Let’s Learn JS Fundamentals

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Agenda – Part 1 (Basics)

- Learn variables & Data types
- Primitive vs Non primitive data types
- Null vs Undefined
- var vs let vs const
- Re-declaration and Re-assignment
- Scoping
- Hoisting

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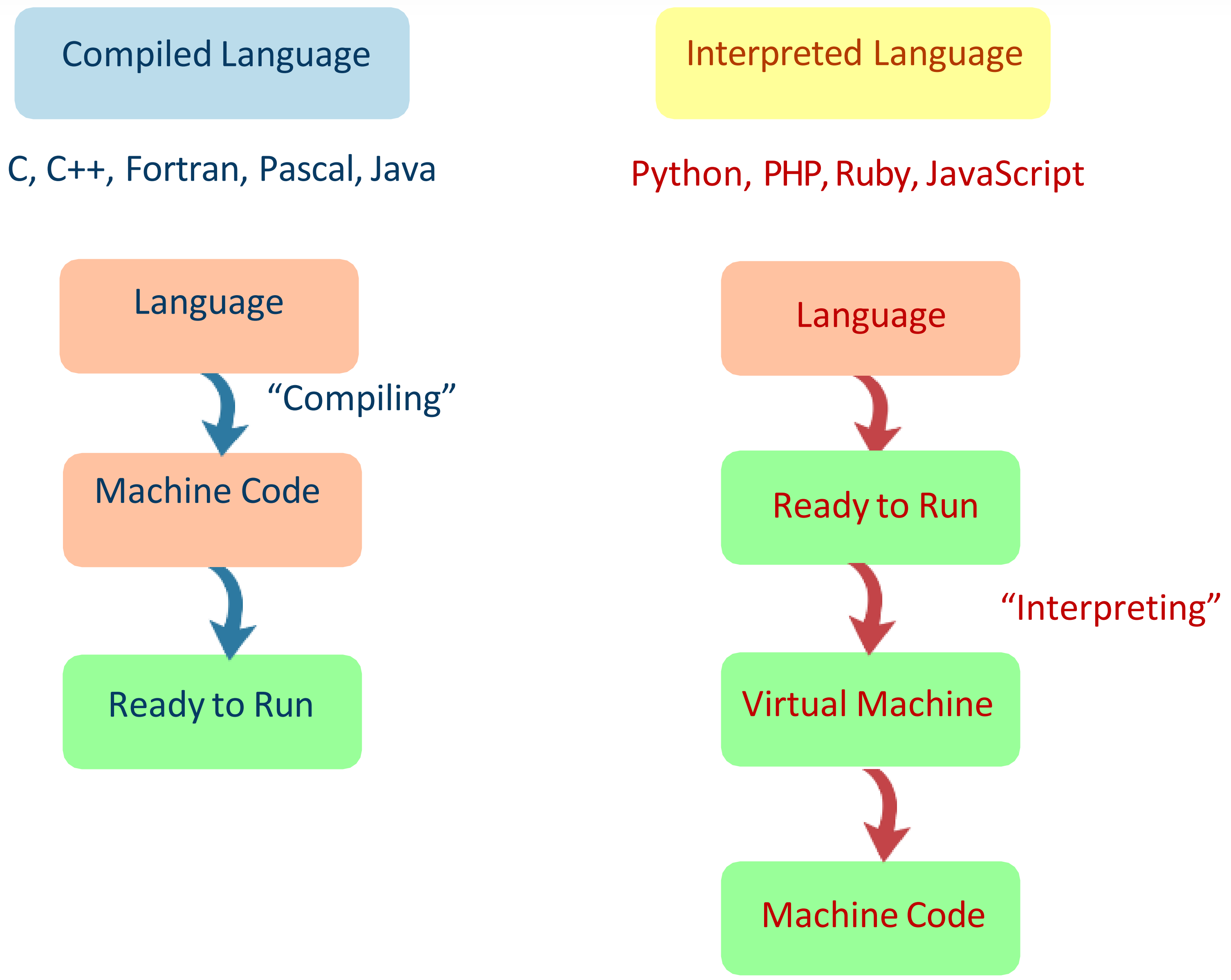
Compiled vs Interpreted language



