

# Introcution to JavaScript

Nils Twelker

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# What learned we last Week?

- Functions `function add(a, b) { return a + b; }`
  - (Default) Arguments, Return Values, Scope, Hoisting
- Arrow Functions `let add = (a, b) => a + b;`
- Function Expressions  
`let add = function(a, b) { return a + b; }`
- Basic Arrays `let myList = [1, 2, 3, 4]`
- Accessing Arrays `myList[0] // 1`

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## Goals of this week

- Objects
  - Accessing Properties
  - Adding Properties
  - Removing Properties
  - “this” Keyword
  - “in” Operator
  - “For in” loop
  - Object references
- Garbage Collection
- Methods on Primitives
- More about Arrays
  - Arrays are Objects
  - Array Methods

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# Objects

```
const player = {  
  health: 30,  
  color: "red",  
  running: false,  
  sayHello: function() { console.log("Hello!") }  
}
```

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# Accessing Properties

```
const player = {  
  health: 30,  
  "player color": "red",  
  running: false,  
  sayHello: function() { console.log("Hello!") }  
}  
  
player.health // 30  
player["player color"] // "red"  
player.running // false  
player.sayHello() // "Hello!"
```

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# Adding Properties

```
const player = {  
  health: 30,  
  color: "red",  
  running: false  
}  
  
console.log(player.name) // undefined  
player.name = "Paul"  
console.log(player.name) // "Paul"
```

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# Removing Properties

```
const player = {  
  health: 30,  
  color: "red",  
  running: false  
}  
  
console.log(player.color) // "red"  
delete player.color  
console.log(player.color) // undefined
```

# “this” Keyword

```
const player = {  
  health: 30,  
  color: "red",  
  sayColor: function() {  
    console.log(this.color)  
  }  
  takeDamage() {  
    this.health -= 10  
  }  
}
```

```
player.sayColor() // "red"  
player.takeDamage()  
  
console.log(player.health)  
// 20
```



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# The “in” Operator

```
const player = {  
  health: 30,  
  color: "red",  
  running: false  
}
```

```
console.log("color" in player) // true  
console.log("name" in player) // false
```

# The “For in” loop

```
const player = {  
  health: 30,  
  color: "red",  
  running: false  
}  
  
for (let key in player) {  
  console.log(key, player[key])  
}
```

Console output:

```
// health 30  
// color red  
// running false
```

# Object references

```
const player = {  
  health: 30,  
  color: "red",  
  running: false  
}  
  
const player2 = player  
player2.health = 20  
  
console.log(player.health) // 20
```

```
const a = 1  
const b = a  
  
b = 2  
console.log(a) // 1  
console.log(b) // 2
```

# Garbage Collection

```
let player = {  
  health: 30,  
  color: "red",  
  running: false  
}  
  
player = null
```

- `player` object is not accessible anymore
- Garbage Collector will remove it from memory

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# Methods on Primitives

```
const myString = "Hello World"
myString.length // 11
myString.toUpperCase() // "HELLO WORLD"
myString.toLowerCase() // "hello world"
```

```
const myNumber = 123
myNumber.toString() // "123"
myNumber.toFixed(2) // "123.00"
```

```
true.toString() // "true"
```

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# Arrays are Objects

```
const myArray = ["a", "b", "c", "d"]

const myFakeArray = {
  0: "a",
  1: "b",
  2: "c",
  3: "d",
  length: 4
}

console.log(typeof myArray) // "object"
```

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# Arrays are Objects

```
const myArray = ["a", "b", "c", "d"]

const notEmpty = '0' in myArray // true
myArray[0] // "a"
myArray[10] = "k"

for(let index in myArray) {
    console.log(index, myArray[index])
}

// 0 "a", 1 "b", 2 "c", 3 "d", 10 "k"
```

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# Methods on Arrays (Stack)

```
const myArray = ["a", "b", "c", "d"]
```

```
myArray.push("e") // 5
```

```
console.log(myArray) // ["a", "b", "c", "d", "e"]
```

```
const last = myArray.pop() // last = "e"
```

```
console.log(myArray) // ["a", "b", "c", "d"]
```



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# Methods on Arrays (Queue)

```
const myArray = ["a", "b", "c", "d"]
```

```
myArray.push("e") // 5
```

```
console.log(myArray) // ["a", "b", "c", "d", "e"]
```

```
const first = myArray.shift() // first = "a"
```

```
console.log(myArray) // ["b", "c", "d", "e"]
```

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# Methods on Arrays (at)

```
const myArray = ["a", "b", "c", "d"]
```

```
myArray.at(0) // "a"
```

```
myArray.at(1) // "b"
```

```
myArray[myArray.length - 1] // "d"
```

```
myArray.at(-1) // "d"
```

```
myArray.at(-2) // "c"
```

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# Tasks and Points

Goal is to get 100 Points.

- `array-methods` (25 Points)
- `basic-objects` (25 Points)
- `in-keyword` (25 Points)
- `object-references` (25 Points)
- `graph-calculator` (50 Points)
- `login-system` (50 Points)