

# DOM

## Document Object Model

# Agenda

- Data-forløbet
- The DOM
- DOM-Manipulation
- Øvelser og Opbygning af UI

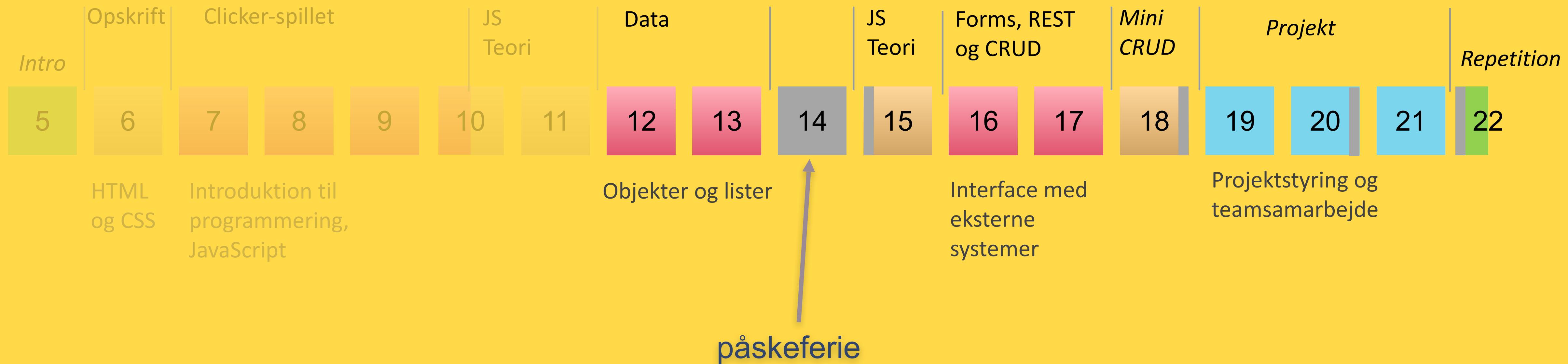
The image shows a screenshot of a code editor window. The menu bar at the top includes 'View', 'Selection', 'Find', 'Debugger', 'Packages', 'Window', 'Help', and 'Native'. The title bar says 'main.js'. The code editor displays the following JavaScript code:

```
1 "use strict";
2
3 fetch("http://headlesscms.cederdorff.com/wp-json/wp/v2/posts?_embed")
4   .then(function(response) {
5     return response.json();
6   })
7   .then(function(json) {
8     appendPosts(json);
9   });
10
11 function appendPosts(posts) {
12   for (let post of posts) {
13     console.log(post);
14     document.querySelector("#grid-posts").innerHTML += `
15       <article>
16         <h3>${post.title.rendered}</h3>
17         <p>Email: <a href="mailto:${post.acf.email}">${post.acf.email}</a></p>
18         <p>Phone: ${post.acf.phone}</p>
19       </article>
20     `;
21   }
22 }
```

The code uses the Fetch API to retrieve JSON data from a WordPress REST API endpoint. It then iterates over the posts and appends HTML to a div with the id 'grid-posts'.

# 1. SEMESTERS STRUKTUR

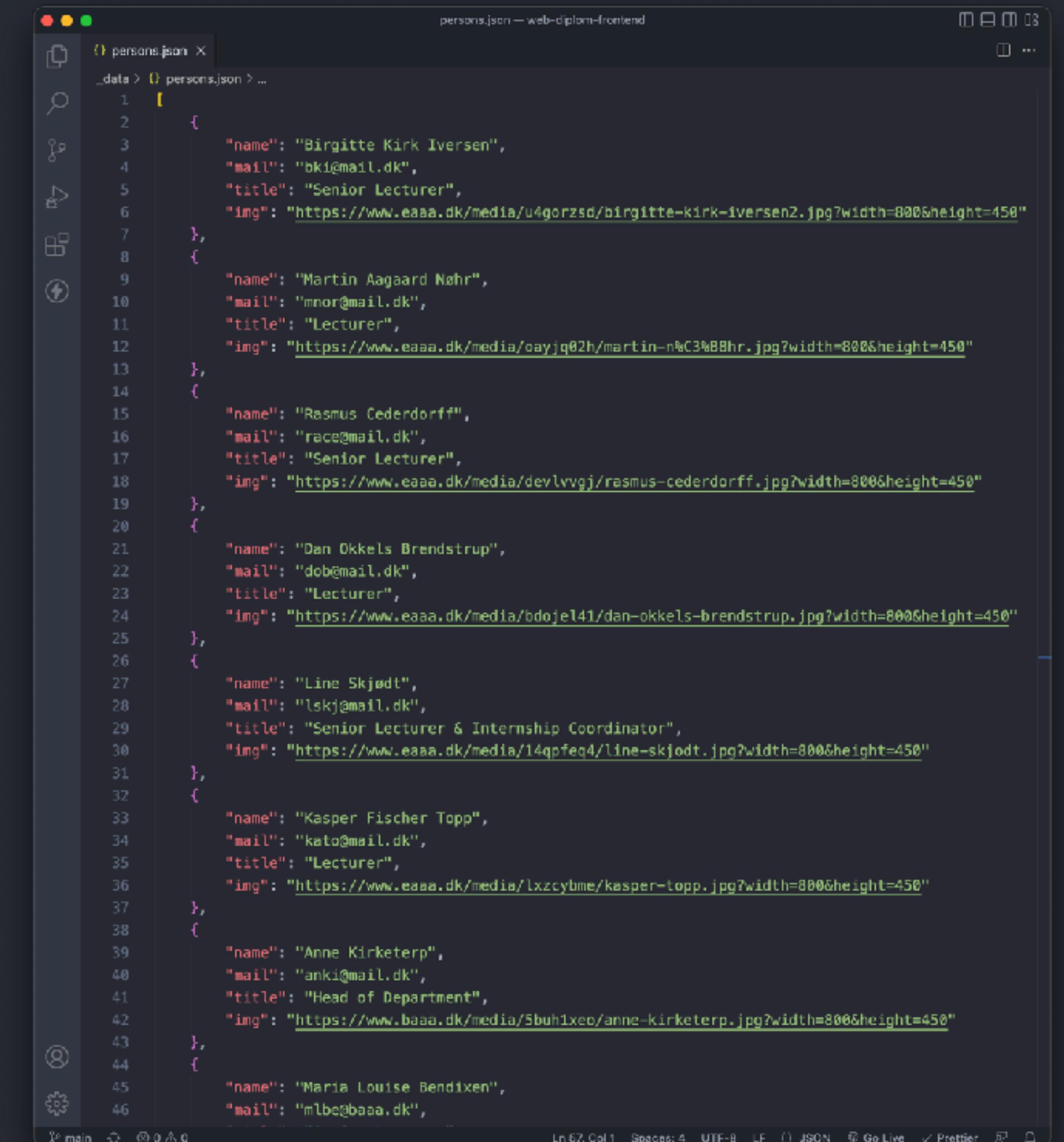
Semesteret består af 16 undervisningsuger (inkl. en masse helligdage)



Eksamnen ligger 12.-14. juni

# Data

JavaScript, lister,  
objekter, JSON, fetch,  
DOM-manipulation og  
meget mere...



The screenshot shows a code editor window titled "persons.json — web-diplom-frontend". The file contains a JSON array of objects representing lecturers. Each object has properties: name, mail, title, and img. The img URLs are relative paths to images on a server.

```
_data > 0 persons.json > ...
1 [
2   {
3     "name": "Birgitte Kirk Iversen",
4     "mail": "bki@mail.dk",
5     "title": "Senior Lecturer",
6     "img": "https://www.eaaa.dk/media/u4gorzsd/birgitte-kirk-iversen2.jpg?width=800&height=450"
7   },
8   {
9     "name": "Martin Aagaard Nørh",
10    "mail": "mnor@mail.dk",
11    "title": "Lecturer",
12    "img": "https://www.eaaa.dk/media/oayjq02h/martin-n%C3%88hr.jpg?width=800&height=450"
13  },
14  {
15    "name": "Rasmus Cederdorff",
16    "mail": "race@mail.dk",
17    "title": "Senior Lecturer",
18    "img": "https://www.eaaa.dk/media/devlvvgj/rasmus-cederdorff.jpg?width=800&height=450"
19  },
20  {
21    "name": "Dan Okkels Brendstrup",
22    "mail": "dob@mail.dk",
23    "title": "Lecturer",
24    "img": "https://www.eaaa.dk/media/bdoje141/dan-okkels-brendstrup.jpg?width=800&height=450"
25  },
26  {
27    "name": "Line Skjødt",
28    "mail": "tskj@mail.dk",
29    "title": "Senior Lecturer & Internship Coordinator",
30    "img": "https://www.eaaa.dk/media/14qpfeq4/line-skjodt.jpg?width=800&height=450"
31  },
32  {
33    "name": "Kasper Fischer Topp",
34    "mail": "kato@mail.dk",
35    "title": "Lecturer",
36    "img": "https://www.eaaa.dk/media/lxzcybme/kasper-topp.jpg?width=800&height=450"
37  },
38  {
39    "name": "Anne Kirketerp",
40    "mail": "anki@mail.dk",
41    "title": "Head of Department",
42    "img": "https://www.baaa.dk/media/5buh1xeo/anne-kirketerp.jpg?width=800&height=450"
43  },
44  {
45    "name": "Maria Louise Bendixen",
46    "mail": "mlbe@baaa.dk",
47  }
```

CRUD App

Lars Bogetoft  
Head of Education  
[lrb@kea.dk](mailto:lrb@kea.dk)

Peter Lind  
Senior Lecturer  
[pet@kea.dk](mailto:pet@kea.dk)

Magdalena "Lenka" Otap  
Lecturer  
[mago@kea.dk](mailto:mago@kea.dk)

Rasmus Cederdorff  
Senior Lecturer  
[race@kea.dk](mailto:race@kea.dk)

Create a new User

Magdalena "Lenka" Otap  
Lecturer  
mago@kea.dk  
<https://share.cederdorff.com/images/mago.jpg>

CREATE USER

Update User

<https://cederdorff.github.io/dat-js-crud-intro/>

# Frontend (client)

CRUD App

Lars Bogetoft  
Head of Education  
[larb@kea.dk](mailto:larb@kea.dk)  
**UPDATE** **DELETE**

Peter Lind  
Senior Lecturer  
[petl@kea.dk](mailto:petl@kea.dk)  
**UPDATE** **DELETE**

Magdalena "Lenka" Otap  
Lecturer  
[mago@kea.dk](mailto:mago@kea.dk)  
**UPDATE** **DELETE**

Rasmus Cederdorff  
Senior Lecturer  
[race@kea.dk](mailto:race@kea.dk)  
**UPDATE** **DELETE**

Create a new User

Update User

<https://cederdorff.github.io/dat-js-crud-intro/>

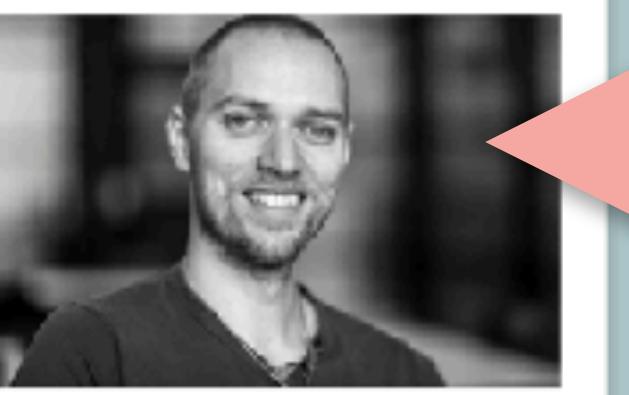
# Backend (Server)

```
Raw Parsed
```

```
{  
  "-NNBOTuFaCLHSY-IzmCt": {  
    "image": "https://kea.dk/slir/w360-clxl/images/user-profile/chefer/larb.jpg",  
    "mail": "larb@kea.dk",  
    "name": "Lars Bogetoft",  
    "title": "Head of Education"  
  },  
  "-NNBQFn28wOOLJTxvma": {  
    "image": "https://share.cederdorff.com/images/petl.jpg",  
    "mail": "petl@kea.dk",  
    "name": "Peter Lind",  
    "title": "Senior Lecturer"  
  },  
  "-NNBQSO5gFb-4xB7liug": {  
    "image": "https://share.cederdorff.com/images/mago.jpg",  
    "mail": "mago@kea.dk",  
    "name": "Magdalena \"Lenka\" Otap",  
    "title": "Lecturer"  
  },  
  "fTs84KRoYw5pRZEWcq2Z": {  
    "image": "https://share.cederdorff.com/images/race.jpg",  
    "mail": "race@kea.dk",  
    "name": "Rasmus Cederdorff",  
    "title": "Senior Lecturer"  
  }  
}
```

<https://race-dat-v1-default-rtdb.firebaseio.com/users.json>

# Fetch Persons

 <p>Birgitte Kirk Iversen Senior Lecturer <a href="mailto:hki@mail.dk">hki@mail.dk</a></p>	 <p>Martin Aagaard Nøhr Lecturer <a href="mailto:mnor@mail.dk">mnor@mail.dk</a></p>	 <p>Rasmus Cederdorff Senior Lecturer <a href="mailto:mcn@mail.dk">mcn@mail.dk</a></p>
 <p>Dan Okkels Brendstrup Lecturer <a href="mailto:dob@mail.dk">dob@mail.dk</a></p>	 <p>Line Skjødt Senior Lecturer &amp; Internship Coordinator <a href="mailto:tskj@mail.dk">tskj@mail.dk</a></p>	 <p>Kasper Fischer Topp Lecturer <a href="mailto:kato@mail.dk">kato@mail.dk</a></p>
 <p>Anne Kirketerp Head of Department <a href="mailto:anki@mail.dk">anki@mail.dk</a></p>	 <p>Maria Louise Bendixen Senior Lecturer <a href="mailto:mlbe@baaa.dk">mlbe@baaa.dk</a></p>	 <p>Marlene Ahlgreen Jensen Senior Lecturer <a href="mailto:maj@baaa.dk">maj@baaa.dk</a></p>

```
persons.json — web-diplom-frontend
```

