```
tt()
```

Schedule

1. Review assignments: SVG
2. JavaScript deep dive
    1. Scope and return values
    2. Functional patterns
    3. .map().filter().reduce()
3. Logout

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Review

```
residen
work: {
    title: "Project Manag
    employer: "Clarify"

  }
}

* Filter by age, normalize capitals in names, convert ages to numbers, remov

  const data = [
      {
        name: "Robert",
        age: 29,
        residence: "Amsterdam",

      },
      {
        name: "Berend",
        age: 32,
        residence: "Rotterdam",
```

Show & tell

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Scope

- The **scope** of a variable refers to where the variable is accessible
- const and let are **block scoped**:
  The variable is accessible inside the block where it is defined

Scope

```
function greet(name) {
   let greeting = “Goedemorgen, ”
   console.log(greeting + name)
}
greet(“Laura”)
```

Wat is de waarde van variabele `greeting`?

(A)greeting=NULL (B)greeting == “Goedemorgen, ” (C) greeting bestaat niet meer

Scope

```
function greet(name) {
   let greeting = “Goedemorgen, ”
   console.log(greeting + name)
}
greet(“Laura”)
```

Wat is de waarde van variabele `greeting`?

(A)greeting=NULL (B)greeting == “Goedemorgen, ” **(C) greeting bestaat niet meer**

Returns

The return statement ends function execution and specifies a value to be returned to the function caller.

https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Statements/return

Return values

- Function calls can produce results, as in:

```
let toevalsgetal = Math.random();


function greet(name) {
   let greeting = “Goedemorgen, ”+ name;
   return greeting
}


console.log(greet(“Laura”);
```

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Functional programming

Javascript is a multi-paradigm language:

Functional, Procedural (let, for), Object Oriented (.)

Functional programming distinguishes between pure and impure functions.

It encourages you to write pure functions.

A pure function must satisfy both of the following properties:

https://opensource.com/article/17/6/functional-javascript

Functional programming

Referential transparency: The function always gives the same return value for the same arguments. This means that the function cannot depend on any mutable state

Side-effect free: The function cannot cause any side effects.
Side effects may include I/O (e.g., writing to the console or a log file), modifying a mutable object, reassigning a variable, etc.

Impure functions

```
1  const kleuren = ["rood", "geel", "paars", "turquoise"];
2  const dieren = ["hond", "kat", "kip", "schildpad", "paard",
   "parkiet", "cavia"];
3
4
5  function telImpure() {
6    console.log(kleuren.length);
7
8  }
9
10 telImpure();
```

Pure functions

```
const kleuren = ["rood", "geel", "paars", "turquoise"];
const dieren = ["hond", "kat", "kip", "schildpad", "paard",
"parkiet", "cavia"];
let lengteArray;


function telPure(myArray) {
  let aantal = myArray.length;

  return aantal;
}



lengteArray = telPure(kleuren);
console.log(lengteArray);
```

Pure functions

- Have limited responsibility
- Their behavior is predictible
- C**an be reused** in different contexts

Higher order functions (functional programming)

- Reuse through abstraction
- `console.log();` Only writes text to the console

```
newOutputFunction(console.log(), “Hello, world”)

newOutputFunction(document.write(), “Hello, world”)

newOutputFunction()
```

Also writes to the Website, maybe to paper?

- Why?
- We offer you a way of **structuring your code** which we think is clean, concise, self-explanatory and **reusable**.

Functional pattern: chaining

```
fetch('https://opensheet.elk.sh/1bOqOXqsuALPR0U26nJu5URFzg2Js54oS7uHoMCBEZHY/respons
es')
        .then(res => res.json())
        .then(data => {↔});
    }
```

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.map().filter().reduce()

Map, filter & reduce are higher order **methods of Array.** We can call them on any array to loop over them and perform actions on their items

.map().filter().reduce() in JavaScript5:

Vrij naar Steven Luscher, in ES6:

[🌽, 🐮, 🐔].map(cook)
=> [🍿, 🍔, 🍳]

[🍿, 🍔, 🍳].filter(isVegetarian)
=> [🍿, 🍳]

[🍿, 🍳].reduce(eat)
=> 💩

.map().filter().reduce()

Map, filter (and reduce) are methods of **Array** that **return** something: an **Array or value.**

They help us to write **robust** code through **abstraction**

Implicit vs explicit

```
const arr = [1,2,3];

const newArray = arr.map(item => {
  return item * 2; // explicit return
})

const newArray2 = arr.map(item => item * 2); // implicit return
```

This code does the same

.map()

.map() is a method of **Array**
applies to **arrays**
requires a **function** as parameter

[🌽, 🐮, 🐔].map(cook)
=> [🍿, 🍔, 🍳]

returns a new **array** where the **function**
is applied to each element of the array

.filter()

.filter() is a method of **Array**
applies to **arrays**
requires a **function** as parameter that
returns a **boolean**

[🍿, 🍔, 🍳].filter(isVegetarian)
=> [🍿, 🍳]

returns the same **array** whit the **elements**
that comply to the test-condition in the function

.reduce()

.reduce() is a method of **Array**
applies to **arrays**
requires (an accumulator value and)
a **function** as parameter
that returns a **value**

[🍿, 🍳].reduce(eat)
=> 💩

returns a **value**

.map().filter().reduce() The devil in the details

.map() does not affect the original Array.
It returns a **new** one

[🌽, 🐮, 🐔].map(cook)
=> [🍿, 🍔, 🍳]

.filter() changes the original Array.

[🍿, 🍔, 🍳].filter(isVegetarian)
=> [🍿, 🍳]

.reduce() returns a **value**, generally a Number

[🍿, 🍳].reduce(eat)
=> 💩

.map().filter().reduce()

Hands-on

ObjectsMapFilter	(practise with Map, Filter)
ObjectsMapFilterReduce	(Add Reduce)
CountriesMapFilterReduce	(practise Map, Filter, reduce with a medium-size dataset)

.map().filter().reduce()

Code lezen

Ok, hij doet het nu. Weet je ook, wat er staat (en wat “hij” doet?)

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Uncaught SyntaxError
Unexpected end of input