JONAS.IO
SCHMEDTMANN

# THE COMPLETE JAVASCRIPT COURSE

FROM ZERO TO EXPERT!

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## SECTION

HOW JAVASCRIPT WORKS BEHIND THE SCENES

## LECTURE

SCOPE AND THE SCOPE CHAIN

JS

# SCOPING AND SCOPE IN JAVASCRIPT: CONCEPTS

**EXECUTION CONTEXT**

- 👉 Variable environment
- 👉 Scope chain
- 👉 `this` keyword

## SCOPE CONCEPTS

- 👉 **Scoping:** How our program's variables are **organized** and **accessed**. *"Where do variables live?"* or *"Where can we access a certain variable, and where not?"*;
- 👉 **Lexical scoping:** Scoping is controlled by **placement** of functions and blocks in the code;
- 👉 **Scope:** Space or environment in which a certain variable is **declared** (*variable environment in case of functions*). There is **global** scope, **function** scope, and **block** scope;
- 👉 **Scope of a variable:** Region of our code where a certain variable can be **accessed**.

# THE 3 TYPES OF SCOPE

## GLOBAL SCOPE

```
const me = 'Jonas';
const job = 'teacher';
const year = 1989;
```

- 👉 Outside of **any** function or block
- 👉 Variables declared in global scope are accessible **everywhere**

## FUNCTION SCOPE

```
function calcAge(birthYear) {
  const now = 2037;
  const age = now - birthYear;
  return age;
}

console.log(now); // ReferenceError
```

- 👉 Variables are accessible only **inside function**, **NOT** outside
- 👉 Also called local scope

## BLOCK SCOPE (ES6)

```
if (year >= 1981 && year <= 1996) {
  const millenial = true;
  const food = 'Avocado toast';
}
```

Example: `if` block, `for` loop block, etc.

```
console.log(millenial); // ReferenceError
```

- 👉 Variables are accessible only **inside block** (block scoped)
- ⚠️ **HOWEVER**, this only applies to **`let`** and **`const`** variables!
- 👉 Functions are **also block scoped** (only in strict mode)

# THE SCOPE CHAIN

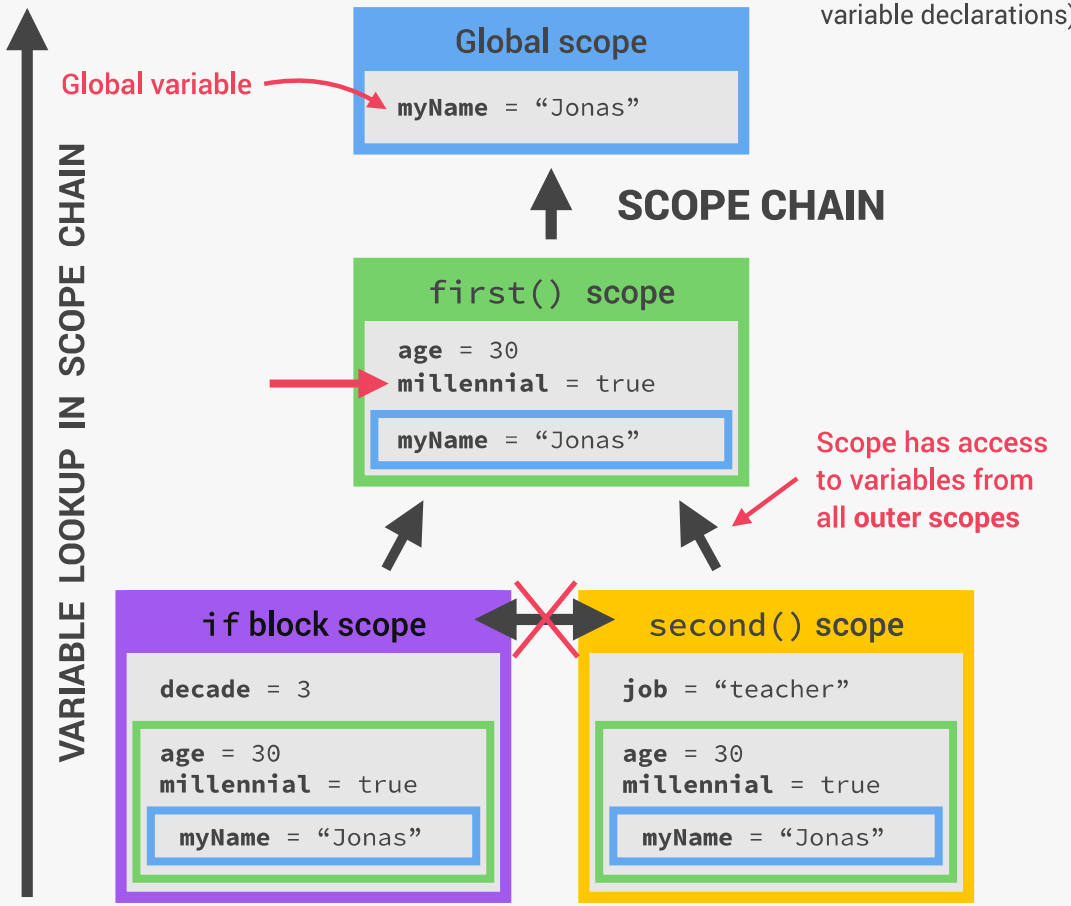
```
const myName = 'Jonas';

function first() {
  const age = 30;

  if (age >= 30) {  // true
    const decade = 3;
    var millenial = true;
  }

  function second() {
    const job = 'teacher';

    console.log(`${myName} is a ${age}-old ${job}`);
    // Jonas is a 30-old teacher
  }

  second();
}

first();
```

let and const are **block-scoped**

var is **function-scoped**

Variables not in current scope

(Considering only variable declarations)