\_data > persons.json > ...

```
1  [
2  {
3      "name": "Birgitte Kirk Iversen",
4      "mail": "bki@mail.dk",
5      "title": "Senior Lecturer",
6      "img": "https://www.eaaa.dk/media/u4gorzsd/birgitte-kirk-iversen2.jpg?width=800&height=450"
7  },
8  {
9      "name": "Martin Aagaard Nøhr",
10     "mail": "mnor@mail.dk",
11     "title": "Lecturer",
12     "img": "https://www.eaaa.dk/media/cayjq02h/martin-n%C3%88hr.jpg?width=800&height=450"
13  },
14  {
15      "name": "Rasmus Cederdorff",
16      "mail": "racer@mail.dk",
17      "title": "Senior Lecturer",
18      "img": "https://www.eaaa.dk/media/devlvvgj/rasmus-cederdorff.jpg?width=800&height=450"
19  },
20  {
21      "name": "Dan Okkels Brendstrup",
22      "mail": "dob@mail.dk",
23      "title": "Lecturer",
24      "img": "https://www.eaaa.dk/media/bdoje141/dan-okkels-brendstrup.jpg?width=800&height=450"
25  },
26  {
27      "name": "Line Skjødt",
28      "mail": "tskj@mail.dk",
29      "title": "Senior Lecturer & Internship Coordinator",
30      "img": "https://www.eaaa.dk/media/14qpfeq4/line-skjodt.jpg?width=800&height=450"
31  },
32  {
33      "name": "Kasper Fischer Topp",
34      "mail": "kato@mail.dk",
35      "title": "Lecturer",
36      "img": "https://www.eaaa.dk/media/lxzcybme/kasper-topp.jpg?width=800&height=450"
37  },
38  {
39      "name": "Anne Kirketerp",
40      "mail": "anki@mail.dk",
41      "title": "Head of Department",
42      "img": "https://www.baaa.dk/media/5buh1xeo/anne-kirketerp.jpg?width=800&height=450"
43  },
44  {
45      "name": "Maria Louise Bendixen",
46      "mail": "mlbe@baaa.dk",
```

Ln 62, Col 1   Spaces: 4   UTF-8   LF   () JSON   Go Live   Prettier

Fetch Persons

127.0.0.1:5503/fetch-persons-grid/index.html

Apps KEA DAT DAT.js IT Arkitektur EAAA BOOKS

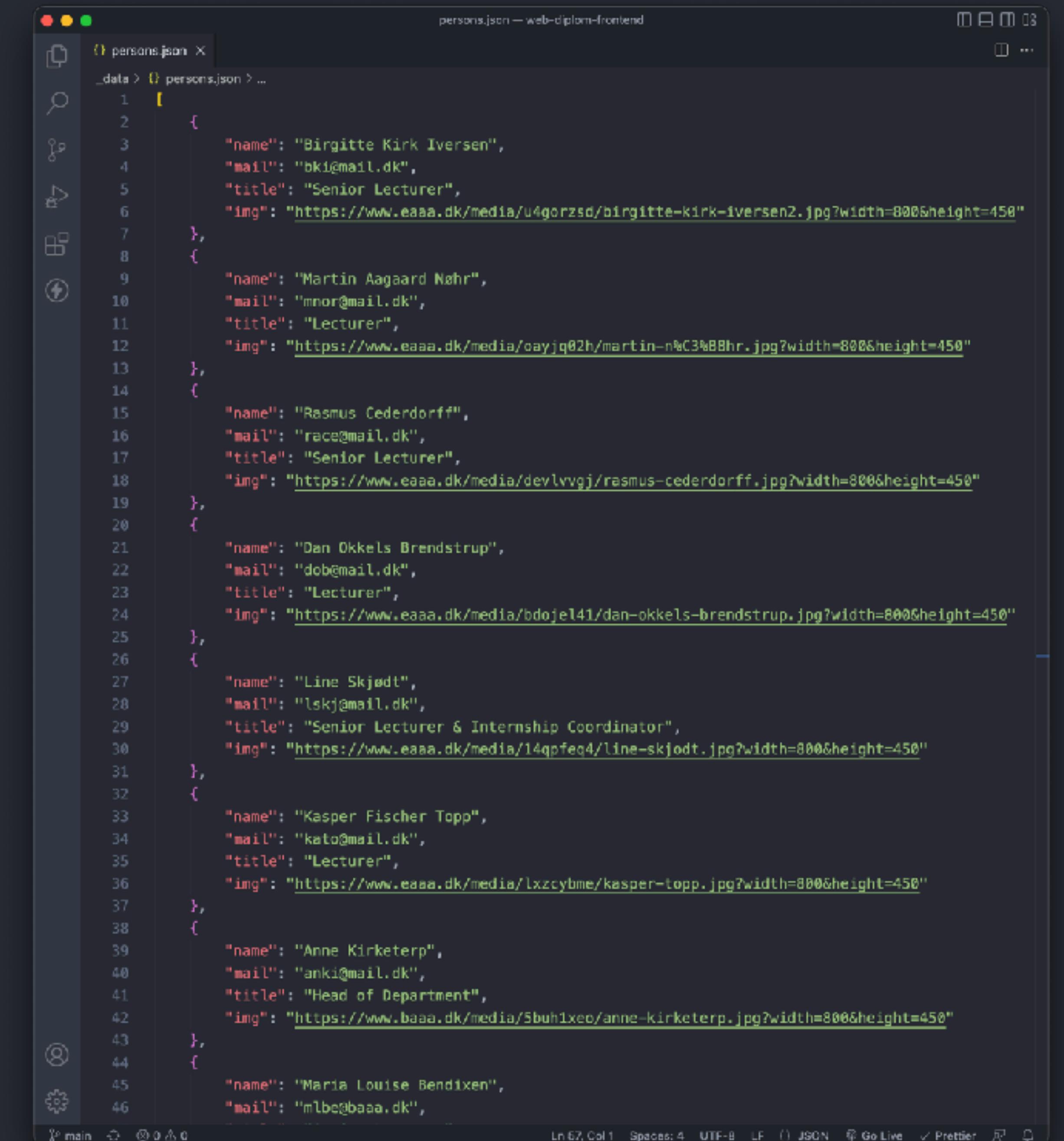
### Fetch Persons

 <p>Birgitte Kirk Iversen Senior Lecturer <a href="mailto:hki@mail.dk">hki@mail.dk</a></p>	 <p>Martin Aagaard Nøhr Lecturer <a href="mailto:mnr@mail.dk">mnr@mail.dk</a></p>	 <p>Rasmus Cederdorff Senior Lecturer <a href="mailto:rnc@mail.dk">rnc@mail.dk</a></p>
 <p>Dan Okkels Brendstrup Lecturer <a href="mailto:dob@mail.dk">dob@mail.dk</a></p>	 <p>Line Skjødt Senior Lecturer &amp; Internship Coordinator <a href="mailto:lskj@mail.dk">lskj@mail.dk</a></p>	 <p>Kasper Fischer Topp Lecturer <a href="mailto:keto@mail.dk">keto@mail.dk</a></p>
 <p>Anne Kirketerp Head of Department <a href="mailto:anki@mail.dk">anki@mail.dk</a></p>	 <p>Maria Louise Bendixen Senior Lecturer <a href="mailto:mlbe@basa.dk">mlbe@basa.dk</a></p>	 <p>Marlene Ahlgreen Jensen Senior Lecturer <a href="mailto:maj@basa.dk">maj@basa.dk</a></p>

# Forståelse for objekter og arrays

# Hvordan viser vi denne JSON-data, så det giver mening for brugerne?

- Denne rette visualisering
- Generere HTML
- DOM-manipulation

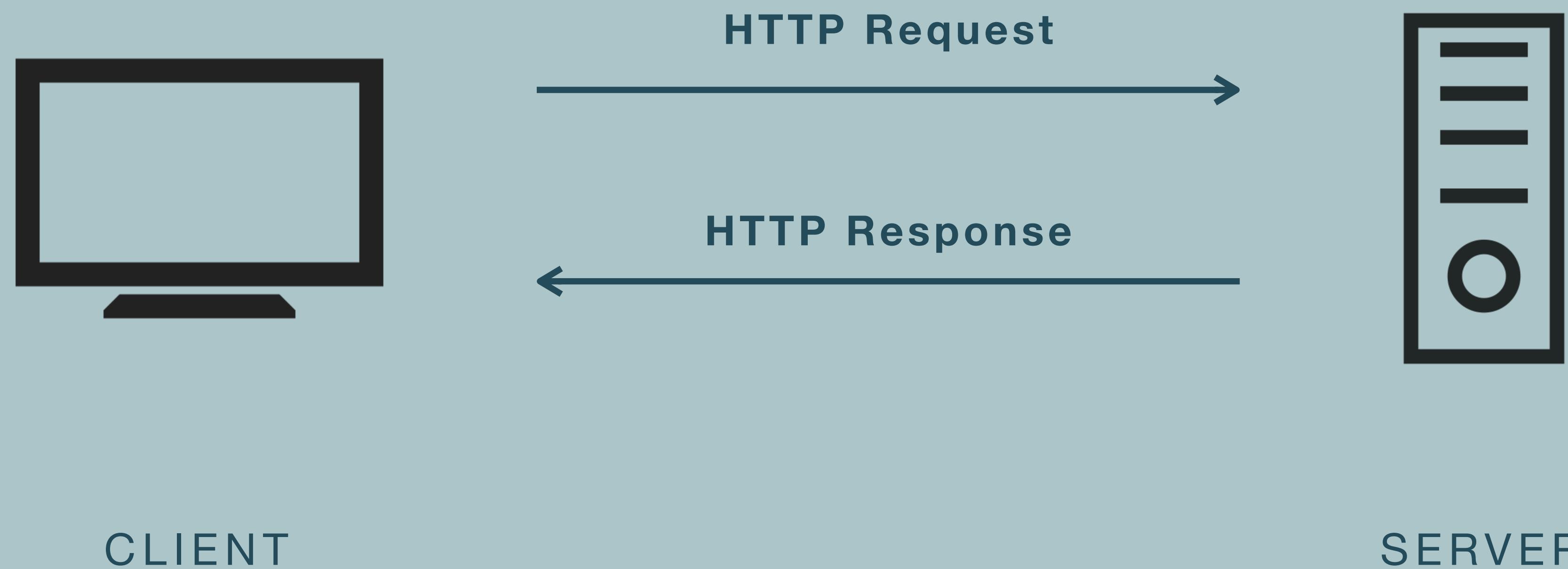


```
persons.json — web-diplom-frontend
persons.json
_ln 62, Col 1  Spaces: 4  UTF-8  LF  ()  JSON  Go Live  Prettier  ⌂  ⌂

1 [           _data > 0 persons.json > ...
2 {             1 [
3   "name": "Birgitte Kirk Iversen", 2 {
4   "mail": "bki@mail.dk", 3   "name": "Martin Aagaard Nørh",
5   "title": "Senior Lecturer", 4   "mail": "mnor@mail.dk",
6   "img": "https://www.eaaa.dk/media/u4gorzsd/birgitte-kirk-iversen2.jpg?width=800&height=450" 5   "title": "Lecturer",
7 },           6   "img": "https://www.eaaa.dk/media/cayjq02h/martin-n%C3%88hr.jpg?width=800&height=450"
8 {             7 },
9   "name": "Rasmus Cederdorff", 8 },
10  "mail": "race@mail.dk", 9   "name": "Dan Okkels Brendstrup",
11  "title": "Senior Lecturer", 10  "mail": "dob@mail.dk",
12  "img": "https://www.eaaa.dk/media/devlvvgj/rasmus-cederdorff.jpg?width=800&height=450" 11  "title": "Lecturer",
13 },           12  "img": "https://www.eaaa.dk/media/bdoje141/dan-okkels-brendstrup.jpg?width=800&height=450"
14 {             13 },
15   "name": "Line Skjødt", 14   "name": "Kasper Fischer Topp",
16   "mail": "tskj@mail.dk", 15  "mail": "kato@mail.dk",
17   "title": "Senior Lecturer & Internship Coordinator", 16  "title": "Lecturer",
18   "img": "https://www.eaaa.dk/media/14qpfeq4/line-skjodt.jpg?width=800&height=450" 17  "img": "https://www.eaaa.dk/media/lxzcybme/kasper-topp.jpg?width=800&height=450"
19 },           18 },
20 {             19 },
21   "name": "Anne Kirketerp", 20   "name": "Maria Louise Bendixen",
22   "mail": "anki@mail.dk", 21  "mail": "mlbe@baaa.dk",
23   "title": "Head of Department", 22 }
```

# Client-Server Model

Communication between web **clients** and web **servers**.



# Client-Server Model

Communication between web **clients** and web **servers**.

