Introcution to JavaScript

Nils Twelker

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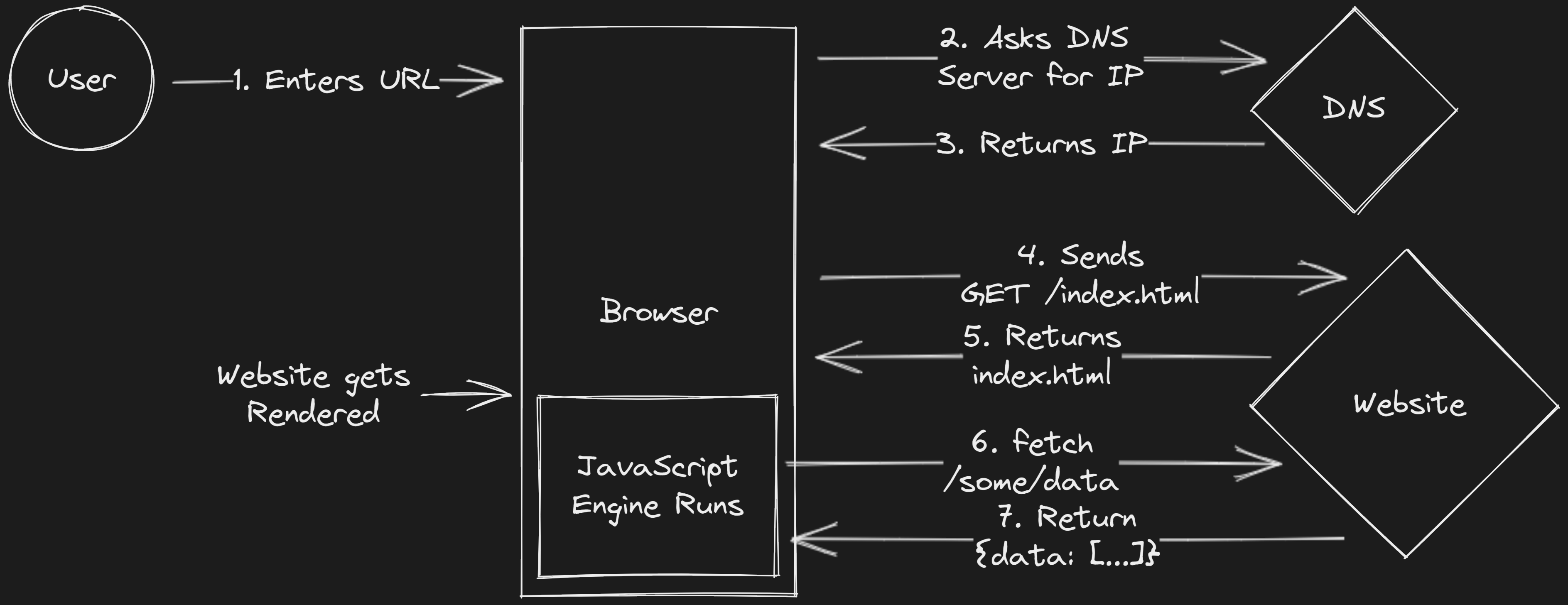
What learned we last Week?

- Common Events `click` , `dblclick` , `mouseover` , `keydown`
- `on<event>` Attribute
- Event Bubbling
- Dispatching Events (Custom Events)
- Displaying Lists `<ul><li>Item A</li></ul>`
- Displaying Tables `<table><tr><th>Name</th></tr></table>`
- Displaying Forms `<form><input type='text'></form>`

Goals of this week

- Server Client Communication
  - HTTP (Hypertext Transfer Protocol)
  - CRUD (Create, Read, Update, Delete)
- JSON (JavaScript Object Notation)
- AJAX (Asynchronous JavaScript and XML)
- Fetch API
- Promises
- Async/Await

Server Client Communication



HTTP (Hypertext Transfer Protocol)

Protocol for communication between a Web Client and a Web Server.