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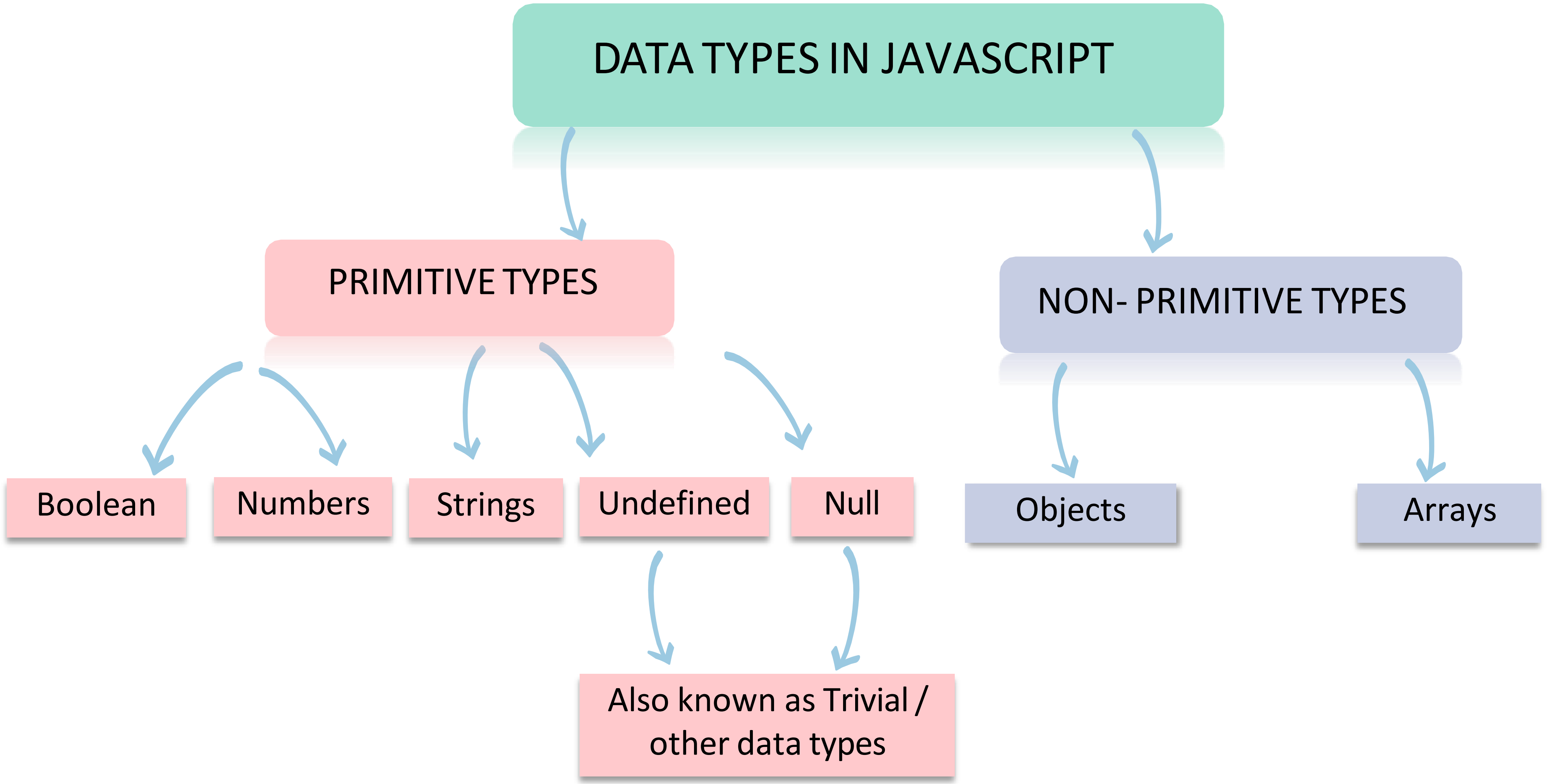
Understanding Data Types

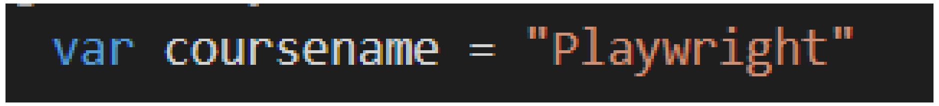


About **variable declaration**

- ❑ Variable declaration in JavaScript refers to the process of creating a named storage space in memory, which can hold a value.

- ❑ When a variable is declared, JavaScript allocates a memory location for that variable and initializes it with a default value (e.g., undefined for uninitialized variables).

