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2026

Authentication (the client side)

For some, but not for all

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Outline

- The need for authentication
- HTTP sessions
- Authentication in React and in Express

Authentication vs. Authorization

Authentication

- Verify you are who you say you are (identity)
- Typically done with credentials
  - e.g., username, password
- Allows a personalized user experience

Authorization

- Decide if you have permission to access a resource
- Granted authorization rights depends on the identity
  - as established during authentication

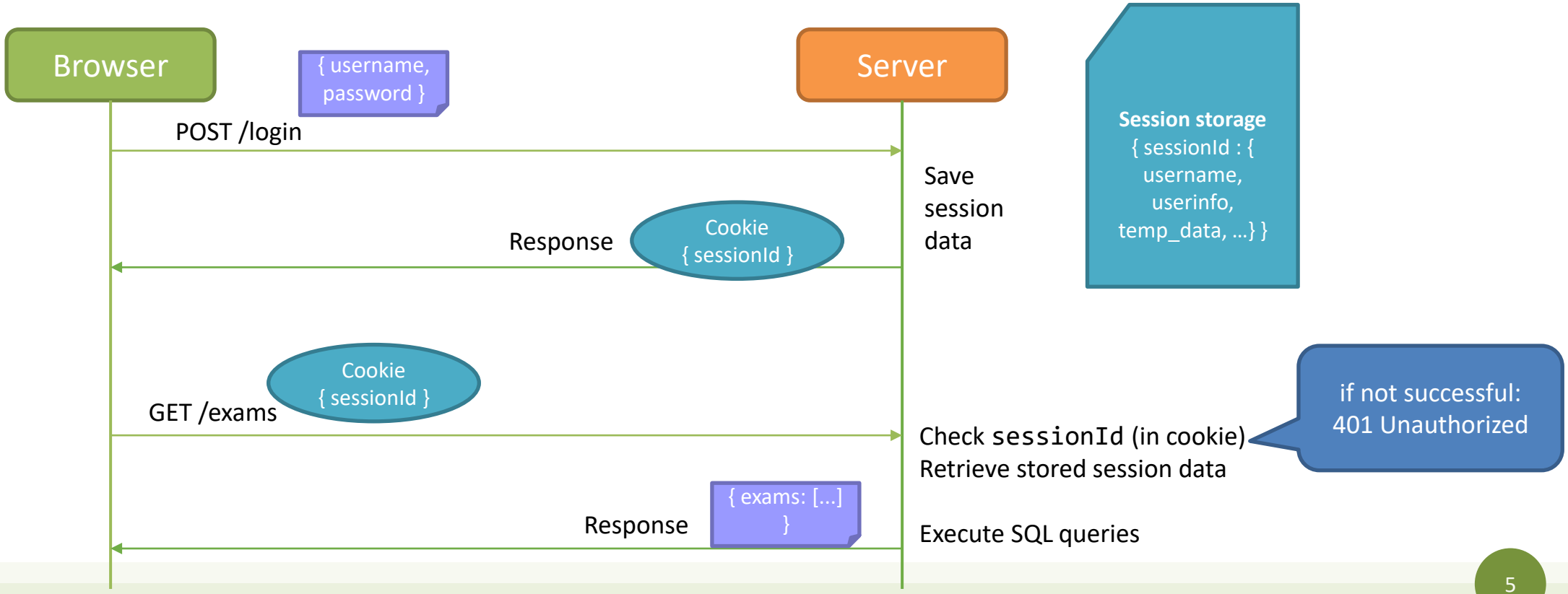
Often used in conjunction to protect access to a system

Layers of Authorization

Who	What	How	When
User	Login / Logout / Navigate pages		
React App	Is the user logged? Remember user information	State/Context variables	Set at login Destroyed at logout Queried during navigation
Browser	Remembers navigation session	Session Cookie (stores session ID)	Received at login, in HTTP Response Re-sent to server at every HTTP Request
Server	Remember session data	Session storage (creates session ID, remembers associated data: username, group, level, …)	Created at login Destroyed at logout Retrieved at every HTTP Request
Route (HTTP API)	Check authorization Execute API	Verify session validity	At every (non-public) HTTP Request
Route (Login)	Perform authentication	Check user/pass If ok, create session information	At Login time
Route (Logout)	Forget authentication	Destroy session information	At Logout request
Database (at Login)	Validates user information	Queries & password encryption	At Login time
Database (HTTP API)	Retrieves user information	Queries from session information	At every HTTP Request

Session-based Auth

- The user state is stored on the server
  - in a storage or, for development only, in memory



Login Form: Use Standard Practice

- Create it as React component with local state or…

```
<LoginForm userLogin={userLoginCallback}/>

function LoginForm(props) => {
    const [username, setUsername] = useState('');
    const [password, setPassword] = useState('');

    doLogin = (event) => {
        event.preventDefault();
        if (… form valid …) {
            props.userLoginCallback(username, password);  // Make POST request to authentication server
        } else {
            // show invalid form fields
        }
    }
...
```

Login Form: Use Standard Practice

- … create it as React component with useActionState

```
<LoginForm userLogin={userLoginCallback}/>

function LoginForm(props) => {
    const [state, formAction] = useActionState(doLogin, {username: '', password: ''});

    doLogin = async (prevState, formData) => {
        if (… form valid …) {
            props.userLoginCallback(formData.get('username'), formData.get('password'));  // Make POST
request to authentication server
        } else {
            // show invalid form fields
        }
    }
...
```

Storing User Information in React

- With the login response, some user information might be available in the browser
  - e.g., the username
- You might want to store such information, for later usage
- Our suggestion, to keep things simple:
  - store them in a `Context` (or a `State`)
  - ask the server for them, when needed (e.g., with `API.getUserInfo()` in a `useEffect`)

- More suggestions:
  - https://www.robinwieruch.de/react-router-authentication/

With CORS Enabled

- By default, cookies can be sent to the same origin
  - CORS has mechanisms to overcome this limitation
- In the server, we need to define *both* the credentials and the origin options, when setting up the `cors` module:

```
const corsOptions = {
  origin: 'http://localhost:3000',
  credentials: true,
};
app.use(cors(corsOptions));
```

With CORS Enabled

- In the client, all the `fetch` requests to protected APIs must include the "*credentials: include*" option:

```
const response = await fetch(SERVER_URL + '/api/exams', {
  credentials: 'include',
});
```

- The login request **must** include such an option as well
  - even if it is not to a protected API
  - otherwise the cookie will not be available in subsequent (protected) requests

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