JavaScript Hoisting

Hoisting is a concept that enables us to extract values of variables and functions even before initializing/assigning value without getting errors and this happens during the 1st phase (memory creation phase) of the Execution Context.

Features of Hoisting:

- In JavaScript, Hoisting is the default behavior of moving all the declarations at the top of the scope before code execution. Basically, it gives us an advantage that no matter where functions and variables are declared, they are moved to the top of their scope regardless of whether their scope is global or local.
- It allows us to call functions before even writing them in our code.

Note: JavaScript only hoists declarations, not initializations.

JavaScript allocates memory for all variables and functions defined in the program before execution.

Sequence of variable declaration: The following is the sequence in which variable declaration and initialization occur.

Declaration –> Initialisation/Assignment –> Usage

Variable lifecycle:

```
let a;                  // Declaration
a = 100;              // Assignment
console.log(a);  // Usage
```

However, since JavaScript allows us to both declare and initialize our variables simultaneously, so we can declare and initialize at the same time.

```
let a = 100;
```

Note: Always remember that in the background the Javascript is first declaring the variable and then initializing them. It is also good to know that variable declarations are processed before any code is executed.

However, in javascript, undeclared variables do not exist until the code assigning them is executed. Therefore, assigning a value to an undeclared variable implicitly creates it as a global variable when the assignment is executed. This means that all undeclared variables are global variables.

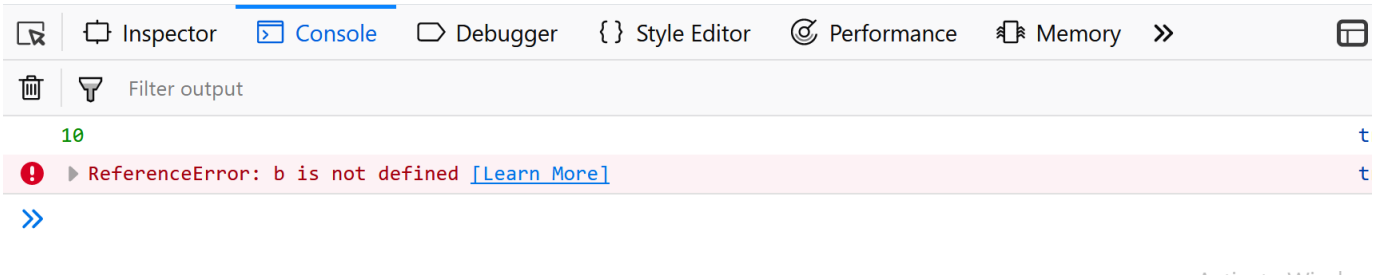
Example:

Javascript

```
// Hoisting
function codeHoist(){
    a = 10;
    let b = 50;
}
codeHoist();

console.log(a); // 10
console.log(b); // ReferenceError : b is not defined
```

Output:



Explanation: In the above code, we created a function called codeHoist() and in there we have a variable that we didn't declare using let/var/const and a let variable b. The undeclared variable is assigned the global scope by javascript hence we are able to print it outside the function, but in case of the variable b the scope is confined and it is not available outside and we get a ReferenceError.

Note: There's a difference between ReferenceError and undefined errors. An undefined error occurs when we have a variable that is either not defined or explicitly defined as type undefined. ReferenceError is thrown when trying to access a previously undeclared variable.

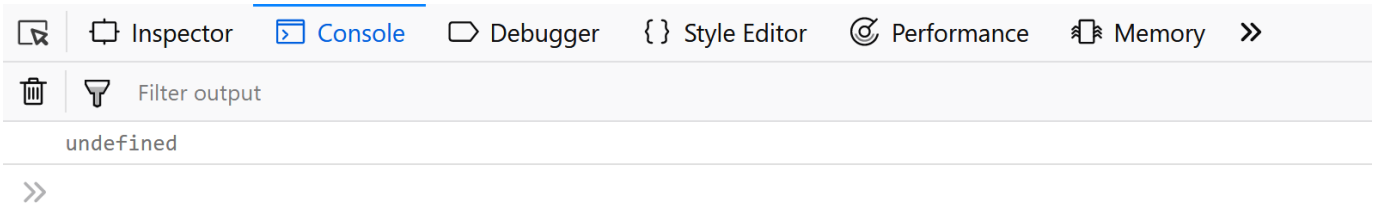
JavaScript var of ES5: When we talk about ES5, the variable that comes into our minds is var. Hoisting with var is somewhat different. When it is compared to let/const. Let's make use of var and see how hoisting works.

