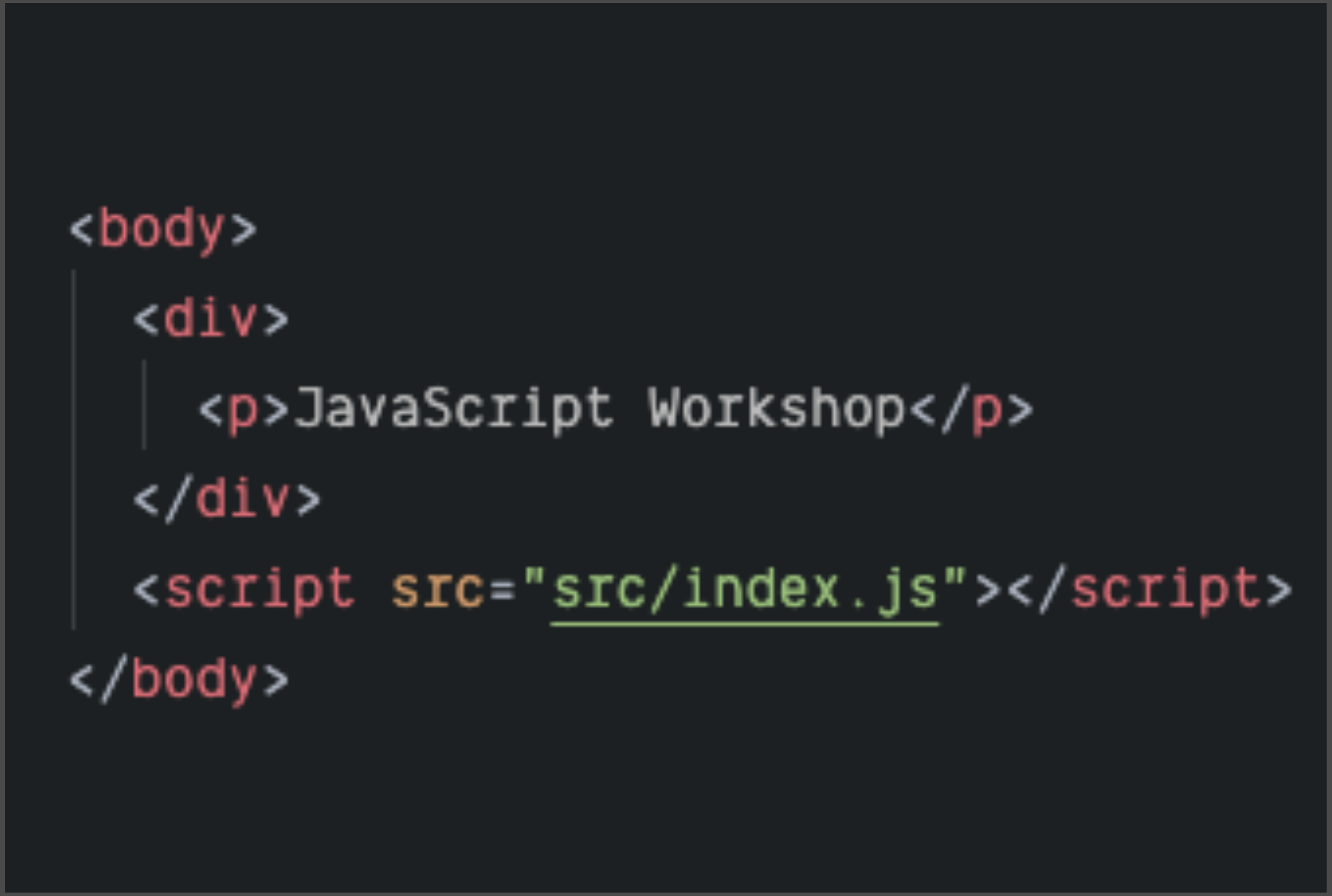
Jit Team & 3LO 2019-2020

JavaScript( )

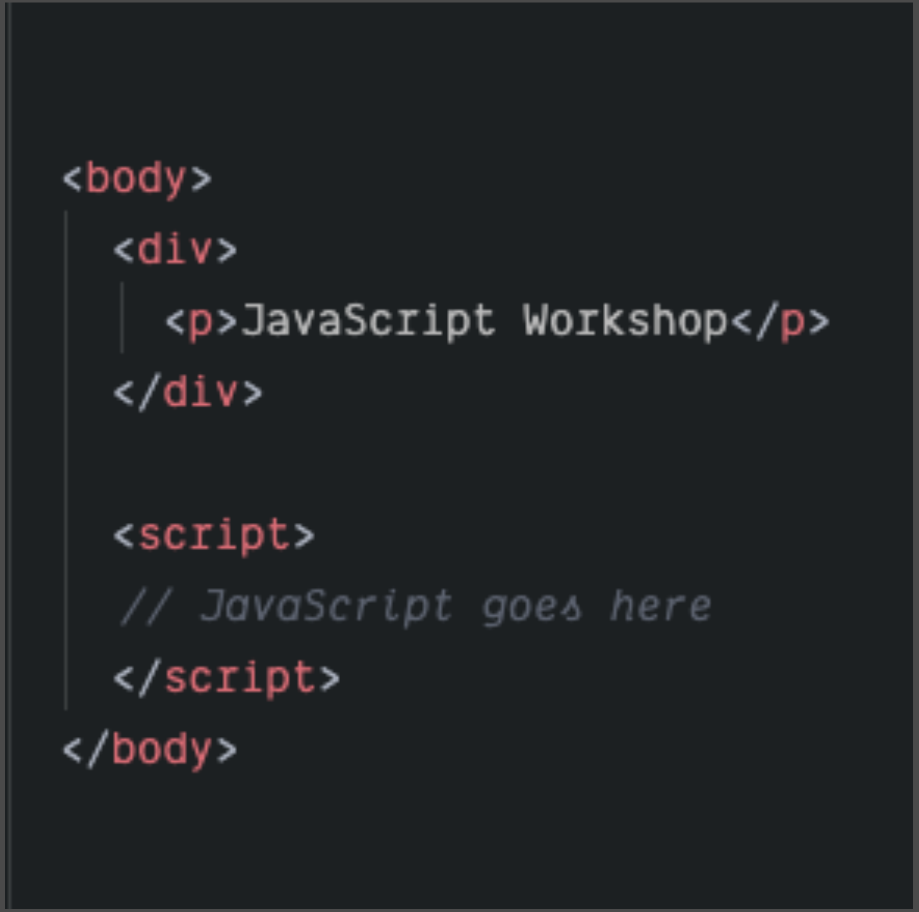
JavaScript definition

- Language of the web
- Dynamically typed
- Aside from websites it can be used for servers, mobile applications or even desktop software.

Adding JavaScript to a project



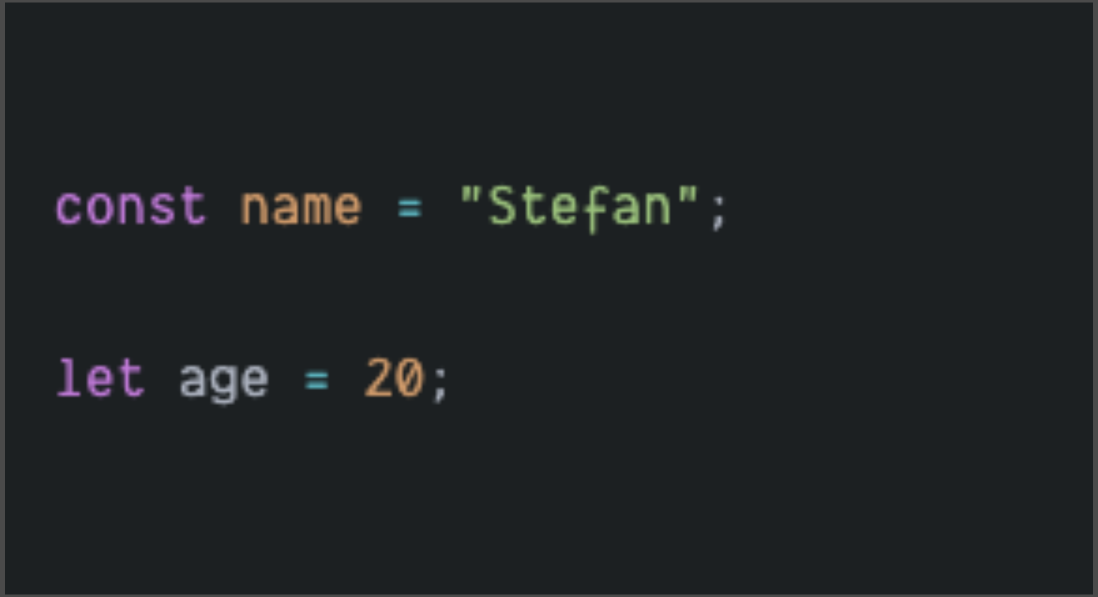
```
<body>
  <div>
    <p>JavaScript Workshop</p>
  </div>
  <script src="src/index.js"></script>
</body>
```



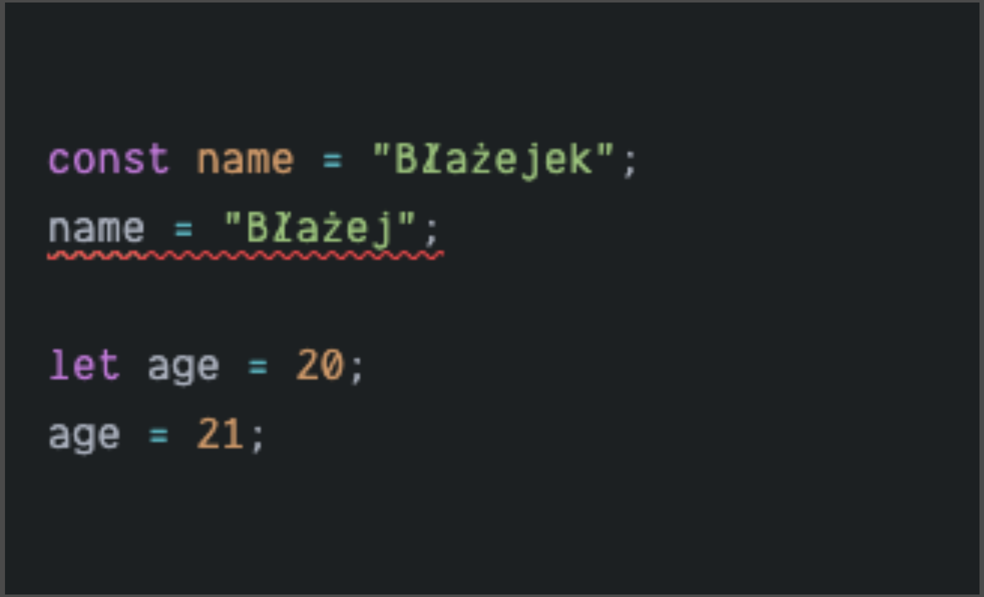
```
<body>
  <div>
    <p>JavaScript Workshop</p>
  </div>

  <script>
  // JavaScript goes here
  </script>
</body>
```

Data declaration and reassignment

- const – short for constant – it cannot be reassigned;
- let – short for let x be equal y – it can be reassigned;



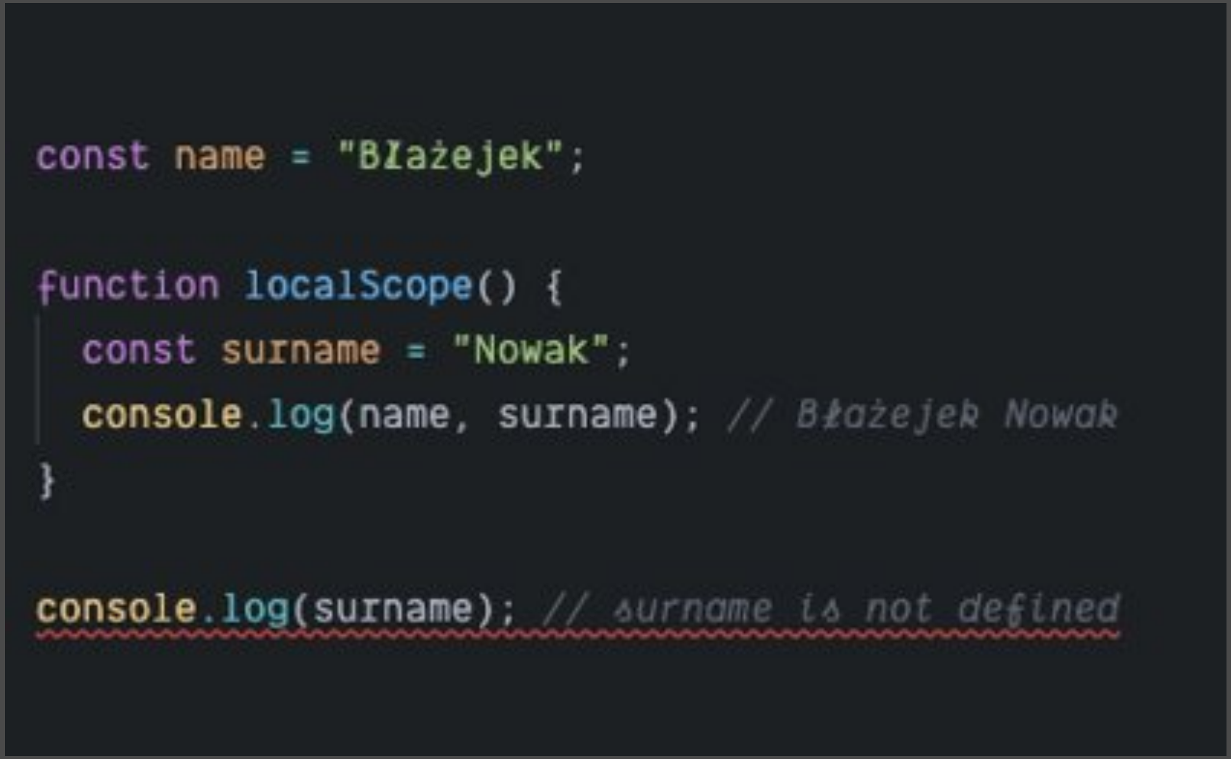
```
const name = "Stefan";

let age = 20;
```



```
const name = "Błażejek";
name = "Błażej";

let age = 20;
age = 21;
```