- ❑ Example



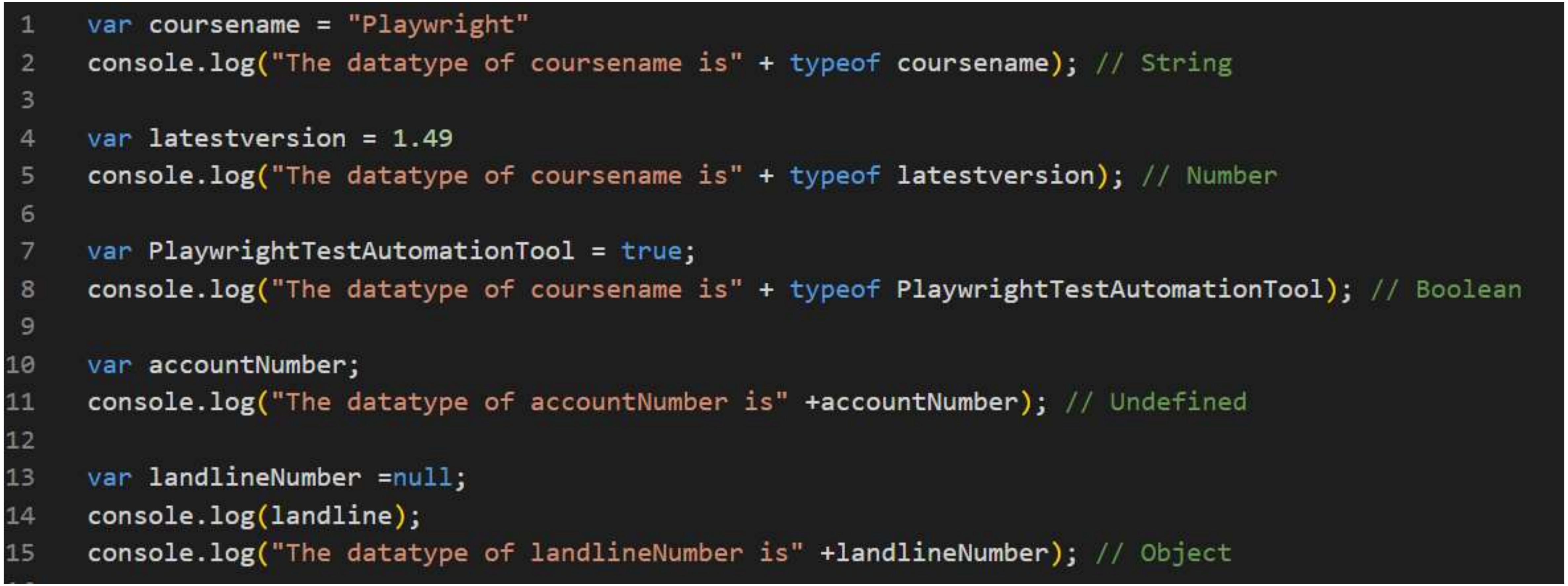
```
var coursename = "Playwright"
```

- var → variable keywords / variable declaration
- coursename → variable name
- = → assignment operator
- “ “ → Used to declare a string.
- Playwright → Value of the assigned to the variable.

About “**typeof**” operator

The **typeof** operator in JavaScript is used to determine the data type of a value or variable.
It returns a string that indicates the type of the operand.

Example :



```
var coursename = "Playwright"
console.log("The datatype of coursename is" + typeof coursename); // String

var latestversion = 1.49
console.log("The datatype of coursename is" + typeof latestversion); // Number

var PlaywrightTestAutomationTool = true;
console.log("The datatype of coursename is" + typeof PlaywrightTestAutomationTool); // Boolean

var accountNumber;
console.log("The datatype of accountNumber is" +accountNumber); // Undefined

var landlineNumber =null;
console.log(landline);
console.log("The datatype of landlineNumber is" +landlineNumber); // Object
```

Classroom on typeof operator :

Assignment Details:

Declare variables using `let` for different data types in JavaScript, and verify their types using `typeof`, including an uninitialized variable.

Assignment Requirements:

Create the following variables using let (not using var) and check their typeOf
a) firstName
b) companyName
c) mobileNumber
d) isAutomation
e) hasPlaywright (do not assign)

Print and confirm the values and data types

Hints to Solve:

Focus on initializing variables with different values, including a string, number, boolean, and leave one variable undefined to practice with `typeof`.

