What is authentication?

Authentication is the process of letting users signup/signin into websites via username / password or using SSO (single sign on)

Acme Inc

Login

Create an account

Enter your email below to create your account

name@example.com

Sign In with Email

OR CONTINUE WITH

 GitHub

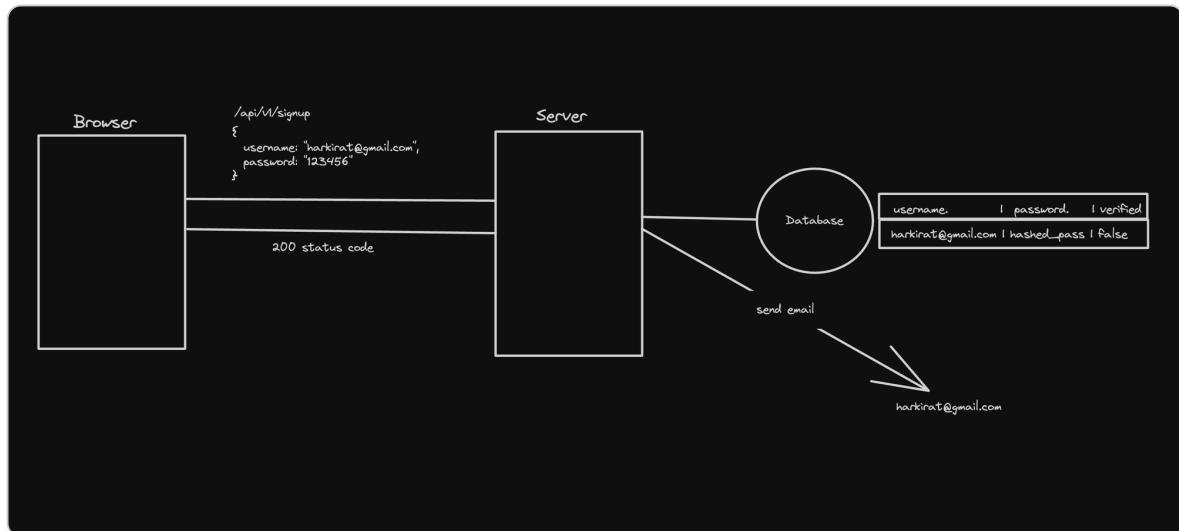By clicking continue, you agree to our Terms of Service and Privacy Policy.

"This library has saved me countless hours of work and helped me deliver stunning designs to my clients faster than ever before."
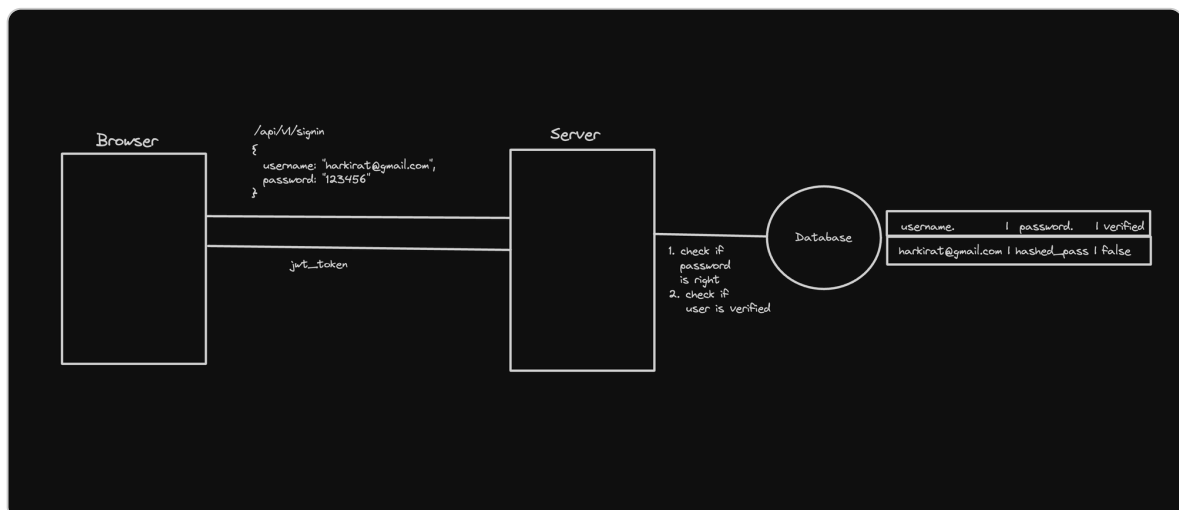
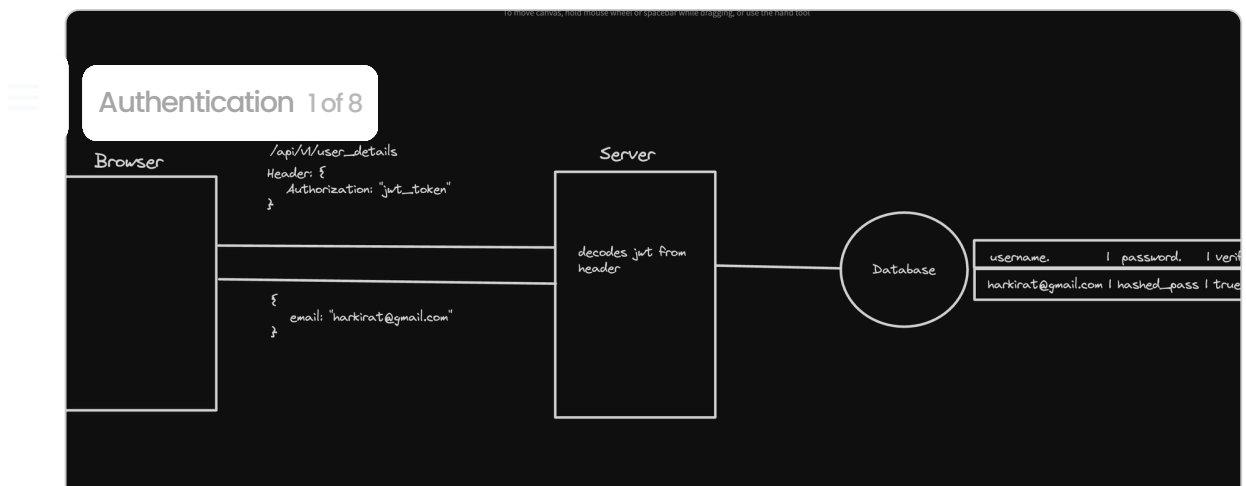Sofia Davis

