->
<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.2/css/all.min.css"

integrity="sha512-HK5fgLBL+ xu6dm/Ii3z4xhlSUyZgTT9tuc/hSrtw6uzJOvgRr2a9jyxxT1ely+B+xFAmJKVSTbpM/
CuL7qxO8w=="
      crossorigin="anonymous" />

<link rel="stylesheet" href="style.css">
<!-- Manifest File link -->
<link rel="manifest" href="manifest.json">

</head>

<body>
  <!-- Header section -->
  <div class="container-fluid header">
    <div class="row">
      <div class="col-3 bg-warning logoSection p-2">
        
      </div>
```

```

<div class="col-9">
  <div class="row">
    <div class="col-6 menu">
      <ul>
        <li><a href="#">Home</a></li>
        <li><a href="#">Courses</a></li>
        <li><a href="#">News</a></li>
        <li><a href="#">Pages</a></li>
        <li><a href="#">Contact</a></li>
      </ul>
    </div>
    <div class="col-6 social-icon">
      <div class="row">
        <div class="col-5 icon">
          <a href=""><i class="fas fa-search"></i></a>
          <a href=""><i class="fab fa-facebook"></i></a>
          <a href=""><i class="fab fa-instagram"></i></a>
          <a href=""><i class="fab fa-twitter"></i></a>
          <a href=""><i class="fab fa-dribbble"></i></a>
        </div>
        <div class="col-4 header-btn">
          <a href="#" class="btn btn-warning">Get Started</a>
        </div>
      </div>
    </div>
  </div>
</div>

```

```

<section class="slider-section">
  <div class="container">
    <div class="row">
      <div class="col-12 slider-content">
        <h3>Best Options for you</h3>
        <h1>Drive safe & get lichen</h1>
        <div class="slider-btn">
          <a href="#" class="btn btn-warning px-4">Contact Us</a>
          <a href="#" class="btn btn-primary px-4">See Courses</a>
        </div>
      </div>
    </div>
  </div>
</section>

```

```

<!-- Feature Section started -->
<section class="feature">
  <div class="container">
    <div class="row">
      <div class="col-lg-4 col-md-4 col-sm-12">
        <div class="content content-center">
          <span>Why choose us ?</span>
        </div>
      </div>
    </div>
  </div>

```

```

    <h2>Our feature</h2>
    <p class="paragraph">Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod
        tempor incididunt ut labore et dolore magna aliqua viverra maecenas facilisis. </p>
    <a href="#" class="btn btn-own">See Courses</a>
</div>
</div>
<div class="col-lg-4 col-md-4 col-sm-12">
    <div class="single-icon">
        
        <h3>Unlimited car support</h3>
    </div>
    <div class="single-icon">
        
        <h3>Driving School Insures</h3>
    </div>
</div>
<div class="col-lg-4 col-md-4 col-sm-12">
    <div class="single-icon content-center">
        
        <h3>Any Time Any Location</h3>
    </div>
</div>

```

```

</div>
</div>
</section>

```

```

<!-- Welcome section started -->
<section class="container welcome">

```

```

    <div class="row">
        <div class="col-lg-6 col-md-12 col-sm-12 welcome-img">
            
        </div>
        <div class="col-lg-6 col-md-12 col-sm-12 shadow-wrap">

```

```

            <div class="content content-center">
                <span>Welcome to Online traffic school</span>
                <h2>looking for lessons?</h2>
                <p class="paragraph">Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod

```

tempor

```

                    incididunt ut labore et dolore magna aliqua. Quis ipsum vidnas accumsan lacus vel facilisis.
                </p>
                <a href="#" class="btn btn-own">Learn More</a>
            </div>
        </div>
    </div>
</section>

```

```

<!-- Contact Form Started -->
<section class="application-form">
    <div class="container">
        <div class="content text-center">

```