Expected Outcome:

Upon completion, you should be able to:
- Grasp the concepts of different data types in JavaScript

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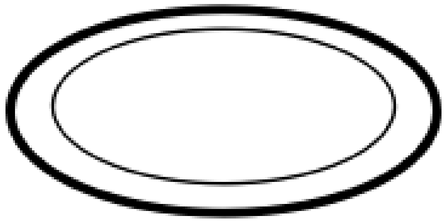
Null & Undefined in JS

Null

Undefined



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Difference between

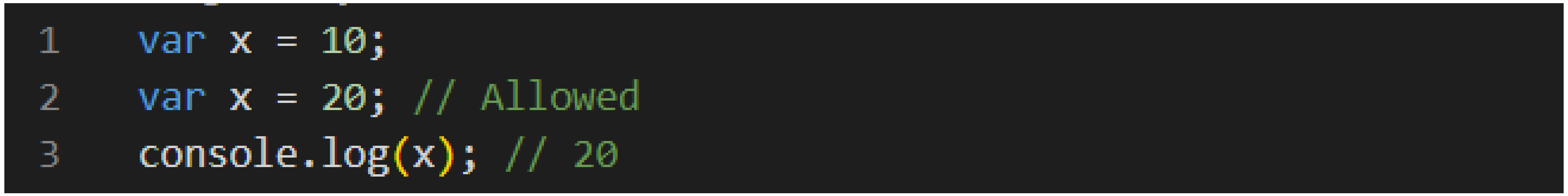
var vs let vs const

In terms of Re-declaration, Re-assignment, Scoping and Hoisting

Behavior of “var” keyword:

Redeclaration using var :

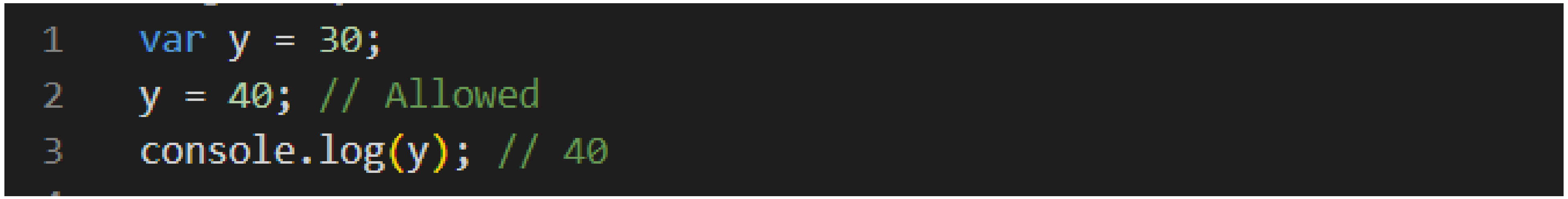
Variables declared with var can be redeclared within the same scope without throwing an error.



```
var x = 10;
var x = 20; // Allowed
console.log(x); // 20
```

Reassignment using var :

Variables declared with var can be reassigned to a new value at any time.

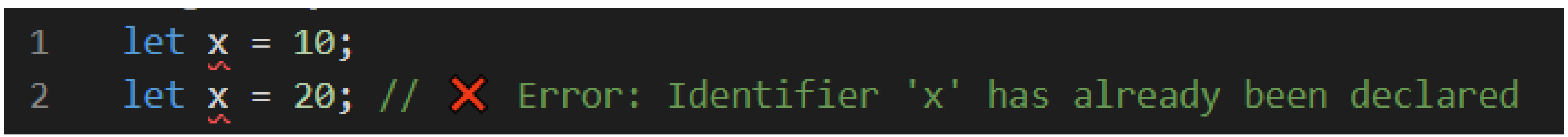


```
var y = 30;
y = 40; // Allowed
console.log(y); // 40
```

Behavior of “let” keyword:

Redeclaration in let :

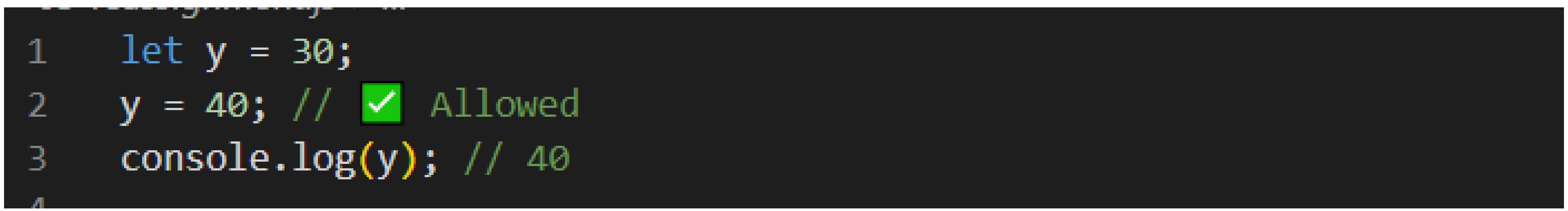
Variables declared with let cannot be redeclared in the same scope.



```
let x = 10;
let x = 20; // ❌ Error: Identifier 'x' has already been declared
```

Reassignment in let :

Variables declared with let can be reassigned new values.