Authentication using jwt + localstorage

Signup

Signin

Auth requests

Authentication using cookies (Part 1)

What are cookies

Cookies in web development are small pieces of data sent from a website and stored on the user's computer by the user's web browser while the user is browsing. They are designed to be a reliable mechanism for websites to remember things (very similar to local storage)

1. **Session Management:** Cookies allow websites to identify users and track their individual session states across multiple pages or visits.

2. **Personalization:** Websites use cookies to personalize content and ads. For instance, cookies might store information about a user's preferences, allowing the site to tailor content or advertisements to those interests.

3. **Tracking:** Cookies can track users across websites, providing insights into browsing behavior. This information can be used for analytics purposes, to improve website functionality, or for advertising targeting.

4. **Security:** Secure cookies can be used to enhance the security of a website by ensuring that the transmission of information is only done over an encrypted connection, helping to prevent unauthorized access to user data.

We will be focussing on point   4

Why not local storage?

Cookies and LocalStorage both provide ways to store data on the client-side, but they serve different purposes and have different characteristics.

to the website (by the browser) (you don't have to explicitly add a header to the fetch call)

This point becomes super important in Next.js, we'll see later why

ıb.com/100xdevs-cohort-2/paytm/blob/complete-solution/frontend/src/pages/SendMoney.jsx#L45
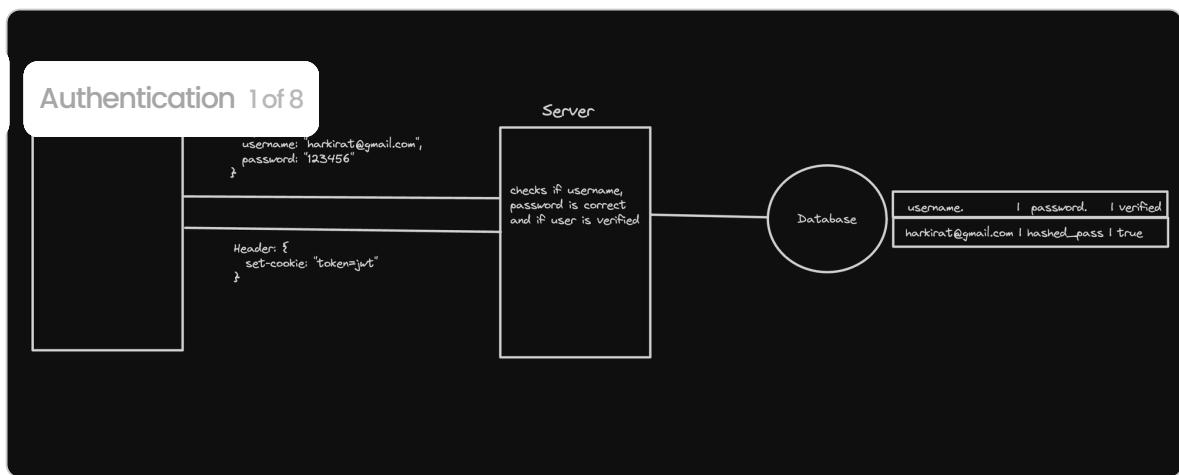
```javascript
axios.post("http://localhost:3000/api/v1/account/transfer", {
    to: id,
    amount
}, {
    headers: {
        Authorization: "Bearer " + localStorage.getItem("token")
    }
})
```