```

    <span>Giving Best Options For You</span>
    <h2 class="p-3">Application Form</h2>
  </div>
  <form class="row form">
    <div class="col-lg-4 col-md-6 col-sm-12">
      <input type="text" placeholder="Your Name">
    </div>
    <div class="col-lg-4 col-md-6 col-sm-12">
      <input type="text" placeholder="Your Name">
    </div>
    <div class="col-lg-4 col-md-6 col-sm-12">
      <input type="text" placeholder="Your Name">
    </div>
    <div class="col-lg-4 col-md-6 col-sm-12">
      <input type="text" placeholder="Your Name">
    </div>
    <div class="col-lg-4 col-md-6 col-sm-12">
      <select name="" id="course">
        <option value="">Course Type</option>
        <option value="">Safe Driving Course</option>
        <option value="">Motorhome Drivers</option>
      </select>
    </div>
    <div class="col-lg-4 col-md-6 col-sm-12">
      <select name="" id="car">
        <option value="">Car Type</option>
        <option value="">Hatchback</option>
        <option value="">Sedan</option>
      </select>
    </div>
  </form>
</div>
<div class="row">
  <div class="col-12 text-center p-4">
    <input type="submit" value="Submit" class="btn btn-own ">
  </div>
</div>
</div>
</section>

```

```

<!-- Pricing section started here -->
<section class="pricing">
  <div class="container">
    <div class="content text-center">
      <span>Get Special Offer</span>
      <h2 class="p-3">Our Pricing</h2>
    </div>
    <div class="row">
      <div class="col-lg-4 col-md-6 col-sm-12">
        <div class="box">
          <div class="box-heading">

```

```

        <span>20% off</span>
        <h1>$ 199</h1>
        <h5>Personal Driving</h5>
    </div>
    <div class="box-list-item">
        <p>Full course theory</p>
        <p>Full driving course</p>
        <p>Training in first aid</p>
        <p>Practical sessions</p>
        <p>Psychological support</p>
    </div>
    <div class="box-btn btn-own">
        <a href="#">Get Started</a>
    </div>

</div>
</div>
<div class="col-lg-4 col-md-6 col-sm-12">
    <div class="box">
        <div class="box-heading">
            <span>20% off</span>
            <h1>$ 199</h1>
            <h5>Personal Driving</h5>
        </div>
        <div class="box-list-item">
            <p>Full course theory</p>
            <p>Full driving course</p>
            <p>Training in first aid</p>
            <p>Practical sessions</p>
            <p>Psychological support</p>
        </div>
        <div class="box-btn btn-own">
            <a href="#">Get Started</a>
        </div>

    </div>
</div>
<div class="col-lg-4 col-md-6 col-sm-12">
    <div class="box">
        <div class="box-heading">
            <span>20% off</span>
            <h1>$ 199</h1>
            <h5>Personal Driving</h5>
        </div>
        <div class="box-list-item">
            <p>Full course theory</p>
            <p>Full driving course</p>
            <p>Training in first aid</p>
            <p>Practical sessions</p>
            <p>Psychological support</p>
        </div>
        <div class="box-btn btn-own">

```



```
        <a href="#">Get Started</a>
    </div>
```

```

</div>
</div>
</div>
```

```
</div>
</section>
```

```
<!-- Instructor section -->
<section class="instructor-section">
    <div class="container">
        <div class="row">
            <div class="col-lg-10 col-md-10 col-sm-12">
                <div class="content text-left">
                    <span>Our Great Team</span>
                    <h2>Our Instructors</h2>
                </div>
            </div>
            <div class="col-lg-2 col-md-2 col-sm-12 my-4">
                <a href="#" class="btn btn-own">View All</a>
            </div>
        </div>
        <div class="row">
            <div class="col-lg-6 col-md-6 col-sm-12 instructor-box">
                <div class="row instructor-wrap">
                    <div class="col-5 instructor-img">
                        