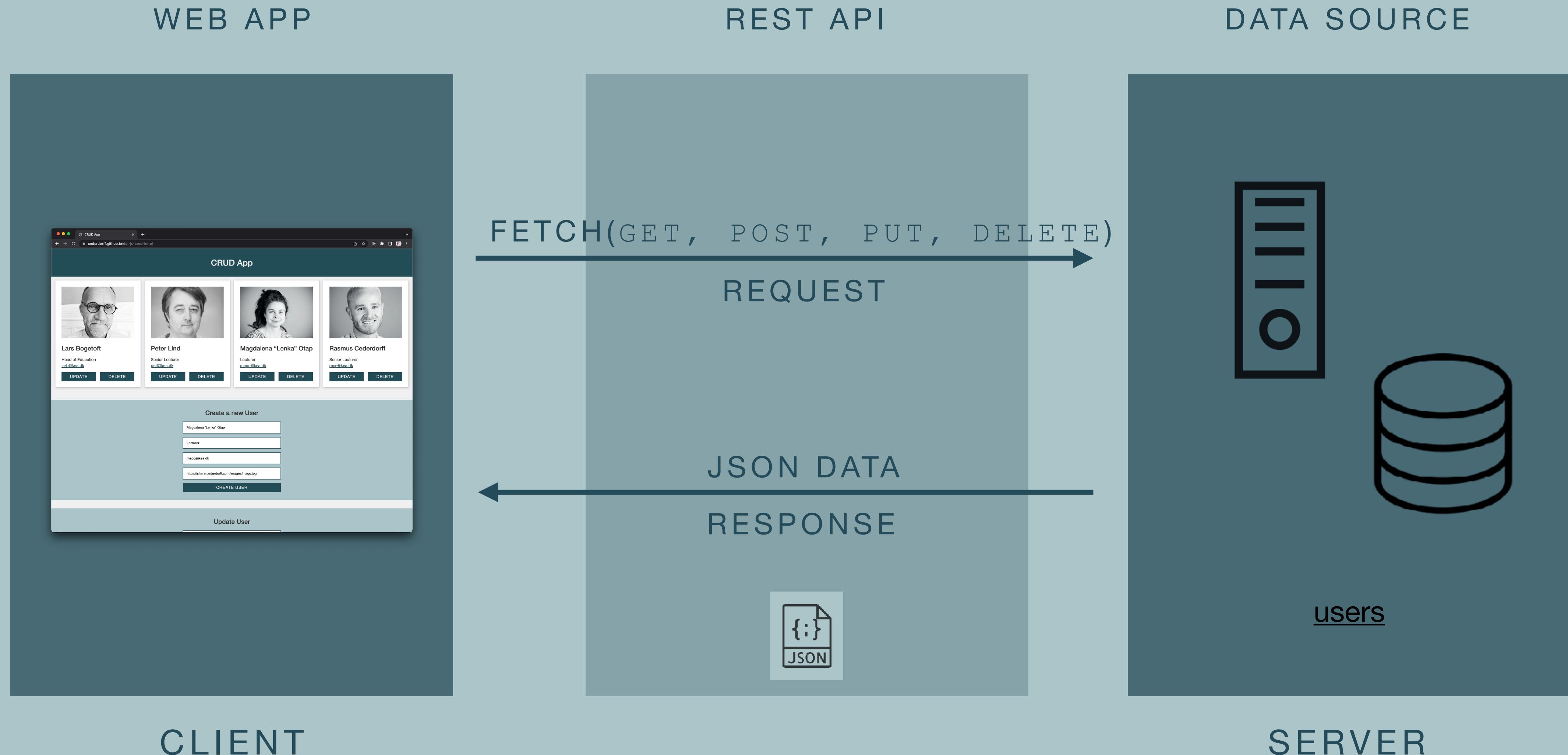


# Hyper Text Transfer Protocol

- A protocol and standard for fetching data, HTML and other resources (text, images, videos, scripts, JSON).
- The foundation of the web.

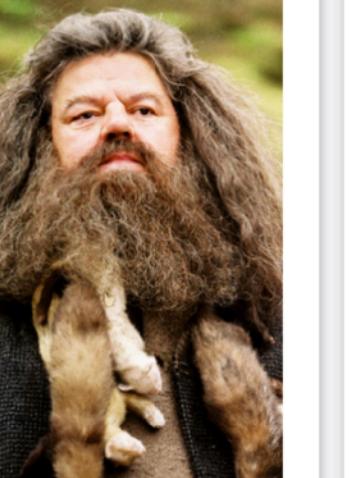


# Web Development



# The Potter App

**Harry Potter Characters**

 Harry Potter Gryffindor	 Hermione Granger Gryffindor	 Ron Weasley Gryffindor	 Draco Malfoy Slytherin	 Minerva McGonagall Gryffindor
 Cedric Diggory	 Cho Chang	 Severus Snape	 Albus Dumbledore	 Fred Weasley

**Harry Potter Wizarding Universe Characters**

 Harry Potter Gryffindor	 Hermione Granger Gryffindor	 Ron Weasley Gryffindor
 Draco Malfoy Slytherin	 Minerva McGonagall Gryffindor	 Cedric Diggory Hufflepuff
 Cho Chang Ravenclaw	 Severus Snape Slytherin	 Albus Dumbledore Gryffindor
 Fred Weasley Gryffindor	 Luna Lovegood Ravenclaw	

# Hvad sker der? Tjek Network-tabben!

The screenshot shows a web application titled "Harry Potter Characters" displaying a grid of eight Harry Potter characters: Harry Potter, Hermione Granger, Ron Weasley, Draco Malfoy, McGonagall, Cedric Diggory, Luna Lovegood, and Snape. Each character has a small portrait and their name and house affiliation below it. To the right of the browser window, the developer tools Network tab is open, showing a list of 29 requests made during the page load. The waterfall chart at the top of the Network tab shows the sequence of requests, with most being 294B images and others being smaller files like CSS or JS.

Name	Status	Type	Initiator	Size	Time	Waterfall
potter-app/	304	document	Other	150 B	21...	
app.css	200	stylesheet	(index)	(me...)	0 ms	
app.js	200	script	(index)	(me...)	0 ms	
harry.jpg	304	image	(index)	294 B	10...	
potter.json	200	fetch	app.js:15	(dis...)	0 ms	
hermione.jpg	304	image	Other	294 B	15...	
ron.jpg	304	image	Other	294 B	15...	
draco.jpg	304	image	Other	294 B	15...	
snape.jpg	304	image	Other	294 B	28...	
mcgonagall.jpg	304	image	Other	294 B	15...	
cedric.png	304	image	Other	295 B	15...	
hagrid.png	304	image	Other	295 B	12...	
cho.jpg	304	image	Other	294 B	15...	
neville.jpg	304	image	Other	294 B	12...	
luna.jpg	304	image	Other	294 B	12...	
ginny.jpg	304	image	Other	294 B	12...	
sirius.JPG	304	image	Other	294 B	12...	
lupin.jpg	304	image	Other	294 B	11...	
arthur.jpg	304	image	Other	295 B	10...	
bellatrix.jpg	304	image	Other	294 B	11...	
voldemort.jpg	304	image	Other	294 B	10...	
slughorn.JPG	304	image	Other	294 B	10...	
kingsley.jpg	304	image	Other	295 B	10...	
umbridge.jpg	304	image	Other	295 B	10...	
lucius.jpg	304	image	Other	294 B	10...	
crabbe.jpg	304	image	Other	294 B	10...	
goyle.jpg	304	image	Other	294 B	11...	
norris.JPG	304	image	Other	294 B	99...	
filch.jpg	304	image	Other	294 B	10...	

<https://cederdorff.github.io/dat-js/05-data/potter-app/>

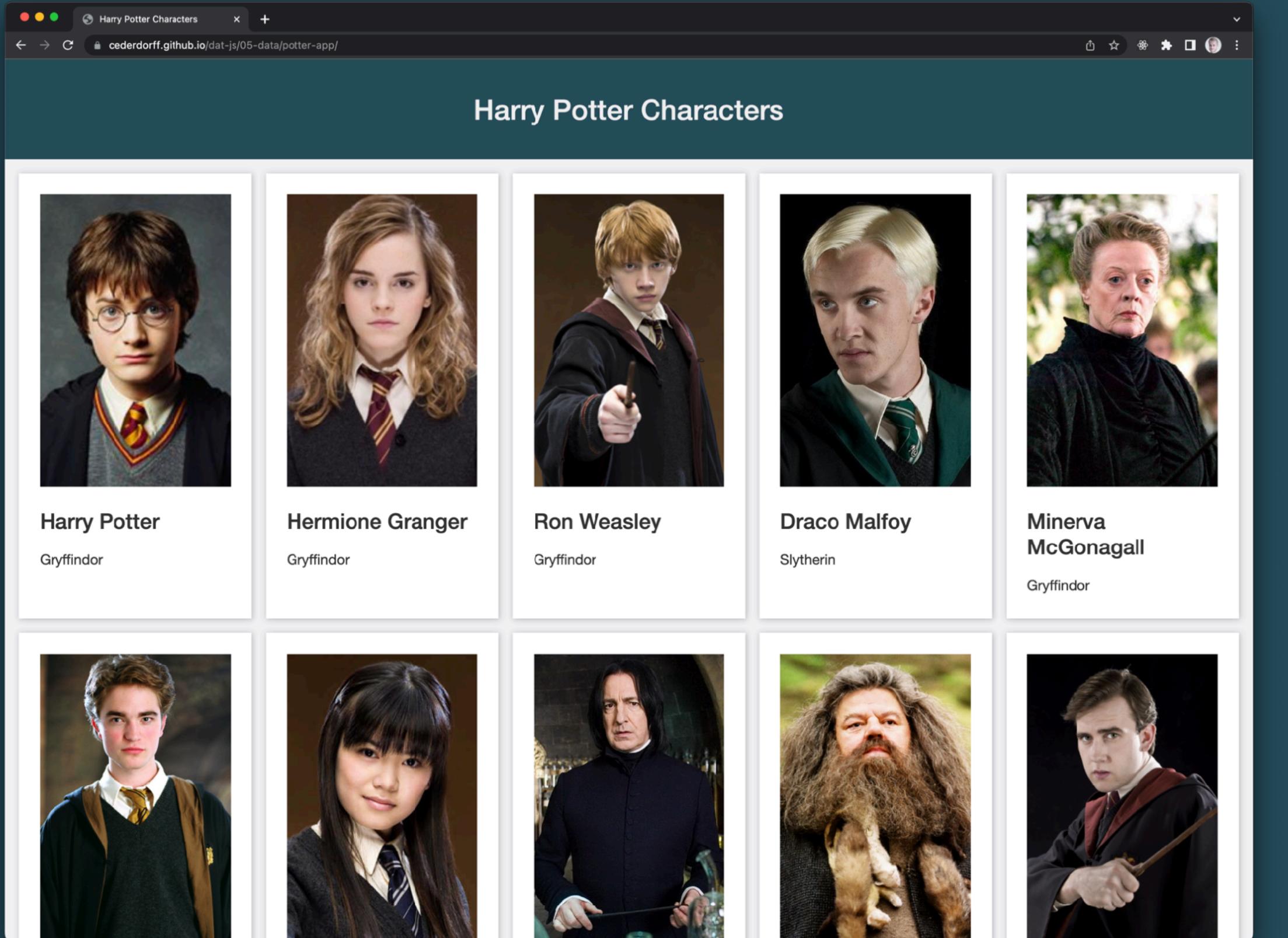
1. Brug Network-tabben til at undersøge:

1. <https://cederdorff.github.io/dat-js/05-data/peters-potter-app/>
  2. <https://cederdorff.github.io/dat-js/05-data/potter-app/>
2. Åben websitet i Chrome (eller en anden browser).
3. Åben Developer Tool (se: [How to open the dev tool in your browser](#)) og gå til Network/Netværk.
4. Genindlæs siden imens du står i Network-tabben og undersøg hvilke ressourcer, der bliver hentet.
5. Hvilke(n) type ressourcer er der tale om?
6. Overvej hvordan ressourcerne hentes.
7. Kan du se hvilken data, der hentes?

## Network-tabben



# Frontend (client)



<https://cederdorff.github.io/dat-js/05-data/potter-app/>

# JSON Data Source (Server)

The screenshot shows a browser window displaying a JSON object representing the Harry Potter characters. The JSON is structured as follows:

```
name: "Harry Potter",  
species: "human",  
gender: "male",  
house: "Gryffindor",  
dateOfBirth: "31-07-1980",  
yearOfBirth: 1980,  
ancestry: "half-blood",  
eyeColour: "green",  
hairColour: "black",  
wand: {  
    wood: "holly",  
    core: "phoenix feather",  
    length: 11  
,  
    patronus: "stag",  
    hogwartsStudent: true,  
    hogwartsStaff: false,  
    actor: "Daniel Radcliffe",  
    alive: true,  
    image: "http://hp-api.herokuapp.com/images/harry.jpg"  
,  
name: "Hermione Granger",  
species: "human",  
gender: "female",  
house: "Gryffindor",  
dateOfBirth: "19-09-1979",  
yearOfBirth: 1979,  
ancestry: "muggleborn",  
eyeColour: "brown",  
hairColour: "brown",  
wand: {  
    wood: "vine",  
    core: "dragon heartstring",  
    length: "  
,  
    patronus: "otter",  
    hogwartsStudent: true,  
    hogwartsStaff: false,  
    actor: "Emma Watson",  
    alive: true,  
    image: "http://hp-api.herokuapp.com/images/hermione.jpeg"  
,  
name: "Ron Weasley",  
species: "human",  
gender: "male",  
house: "Gryffindor",  
dateOfBirth: "01-03-1980",  
yearOfBirth: 1980,  
ancestry: "pure-blood",  
eyeColour: "blue",  
hairColour: "red",  
wand: {
```

<https://raw.githubusercontent.com/cederdorff/dat-js/main/data/potter.json>

# Hvad sker der uden JavaScript?

The screenshot shows a web application titled "Harry Potter Characters" displaying a grid of four characters: Harry Potter, Hermione Granger, Ron Weasley, and Draco Malfoy. Below each character is their name and house. The network tab in the developer tools shows 29 requests, with most being image files (e.g., harry.jpg, hermione.jpg) and one being the index file (potter-app/). The total transferred data is 7.5 KB.

The screenshot shows the same "Harry Potter Characters" application, but the images of the characters have been removed. The network tab shows the same 29 requests as the first screenshot, but the transferred data is significantly larger at 14.0 kB, indicating the cost of loading all those images.