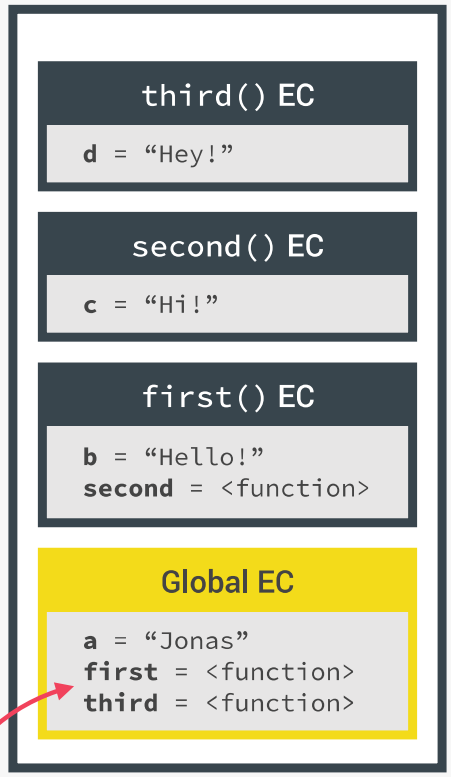


# SCOPE CHAIN VS. CALL STACK

```
const a = 'Jonas';
first();

function first() {
  const b = 'Hello!';
  second();

  function second() {
    const c = 'Hi!';
    third();
  }
}

function third() {
  const d = 'Hey!';
  console.log(d + c + b + a);
  // ReferenceError
}
```

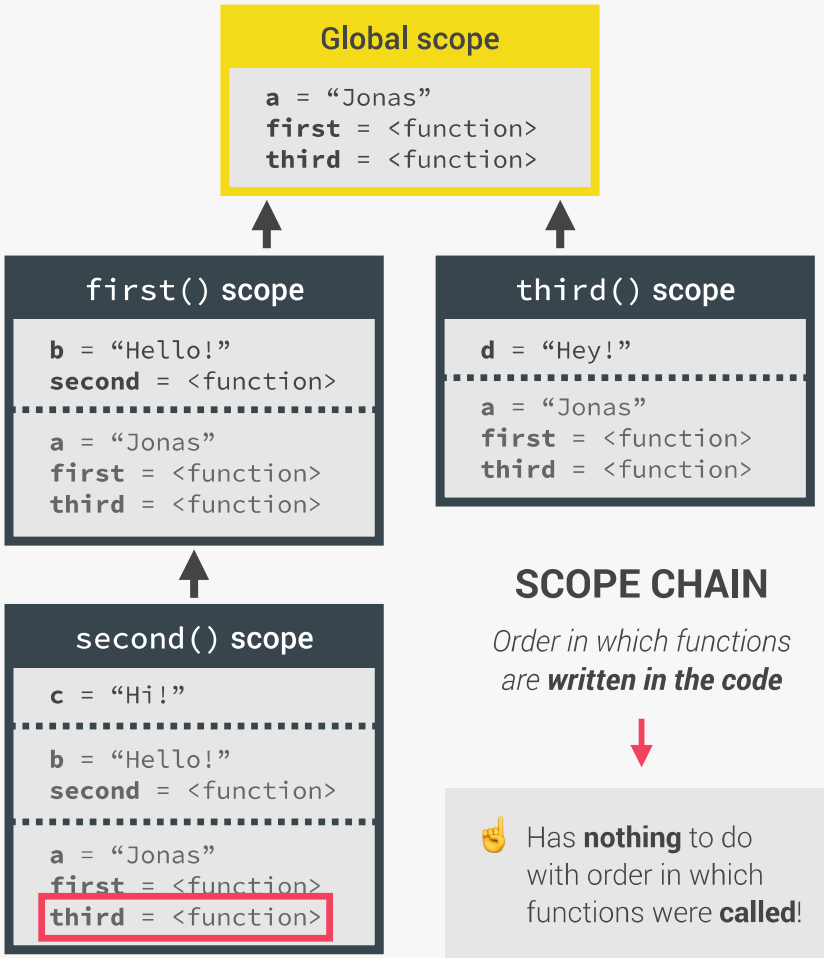
c and b can NOT be found in third() scope!

Variable environment (VE)




## CALL STACK

*Order in which functions were **called***




## SCOPE CHAIN

*Order in which functions are **written in the code***

☝ Has **nothing** to do with order in which functions were **called**!

# SUMMARY 🥳

- 👉 Scoping asks the question *"Where do variables live?"* or *"Where can we access a certain variable, and where not?"*;
- 👉 There are 3 types of scope in JavaScript: the global scope, scopes defined by functions, and scopes defined by blocks;
- 👉 Only `let` and `const` variables are block-scoped. Variables declared with `var` end up in the closest function scope;
- 👉 In JavaScript, we have lexical scoping, so the rules of where we can access variables are based on exactly where in the code functions and blocks are written;
- 👉 Every scope always has access to all the variables from all its outer scopes. This is the scope chain!
- 👉 When a variable is not in the current scope, the engine looks up in the scope chain until it finds the variable it's looking for. This is called variable lookup;
- 👉 The scope chain is a one-way street: a scope will never, ever have access to the variables of an inner scope;
- 👉 The scope chain in a certain scope is equal to adding together all the variable environments of the all parent scopes;
- 👉 The scope chain has nothing to do with the order in which functions were called. It does not affect the scope chain at all!