Example:

Javascript

```
// var code (global)
console.log(name); // undefined
let name = 'Mukul Latiyan';
```

Output:



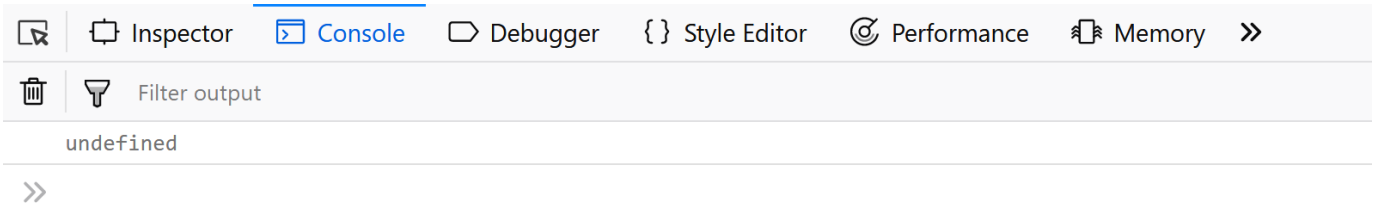
Explanation: In the above code we tried to console the variable name which was declared and assigned later, the compiler gives us *undefined* which we didn't expect as we should have gotten *ReferenceError* as we were trying to use the name variable even before declaring it.

But the interpreter sees this differently, the above code is seen like this:

Javascript

```
// how interpreter sees the above code
let name;
console.log(name); // undefined
name = 'Mukul Latiyan';
```

Output:



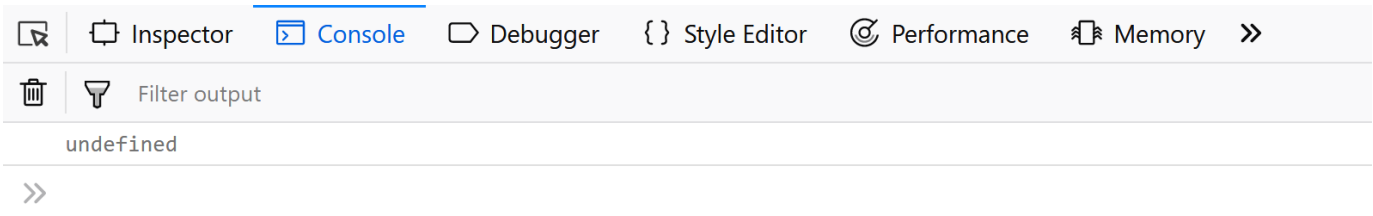
Function scoped variable: Let's look at how function-scoped variables are hoisted.

Example:

Javascript

```
// Function scoped
function fun(){
    console.log(name);
    let name = 'Mukul Latiyan';
}
fun(); // Undefined
```

Output:



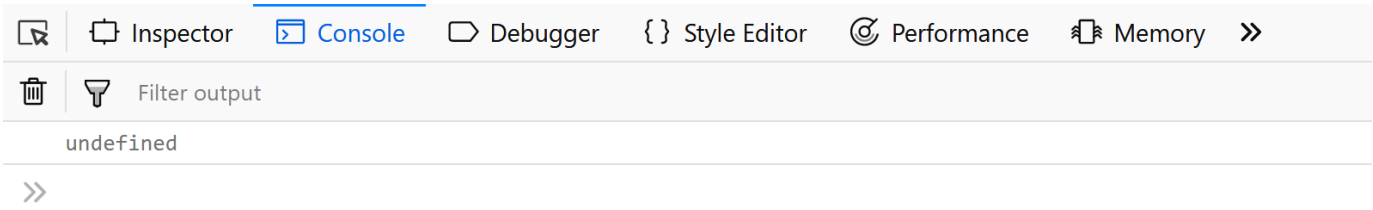
globally.

Example: We get undefined as the code seen by the interpreter.

Javascript

```
function fun(){
    let name;
    console.log(name);
    name = 'Mukul Latiyan';
}
fun(); // undefined
```

Output:



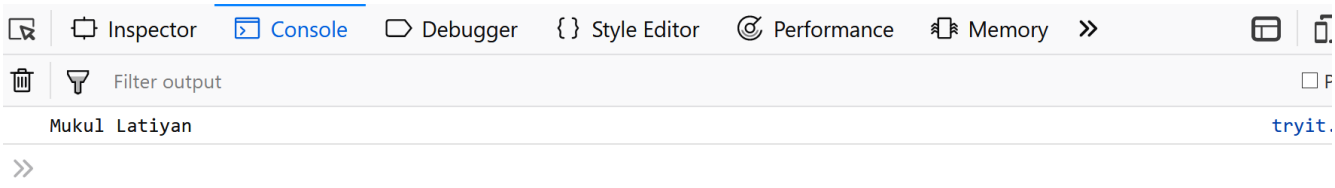
In order to avoid this pitfall, we can make sure to **declare and assign the variable at the same time, before using it.**

Example:

Javascript

```
// in order to avoid it
function fun(){
    let name = 'Mukul Latiyan';
    console.log(name); // Mukul Latiyan
}
fun();
```

Output:



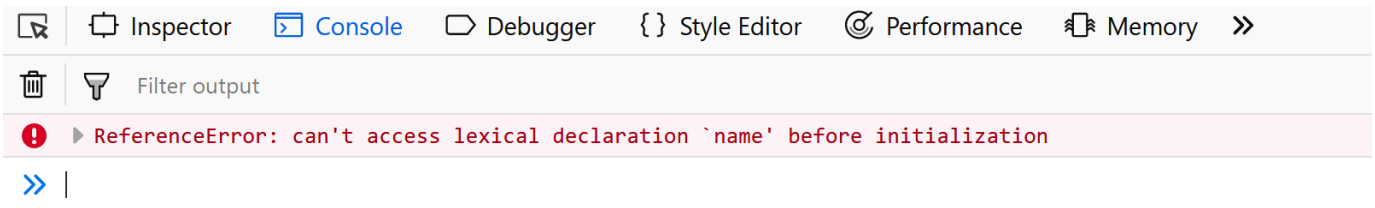
JavaScript Let of ES6: We know that variables declared with let keywords are block scoped not function scoped and hence there is no problem when it comes to hoisting.