How to Disable JavaScript

# Med JavaScript

# Uden JavaScript

```
...<!DOCTYPE html> == $0
<html lang="en">
  ><head> ...
  ><body>
    ><header> ...
    ><main>
      <section id="characters" class="grid-container"></section> grid
    </main>
    ><dialog id="dialog-character"> ...
    ><footer> ...
      <script src="app.js"></script>
    </body>
</html>
```

# DOM

```
<html lang="en">  
  
<head>  
  <meta charset="UTF-8">  
  <meta http-equiv="X-UA-Compatible" content="IE=edge">  
  <meta name="viewport" content="width=device-width, initial-scale=1.0">  
  <link rel="stylesheet" href="app.css">  
  <link rel="shortcut icon" href="https://cederdorff.github.io/img/favicon.webp" type="image/x-icon">  
  <title>Harry Potter Characters</title>  
</head>  
  
<body>  
  <header>  
    <h1>Harry Potter Characters</h1>  
  </header>  
  <main>  
    <section id="characters" class="grid-container">  
      <article>  
          
        <h2>Harry Potter</h2>  
        <p>Gryffindor</p>  
      </article>  
  
      <article>  
          
        <h2>Hermione Granger</h2>  
        <p>Gryffindor</p>  
      </article>  
  
      <article>  
          
        <h2>Ron Weasley</h2>  
        <p>Gryffindor</p>  
      </article>  
  
      <article>  
          
        <h2>Draco Malfoy</h2>  
        <p>Slytherin</p>  
      </article>  
    </section>  
  </main>  
</body>
```

# Source Code (HTML)

```
<!DOCTYPE html>  
<html lang="en">  
  
<head>  
  <meta charset="UTF-8">  
  <meta http-equiv="X-UA-Compatible" content="IE=edge">  
  <meta name="viewport" content="width=device-width, initial-scale=1.0">  
  <link rel="stylesheet" href="app.css">  
  <link rel="shortcut icon" href="https://cederdorff.github.io/img/favicon.webp" type="image/x-icon">  
  <title>Harry Potter Characters</title>  
</head>  
  
<body>  
  <header>  
    <h1>Harry Potter Characters</h1>  
  </header>  
  <main>  
    <section id="characters" class="grid-container"></section>  
  </main>  
  
  <dialog id="dialog-character">...</dialog>  
  <footer>  
    <p>Potter App by RACE</p>  
  </footer>  
  
<script src="app.js"></script>  
</body>
```

# The DOM

“

The Document Object Model (DOM) is a programming interface for web documents.

It represents the page so that programs can change the document structure, style, and content.

”

[https://developer.mozilla.org/en-US/docs/Web/API/Document\\_Object\\_Model/Introduction](https://developer.mozilla.org/en-US/docs/Web/API/Document_Object_Model/Introduction)

## Source Code (HTML)

The browser fetches the source code (HTML).

When the source code is loaded the browser creates The HTML DOM.

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <link rel="stylesheet" href="app.css">
  <link rel="shortcut icon" href="https://cederdorff.github.io/img/favicon.ico">
  <title>Harry Potter Characters</title>
</head>

<body>
  <header>
    <h1>Harry Potter Characters</h1>
  </header>
  <main>
    <section id="characters" class="grid-container"></section>
  </main>

  <dialog id="dialog-character">...
  </dialog>
  <footer>
    <p>Potter App by RACE</p>
  </footer>

  <script src="app.js"></script>
</body>
```

# DOM

```
<html lang="en">

<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <link rel="stylesheet" href="app.css">
  <link rel="shortcut icon" href="https://cederdorff.github.io/img/favicon.webp" type="image/x-icon">
  <title>Harry Potter Characters</title>
</head>

<body>
  <header>
    <h1>Harry Potter Characters</h1>
  </header>
  <main>
    <section id="characters" class="grid-container">
      <article>
        
        <h2>Harry Potter</h2>
        <p>Gryffindor</p>
      </article>

      <article>
        
        <h2>Hermione Granger</h2>
        <p>Gryffindor</p>
      </article>

      <article>
        
        <h2>Ron Weasley</h2>
        <p>Gryffindor</p>
      </article>

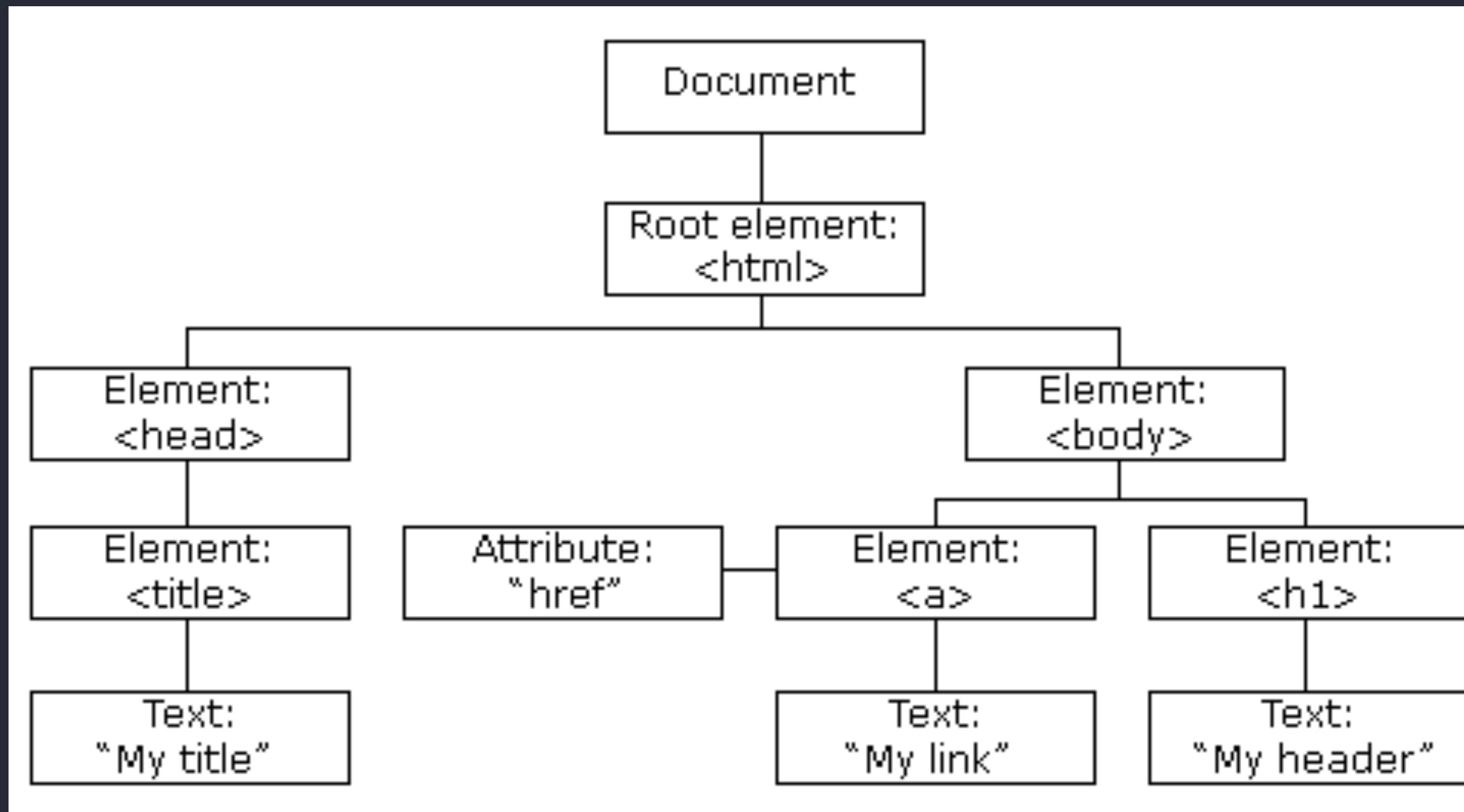
      <article>
        
        <h2>Draco Malfoy</h2>
        <p>Slytherin</p>
      </article>

      <article>
        
```

The DOM is represent the updated version of the (page) content, which can be updated and manipulated by JavaScript.

# The HTML DOM (Document Object Model)

A tree of objects



- Object Model for HTML:
  - HTML elements as objects
  - Properties for all HTML elements
  - Methods for all HTML elements
  - Events for all HTML elements

```
1  <!DOCTYPE html>
2  <html>
3    <head>
4      <title>Page Title</title>
5      <link rel="stylesheet" href="styles.css" />
6    </head>
7    <body>
8      <h1>This is a Heading</h1>
9      <p>This is a paragraph.</p>
10     <button onclick="tryMe()">Try me</button>
11     <script src="app.js"></script>
12   </body>
13 </html>
14
```

# What is JavaScript?

.. is the world's most popular programming language.

... is the programming language of the Web.

... is easy to learn.

... can change content of a webpage (HTML content).

... can change styling of HTML.

```
1  function tryMe() {
2    document.body.style.backgroundColor = "red";
3    document.body.style.color = "white";
4  }
5
```

```
1  <!DOCTYPE html>
2  <html>
3      <head>
4          <title>Page Title</title>
5          <link rel="stylesheet" href="styles.css" />
6      </head>
7      <body>
8          <h1>This is a Heading</h1>
9          <p>This is a paragraph.</p>
10         <button onclick="tryMe()">Try me</button>
11         <script src="app.js"></script>
12     </body>
13 </html>
```

# With JavaScript we are able to

... build dynamic web pages and web apps.

... fetch content/ data from a backend (web service, data source, etc. ) through an API.

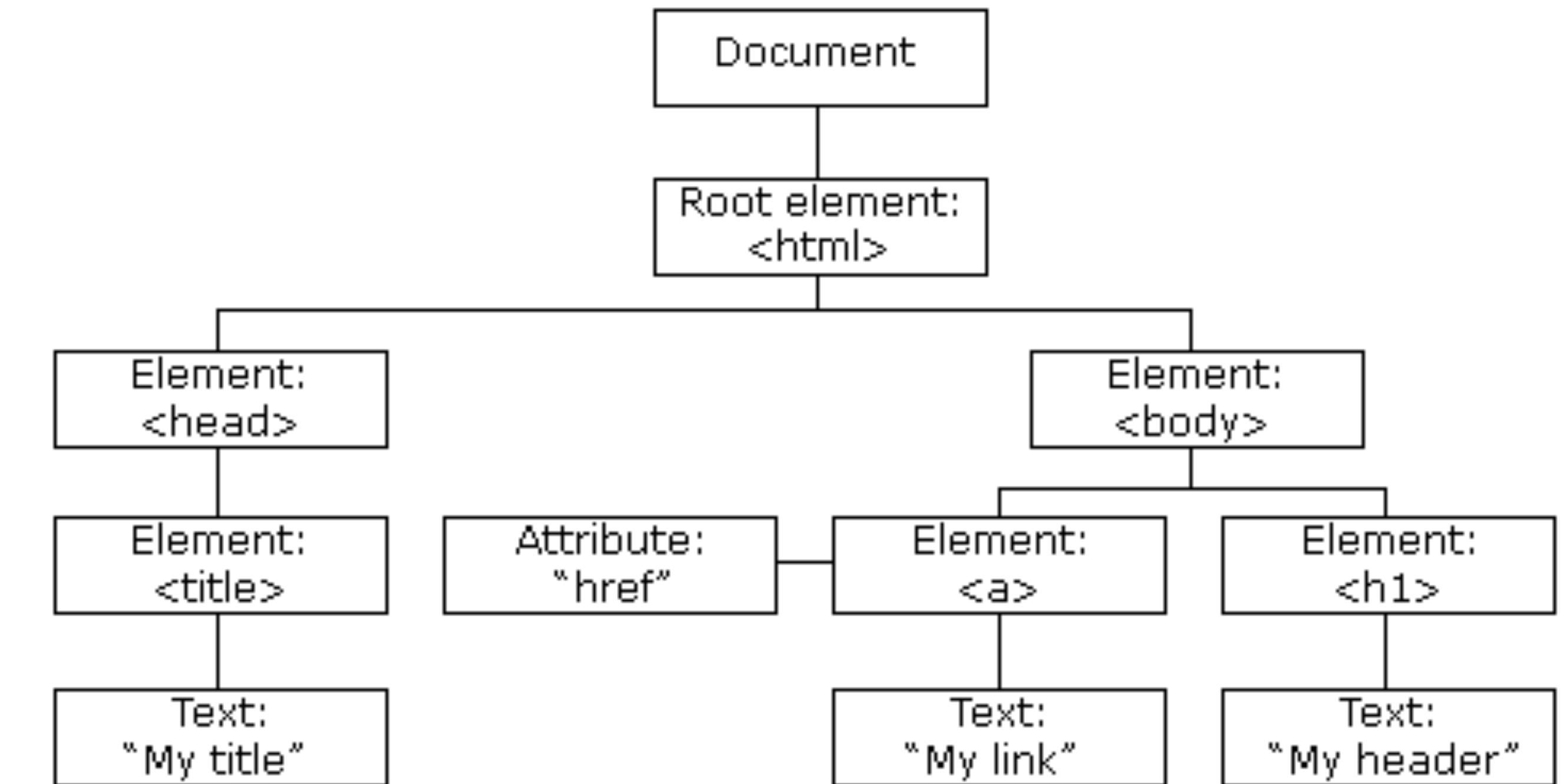
```
1  function tryMe() {
2      document.body.style.backgroundColor = "red";
3      document.body.style.color = "white";
4  }
5
```

... do DOM-manipulation.

... build and develop anything 

# JavaScript HTML DOM

```
index.html ×  
1  <!DOCTYPE html>  
2  <html>  
3  | <head>  
4  | | <title>My title</title>  
5  | </head>  
6  |  
7  <body>  
8  | | <h1>My header</h1>  
9  | | <a href="https://cederdorff.com">My link</a>  
10 | </body>  
11 |  
12 </html>
```



[https://www.w3schools.com/js/js\\_htmldom.asp](https://www.w3schools.com/js/js_htmldom.asp)  
<https://javascript.info/dom-nodes>  
<https://javascript.info/dom-navigation>

# JavaScript HTML DOM

## Document Object Model