                    </div>
                    <div class="col-7 instructor-details">
                        <h3>DAVID WARNER</h3>
                        <span>Instructor</span>
                        <p>Morbi accumsan ipsum velit. Nam nec tellus a odio tincidunt auctor.</p>
                        <div class="instructor-social">
                            <a href=""><i class="fab fa-facebook"></i></a>
                            <a href=""><i class="fab fa-instagram"></i></a>
                            <a href=""><i class="fab fa-twitter"></i></a>
                            <a href=""><i class="fab fa-dribbble"></i></a>
                        </div>
                    </div>
                </div>
            </div>
            <div class="col-lg-6 col-md-6 col-sm-12 instructor-box">
                <div class="row instructor-wrap">
                    <div class="col-5 instructor-img">
                        
                    </div>
                    <div class="col-7 instructor-details">
                        <h3>DAVID WARNER</h3>
                        <span>Instructor</span>
                        <p>Morbi accumsan ipsum velit. Nam nec tellus a odio tincidunt auctor.</p>
                    </div>
                </div>
            </div>
        </div>
    </div>
</section>
```

```
<div class="instructor-social">
    <a href=""><i class="fab fa-facebook"></i></a>
    <a href=""><i class="fab fa-instagram"></i></a>
    <a href=""><i class="fab fa-twitter"></i></a>
    <a href=""><i class="fab fa-dribbble"></i></a>
</div>
</div>
</div>
</div>
<div class="col-lg-6 col-md-6 col-sm-12 instructor-box">
    <div class="row instructor-wrap">
        <div class="col-5 instructor-img">
            
        </div>
        <div class="col-7 instructor-details">
            <h3>DAVID WARNER</h3>
            <span>Instructor</span>
            <p>Morbi accumsan ipsum velit. Nam nec tellus a odio tincidunt auctor.</p>
            <div class="instructor-social">
                <a href=""><i class="fab fa-facebook"></i></a>
                <a href=""><i class="fab fa-instagram"></i></a>
                <a href=""><i class="fab fa-twitter"></i></a>
                <a href=""><i class="fab fa-dribbble"></i></a>
            </div>
        </div>
    </div>
</div>
</div>
<div class="col-lg-6 col-md-6 col-sm-12 instructor-box">
    <div class="row instructor-wrap">
        <div class="col-5 instructor-img">
            
        </div>
        <div class="col-7 instructor-details">
            <h3>DAVID WARNER</h3>
            <span>Instructor</span>
            <p>Morbi accumsan ipsum velit. Nam nec tellus a odio tincidunt auctor.</p>
            <div class="instructor-social">
                <a href=""><i class="fab fa-facebook"></i></a>
                <a href=""><i class="fab fa-instagram"></i></a>
                <a href=""><i class="fab fa-twitter"></i></a>
                <a href=""><i class="fab fa-dribbble"></i></a>
            </div>
        </div>
    </div>
</div>
</div>
</div>
</section>
```

```

<div class="row footer-wrap">
  <div class="col-lg-3 col-md-6 col-sm-12 footer-details">
    <h3>Company</h3>
    <a href="#">About Us</a>
    <a href="#">Company</a>
    <a href="#">Press & Blog</a>
    <a href="#">Privacy Policy</a>
    <a href="#">Faq</a>
  </div>
  <div class="col-lg-3 col-md-6 col-sm-12 footer-details">
    <h3>Courses</h3>
    <a href="#">Winter driving</a>
    <a href="#">Program for seniors</a>
    <a href="#">Adult in car lesons</a>
    <a href="#">Defensive driving</a>
    <a href="#">Stick shit lessons</a>
  </div>
  <div class="col-lg-3 col-md-6 col-sm-12 footer-details">
    <h3>USEFUL LINKS</h3>
    <a href="#">Home</a>
    <a href="#">Drupal Themes</a>
    <a href="#">WordPress Themes</a>
    <a href="#">Support</a>
    <a href="#">Services</a>
  </div>
  <div class="col-lg-3 col-md-6 col-sm-12 footer-details">
    
    <a href="#">Address : 15 Division Street, New York, NY 12032, United States of America</a>
    <a href="#">Phone : +0 (123) 456789</a>
    <a href="#">Email : Kaseo@gmail.com</a>
    <a href="#">Fax : +8 (123) 456 789</a>
  </div>