Scope

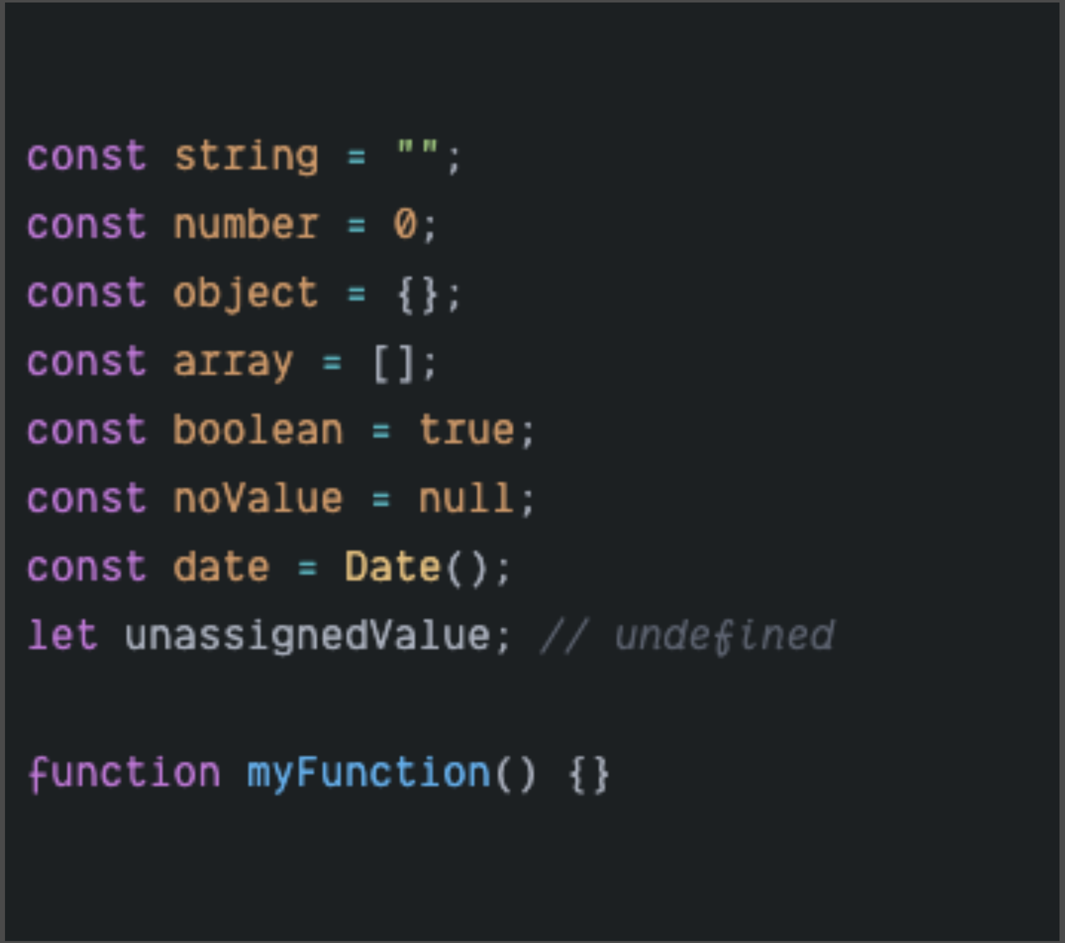
- Both const and let are block-scoped
- Block-scope is defined by curly braces {}
- Scope works up but not down



```
const name = "Błażejek";

function localScope() {
  const surname = "Nowak";
  console.log(name, surname); // Błażejek Nowak
}

console.log(surname); // surname is not defined
```

Data types

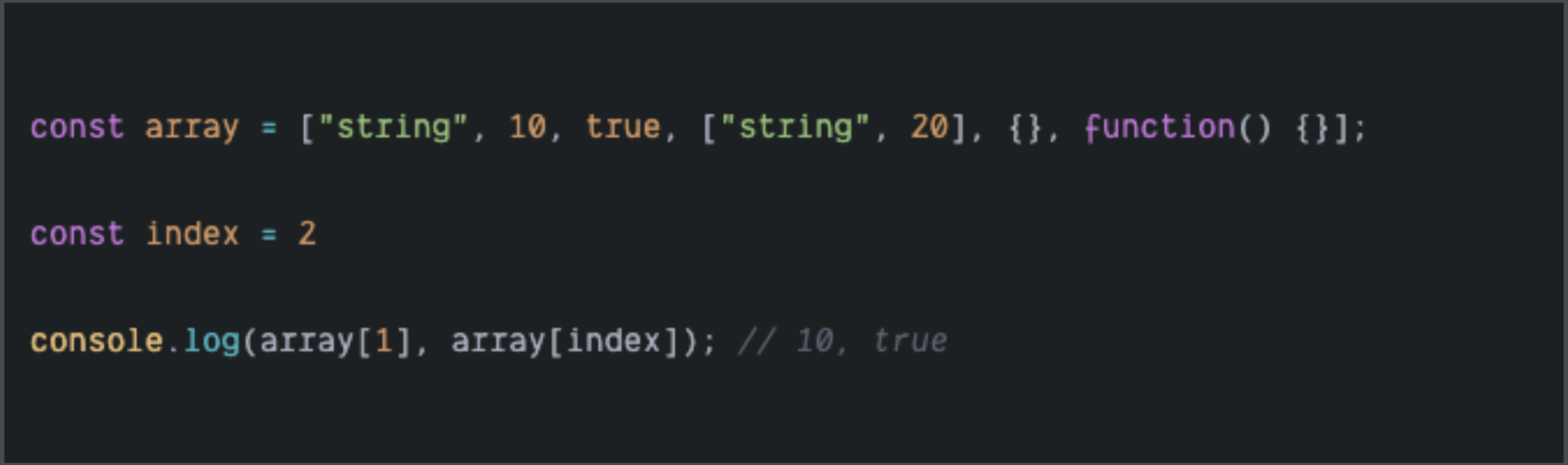
- String
- Number
- Function
- Date
- Boolean – true / false
- Null – for no value
- Undefined – for unassigned values
- Object – complex data structures
- Array – list of values



```
const string = "";
const number = 0;
const object = {};
const array = [];
const boolean = true;
const noValue = null;
const date = Date();
let unassignedValue; // undefined

function myFunction() {}
```

Array

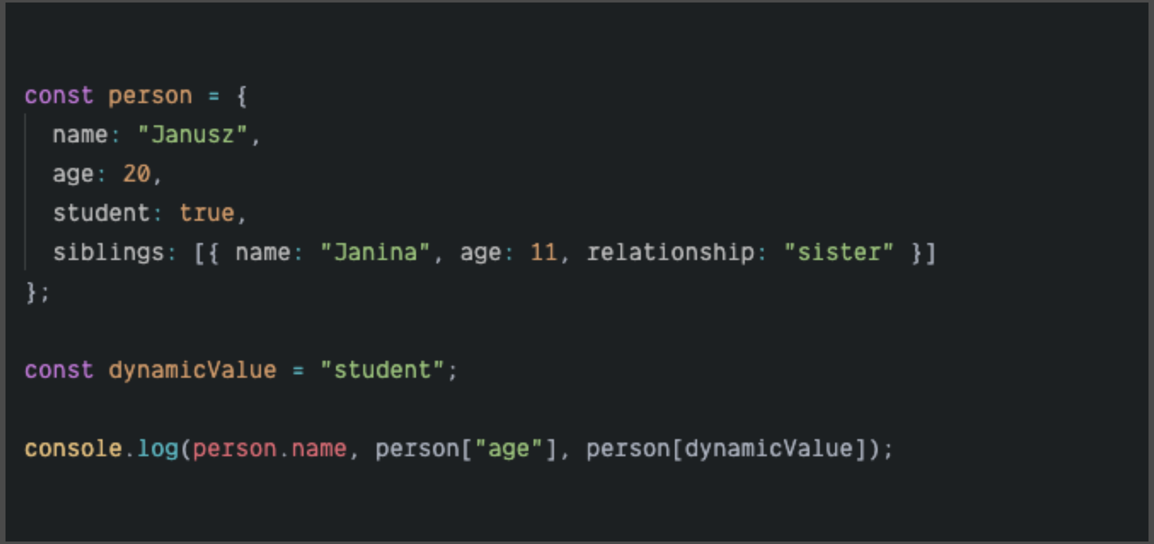
- List of values
- Represented by 0-based index
- Can contain any other type of data including other arrays
- Eah value in the array can be accessed via square bracket notation []



```
const array = ["string", 10, true, ["string", 20], {}, function() {}];

const index = 2

console.log(array[1], array[index]); // 10, true
```

Object

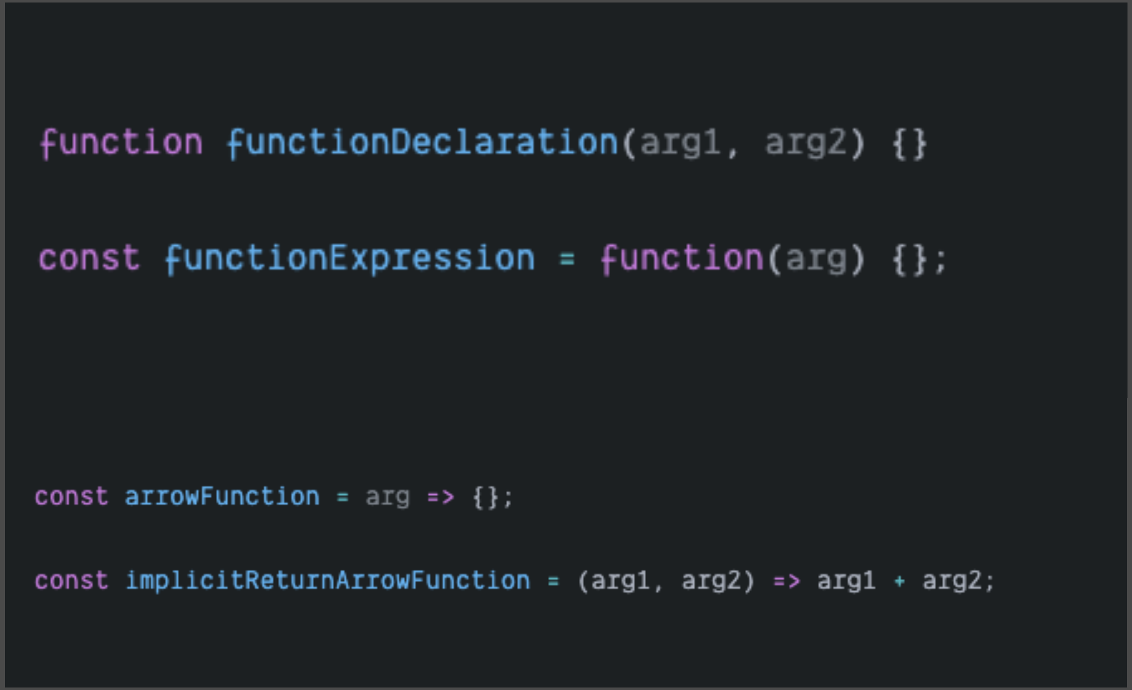
- Dataset containing contextual information
- Represented as a set of key-value pairs
- Can contain any other type of data including other objects
- You can access each value using a key and dot or square bracket notation



```
const person = {
  name: "Janusz",
  age: 20,
  student: true,
  siblings: [{ name: "Janina", age: 11, relationship: "sister" }]
};

const dynamicValue = "student";

console.log(person.name, person["age"], person[dynamicValue]);
```