```
index.html ×  
1  <!DOCTYPE html>  
2  <html>  
3  |   <head>  
4  |   |   <title>My title</title>  
5  |   </head>  
6  
7  <body>  
8  |   <h1>My header</h1>  
9  |   <a href="https://cederdorff.com">My link</a>  
10 |</body>  
11 </html>  
12
```

The HTML document as an object

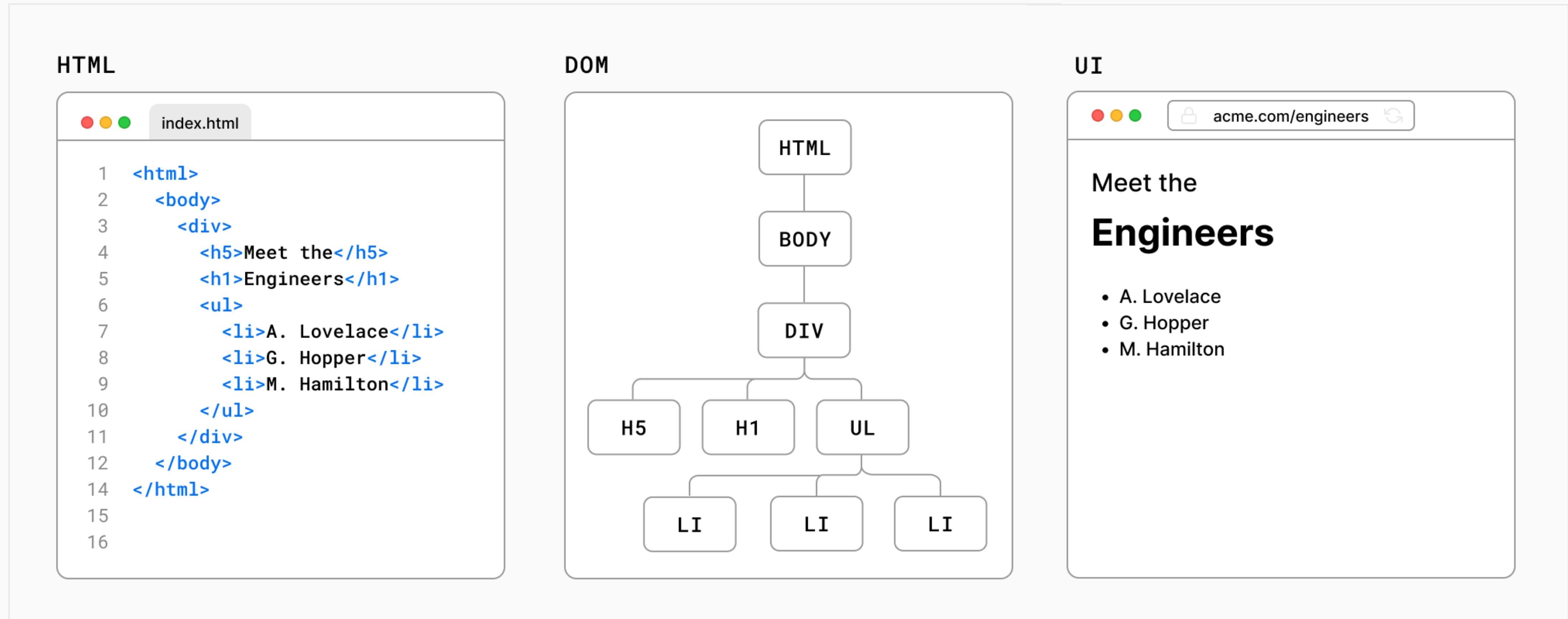
Gives us the power to create dynamic HTML and manipulate with the HTML (the DOM).

JavaScript can:

- ... change all the HTML elements in the page*
- ... change all the HTML attributes in the page*
- ... change all the CSS styles in the page*
- ... remove existing HTML elements and attributes*
- ... add new HTML elements and attributes*
- ... react to all existing HTML events in the page*
- ... create new HTML events in the page*

[https://www.w3schools.com/js/js\\_htmldom.asp](https://www.w3schools.com/js/js_htmldom.asp)  
<https://javascript.info/dom-nodes>  
<https://javascript.info/dom-navigation>

# Example?



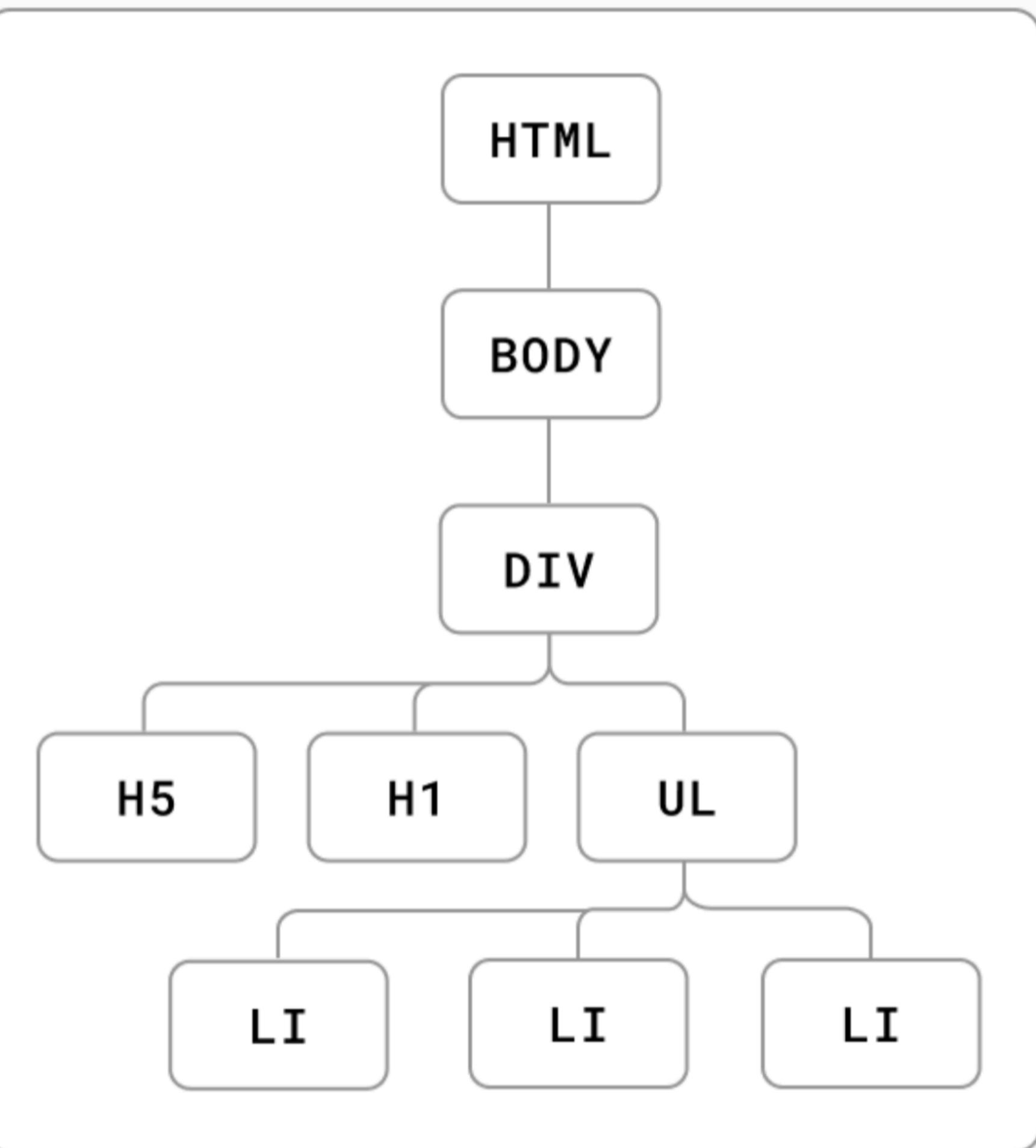
When a user visits a web page, the server returns an HTML file to the browser that may look like this:

## HTML

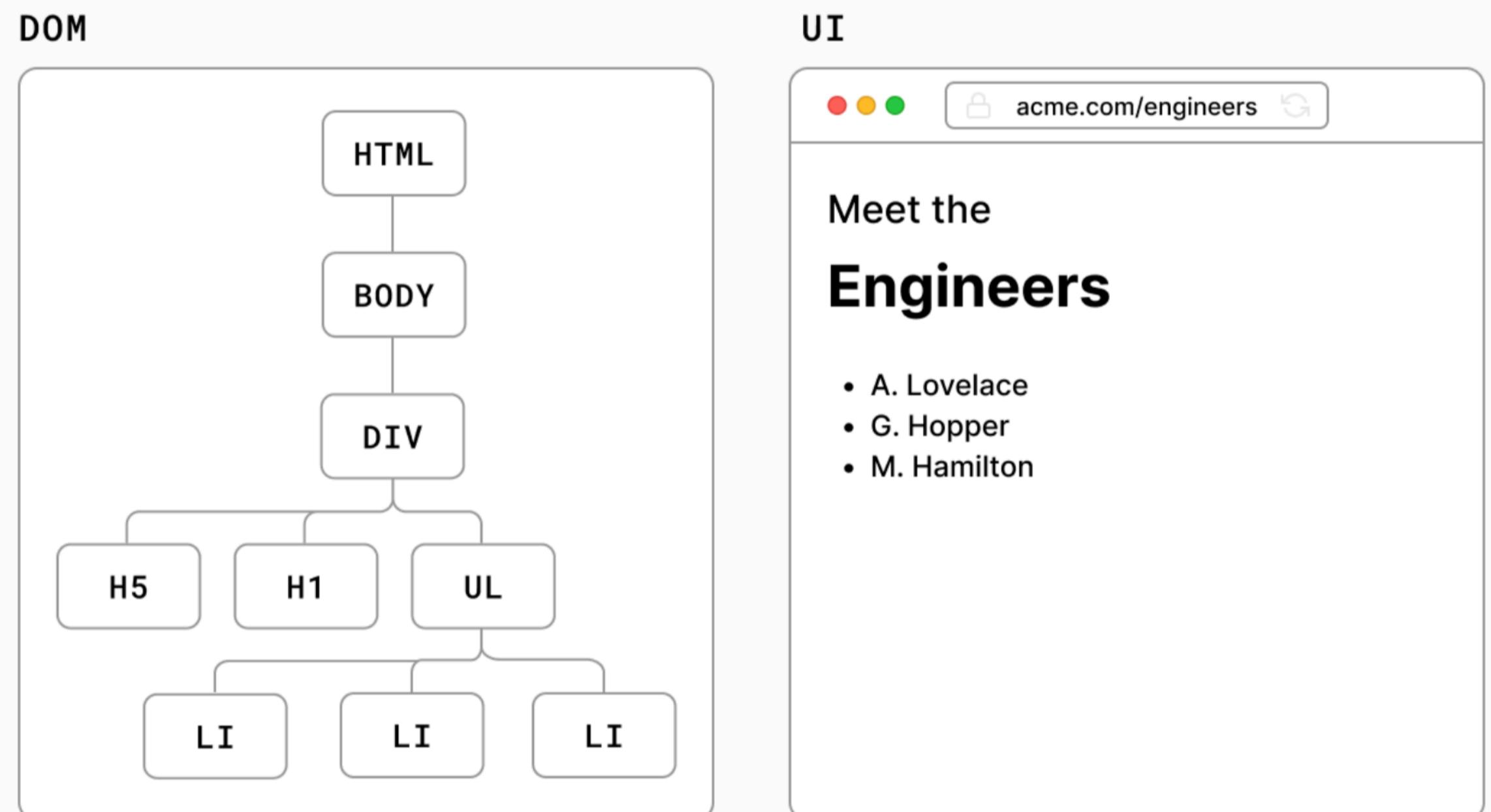
```
index.html  
1 <html>  
2   <body>  
3     <div>  
4       <h5>Meet the</h5>  
5       <h1>Engineers</h1>  
6       <ul>  
7         <li>A. Lovelace</li>  
8         <li>G. Hopper</li>  
9         <li>M. Hamilton</li>  
10        </ul>  
11      </div>  
12    </body>  
14  </html>  
15  
16
```

The browser then reads the HTML and constructs the Document Object Model (DOM).

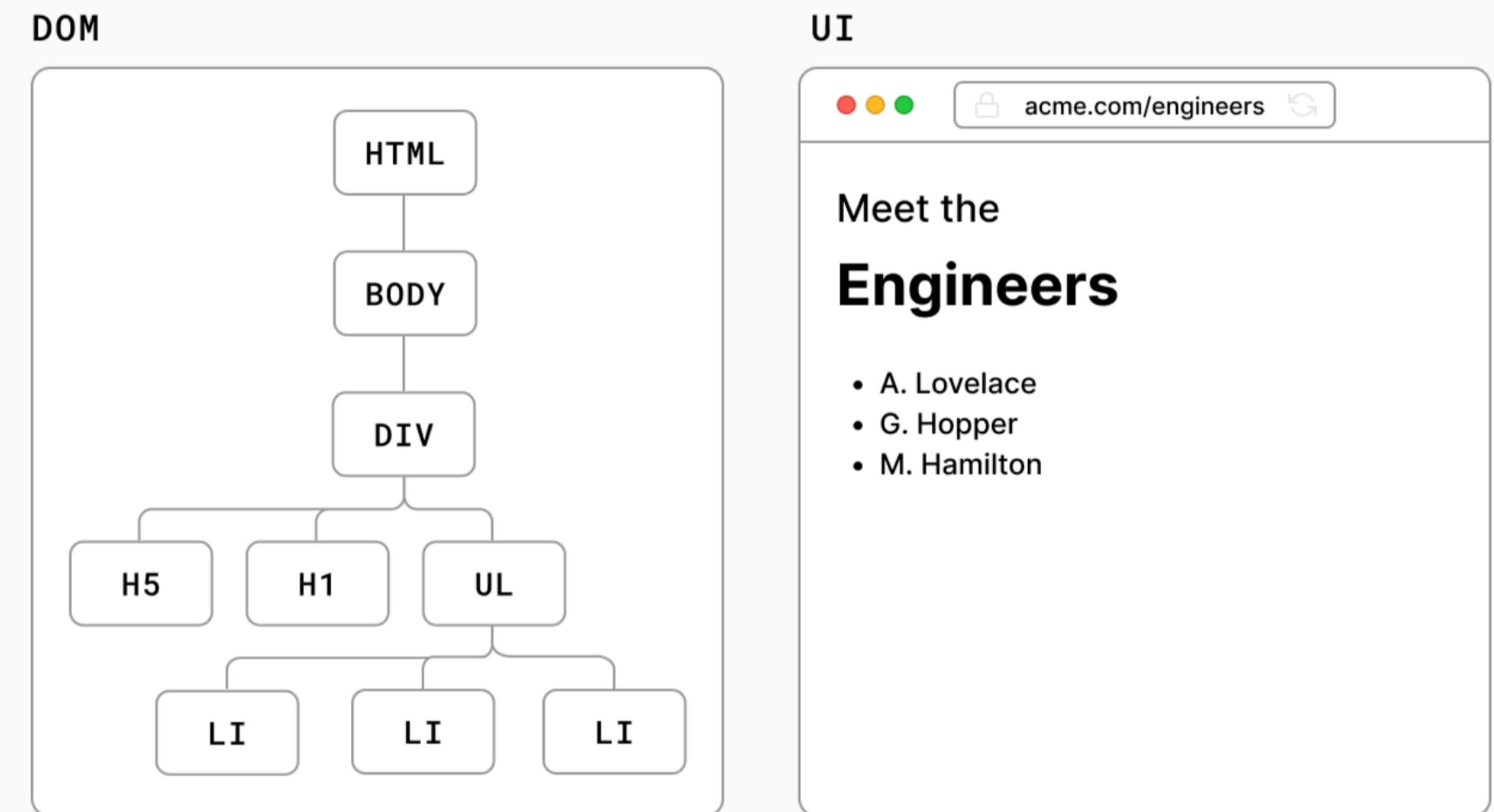
DOM



The DOM is an object representation of the HTML elements. It acts as a bridge between your code and the user interface, and has a tree-like structure with parent and child relationships.



You can use DOM methods and a programming language, such as JavaScript, to listen to user events and manipulate the DOM by selecting, adding, updating, and deleting specific elements in the user interface. DOM manipulation allows you to not only target specific elements, but also change their style and content.



# Updating the UI with JavaScript and DOM Methods

