Var / let / const keywords

# VAR

Before the advent of ES6, var declarations ruled as King. There are issues associated with variables declared with var though. That is why it was necessary for new ways to declare variables to emerge. First though, let us get to understand var more before we discuss one of such issues.

## Scope of var

**Scope** essentially means where these variables are available for use. var declarations are globally scoped or function/locally scoped. It is globally scoped when a var variable is declared outside a function. This means that any variable that is declared with var outside a function block is available for use in the whole window. var is function scoped when it is declared within a function. This means that it is available and can be accessed only within that function.  
To understand further, look at the example below.

var greeter = "hey hi";

function newFunction() {

var hello = "hello";

}

Here, greeter is globally scoped because it exists outside a function while hello is function scoped. So we cannot access the variable hello outside of a function. So if we do this:

var tester = "hey hi";

function newFunction() {

var hello = "hello";

}

console.log(hello); // error: hello is not defined

We'll get an error which is as a result of hello not being available outside the function.

## var variables can be re-declared and updated

That means that we can do this within the same scope and won't get an error.

var greeter = "hey hi";

var greeter = "say Hello instead";

and this also

var greeter = "hey hi";

greeter = "say Hello instead";

## Hoisting of var

Hoisting is a JavaScript mechanism where variables and function declarations are moved to the top of their scope before code execution. What this means is that if we do this:

console.log (greeter);

var greeter = "say hello"

it is interpreted as this

var greeter;

console.log(greeter); //greeter is undefined

greeter = "say hello"

So var variables are hoisted to the top of its scope and initialized with a value of undefined.

## Problem with var

There's a weakness that comes with var. I'll use the example below to explain this.

var greeter = "hey hi";

var times = 4;

if (times > 3) {

var greeter = "say Hello instead";

}

console.log(greeter) //"say Hello instead"

So, since times > 3 returns true, greeter is redefined to "say Hello instead". While this is not a problem if you knowingly want greeter to be redefined, it becomes a problem when you do not realize that a variable greeter has already been defined before.   
If you have use greeter in other parts of your code, you might be surprised at the output you might get. This might cause a lot of bugs in your code. This is why the let and const is necessary.

# LET

let is preferred for variable declaration now. It's no surprise as it comes as an improvement to the var declarations. It also solves this problem that was raised in the last subheading. Let's consider why this is so.

## let is block scoped

A block is chunk of code bounded by {}. A block lives in curly braces. Anything within curly braces is a block. So a variable declared in a block with the let is only available for use within that block. Let me explain this with an example.

let greeting = "say Hi";

let times = 4;

if (times > 3) {

let hello = "say Hello instead";

console.log(hello);//"say Hello instead"

}

console.log(hello) // hello is not defined

We see that using hello outside its block(the curly braces where it was defined) returns an error. This is because let variables are block scoped .

## let can be updated but not re-declared.

Just like var, a variable declared with let can be updated within its scope. Unlikevar, a let variable cannot be re-declared within its scope. So while this will work,

let greeting = "say Hi";

greeting = "say Hello instead";

this will return an error.

let greeting = "say Hi";

let greeting = "say Hello instead";//error: Identifier 'greeting' has already been declared

However, if the same variable is defined in different scopes, there will be no error.

let greeting = "say Hi";

if (true) {

let greeting = "say Hello instead";

console.log(greeting);//"say Hello instead"

}

console.log(greeting);//"say Hi"

Why is there no error? This is because both instances are treated as different variables since they have different scopes.

This fact makes let a better choice than var. When using let, you don't have to bother if you have used a name for a variable before as a variable exists only within its scope. Also, since a variable cannot be declared more than once within a scope, then the problem discussed earlier that occurs with var does not occur.

Hoisting of let  
Just like var, let declarations are hoisted to the top. Unlike var which is initialized as undefined, the let keyword is not initialized. So if you try to use a let variable before declaration, you'll get a Reference Error.

# CONST

Variables declared with the const maintain constant values. const declarations share some similarities with let declarations.

## const declarations are block scoped

Like let declarations, const declarations can only be accessed within the block it was declared.

## const cannot be updated or re-declared

This means that the value of a variable declared with const remains the same within its scope. It cannot be updated or re-declared. So if we declare a variable with const, we can neither do this

const greeting = "say Hi";

greeting = "say Hello instead";//error : Assignment to constant variable.

nor this

const greeting = "say Hi";

const greeting = "say Hello instead";//error : Identifier 'greeting' has already been declared

Every const declaration therefore, must be initialized at the time of declaration.  
This behavior is somehow different when it comes to objects declared with const. While a const object cannot be updated, the properties of this objects can be updated. Therefore, if we declare a const object as this

const flow = {

message : "say Hi",

times : 4

}

while we cannot do this

const greeting = {

words : "Hello",

number : "five"

}//error : Assignment to constant variable.

we can do this

greeting.message = "say Hello instead";

This will update the value of greeting.message without returning errors.

## Hoisting of const

Just like let, const declarations are hoisted to the top but are not initialized.

Summary

So just in case, you missed the differences, here they are :

1. var declarations are globally scoped or function scoped while let and const are block scoped.
2. var variables can be updated and re-declared within its scope; let variables can be updated but not re-declared; const variables can neither be updated nor re-declared.
3. They are all hoisted to the top of their scope but while varvariables are initialized with undefined, let and const variables are not initialized.
4. While var and let can be declared without being initialized, const must be initialized during declaration.