Function

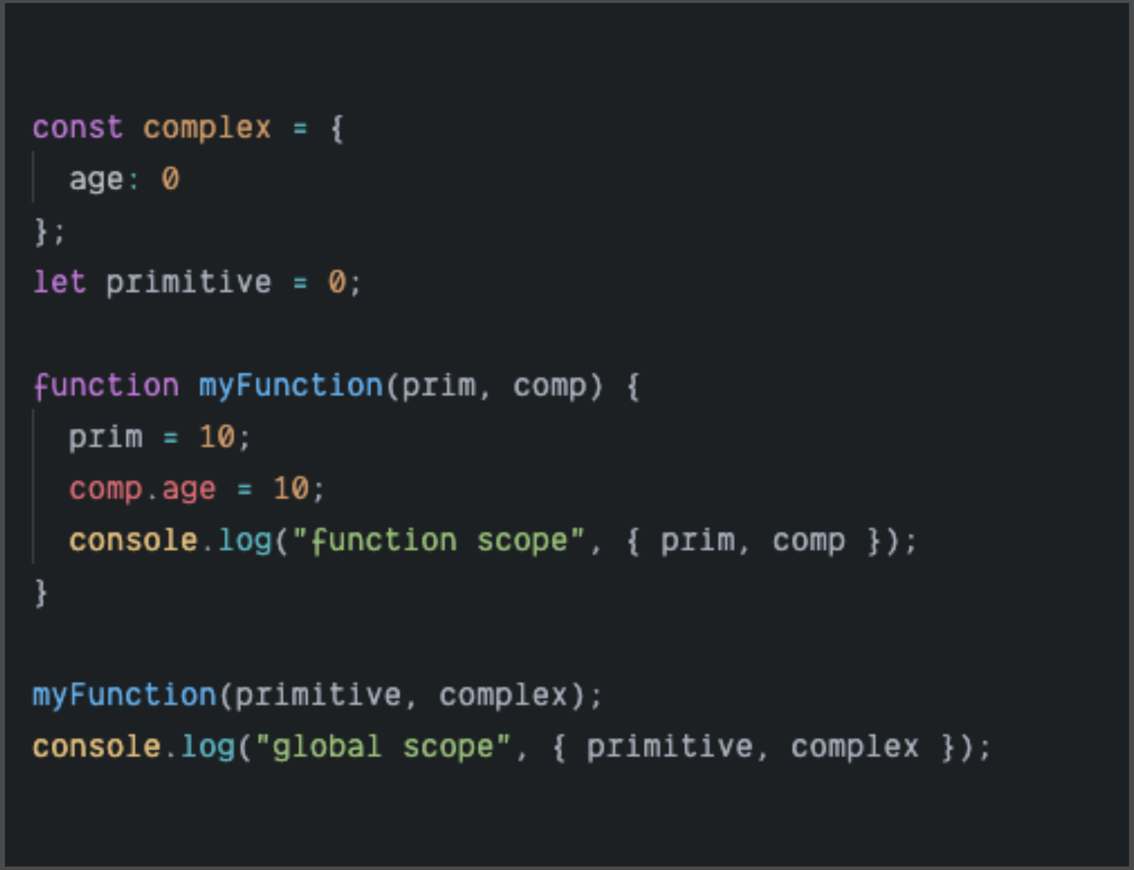
- Enables to run a particular block of code on demand
- Takes in arguments, does calculations and returns new value – or not
- Function declaration vs. Function expression
- Arrow function



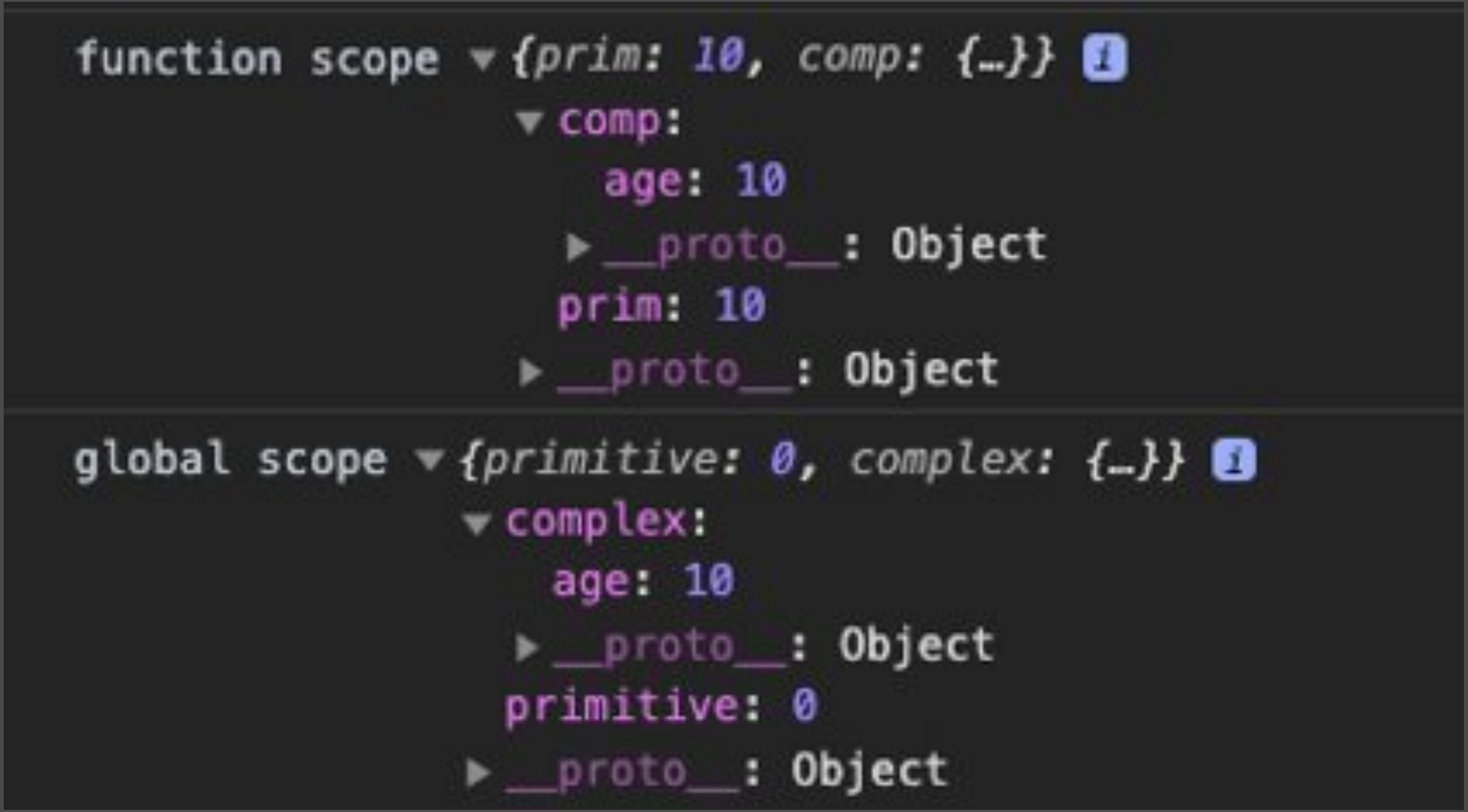
```
function functionDeclaration(arg1, arg2) {}

const functionExpression = function(arg) {};



const arrowFunction = arg => {};

const implicitReturnArrowFunction = (arg1, arg2) => arg1 + arg2;
```

Primitive vs. Complex types

- String, number, boolean, null & undefined are primitive
- Array, function, object and date are complex
- Primitive types are passed by value
- Complex types are passed by reference

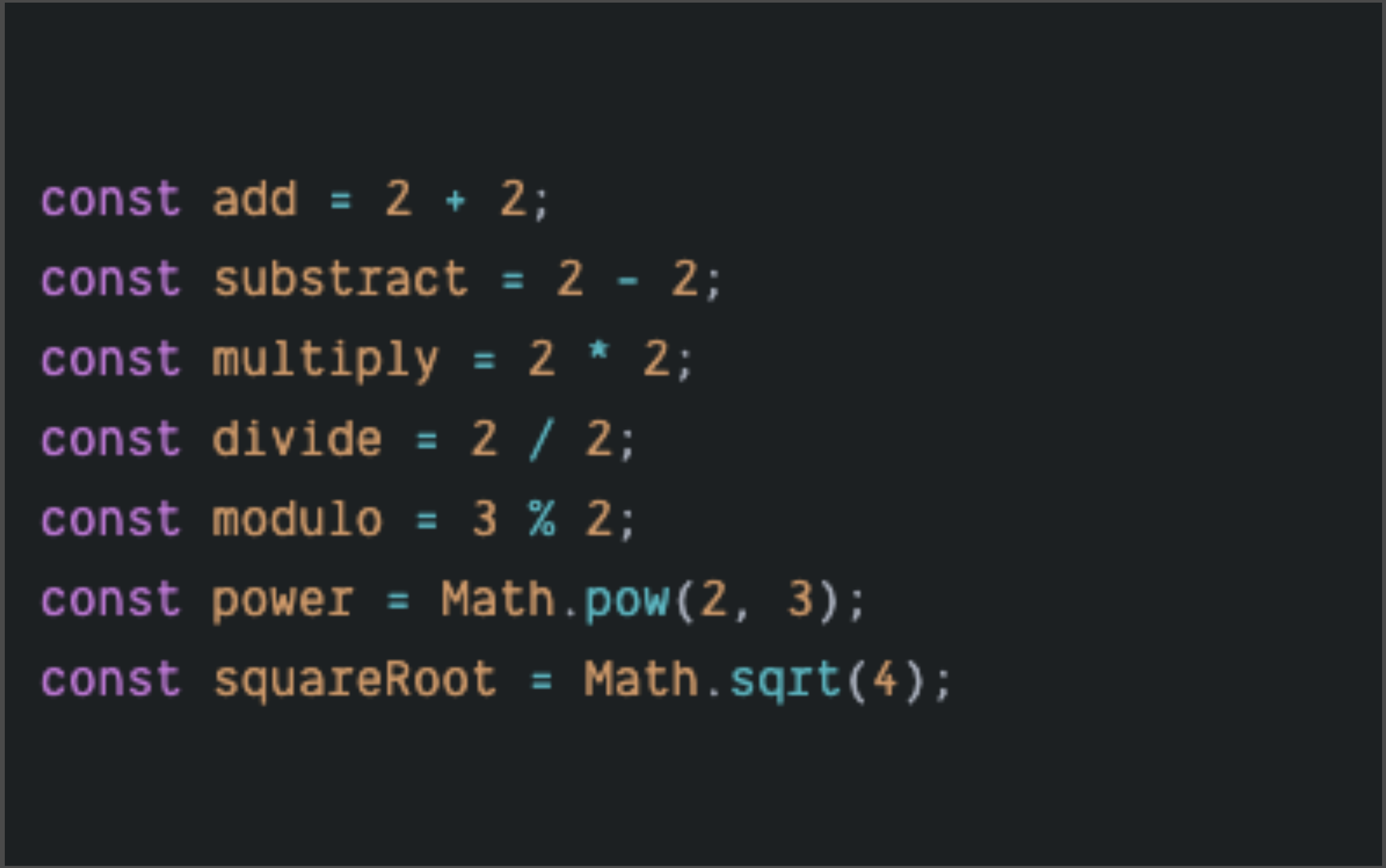


```
const complex = {
  age: 0
};
let primitive = 0;

function myFunction(prim, comp) {
  prim = 10;
  comp.age = 10;
  console.log("function scope", { prim, comp });
}

myFunction(primitive, complex);
console.log("global scope", { primitive, complex });
```



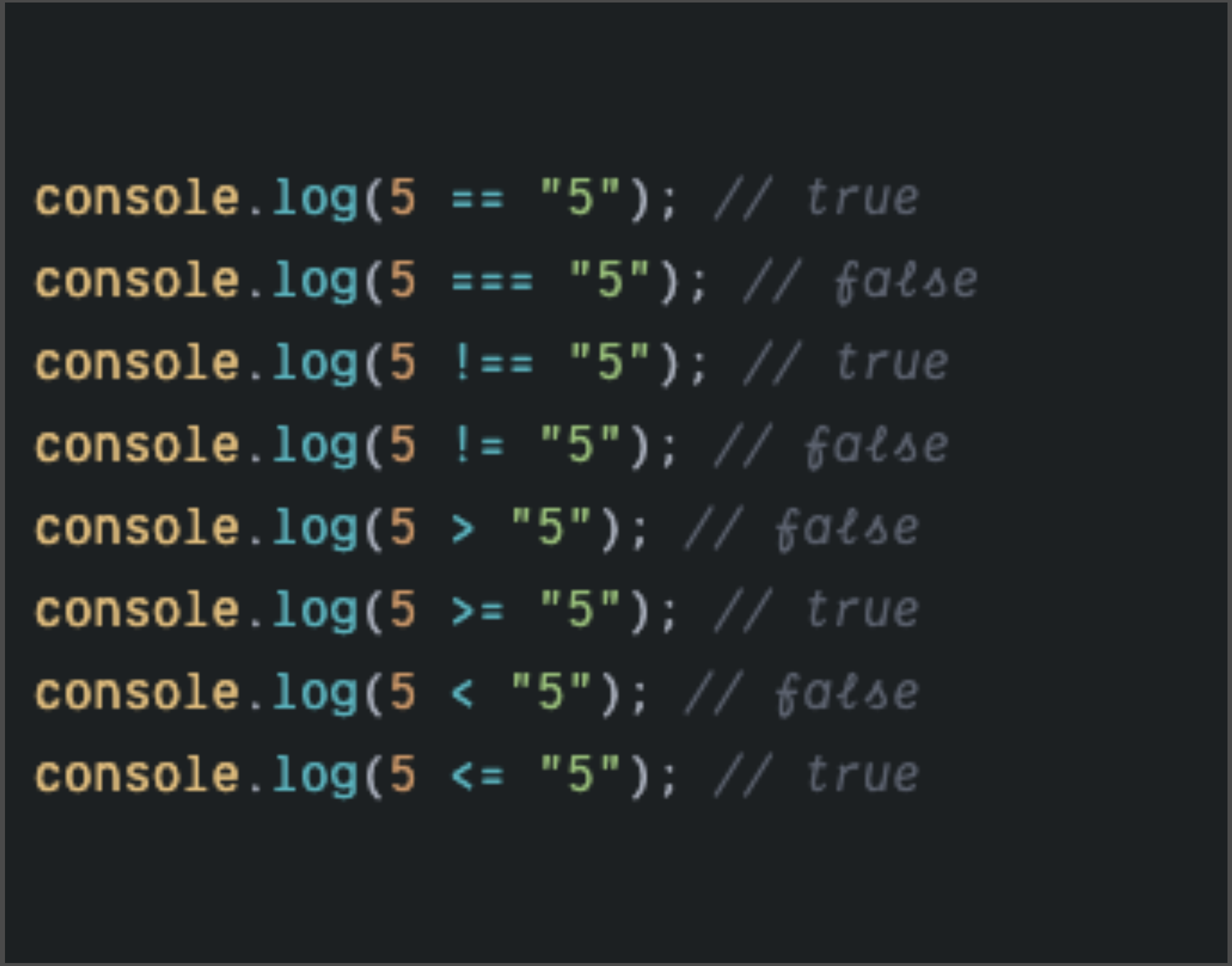
```
function scope ▼{prim: 10, comp: {…}} i
                 ▼ comp:
                     age: 10
                   ▶ __proto__: Object
                   prim: 10
                 ▶ __proto__: Object
global scope ▼{primitive: 0, complex: {…}} i
               ▼ complex:
                   age: 10
                 ▶ __proto__: Object
                 primitive: 0
               ▶ __proto__: Object
```