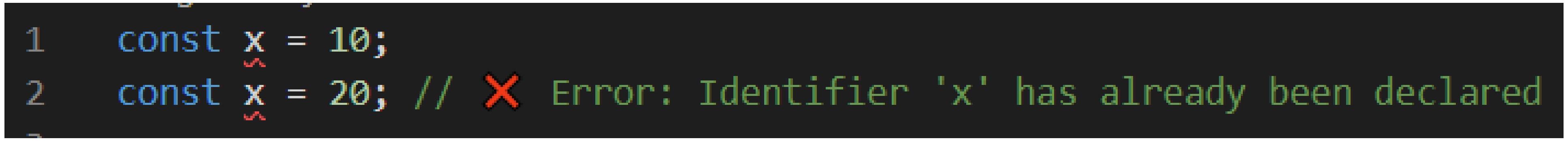


```
let y = 30;
y = 40; // ✅ Allowed
console.log(y); // 40
```

Behavior of “const” keyword:

Redeclaration in const :

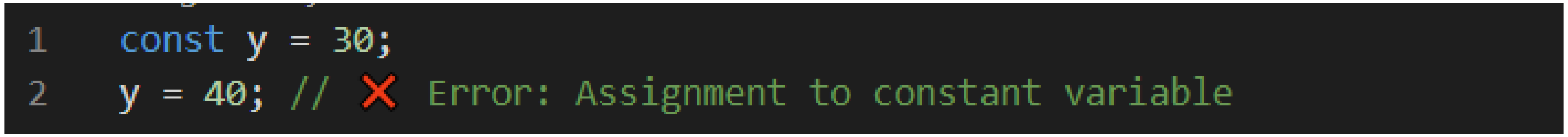
Variables declared with const cannot be redeclared in the same scope.



```
const x = 10;
const x = 20; // ❌ Error: Identifier 'x' has already been declared
```

Reassignment in const :

Variables declared with const cannot be reassigned after their initial assignment.



```
const y = 30;
y = 40; // ❌ Error: Assignment to constant variable
```

Hoisting

- Hoisting is a simple mechanism where the JavaScript interpreter moves the variable and function declarations to the top of the code block

```
console.log(x);                // Outputs: undefined

var x = 10;

console.log(x);                // Outputs: 10



                               // Outputs: "Hello, hoisting!"
```