</div>
<div class="footer-copyright">
  <span>Copyright &copy 2021 All rights reserveed By Al Siam</span>
</div>
</div>
</footer>

<!-- Bootstrap Bundle with Popper -->
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta2/dist/js/bootstrap.bundle.min.js"
  integrity="sha384-b5kHyXgcpbZJO/†Y9UI7kGkf1S0CWuKcCD38l8YkeH8z8QjE0GmW1gYU5S9FOnJ0"
  crossorigin="anonymous">
</script>
<script src="./app.js"></script>
<script>
  if ('Notification' in window) {
    Notification.requestPermission().then(function (result) {
      if (result === 'granted') {
        console.log('Notification permission granted');
      } else {

```

```

        console.warn('Notification permission denied');
    }
});
}
</script>

</body>

</html>

```

### serviceworker.js:

```

self.addEventListener("install", function (event) {
    event.waitUntil(preLoad());
});
self.addEventListener("fetch", function (event) {
    event.respondWith(
        checkResponse(event.request).catch(function () {
            console.log("Fetch from cache successful!");
            return returnFromCache(event.request);
        })
    );
    console.log("Fetch successful!");
    event.waitUntil(addToCache(event.request));
});
self.addEventListener("sync", (event) => {
    if (event.tag === "syncMessage") {
        console.log("Sync successful!");
    }
});
self.addEventListener("push", function (event) { if (event && event.data) {
    try {
        var data = event.data.json();
        if (data && data.method === "pushMessage") { console.log("Push notification sent");
            self.registration.showNotification("Learn2Drive", { body: data.message,
        });
        }
    } catch (error) {
        console.error("Error parsing push data:", error);
    }
});
var preLoad = function () {
    return caches.open("offline").then(function (cache) { // caching index and important routes
        return cache.addAll([
            '/',
            '/index.html',
            '/style.css',

```

```
'/app.js',
```

```
]);
```

```
});
```

```
};
```

```
var checkResponse = function (request) { return new Promise(function (fulfill, reject) { fetch(request)
```