Arythmetic operators



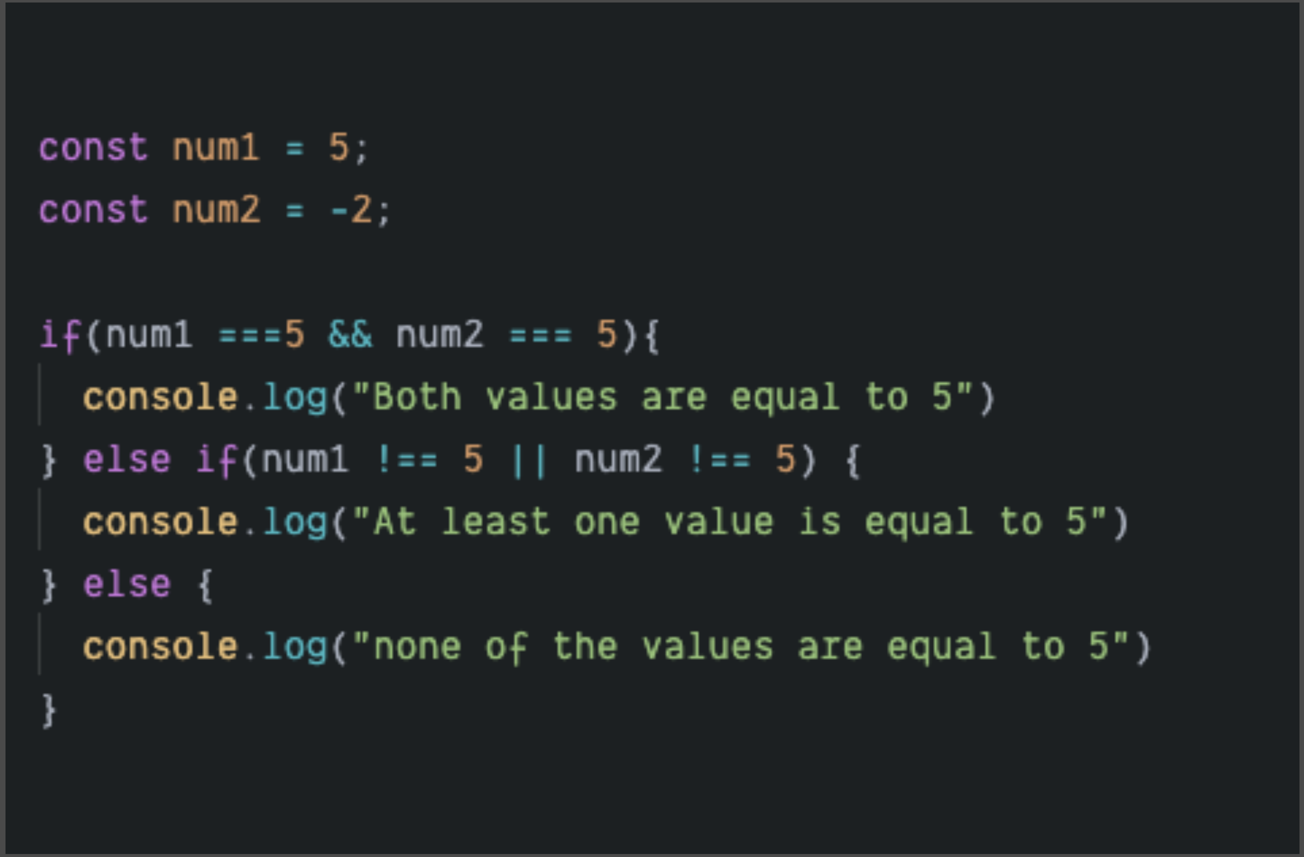
```
const add = 2 + 2;
const substract = 2 - 2;
const multiply = 2 * 2;
const divide = 2 / 2;
const modulo = 3 % 2;
const power = Math.pow(2, 3);
const squareRoot = Math.sqrt(4);
```

Logic operators



```
console.log(5 == "5"); // true
console.log(5 === "5"); // false
console.log(5 !== "5"); // true
console.log(5 != "5"); // false
console.log(5 > "5"); // false
console.log(5 >= "5"); // true
console.log(5 < "5"); // false
console.log(5 <= "5"); // true
```

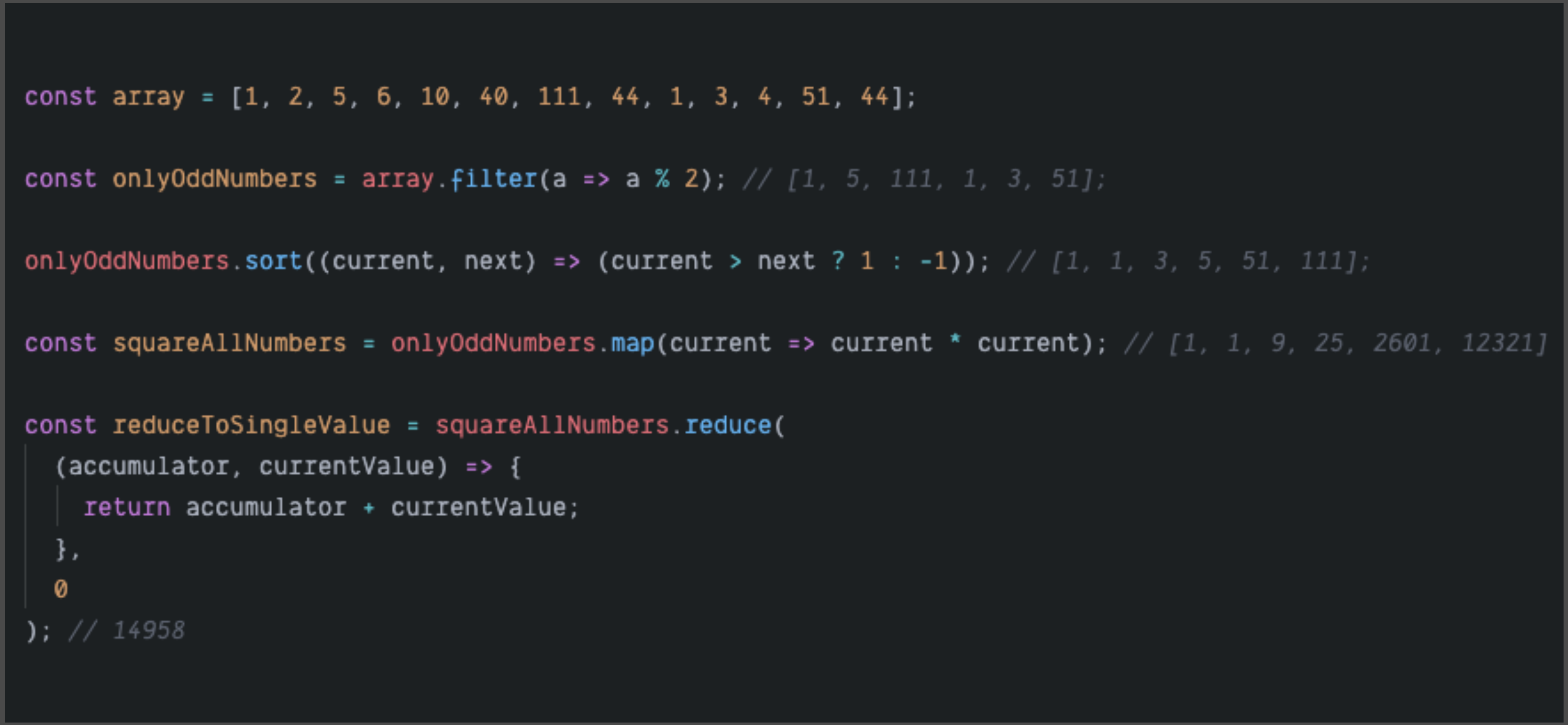
Conditional statements



```
const num1 = 5;
const num2 = -2;

if(num1 ===5 && num2 === 5){
  console.log("Both values are equal to 5")
} else if(num1 !== 5 || num2 !== 5) {
  console.log("At least one value is equal to 5")
} else {
  console.log("none of the values are equal to 5")
}
```

Array methods

- Array.prototype.filter
- Array.prototype.sort
- Array.prototype.map
- Array.prototype.reduce

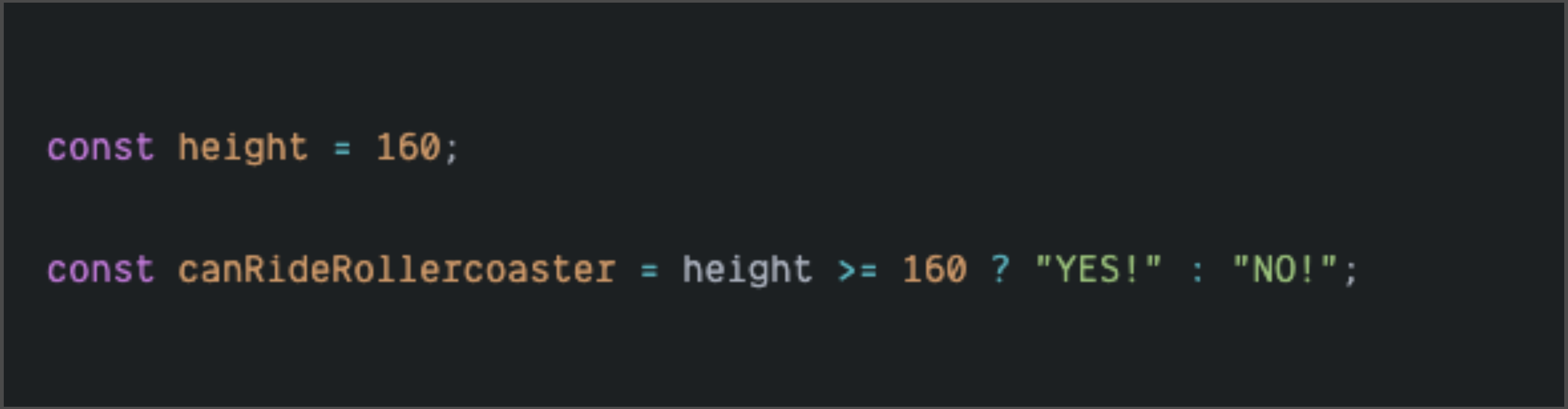


```
const array = [1, 2, 5, 6, 10, 40, 111, 44, 1, 3, 4, 51, 44];

const onlyOddNumbers = array.filter(a => a % 2); // [1, 5, 111, 1, 3, 51];

onlyOddNumbers.sort((current, next) => (current > next ? 1 : -1)); // [1, 1, 3, 5, 51, 111];

const squareAllNumbers = onlyOddNumbers.map(current => current * current); // [1, 1, 9, 25, 2601, 12321]

const reduceToSingleValue = squareAllNumbers.reduce(
  (accumulator, currentValue) => {
    return accumulator + currentValue;
  },
  0
); // 14958
```