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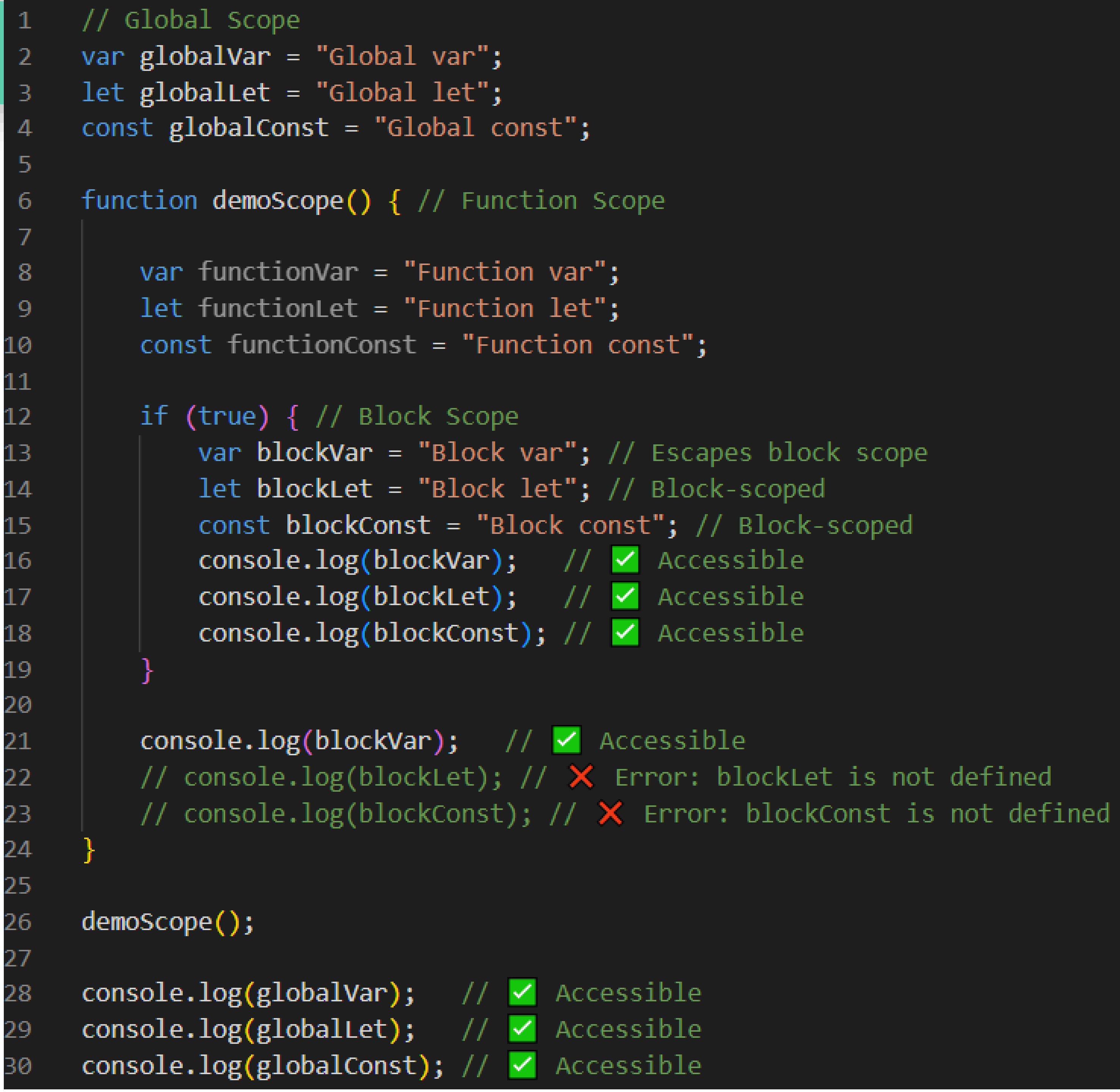
Scoping

- Scoping in JavaScript refers to the ***accessibility or visibility*** of variables in different parts of the code.

- Variables in JavaScript can be scoped ***globally, functionally, or block-level,*** depending on how they are declared (var, let, or const).

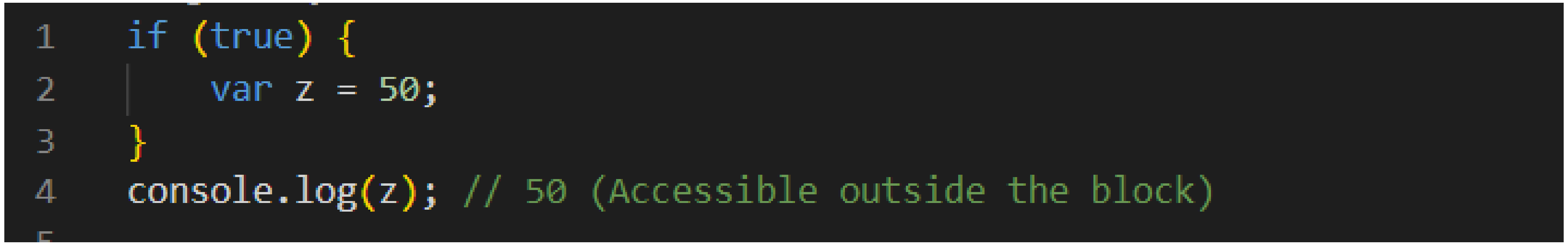


```
// Global Scope
var globalVar = "Global var";
let globalLet = "Global let";
const globalConst = "Global const";

function demoScope() { // Function Scope

    var functionVar = "Function var";
    let functionLet = "Function let";
    const functionConst = "Function const";

    if (true) { // Block Scope
        var blockVar = "Block var"; // Escapes block scope
        let blockLet = "Block let"; // Block-scoped
        const blockConst = "Block const"; // Block-scoped
        console.log(blockVar);   // ✅ Accessible
        console.log(blockLet);   // ✅ Accessible
        console.log(blockConst); // ✅ Accessible
    }

    console.log(blockVar);   // ✅ Accessible
    // console.log(blockLet); // ❌ Error: blockLet is not defined
    // console.log(blockConst); // ❌ Error: blockConst is not defined
}

demoScope();

console.log(globalVar);   // ✅ Accessible
console.log(globalLet);   // ✅ Accessible
console.log(globalConst); // ✅ Accessible
```