```
.then(function (response) {
```

```
if (response.status !== 404) {
```

```
fulfill(response);
```

```
} else {
```

```
reject(new Error("Response not found"));
```

```
}
```

```
})
```

```
.catch(function (error) {
```

```
reject(error);
```

```
});
```

```
});
```

```
};
```

```
var returnFromCache = function (request) {
```

```
return caches.open("offline").then(function (cache) {
```

```
return cache.match(request).then(function (matching) {
```

```
if (!matching || matching.status === 404) {
```

```
return cache.match("offline.html");
```

```
} else {
```

```
return matching;
```

```
}
```

```
});
```

```
});
```

```
};
```

```
var addToCache = function (request) {
```

```
return caches.open("offline").then(function (cache) {
```

```
return fetch(request).then(function (response) {
```

```
return cache.put(request, response.clone()).then(function () {
```

```
return response;
```

```
});
```

```
});
```

```
});
```

```
};
```

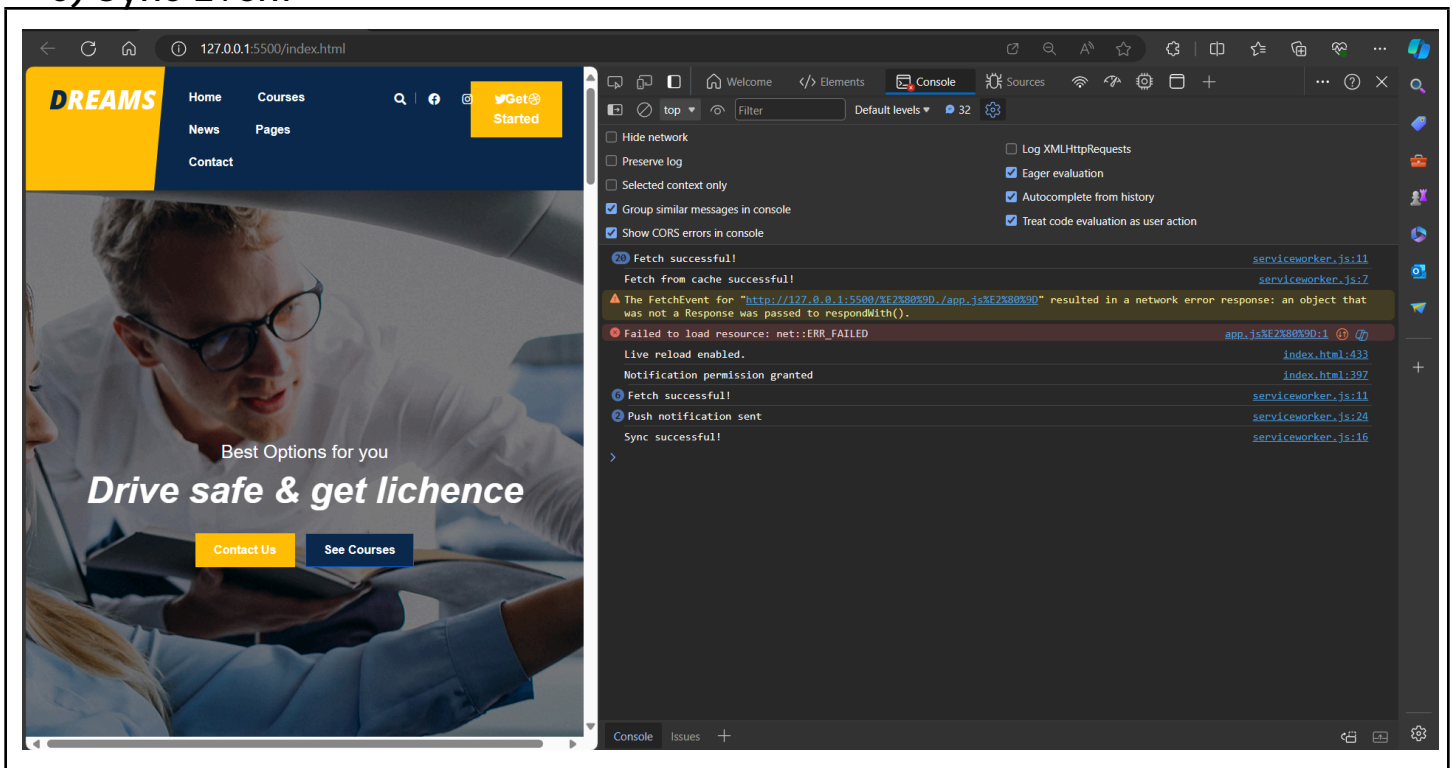
## 1) Fetch Event

The screenshot shows a web browser displaying a website with a yellow header and a blue navigation bar. The main content area features a large image of a man and a woman looking at a laptop, with the text "Best Options for you" and "Drive safe & get lichenice". Below this, there are two buttons: "Contact Us" and "See Courses". The browser's developer tools are open, showing the Console tab. The console displays several messages, including a network error: "The FetchEvent for 'http://127.0.0.1:5500/app.js?238090' resulted in a network error response: an object that was not a Response was passed to respondWith()."

## 2) Push Event

The screenshot shows the same web browser as in the first image, but with the developer tools open to the Application tab. The left sidebar shows the "Service workers" section. The main area displays the "Service workers" for the URL "http://127.0.0.1:5500/". It shows a list of service workers, including "http://127.0.0.1:5500/app.js?238090" which is "activated and is running". Below this, there is a "Push" button and a "Sync" button. The "Push" button is labeled with the message: "({\"method\": \"pushMessage\", \"message\": \"This is Snehaa\"})". The "Sync" button is labeled with the message: "test-tag-from-devtools".

### 3) Sync Event



### **Conclusion:**

In this experiment, we have successfully implemented service worker events like fetch, sync and push for my Learn2Drive PWA and found out output for above implementation.