Exercise

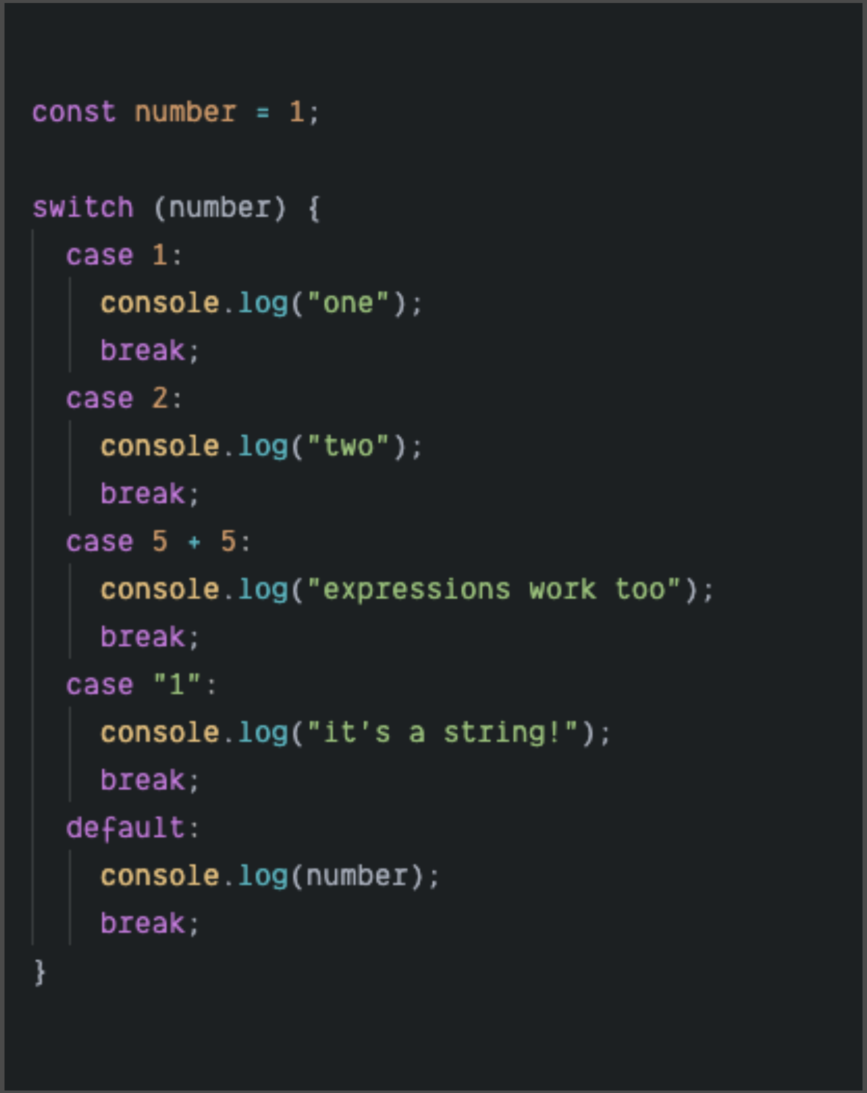
https://gitlab.com/Chandler_Bing/3lo_array_exercises/tree/master

Ternary operator



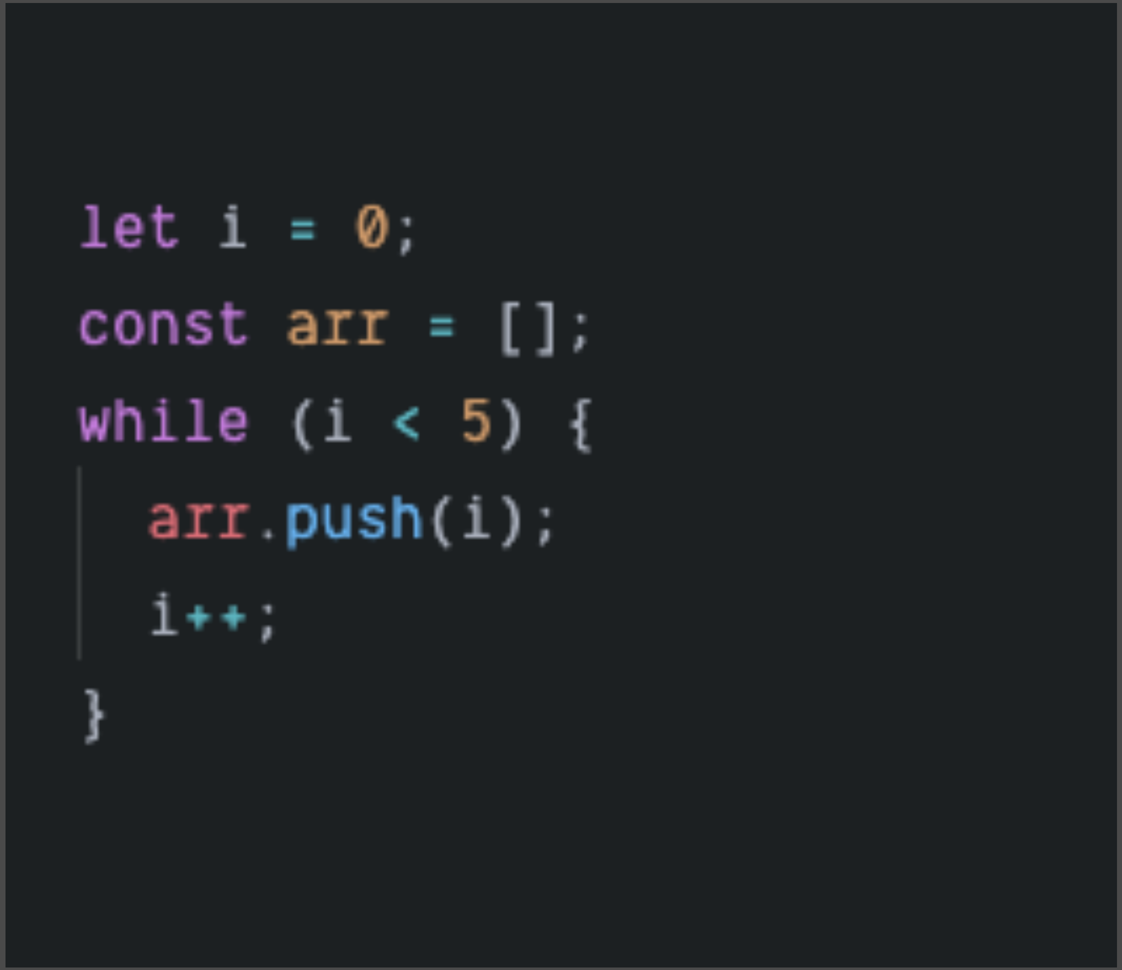
```
const height = 160;

const canRideRollercoaster = height >= 160 ? "YES!" : "NO!";
```

Switch statement



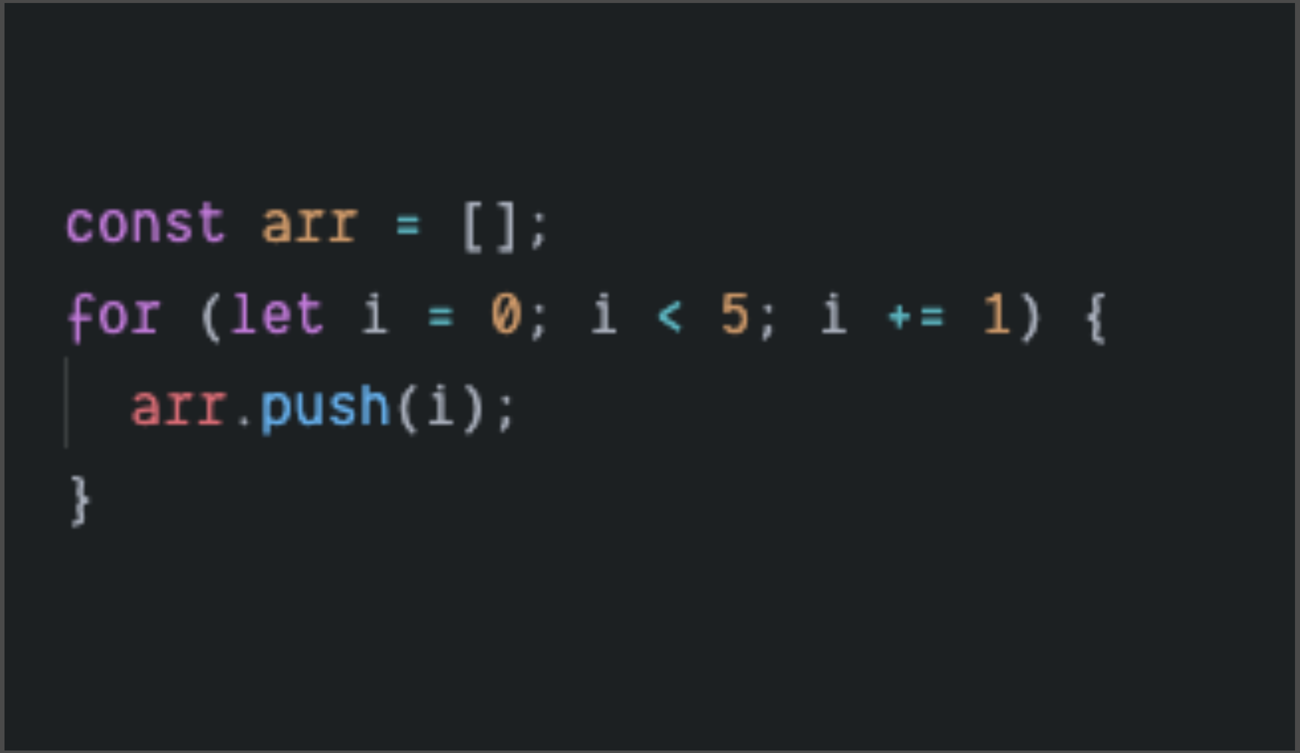
```
const number = 1;

switch (number) {
  case 1:
    console.log("one");
    break;
  case 2:
    console.log("two");
    break;
  case 5 + 5:
    console.log("expressions work too");
    break;
  case "1":
    console.log("it's a string!");
    break;
  default:
    console.log(number);
    break;
}
```

Loops - while



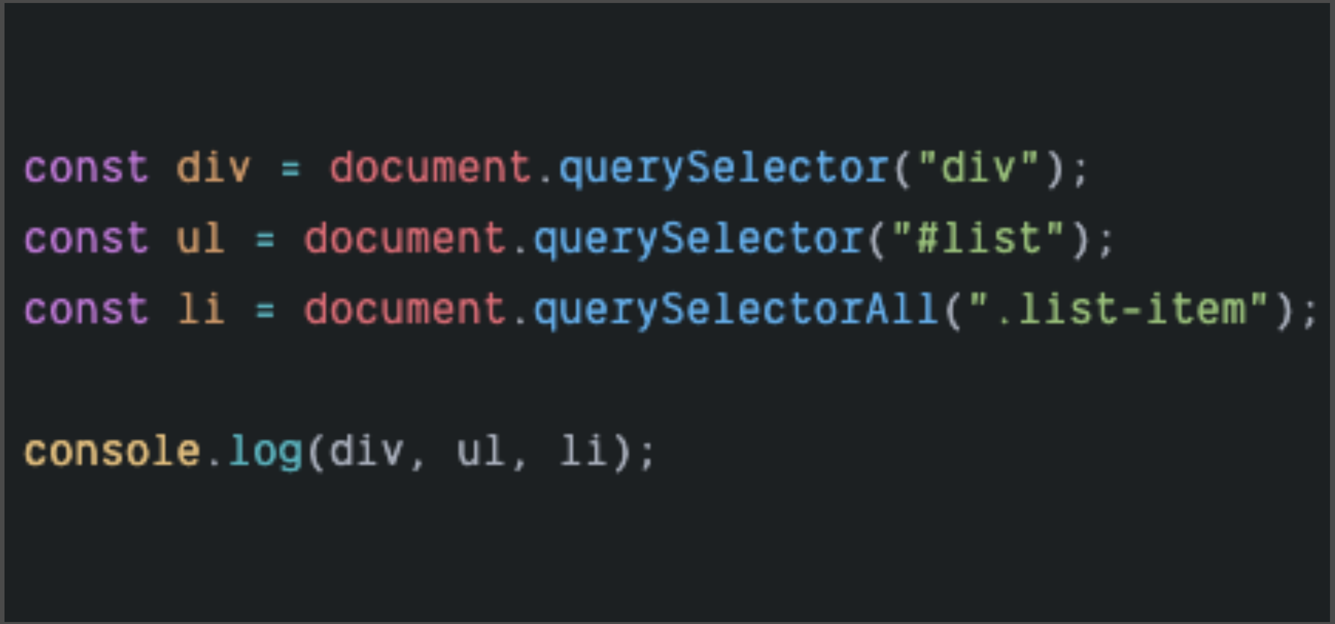
```
let i = 0;
const arr = [];
while (i < 5) {
  arr.push(i);
  i++;
}
```

Loops - for

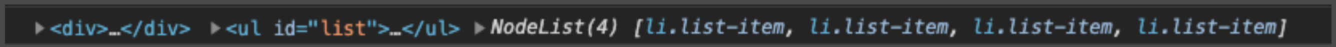


```
const arr = [];
for (let i = 0; i < 5; i += 1) {
  arr.push(i);
}
```