1. Cookies can have an expiry attached to them

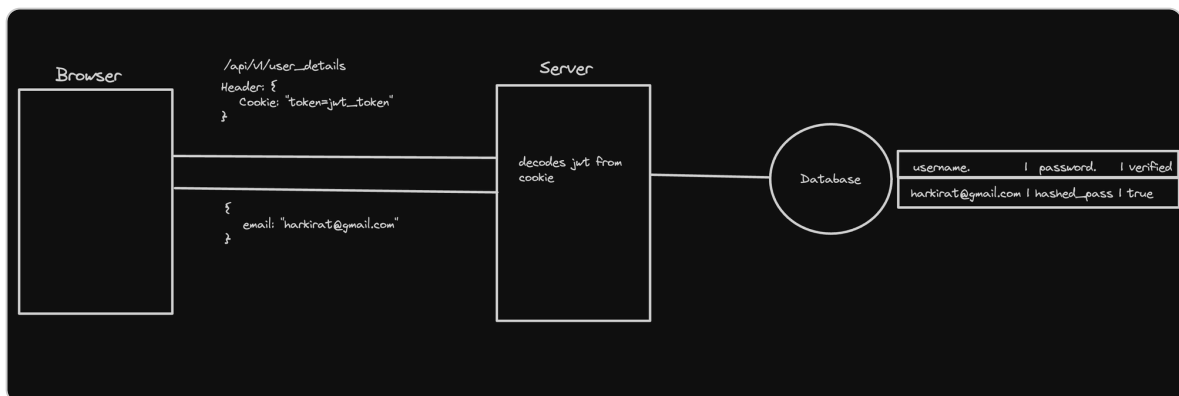2. Cookies can be be restricted to only https and to certain domains

Authentication with cookies (Part 2)

Signup

Server

username: "harkirat@gmail.com",
password: "123456"
}

checks if username,
password is correct
and if user is verified

Database

username.	password.	verified
harkirat@gmail.com	hashed_pass	true

Header: {
    set-cookie: "token=jwt"
}

Auth endpoints

Browser

/api/v1/user_details
Header: {
    Cookie: "token=jwt_token"
}

Server

decodes jwt from
cookie

Database

username.	password.	verified
harkirat@gmail.com	hashed_pass	true

{
    email: "harkirat@gmail.com"
}

You don't need to explicitly set the cookie header in the browser. It's automatically set by the browser in every request

Properties of cookies

Types of cookies

1. Persistent - Stay even if u close the window

2. Session - Go away after the window closes

3. **Secure - S**ent only over secure, encrypted connections (HTTPS).

HttpOnly - Cannot be accessed by client side scripts

- **SameSite** - Ensures cookies are not send on cross origin requests

2. Lax - Only GET requests and on top level navigation

3. None

Ref - https://portswigger.net/web-security/csrf/bypassing-samesite-restrictions#:~:text=SameSite is a browser security,leaks%2C and some CORS exploits.

- **Domains** - You can also specify what all domains should the cookie be sent from

CSRF attacks

Cross site request forgery attacks were super common because of cookies and hence the SameSite attribute was introduced

Let's see a few cases

SameSite: none

SameSite: Strict

But there's a problem -

SameSite: Lax

Example in express (Backend)

1. Initialize an empty TS project

   npm init -y
   npx tsc --init

1. Update rootDir and outDir

1. Add required libraries

```
import express from "express";
import cookieParser from "cookie-parser";
import cors from "cors";
import jwt, { JwtPayload } from "jsonwebtoken";
import path from "path";
```

1. Initialize express app, add middlewares

```
const app = express();
app.use(cookieParser());
app.use(express.json());
app.use(cors({
   credentials: true,
   origin: "http://localhost:5173"
}));
```

