`var` **vs** `let` **vs** `const`

The current state of things

- Up to this point we've been using `var` to declare new variables that we can later re-assign to
- This has worked fine for the most part, but there are some issues with `var`
- However, these issues can't just be fixed, since old code may rely on them
- Thus, new keywords were created that handle those issues

Problem #1: Scoping

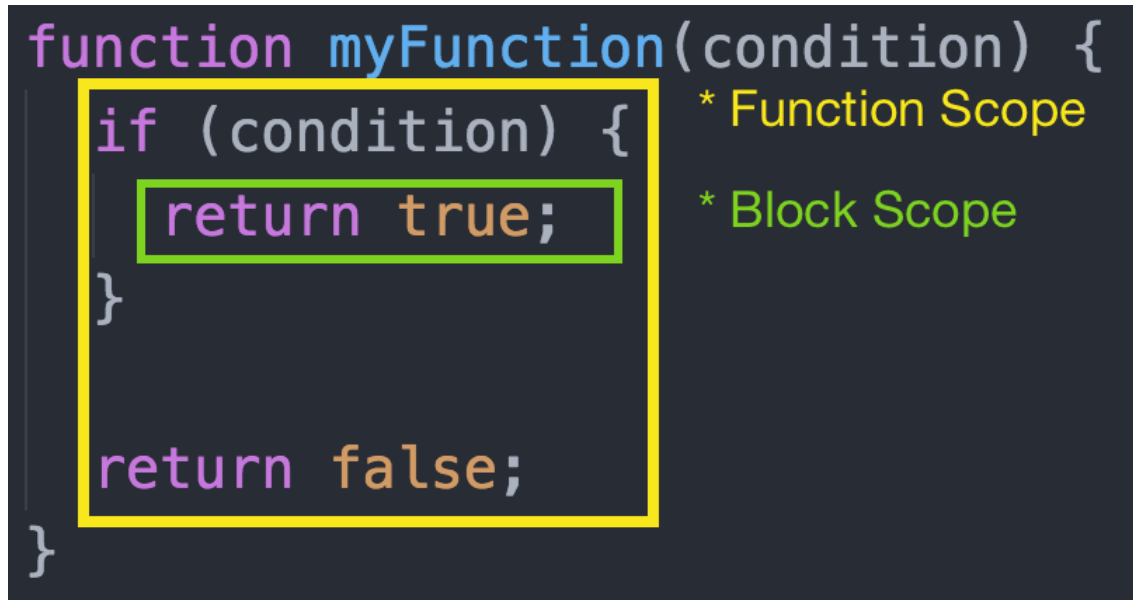
Take this code sample, what would you expect to happen?

```
for (var i = 0; i < 5; i++) {
    var text = "The loop count is " + i + 1;
}

// text should be undefined... or should it?
console.log(text);
```

Problem #1: Scoping (cont.)

The issue is that `var` declares things at the *function* level, not the *block* level. Anything declared inside of a function (or globally, if not in a function) are available. That also means it can be **overridden** anywhere in the function.



```
function myFunction(condition) {
  if (condition) {
    return true;
  }

  return false;
}
```

Problem #2: Redeclaring

If we're not keeping track of our code, we might accidentally re-declare a variable within the same scope. This is almost always indicative of a mistake, but `var` will let that happen.

```
var text = "hello";

// ... later that file

var text = "goodbye";
```

Introducing `let` and `const`

- Using either `let` or `const` will limit you to the current *block* level scoping, and any lower scopes.
- They also cannot be redeclared *within the same scope*. This will result in an error.
- `let` variables can be reassigned, just like var
- `const` variables **cannot** be reassigned, they must keep their initial value

Example 1: For loop

```
// This will mistakenly print "4" "4" "4" "4" "4"
for (var i = 0; i < 5; i++) {
    setTimeout(function() {
        console.log(i);
    }, i * 1000);
}

// This will correctly print "0" "1" "2" "3" "4"
for (let i = 0; i < 5; i++) {
    setTimeout(function() {
        console.log(i);
    }, i * 1000);
}
```

Example 2: Declaring in conditionals

```
if (condition) {
    var something = true;
}

if (something) {
    console.log("condition was true!");
}

/* ↑ var ********* let ↓ */

let something;
if (condition) {
    something = true;
}

if (something) {
    console.log("condition was true!");
}
```

Example 3: Reassigning `const`

```
const text = "hello";
text = "goodbye";
// This will result in an error!

const obj = { attr: true };
obj.attr = false;
// This is fine, since it's still the same object
```

Why use `const` at all?

- Some people question the value of it. After all, they function the same whether or not I re-assign, right?
- As good developers, it's our job to try and make our code as clear as possible.
- Letting other developers know this variable is expected to stay the same is a valuable communication tool.
- Therefore, we should take advantage of that and use `const`.

Caveats

- Our new friends `let` and `const` don't have 100% browser support yet, which is why we started with `var`
- However, since node doesn't run in browsers, we don't have to worry about that
- Therefore, **all futher node code should be written using `let` and `const`** as they have the more 'correct' behavior
- We'll handle this compatibility problem on the web soon, but get used to the differences for now