```
// Create a new H1 element
const header = document.createElement("h1");

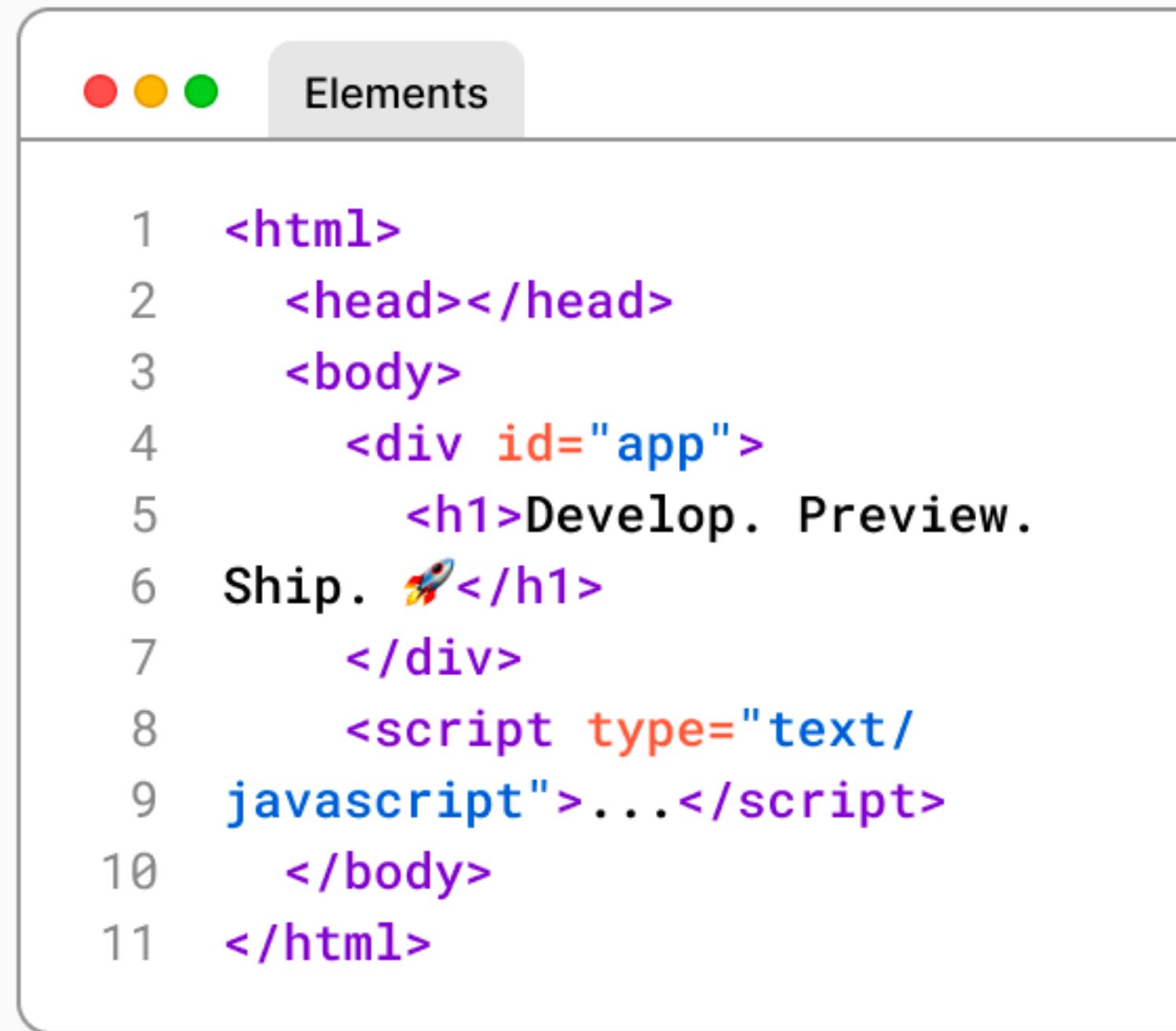
// Add content to H1 element
header.textContent = "Develop. Preview. Ship. 🚀";

// add the newly created element into the DOM
document.querySelector("body").appendChild(header);
```

Let's try  
it out!

# DOM VS Source Code

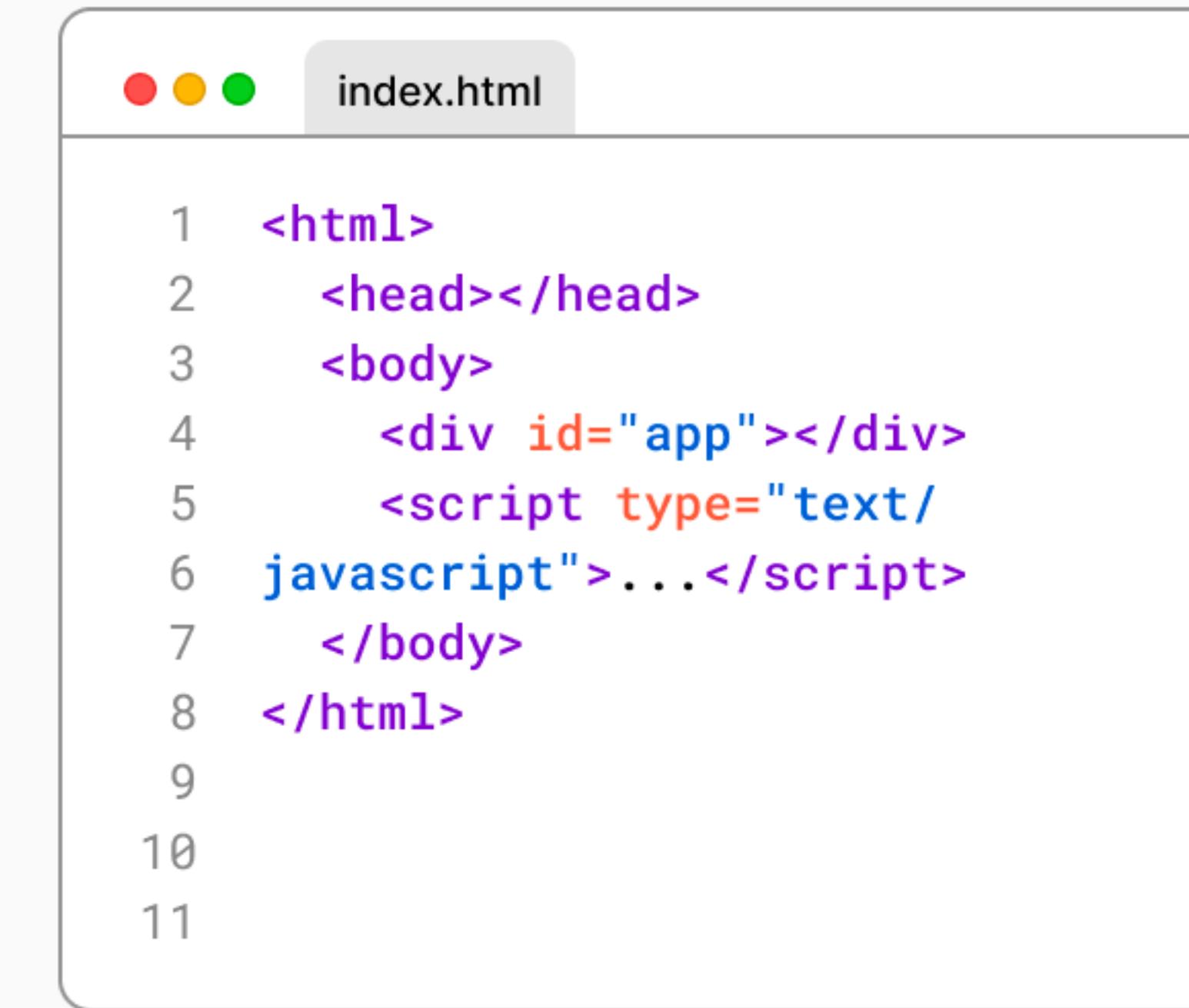
DOM



The screenshot shows the DOM tab of a browser's developer tools. It displays a tree structure of HTML elements. At the top is the <html> element, followed by <head> and <body>. Inside the body, there is a <div id="app"> element, which contains an <h1> element with the text "Develop. Preview. Ship. 🚀". Below the <h1> is another <div> element, which contains a script tag with type="text/javascript". The script tag contains some code and ends with "...</script>". The entire structure is enclosed in a <body> tag, which is itself enclosed in a <html> tag.

```
1 <html>
2   <head></head>
3   <body>
4     <div id="app">
5       <h1>Develop. Preview.
6       Ship. 🚀</h1>
7       </div>
8       <script type="text/
9 javascript">...</script>
10      </body>
11    </html>
```

SOURCE CODE (HTML)



The screenshot shows the Source Code tab of a browser's developer tools. It displays the raw HTML source code of the file index.html. The code is identical to the DOM structure shown in the previous screenshot, with minor differences in line numbers and styling. The <script> tag is explicitly named with type="text/javascript". The entire structure is enclosed in a <html> tag, followed by <head>, <body>, and the <div id="app"> containing the <h1> and script tags.

```
1 <html>
2   <head></head>
3   <body>
4     <div id="app"></div>
5     <script type="text/
6 javascript">...</script>
7   </body>
8 </html>
9
10
11
```

# DOM Manipulation

“

When you use JavaScript to  
add, remove, and modify  
elements of a website

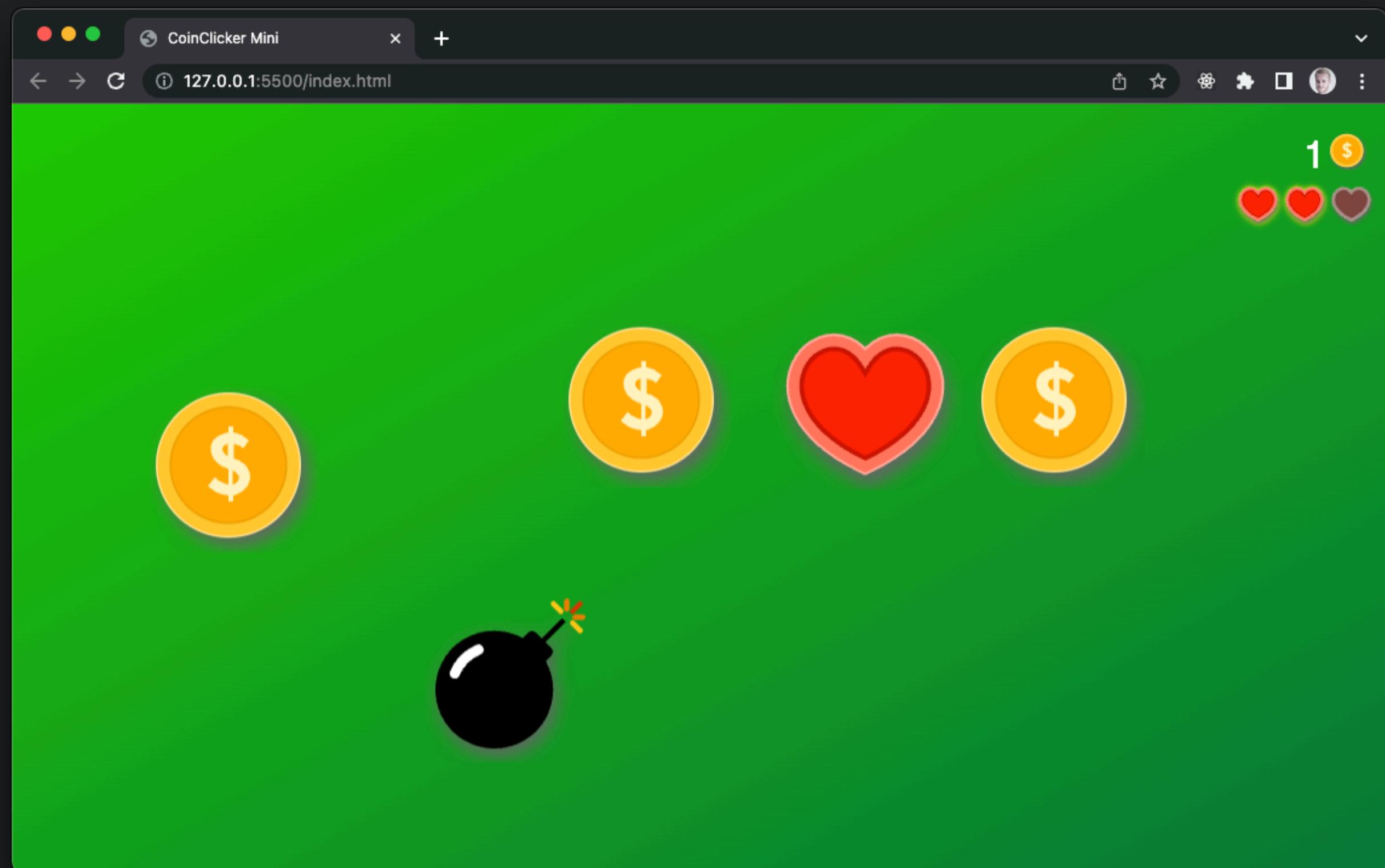
”

- document.querySelector(selector)
- document.querySelectorAll(name)
- document.createElement(name)
- parentNode.appendChild(node)
- element.append(node, node, ...)
- element.insertAdjacentHTML(position, html)
- element.innerHTML
- element.textContent
- element.style.xxx
- element.setAttribute()
- element.getAttribute()
- element.addEventListener()
- element.classList
- window.content
- Window.onload
- window.scrollTo()

# Methods for DOM Manipulation

Common Methods

# I Clicker-spillet?



# DOM Manipulation