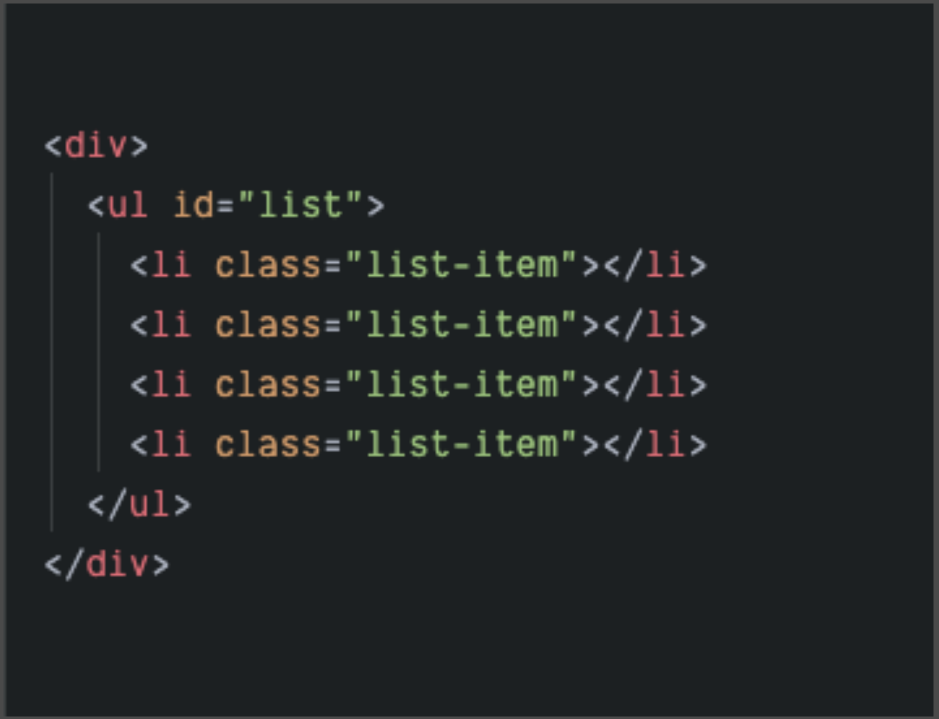
Accessing DOM elements



```javascript
const div = document.querySelector("div");
const ul = document.querySelector("#list");
const li = document.querySelectorAll(".list-item");

console.log(div, ul, li);
```

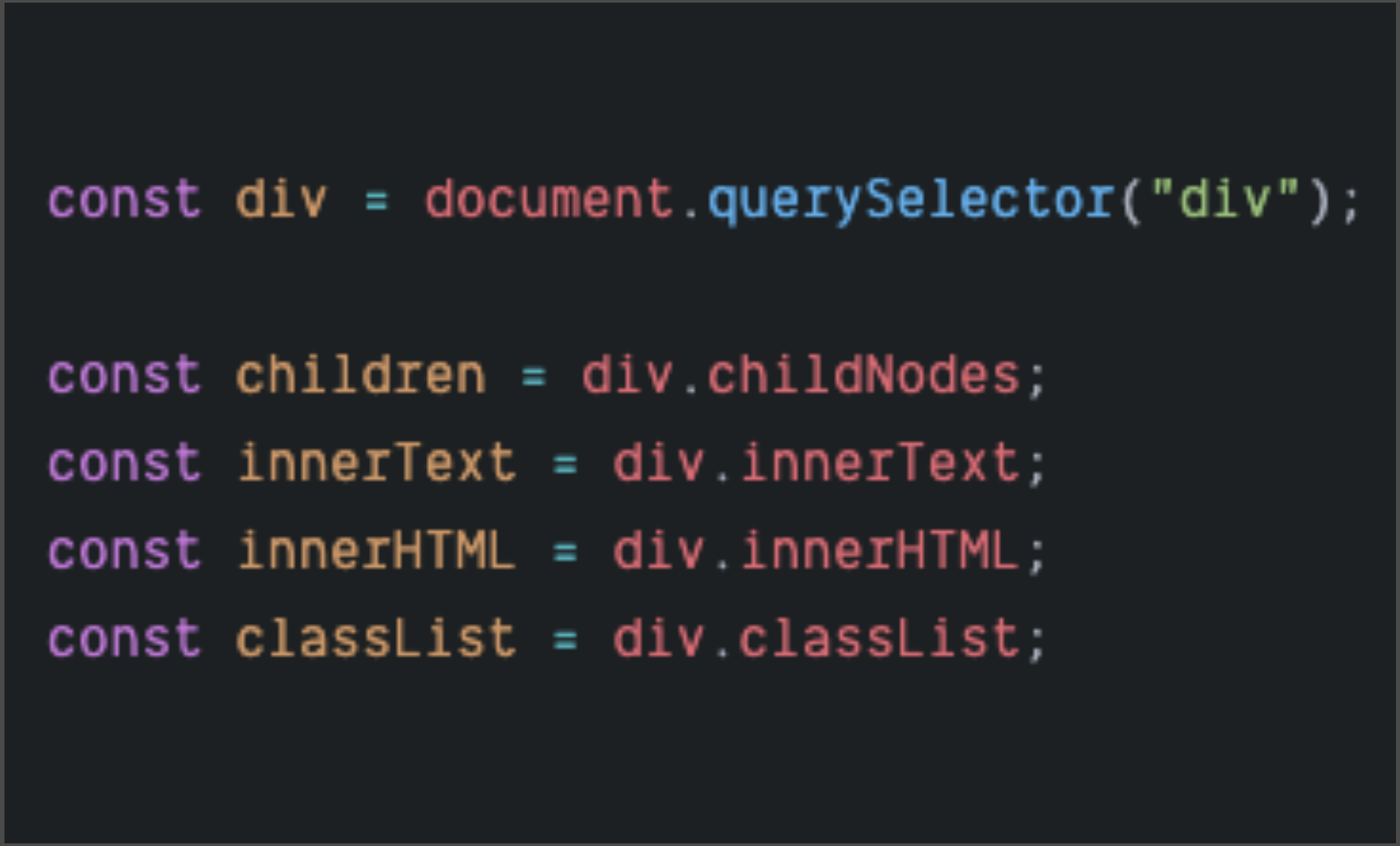


```
▸<div>…</div>  ▸<ul id="list">…</ul>  ▸NodeList(4) [li.list-item, li.list-item, li.list-item, li.list-item]
```



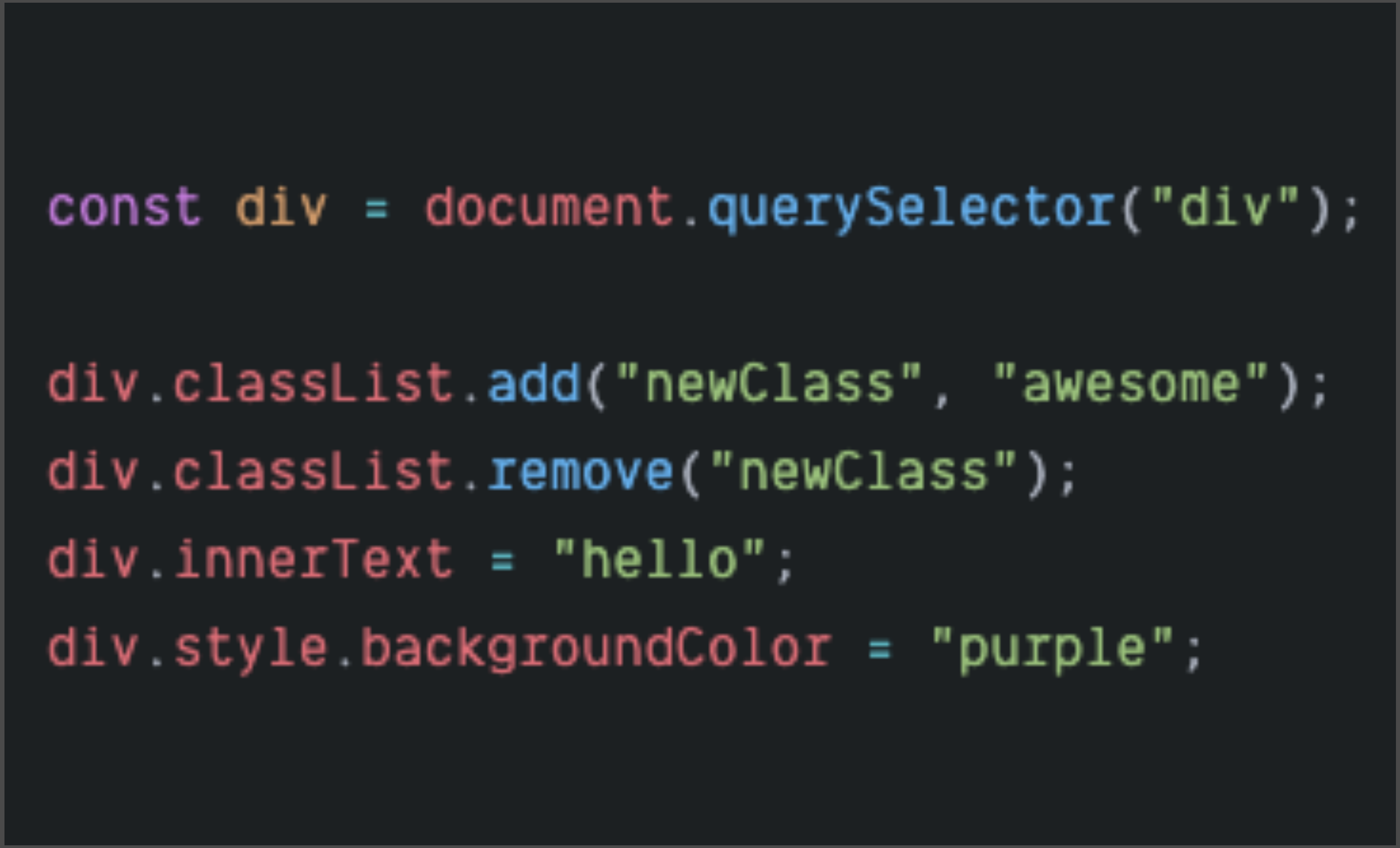
```html
<div>
  <ul id="list">
    <li class="list-item"></li>
    <li class="list-item"></li>
    <li class="list-item"></li>
    <li class="list-item"></li>
  </ul>
</div>
```

Accessing DOM elements



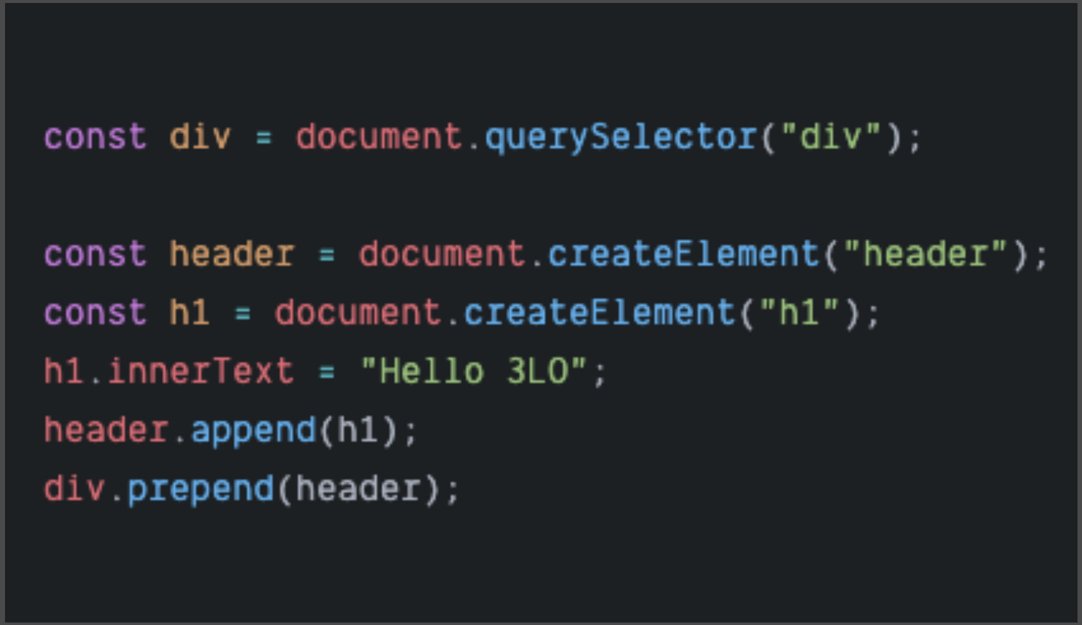
```
const div = document.querySelector("div");

const children = div.childNodes;
const innerText = div.innerText;
const innerHTML = div.innerHTML;
const classList = div.classList;
```