Example:

Javascript

```
//let example(global)
console.log(name);
let name='Mukul Latiyan'; // ReferenceError: name is not defined
```

Output:



Explanation: Like before, for the var keyword, we expect the output of the log to be undefined. However, since the es6 let doesn't take kindly on us using undeclared variables, the interpreter explicitly spits out a Reference error. This ensures that we always **declare** our variable first.

JavaScript const of ES6: It behaves similarly to let when it comes to hoisting. A **function** as a whole can also be hoisted and we can call it before the declaration.

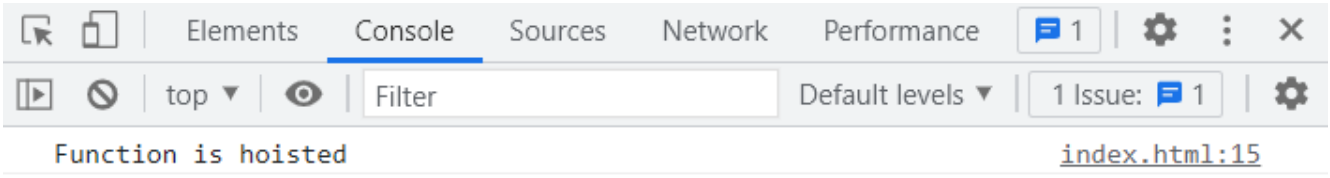
Example:

Javascript

```
fun(); // Calling before declaration

function fun(){ // Declaring
    console.log("Function is hoisted");
}
```

Output:



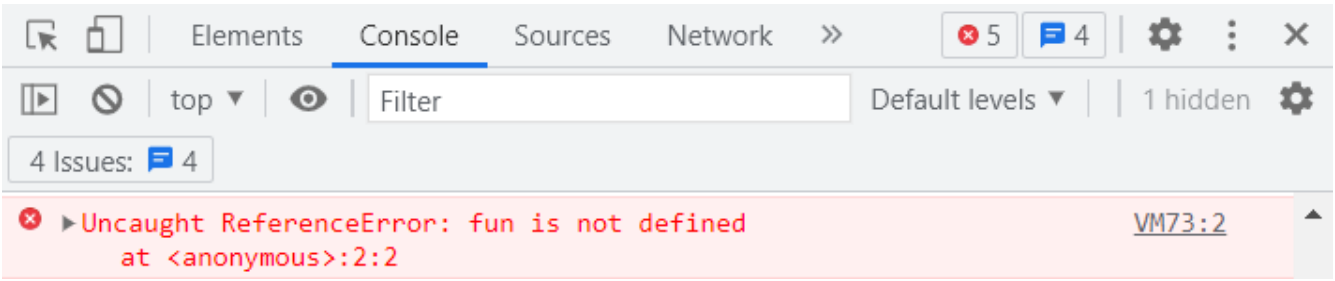
Also, if a function is used as an **expression** and we try to access it before the assignment an error will occur as only declarations are hoisted.

Example:

Javascript

```
fun() // Calling the expression

let fun = () =>{ // Declaring
    let name = 'Mukul Latiyan';
    console.log(name);
}
```



However, if var is used in the expression instead of let we will get the following Type Error as follows.

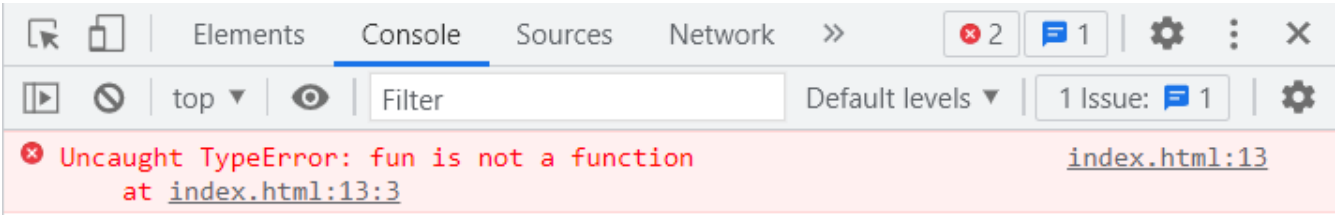
Example:

Javascript

```
fun() // Calling the expression

let fun = () =>{ // Declaring
    let name = 'Mukul Latiyan';
    console.log(name);
}
```

Output:



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