```
let fullName = "Peter Lind";
console.log(fullName);
document.querySelector("#fullName_container").textContent = fullName;
```

```
<body>
  <header>
    <h1 id="fullName_container"></h1>
  </header>
  <script src="app.js"></script>
</body>
```



# DOM Manipulation

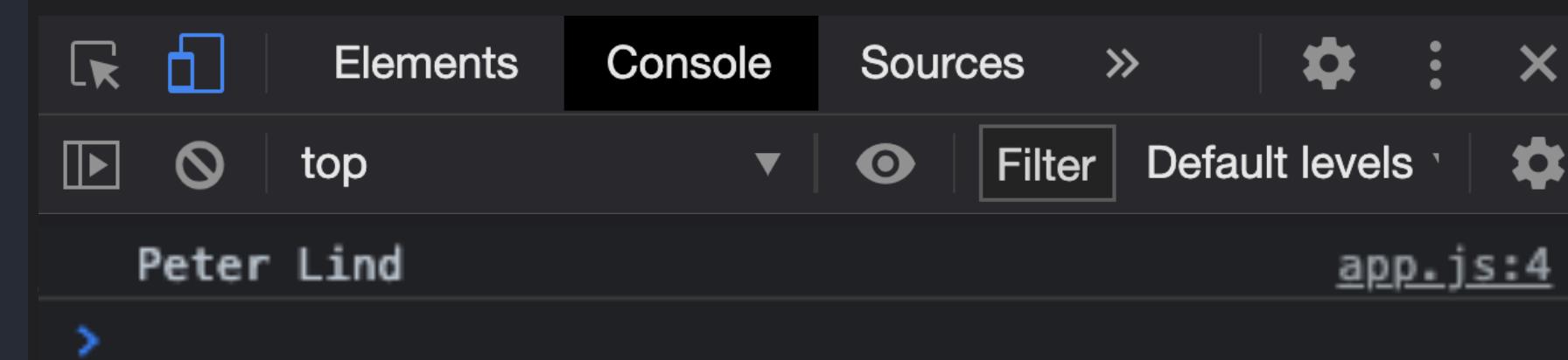
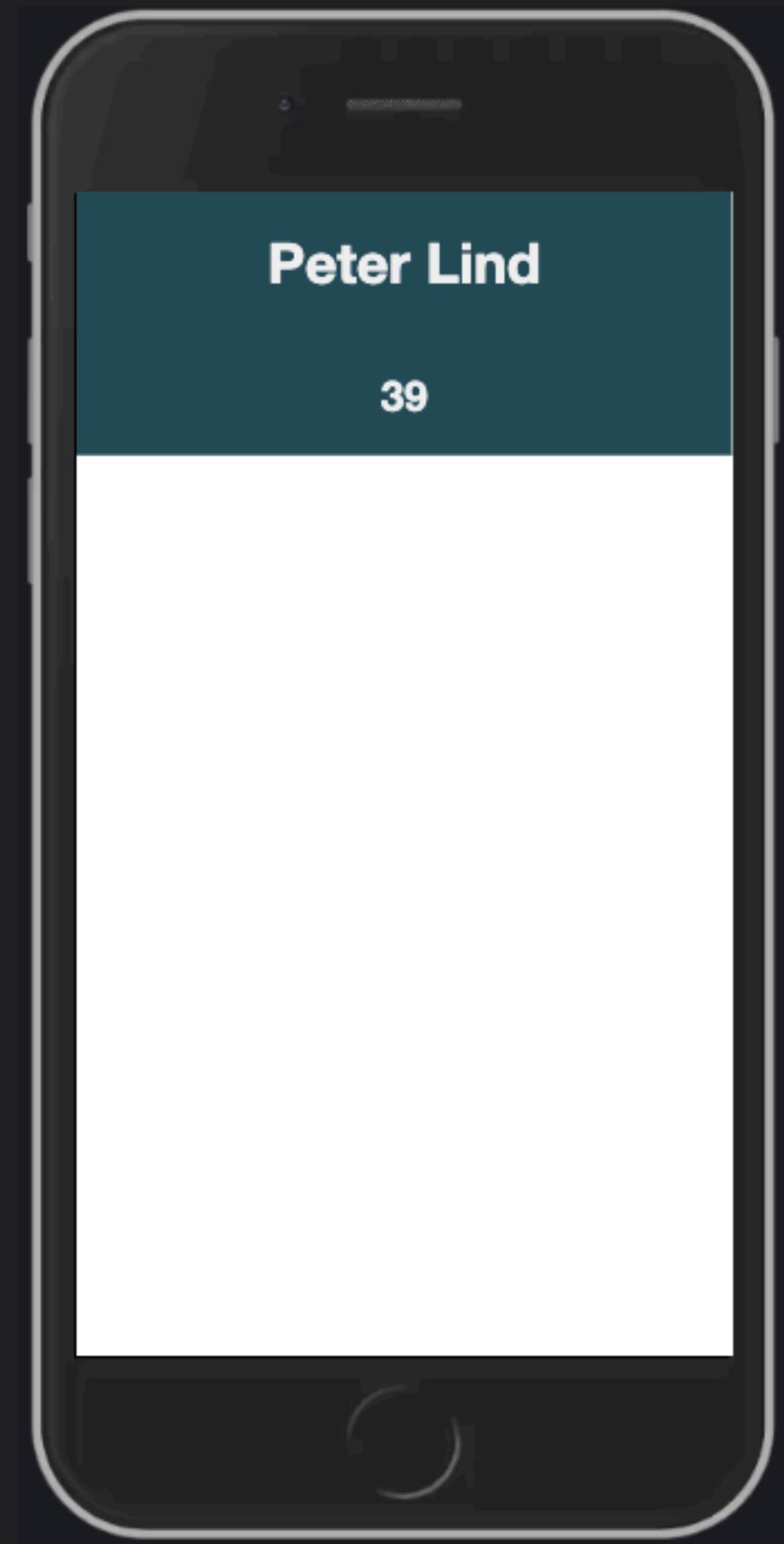
```
let fullName = "Peter Lind";
console.log(fullName);
document.querySelector("#fullName_container").textContent = fullName;
```

## .textContent

Get or set the text content of a given (HTML) element

# Variables & UI

```
let fullName = "Peter Lind";
let age = 39;
console.log(fullName, age);
document.querySelector("#fullName_container").textContent = fullName;
document.querySelector("#age_container").textContent = age;
```



# DOM Manipulation

```
let fullName = "Peter Lind";
let age = 39;

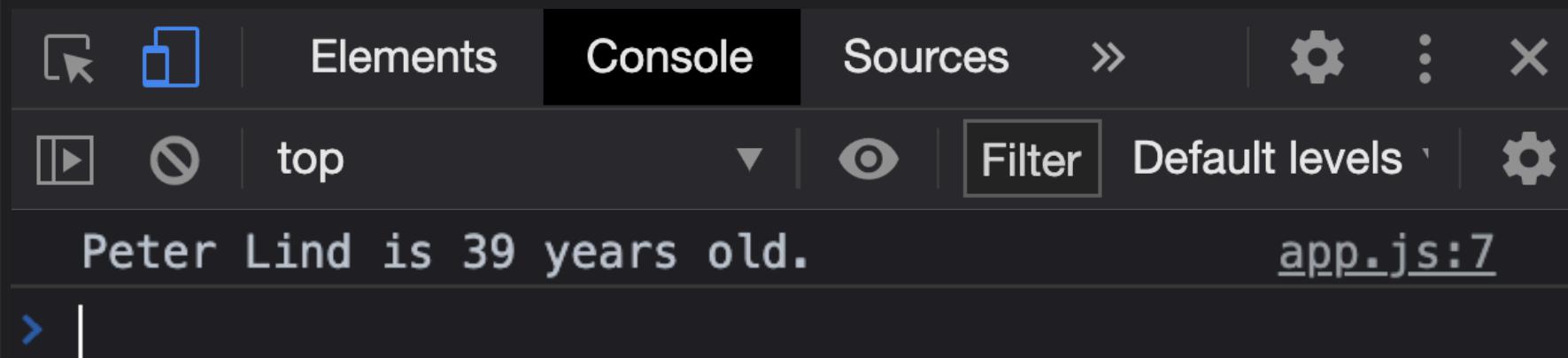
let message = `${fullName} is ${age} years old.`;
console.log(message);
document.querySelector("#message_container").textContent = message;
```

```
<body>
  <main>
    <p id="message_container"></p>
  </main>
  <script src="app.js"></script>
</body>
```

# DOM Manipulation

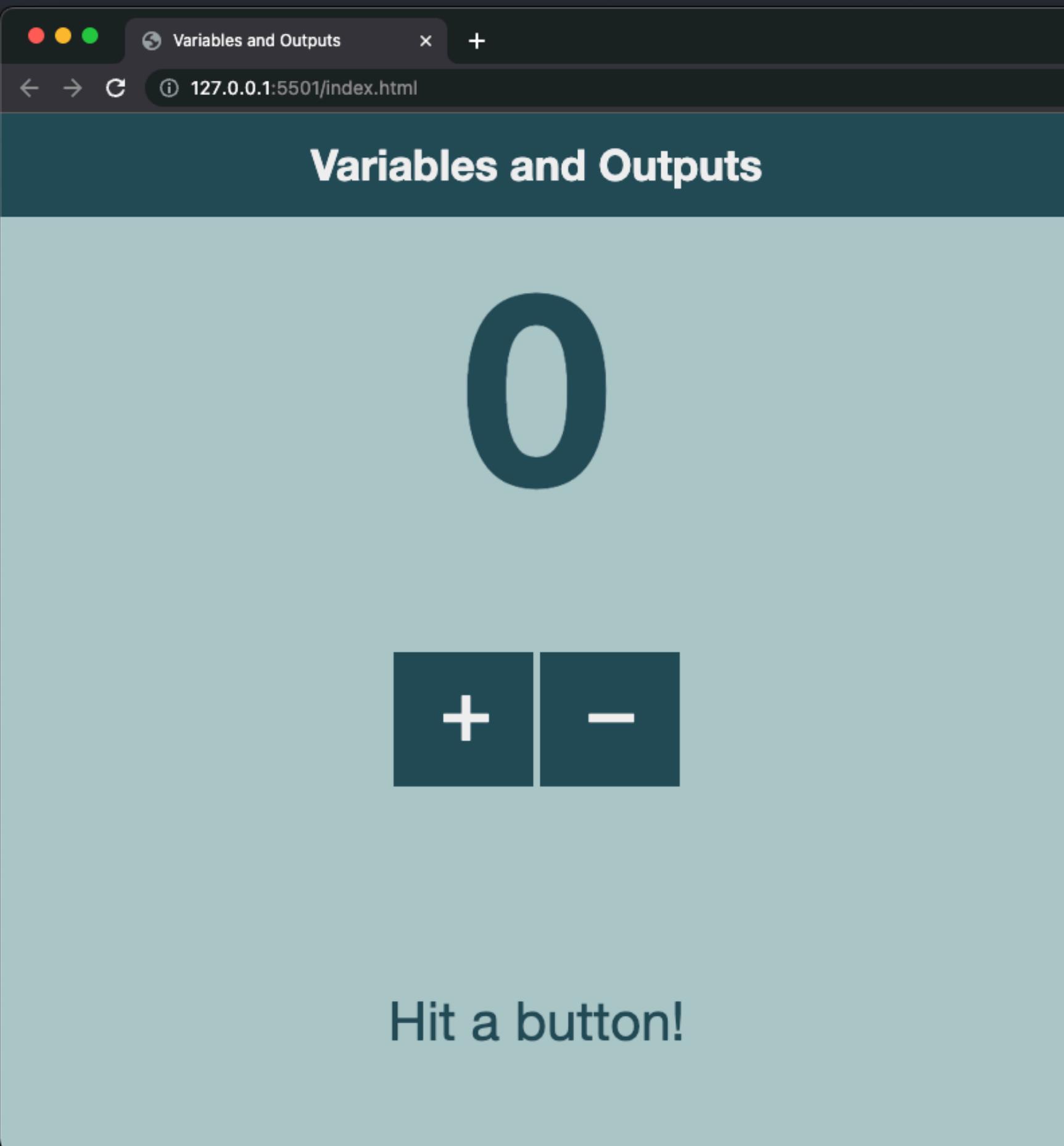
```
let fullName = "Peter Lind";
let age = 39;