1. Add a dummy signin endpoint

```
app.post("/signin", (req, res) => {
   const email = req.body.email;
   const password = req.body.password;
   // do db validations, fetch id of user from db
   const token = jwt.sign({
      id: 1
   }, JWT_SECRET);
   res.cookie("token", token);
   res.send("Logged in!");
});
```

1. Add a protected backend route

```
app.get("/user", (req, res) => {
   const token = req.cookies.token;
   const decoded = jwt.verify(token, JWT_SECRET) as JwtPayload;
                                        ıtabase

      userId: decoded.id
```

```
    })
```
`)

1. Add a logout route

```
app.post("/logout", (req, res) => {
    res.cookie("token", "ads");
    res.json({
        message: "Logged out!"
    })
});
```

1. Listen on port 3000

```
app.listen(3000);
```

Code - https://github.com/100xdevs-cohort-2/week-16-auth-1

Frontend in React

- Initialize an empty react project

- Add a signin page

```
import { useState } from "react"
import { BACKEND_URL } from "../config"
import axios from "axios"

export const Signin = () => {
    const [username, setUsername] = useState("")
    const [password, setPassword] = useState("")


        <input onChange={(e) => {
```

```
          setUsername(e.target.value);
        }}             placeholder="username" />
                       e={(e) => {
          setPassword(e.target.value);
        }} type="password" placeholder="password" />
        <button onClick={async () => {
          await axios.post(`${BACKEND_URL}/signin`, {
            username,
            password
          }, {
            withCredentials: true,
          });
          alert("you are logged in")
        }}>Submit</button>
      </div>
    }
```

- Add a **user** page

```
import axios from "axios";
import { useEffect, useState } from "react"
import { BACKEND_URL } from "../config";

export const User = () => {
  const [userData, setUserData] = useState();

  useEffect(() => {
    axios.get(`${BACKEND_URL}/user`, {
      withCredentials: true,
    })
      .then(res => {
        setUserData(res.data);
      })
  }, []);

  return <div>
    You're id is {userData?.userId}
    <br /><br />
    <button onClick={() => {
      axios.post(`${BACKEND_URL}/logout`, {}, {
        withCredentials: true,
      })
    }}>Logout</button>
  </div>
```

- Add routing

```
import './App.css'

import { BrowserRouter, Route, Routes } from "react-router-dom";
import { Signup } from './components/Signup';
import { Signin } from './components/Signin';
import { User } from './components/User';

function App() {
  return (
    <BrowserRouter>
      <Routes>
        <Route path={"/signup"} element={<Signup />} />
        <Route path={"/signin"} element={<Signin />} />
        <Route path={"/user"} element={<User />} />
      </Routes>
    </BrowserRouter>
  )
}

export default App
```

Code - https://github.com/100xdevs-cohort-2/week-16-auth-1

Frontend from express

1. Add an index.html file in src folder of backend

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Login Page</title>
  <script src="https://cdn.jsdelivr.net/npm/axios/dist/axios.min.js"></script>
```

```
"                    " type="text" placeholder="username" />
                       ' type="password" placeholder="password" />
<button id="loginButton">Submit</button>
<button id="logoutButton">Logout</button>
<div id="userData"></div>


<script>

  document.getElementById('loginButton').addEventListener('click', async () => {
    const username = document.getElementById('username').value;
    const password = document.getElementById('password').value;

    try {
      await axios.post(`/signin`, {
        username,
        password
      });
      alert("You are logged in");
    } catch (error) {
      console.error('Login failed:', error);
      alert("Login failed");
    }
  });

  document.getElementById('logoutButton').addEventListener('click', () => {
    axios.post(`/logout`, {}, {
      withCredentials: true,
    }).then(() => {
      console.log('Logged out successfully.');
    }).catch(error => {
      console.error('Logout failed:', error);
    });
  });

  function fetchUserData() {
    axios.get(`/user`, {
      withCredentials: true,
    }).then(response => {
      const userData = response.data;
      displayUserData(userData);
    }).catch(error => {
      console.error('Failed to fetch user data:', error);
    });
  `

  function displayUserData(userData) {
```

```
      const userDataDiv = document.getElementById('userData');
      //                mes userData contains a 'name' and 'email'. Adapt based o
                        rHTML = `<p>Your id is: ${userData.userId}</p>`;
      }
      fetchUserData();
    </script>

</body>
</html>
```

1. Add a route that sends this html file

```
app.get("/", (req, res) => {
    res.sendFile(path.join(__dirname, "../src/index.html"))
})
```

1. Remove credentials from cors

```
app.use(cors());
```

Link - https://github.com/100xdevs-cohort-2/week-16-auth-1