Changing DOM elements

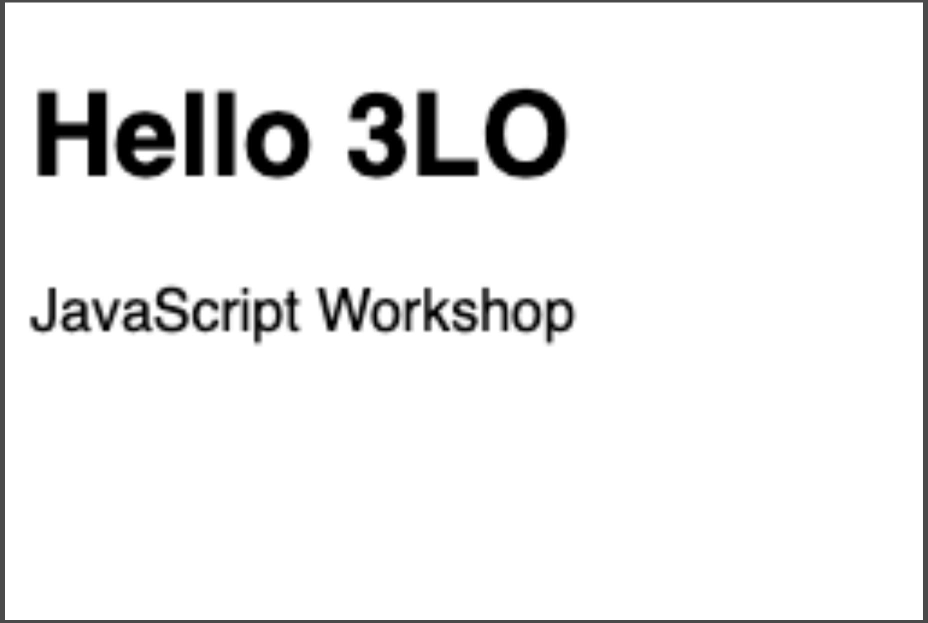


```
const div = document.querySelector("div");

div.classList.add("newClass", "awesome");
div.classList.remove("newClass");
div.innerText = "hello";
div.style.backgroundColor = "purple";
```

Adding new DOM elements



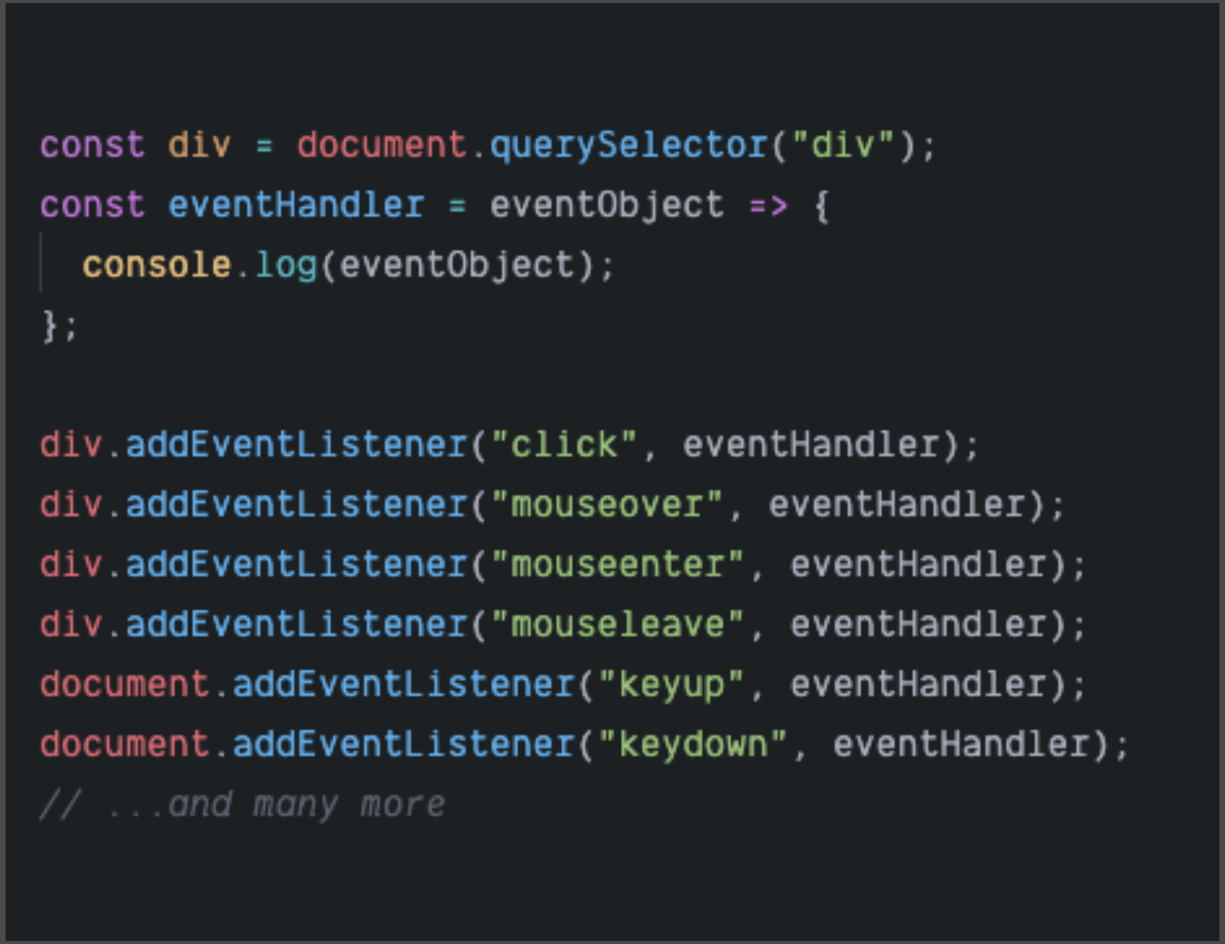
```
const div = document.querySelector("div");

const header = document.createElement("header");
const h1 = document.createElement("h1");
h1.innerText = "Hello 3LO";
header.append(h1);
div.prepend(header);
```



Hello 3LO

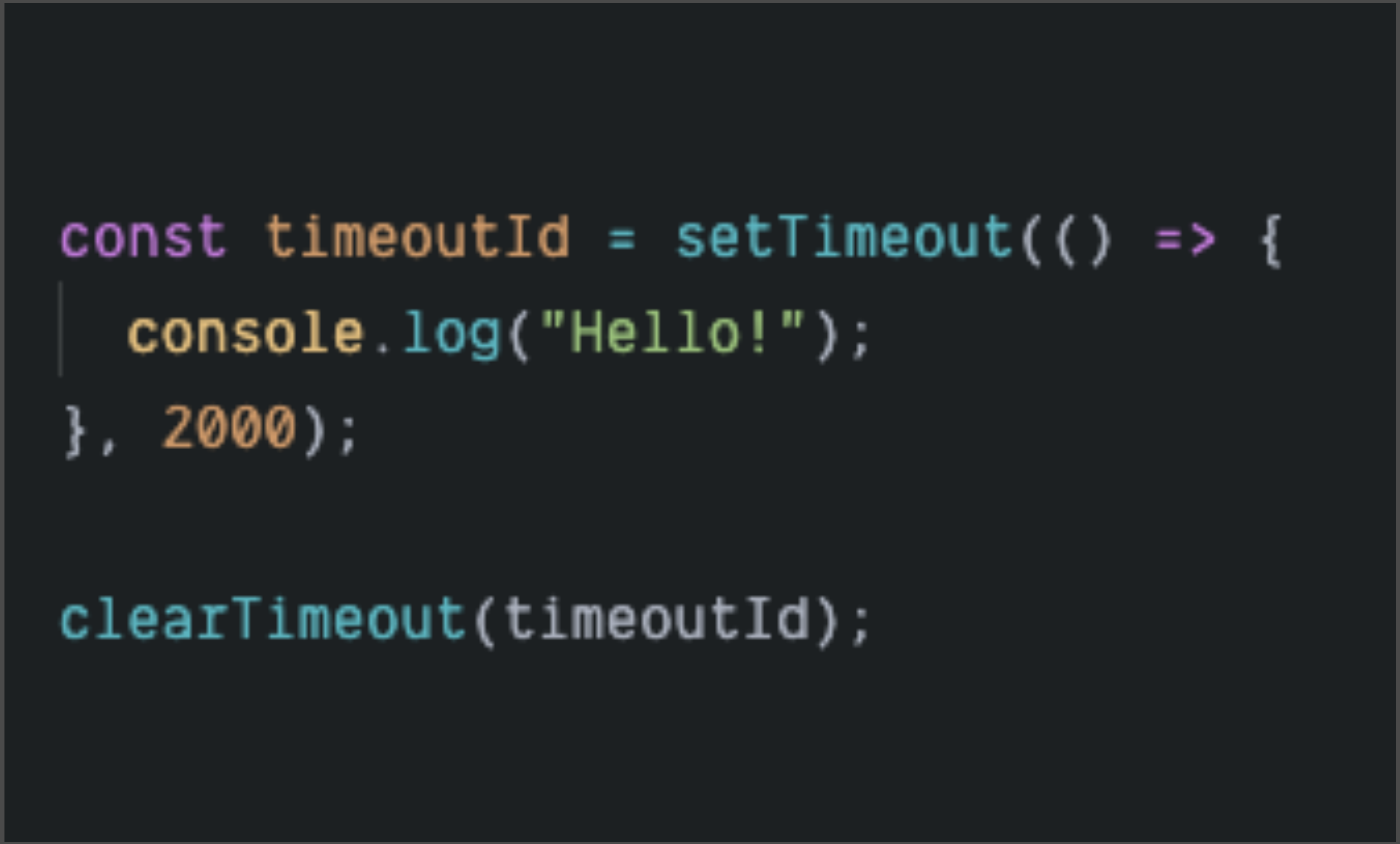
JavaScript Workshop

DOM Events



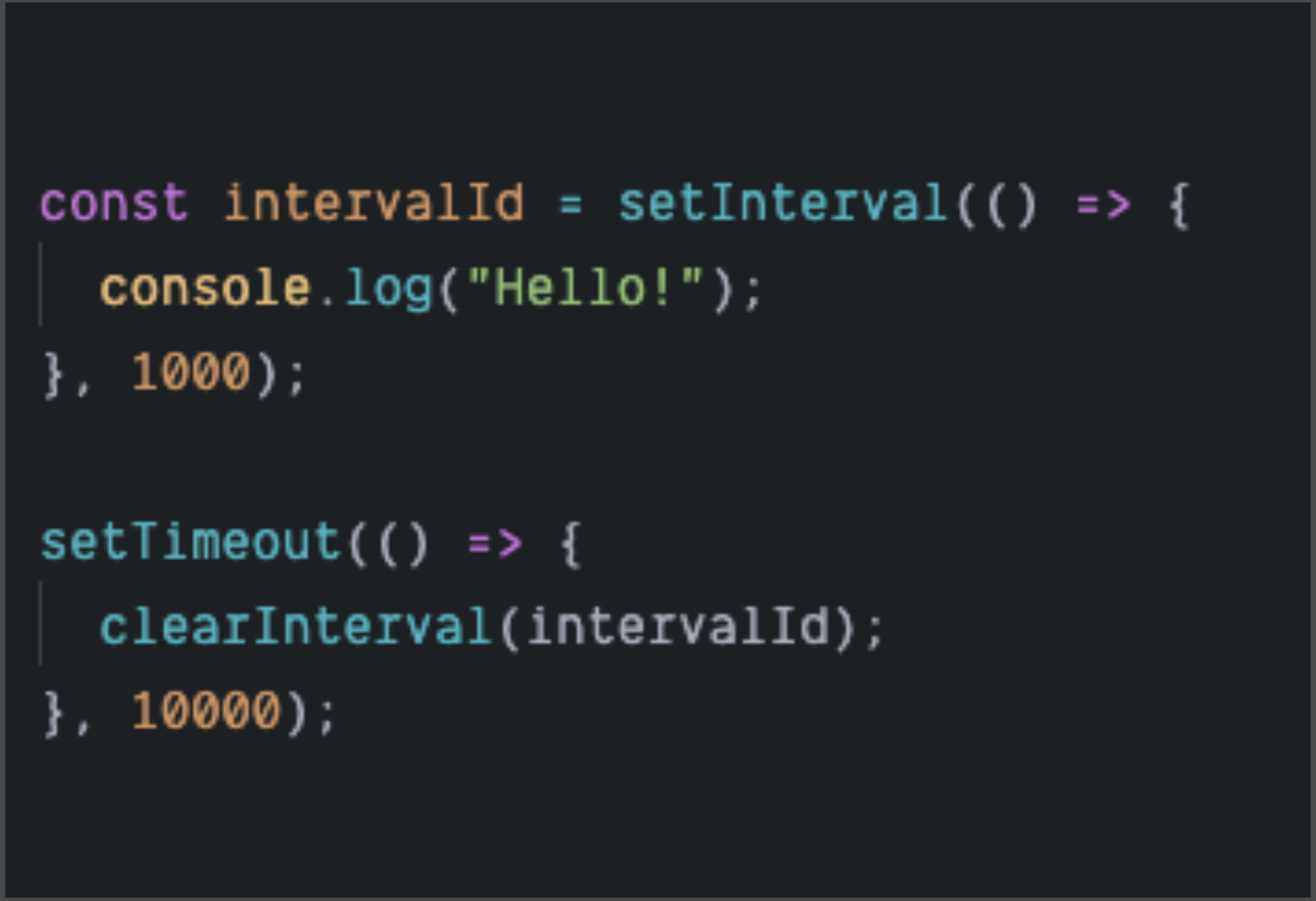
```
const div = document.querySelector("div");
const eventHandler = eventObject => {
  console.log(eventObject);
};

div.addEventListener("click", eventHandler);
div.addEventListener("mouseover", eventHandler);
div.addEventListener("mouseenter", eventHandler);
div.addEventListener("mouseleave", eventHandler);
document.addEventListener("keyup", eventHandler);
document.addEventListener("keydown", eventHandler);
// ...and many more
```