Behavior of “var” keyword:

Scoping in var :

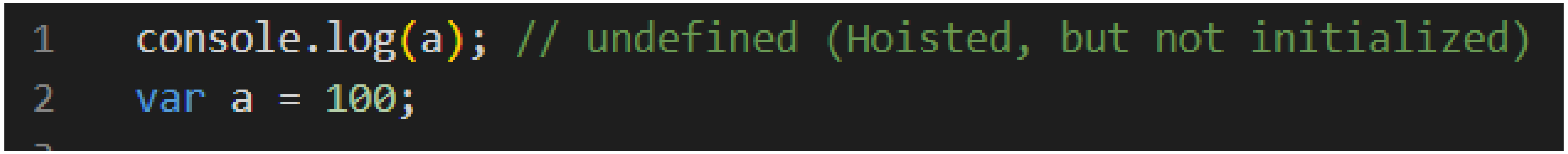
var is function-scoped, meaning it is accessible throughout the function where it is declared, even before its declaration due to hoisting.
However, it is not block-scoped, so it can "leak" outside block statements like if or for.



```
if (true) {
    var z = 50;
}
console.log(z); // 50 (Accessible outside the block)
```

Hoisting in var :

Variables declared with var are hoisted to the top of their function or global scope, but they are initialized as undefined.

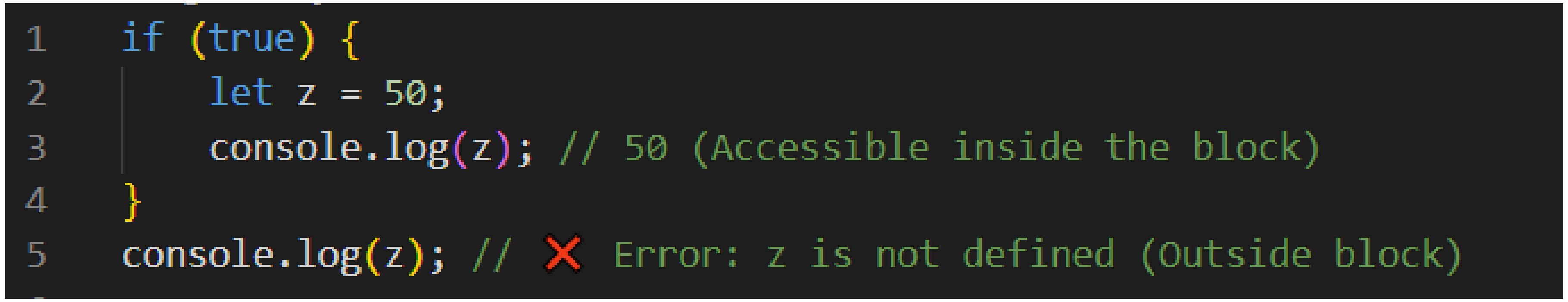


```
console.log(a); // undefined (Hoisted, but not initialized)
var a = 100;
```

Behavior of “let” keyword:

Scoping in let :

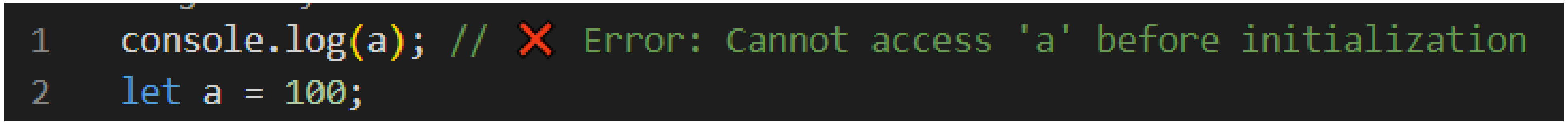
let is block-scoped, meaning it is only accessible within the block, statement, or expression where it is defined.



```
if (true) {
    let z = 50;
    console.log(z); // 50 (Accessible inside the block)
}
console.log(z); // ❌ Error: z is not defined (Outside block)
```

Hoisting in let :

Variables declared with let are hoisted, but they are not initialized.
Accessing them before their declaration results in a ReferenceError.