1. Web Client sends HTTP Request to Web Server.
2. Web Server processes Request.
3. Web Server sends HTTP Response to Web Client.

HTTP Request & Response

```
GET /index.html HTTP/2
Host: www.example.com
```

```
HTTP/2 200 OK
Content-Type: text/html
Content-Length: 1234

<html>
    <head>
        <title>Example</title>
    </head>
    <body>
        <h1>Hello World</h1>
    </body>
</html>
```

CRUD (Create, Read, Update, Delete)

Operations for persistent data.

- Create: `POST`
- Read: `GET`
- Update: `PUT` or `PATCH`
- Delete: `DELETE`

CRUD (Create)

Request

```
POST /users HTTP/2
Host: www.example.com
Content-Type: application/json

{
    "name": "John Doe",
    "age": 42
}
```

Response

```
HTTP/2 201 Created
Content-Type: application/json
Content-Length: 123

{
    "id": 123,
    "name": "John Doe",
    "age": 42
}
```

CRUD (Read)

Request

```
GET /users/123 HTTP/2
Host: www.example.com
```

Response

```
HTTP/2 200 OK
Content-Type: application/json
Content-Length: 123

{
    "id": 123,
    "name": "John Doe",
    "age": 42
}
```

CRUD (Update)

Request

```
PATCH /users/123 HTTP/2
Host: www.example.com
Content-Type: application/json

{
    "age": 43
}
```

Response

```
HTTP/2 200 OK
Content-Type: application/json
Content-Length: 123

{
    "id": 123,
    "name": "John Doe",
    "age": 43
}
```

CRUD (Delete)

Request

```
DELETE /users/123 HTTP/2
Host: www.example.com
```

Response

```
HTTP/2 204 No Content
```

HTTP Status Codes

- 1xx: Informational
- 2xx: Success
- 3xx: Redirection
- 4xx: Client Error
- 5xx: Server Error

Some common Status Codes:

- 200 OK
- 201 Created
- 204 No Content
- 400 Bad Request
- 401 Unauthorized
- 403 Forbidden
- 404 Not Found
- 500 Internal Server Error
- 503 Service Unavailable

JSON (JavaScript Object Notation)

Lightweight data-interchange format.

```json
{
    "name": "John Doe",
    "age": 42,
}
```

JSON Data Types

```json
{
    "string": "Hello World",
    "number": 42,
    "boolean": true,
    "null": null,
    "array": [1, 2, 3],
    "object": {
        "name": "John Doe",
        "age": 42
    }
}
```

AJAX (Asynchronous JavaScript and XML)

Technique for asynchronous communication between a Web Client and a Web Server.

- Asynchronous: No page reload.
- JavaScript: Client side scripting language.
- XML: Data format. (JSON is more common today)

Fetch API

API for making HTTP Requests.

```
fetch("https://example.com/users/123")
    .then(response => response.json())
    .then(data => console.log(data))
```

Fetch API (POST)

```
fetch("https://example.com/users", {
    method: "POST",
    headers: {
        "Content-Type": "application/json"
    },
    body: JSON.stringify({
        name: "John Doe",
        age: 42
    })
}).then(response => response.json())
  .then(data => console.log(data))
```

Promises

Object that represents the eventual completion (or failure) of an asynchronous operation.

```javascript
const promise = new Promise((resolve, reject) => {
    setTimeout(() => {
        resolve("Hello World")
    }, 1000)
})

promise.then(data => console.log(data))
```

Async/Await

```javascript
async function getData() {
    const response = await fetch("https://example.com/users/123")
    const data = await response.json()
    return data
}

const myData = await getData()
console.log(myData)
```

Tasks and Points

Goal is to get 100 Points.

- `fetch` (25 Points)
- `promise` (25 Points)
- `basic-server` (50 Points)
- `crud` (100 Points)