

# Lecture III



Compiler-man

# Example

```
var a = 2;
```

```
var b = 2;
```

```
console.log(a + b);
```

# Recap of the previous lecture

# Scope in ES3 World

# The Scope of a Variable

The scope of a variable are the locations where it is accessible.

For example:

```
function foo() {  
    var x;  
}
```

Scope - is a logical boundaries in which a variable (or expression) has its meaning.

For example, a global variable, a local variable, etc, which generally reflects a logical range of a variable lifetime.

# Scope can be nested

```
function f() {  
    var x = 2;  
    function g()  
    {  
        var y = 3;  
        alert(x +  
y);  
    }  
}
```



# Nested Scope

```
function f() {  
  var x = 2;  
  function g()  
  {  
    var y = 3;  
    alert(x +  
y);  
  }  
}
```

outer scope

inner scope

The diagram shows a code snippet with two nested function scopes. The outer function 'f()' is enclosed in a large left-facing curly bracket labeled 'outer scope'. Inside 'f()', the inner function 'g()' is enclosed in a smaller right-facing curly bracket labeled 'inner scope'. The code is as follows:  
`function f() {  
 var x = 2;  
 function g()  
 {  
 var y = 3;  
 alert(x +  
y);  
 }  
}`

# Shadowing

```
var scope = "global ";    // A global variable
function outer() {
    var scope = "outer";  // A outer variable
    function inner() {
        var scope = "inner";
        document.write(scope);    // Prints "inner"
    }
    inner();
}
outer();
```

# Shadowing

```
var scope = "global ";    // A global variable
function outer() {
    var scope = "outer";  // A outer variable
    function inner() {
        document.write(scope);    // Prints "outer"
    }
    inner();
}
outer();
```

# Shadowing

```
var scope = "global ";    // A global variable
function outer() {
    function inner() {
        document.write(scope);    // Prints "global"
    }
    inner();
}
outer();
```

```
function X() {  
  var a = 3, b = 5;  
  function foo () {  
    var b = 7, c = 11;  
    a += b + c;  
  };  
  foo();  
  alert("a = " + a + "; b = " + b);  
}  
X();
```

```
var x = function(){  
  alert(x.toString());  
}  
x();
```

# Hoisting

JavaScript *hoists* all variable declarations, it moves them to the beginning of their direct scopes.

# Hoisting

```
foo(); // undefined ("foo"  
and "bar" exist)
```

```
function foo() {  
    alert(bar);  
}
```

```
var bar;
```



```
function foo() {  
    alert(bar);  
}
```

```
var bar;
```

```
foo(); // undefined
```

# Hoisting

```
var scope = "global ";  
function f() {  
    alert(scope);  
    var scope = "local";  
    alert(scope);  
}  
f();
```

```
var scope = "global ";  
function f() {  
    var scope;  
    alert(scope);  
    scope = "local";  
    alert(scope);  
}  
f();
```



# Only functions introduce new scopes

## No block scope

```
function f() {  
  { // block starts  
    var foo = 4;  
  } // block ends  
  console.log(foo);  
// 4  
}
```

# No block scope!

```
function test(o) {  
  var i = 0;    // i is defined throughout function  
  if (typeof o == "object") {  
    var j = 0;  // j is defined everywhere, not just block  
  
    for(var k=0; k < 10; k++) { // k is defined everywhere, not just loop  
      console.log (k);  
    }  
  
    console.log (k); // k is still defined: prints 10  
  }  
  console.log (j); // j is defined, but may not be initialized  
}
```

# Hoisting

```
var foo = 1;  
  
function bar() {  
  if (!foo) {  
    var foo = 10;  
  }  
  alert(foo);  
}  
  
bar();
```

# Code in global scope

Index.html

```
<!DOCTYPE html>
<html>
<head>
  <title>Untitled Page</title>
  <script type="text/javascript" src="script.js"></script>

</head>
<body>
  <script type="text/javascript">
    var a = 5;
    var b = 2;

    function sum(x, y) {
      return x + y;
    }

    function mul(x, y) {
      return x * y;
    }
  </script>
</body>
</html>
```

script.js

```
var gloabalVar = 5;
function square(x) {
  return x * x;
}
```

# Global namespace

Every variable is global unless it's in a function and is declared with **var**

```
function f(){  
    x = "global variable";  
}  
f();
```

# Global object (WAT)

```
function f(){  
  x = "global variable"; // var is missed  
}  
f();  
this.x === "global variable";  
window.x === "global variable"; // true for browsers
```

# window vs global

```
(function (glob) {  
    // glob points to global object  
})(typeof window !== 'undefined' ? window :  
global));
```

# Global variables are evil

- They are less robust, behave less predictably, and are less reusable.
- Name clashes. Your code, built-ins, analytics code, social media buttons use the same global scope.



# Globals

```
// antipattern
function sum(x, y) {
  // implied global
  result = x + y;
  return result;
}

// antipattern
function foo() {
  var a = b = 0;
  // ...
}

// preferred
function foo() {
  var a, b;
  // ...
  a = b = 0; // both local
}
```

```
<script>  
  if ("a" in window) == false) {  
    var a = 1;  
  }  
  alert(a);  
</script>
```

# Working with global

`window.foo`

```
if (window.foo) { ... }
```

```
if ("foo" in window) { ... }
```

```
if (typeof "foo" !== "undefined") {  
... }
```

# Namespaces

```
if (window.myNamespace == null){  
    window.myNamespace = {};  
}
```

```
window.myNamespace.myFunction = function( /* params */ ) {  
    /* code here */  
};
```

immediately invoked function  
expression and ES6 Modules  
in next lectures

# REFERENCES

**JavaScript: The Definitive Guide, Six Edition**  
by David Flanagan

**Speaking JavaScript: An In-Depth Guide for Programmers**  
by Dr. Axel Rauschmayer

<http://dmitrysoshnikov.com>

<http://learn.javascript.ru>