SetTimeout / ClearTimeout



```
const timeoutId = setTimeout(() => {
  console.log("Hello!");
}, 2000);

clearTimeout(timeoutId);
```

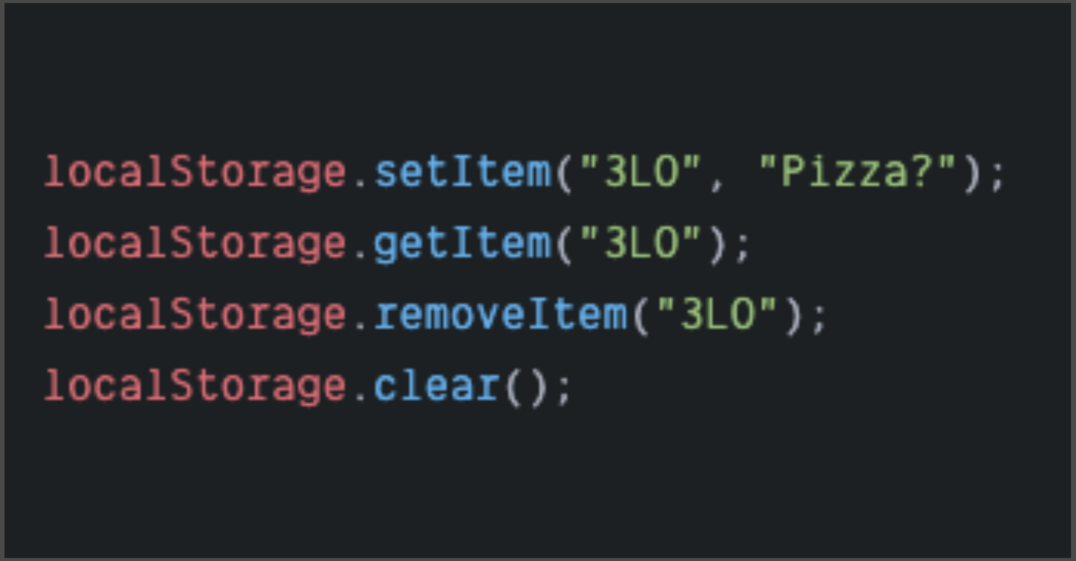
SetInterval / ClearInterval



```
const intervalId = setInterval(() => {
  console.log("Hello!");
}, 1000);

setTimeout(() => {
  clearInterval(intervalId);
}, 10000);
```

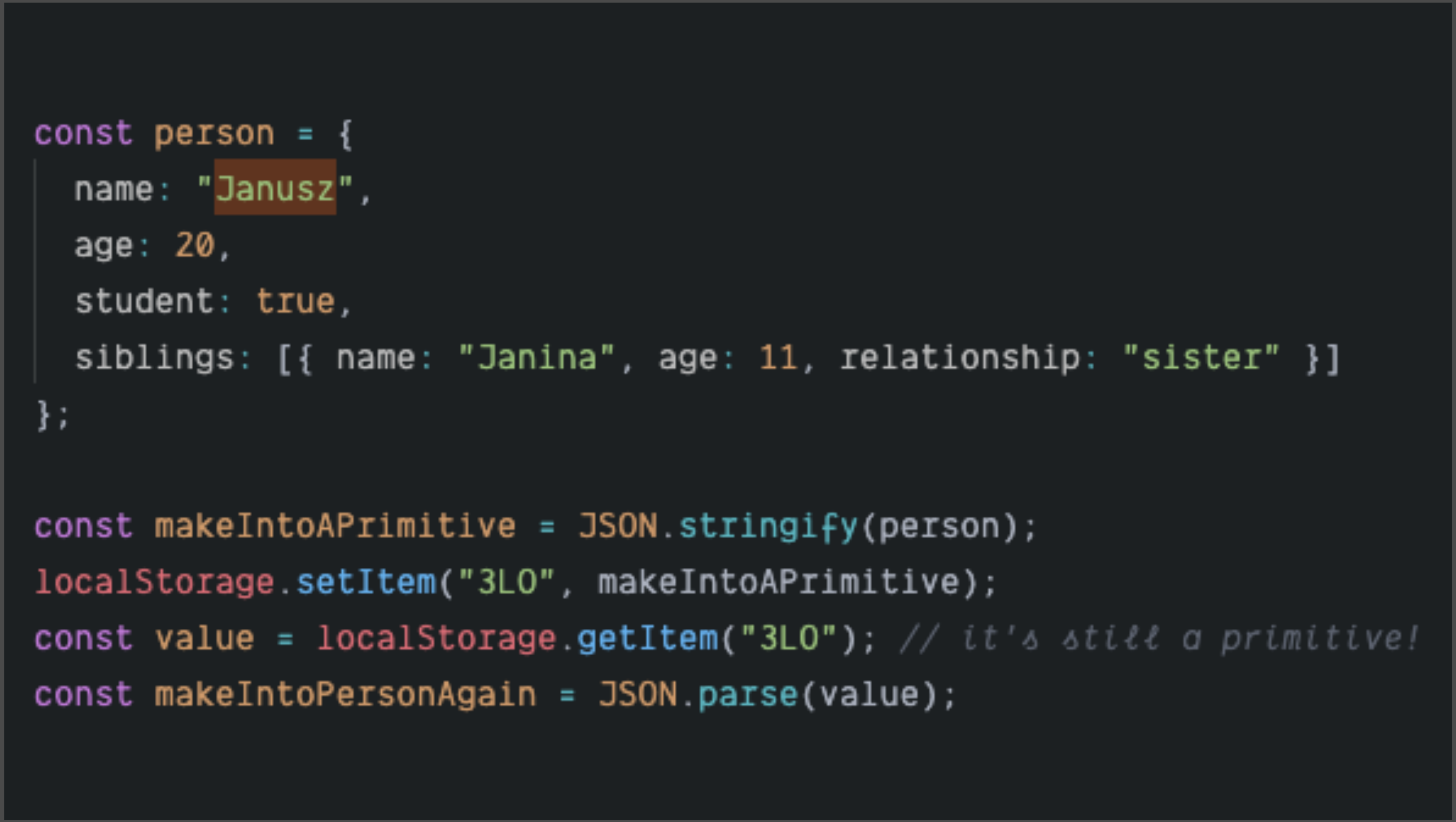
Local storage

- Accepts only primitive value types
- Browser scoped
- Persists through page reloads
- Key-value pair based



```
localStorage.setItem("3LO", "Pizza?");
localStorage.getItem("3LO");
localStorage.removeItem("3LO");
localStorage.clear();
```

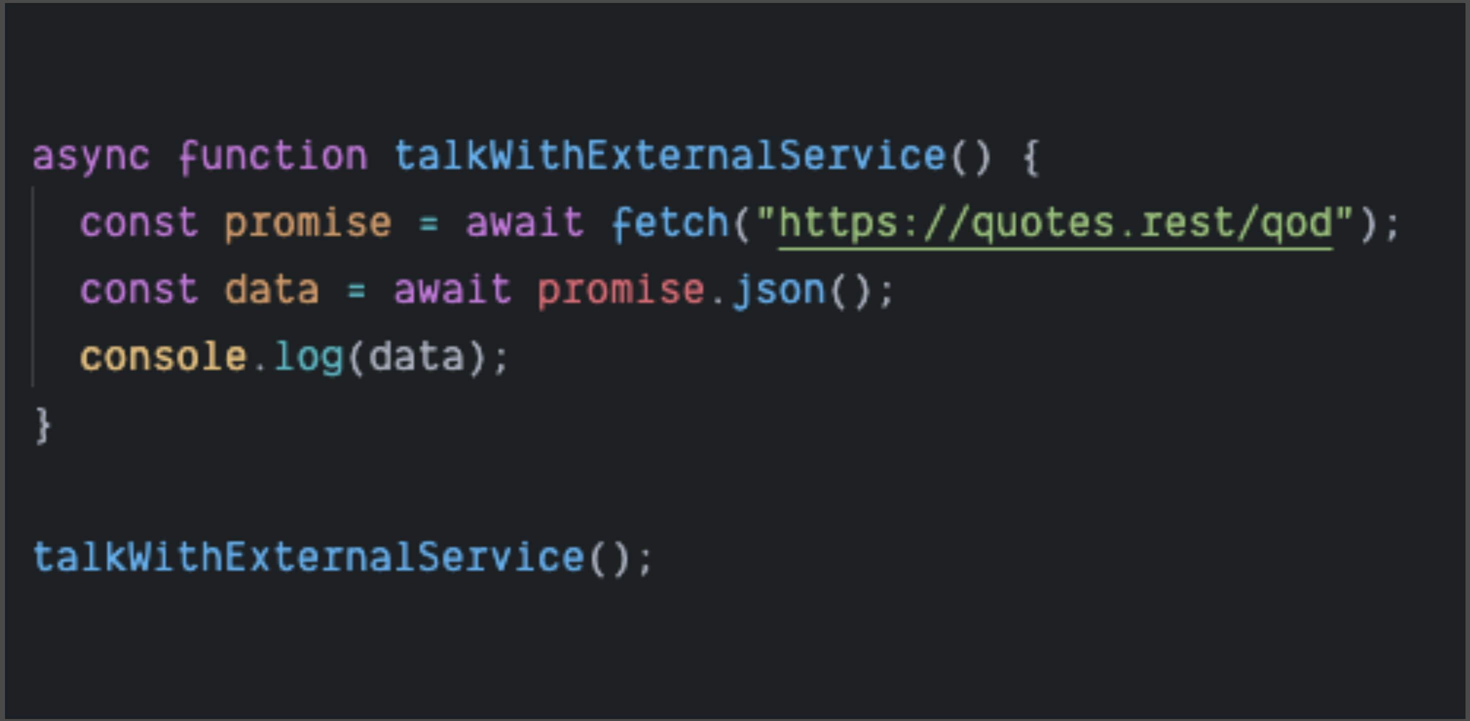
Local storage – what about complex types though?



```
const person = {
  name: "Janusz",
  age: 20,
  student: true,
  siblings: [{ name: "Janina", age: 11, relationship: "sister" }]
};

const makeIntoAPrimitive = JSON.stringify(person);
localStorage.setItem("3LO", makeIntoAPrimitive);
const value = localStorage.getItem("3LO"); // it's still a primitive!
const makeIntoPersonAgain = JSON.parse(value);
```

Talking with backend and other services

- Fetch API
- Promises
- Async / await



```javascript
async function talkWithExternalService() {
  const promise = await fetch("https://quotes.rest/qod");
  const data = await promise.json();
  console.log(data);
}

talkWithExternalService();
```

Workshop #1 random quote generator

- A quote is generated on page load
- User can click a button to generate a new quote
- Style it best you can!

Workshop #2 stopwatch

- User can play, pause and reset the timer
- Style it best you can!

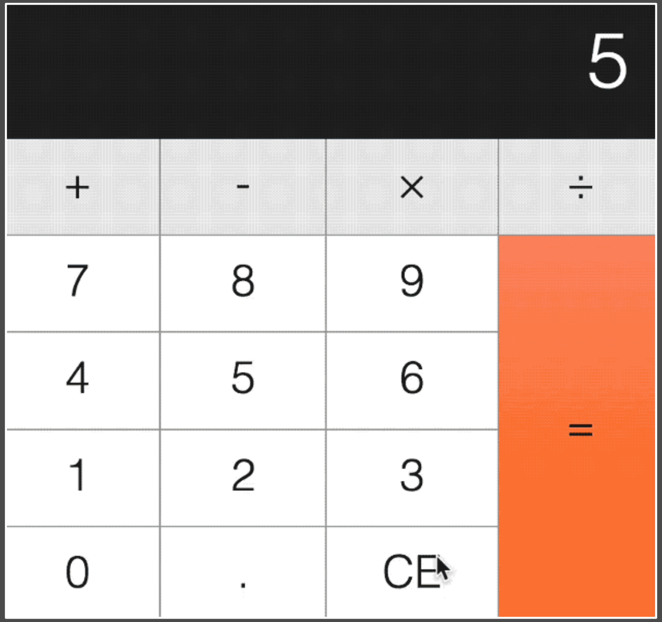
Workshop #3 todo list

- User can add new todos
- User can edit existing todos
- User can delete a todo
- Todos persist through reload – local storage
- Style it best you can!

Workshop #4 calculator

Requirements:

- Using **DOM EventListeners:** https://www.w3schools.com/js/js_htmldom_eventlistener.asp
- Reponsive layout (flexbox, grid)



Workshop #5 hangman *

Requirements:

- Vanilla JS (no libraries and frameworks)
- Use predefined dataset: https://github.com/mackankowski/frontend-bootcamp/blob/master/trainings/js/playground/hangman/data.js
- Scoreboard in **localStorage:** https://www.w3schools.com/html/html5_webstorage.asp
- Reponsive layout (flexbox, grid)