let message = `${fullName} is ${age} years old.`;
console.log(message);
document.querySelector("#message_container").textContent = message;
```

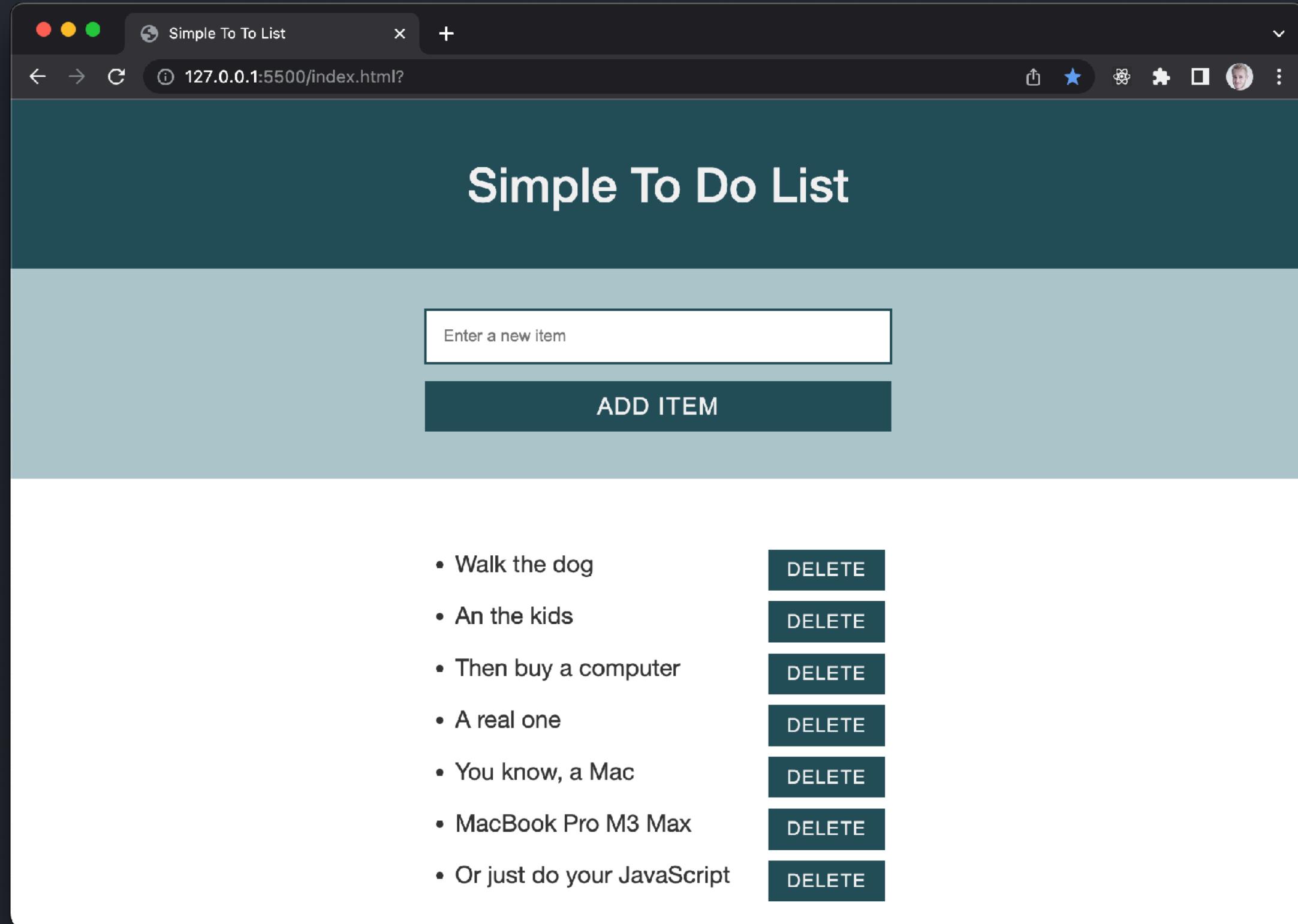


# Udskrive til DOM'en

```
let variableName = 0;  
variableName++; //lægger 1 til den nuværende værdi  
variableName--; //trækker 1 fra den nuværende værdi  
variableName += x; //lægger værdien x til den nuværende værdi  
variableName -= x; //trækker værdien x fra den nuværende værdi  
  
document.querySelector("#mitElement").textContent = variableName;
```



Hit a button!



# DOM Manipulation

## Simple To Do List

[Link til øvelse](#)

# document.createElement()

```
// create a new h1 element
const newTitle = document.createElement("h1");

// and give it some content
newTitle.textContent = "Hi there and greetings!";

// add the newly created element into the DOM
document.querySelector("body").appendChild(newTitle);
```

## .createElement

Creates an HTML element specified by tagName.

## .appendChild

Appends an element as last child of an element.

# insertAdjacentHTML(position, html)

```
// 1

// create a new h1 with content using a backtick
const newTitle = /*html*/ `<h1>Hi there and greetings!</h1>`;

// add the newly created element into the DOM
document.querySelector("body").insertAdjacentHTML("beforeend", newTitle);

// 2

// variable holding username
const username = "RACE";

// create a new p with content using a backtick and username variable
const newParagraph = /*html*/ `<p>Welcome, ${username}!</p>`;

// add the newly created element into the DOM
document.querySelector("body").insertAdjacentHTML("beforeend", newParagraph);
```

## Backtick string

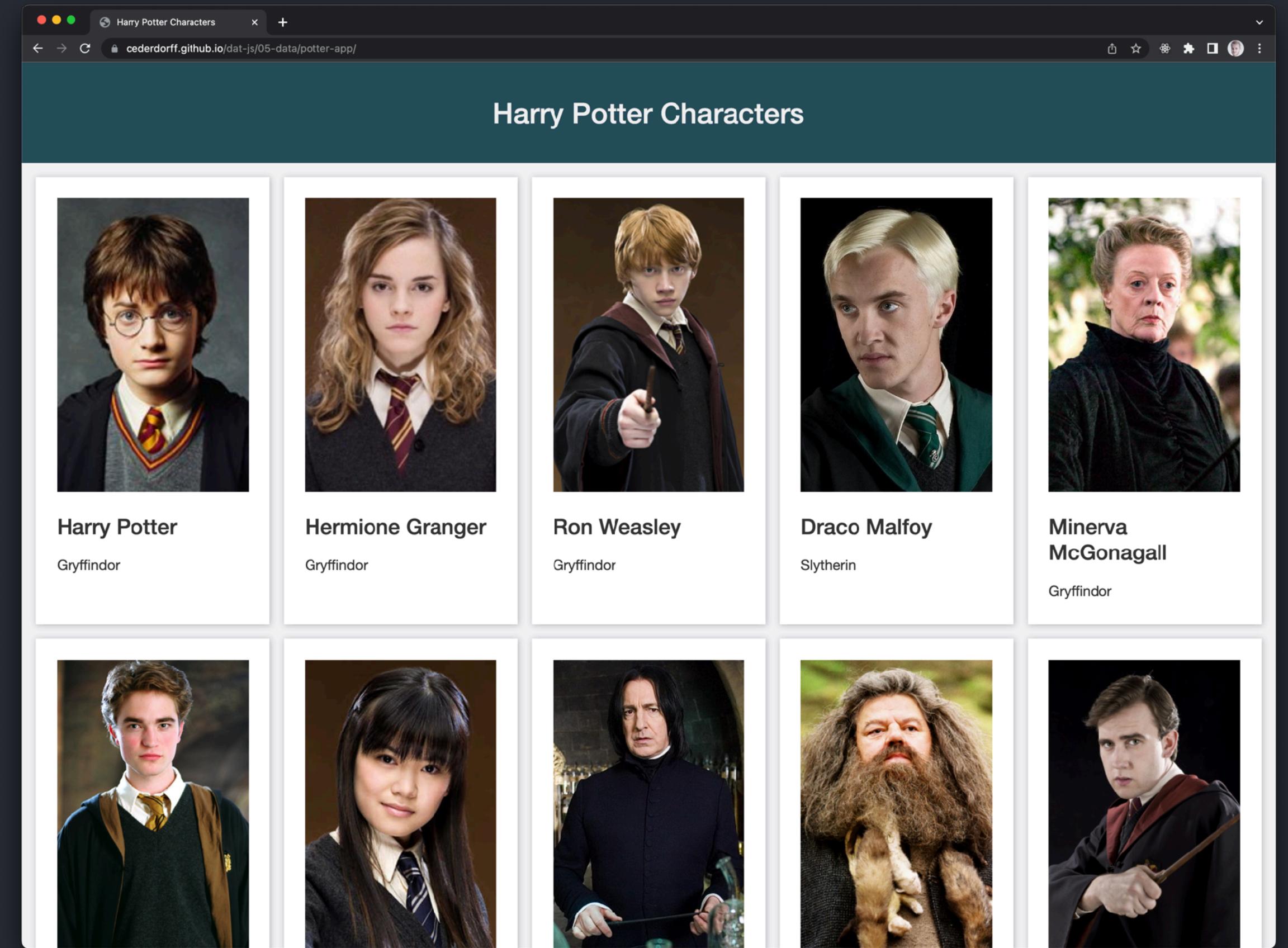
Create multiline strings (templates) with embedded expressions and tags.

## .insertAdjacentHTML

Inserts HTML into a specified position.

# DOM Manipulation Potter App

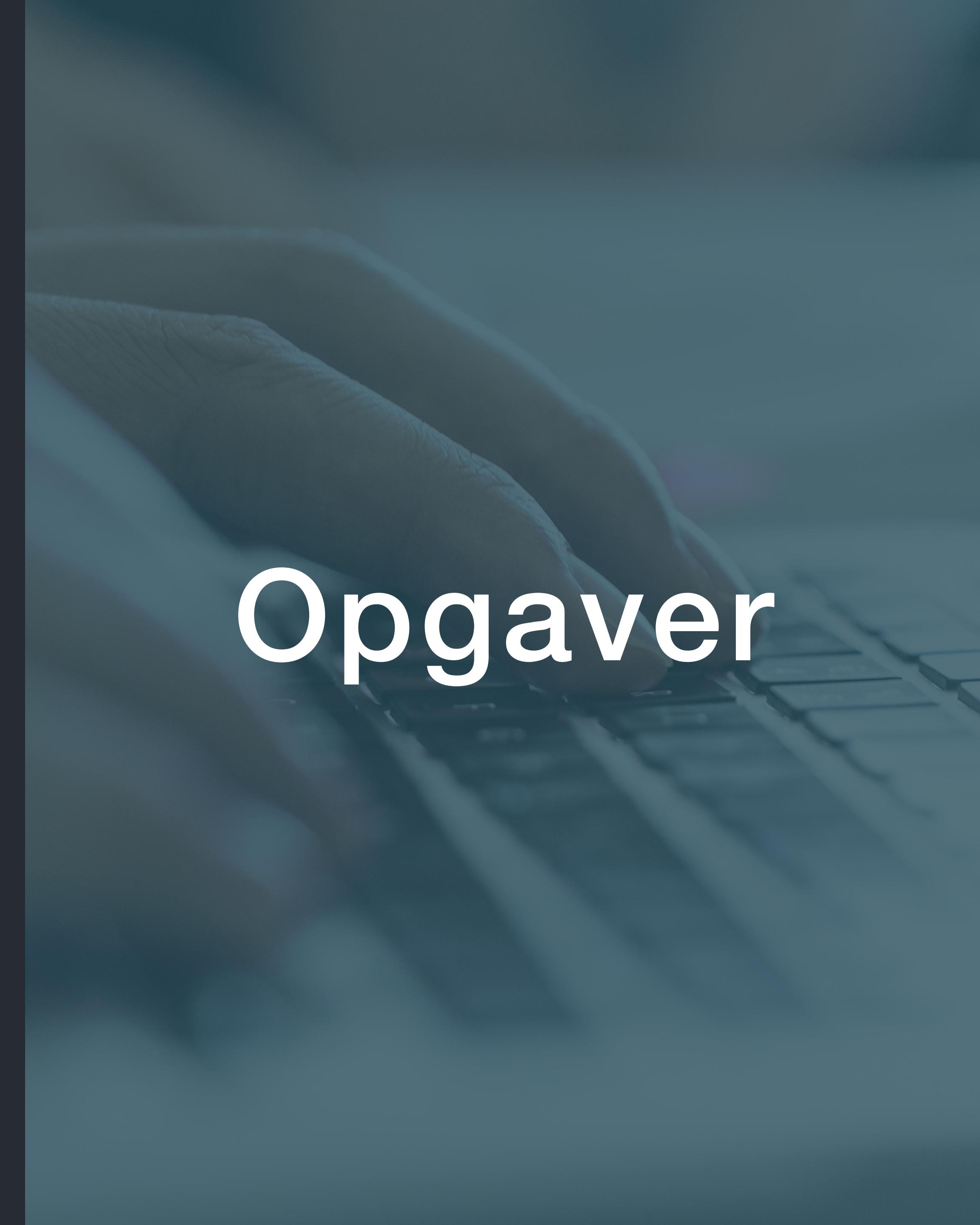
[Link til øvelse](#)



# The DOM & DOM Manipulation

- Manipulating documents: [https://developer.mozilla.org/en-US/docs/Learn/JavaScript/Client-side web APIs/Manipulating documents](https://developer.mozilla.org/en-US/docs/Learn/JavaScript/Client-side_web_APIs/Manipulating_documents)
- Introduction to the DOM: [https://developer.mozilla.org/en-US/docs/Web/API/Document Object Model/Introduction](https://developer.mozilla.org/en-US/docs/Web/API/Document_Object_Model/Introduction)
- Using the Document Object Model: [https://developer.mozilla.org/en-US/docs/Web/API/Document object model/Using the Document Object Model](https://developer.mozilla.org/en-US/docs/Web/API/Document_object_model/Using_the_Document_Object_Model)
- Modifying the document: <https://javascript.info/modifying-document>

- Simple To Do List
- DOM Manipulation - Potter App
- Ekstra:
  - Active learning: Basic DOM manipulation
  - Active learning: A dynamic shopping list



# Opgaver



Code  
Every  
Day