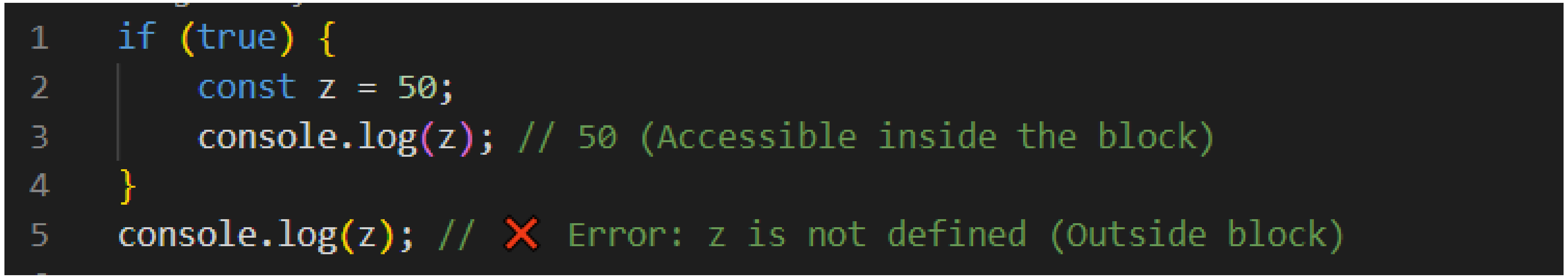


```
console.log(a); // ❌ Error: Cannot access 'a' before initialization
let a = 100;
```

Behavior of “const” keyword:

Scoping in const :

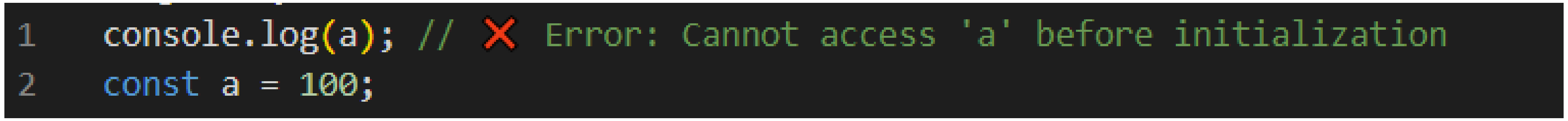
const is block-scoped, meaning it is only accessible within the block, statement, or expression where it is defined.



```
if (true) {
    const z = 50;
    console.log(z); // 50 (Accessible inside the block)
}
console.log(z); // ❌ Error: z is not defined (Outside block)
```

Hoisting in const :

Variables declared with const are hoisted, but they are not initialized.
Accessing them before their declaration results in a ReferenceError.



```
console.log(a); // ❌ Error: Cannot access 'a' before initialization
const a = 100;
```

Scoping sample program to understand better

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Comparison Summary Table: var, let, and const

Feature	`var`	`let`	`const`
Re-declaration	✅ Allowed in the same scope	❌ Not allowed in the same scope	❌ Not allowed in the same scope
Re-assignment	✅ Allowed	✅ Allowed	❌ Not allowed
Scoping	Function-scoped or global	Block-scoped	Block-scoped
Block Awareness	❌ Does not respect block scope	✅ Respects block scope	✅ Respects block scope
Hoisting	✅ Hoisted and initialized to `undefined`	✅ Hoisted but uninitialized (**TDZ applies**)	✅ Hoisted but uninitialized (**TDZ applies**)
TDZ (Temporal Dead Zone)	❌ No TDZ	✅ Exists (cannot access before declaration)	✅ Exists (cannot access before declaration)

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Classroom on keyword var, let, const behavior :

Assignment Details:

Declare a global variable and shadow it inside a function using both `var` and `let` to see how they behave differently when printed.

Assignment Requirements:

1. Declare a const name as browserVersion (global)
2. Assign value as Chrome
3. Create a function by name getBrowserVersion
4. Create if condition inside function to check if browser is chrome, then
5. Declare a local variable (browserVersion) and print that variable inside function (outside block)
6. Call that function from the javascript

Hints to Solve:

- Use 'var' first as block variable and then convert that as 'let'
- Confirm how it works

Expected Outcome:

Upon completion, you should be able to:

- Understand the concepts of var, let and const and the hoisting principles