Variables, Types and Scope

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Module Overview

Hoisting

Primitive Types

undefined and null

Global Scope

Function Scope

Block Scope

Hoisting

Two Pass Compilation in JavaScript

Pass 1

All declarations are located and identifiers are known by the compiler.

Pass 2

Execution occurs in Pass 2.
Because all variables are known
from Pass 1, they may be
accessed before they're
declared.

Hoisting

The word "hoisting" is used to describe this behavior because it's as if the declarations are lifted (hoisted) to the top of the function before execution.

Hoisting

Hoisted variables are initialized
to undefined.

```
console.log(productId);
```

What shows in the console?

```
ReferenceError:
productId is not
defined
```

```
console.log(productId);

var productId = '9000';
```

What shows in the console?

undefined

```
var total = price * quantity;
var price = 3.00;
var quantity = 5;

console.log(total);
```

What shows in the console?

NaN

```
showProduct();

function showProduct() {
    console.log('Showing a Product');
}
```

What shows in the console?

Showing a Product

```
showProduct();

var showProduct = function () {
    console.log('Showing a Product');
}
```

What shows in the console?

TypeError: showProduct is not a function

```
var showProduct = function () {
    console.log('Showing a Product');
}

showProduct();
```

What shows in the console?

Showing a Product

```
showProduct();

function showProduct() {
    console.log('Showing a Product');
}
```

What shows in the console?

Showing a Product

Numbers

```
var quantity = 2;
var price = 0.99;
console.log(quantity * price);
```

What shows in the console?

1.98

```
var price = "0.99";
console.log(typeof price);
```

What shows in the console?

string

```
var oct = 070;
console.log(oct);
```

What shows in the console?

56

```
var oct = 088;
console.log(oct);
```

What shows in the console?

88

```javascript
'use strict';
var oct = 070;
console.log(oct);
```

What shows in the console?

SyntaxError

```
var hex = 0x10;
console.log(hex);
```

What shows in the console?

16

```
var value = 3.2e4;
console.log(value);
```

What shows in the console?

32000

```javascript
var value = 3.2e-4;
console.log(value);
```

What shows in the console?

```
0.00032
```

```
console.log(Number.MAX_VALUE);
```

What shows in the console?

1.7976931348623157e+308

```
console.log(Number.MIN_VALUE);
```

What shows in the console?

5e-324

```
var n = Number.MAX_VALUE * 2;
console.log(n);
```

What shows in the console?

A nswer

Infinity

```
var n = Infinity;
console.log(typeof n);
```

What shows in the console?

number

```
var n = -Infinity;
console.log(n);
```

What shows in the console?

-Infinity

```
console.log(Number.POSITIVE_INFINITY + ' ' +
            Number.NEGATIVE_INFINITY);
```

What shows in the console?

Answer

Infinity -Infinity

```
var count;
var price = 5.00;

console.log(price / count);
```

What shows in the console?

NaN

```
console.log(typeof NaN);
```

What shows in the console?

number

```
var n = NaN;
if (isNaN(n))
    console.log('NaN!');
```

What shows in the console?

Answer

NaN!

Strings

```
console.log("Hello" + ' world!');
```

What shows in the console?

```
Hello world!
```

```
console.log("The order is \"In Progress\"");
```

What shows in the console?

```
The order is "In
Progress"
```

```
console.log('Nike\'s Order');
```

What shows in the console?

```
Nike's Order
```

```
var productType = 'Hardware';
console.log(productType.length);
```

uestion

What shows in the console?

A nswer

8

```
var productType = '  Hardware   ';
console.log('[' + productType.trim() + ']');
```

What shows in the console?

[Hardware]

```
var productType = '   Hardware    ';
productType.trim();
console.log('[' + productType + ']');
```

What shows in the console?

[Hardware   ]

```
var productType = 'Hardware';
console.log(productType.toLowerCase());
```

What shows in the console?

hardware

```
var productType = 'Hardware';
console.log(productType.toUpperCase());
```

What shows in the console?

HARDWARE

Boolean Values

```
var isSpecial = true;
if (isSpecial)
    console.log("It's true!");
```

Question

What shows in the console?

A nswer

It's true!

```
var isSpecial = True;
if (isSpecial)
    console.log("It's true!");
```

What shows in the console?

ReferenceError: True is not defined

```
console.log( Boolean("Hello") );
```

What shows in the console?

Answer

true

```
console.log( Boolean("") );
```

What shows in the console?

Answer

```
false
```

```
console.log( Boolean(" ") );
```

What shows in the console?

true

```
console.log( Boolean(6) );
```

What shows in the console?

Answer

true

```
console.log( Boolean(0) );
```

What shows in the console?

Answer

```
false
```

```
console.log( Boolean(undefined) );
```

uestion

What shows in the console?

A nswer

false

```
console.log( Boolean(null) );
```

What shows in the console?

Answer

```
false
```

```
var value = 99.99;
console.log(typeof !!value );
```

What shows in the console?

boolean

```
var value = "no value";
console.log( !!value );
```

What shows in the console?

true

undefined and null

```
var productId;

console.log(typeof productId);
```

What shows in the console?

undefined

```
//var productId;

console.log(typeof productId);
```

What shows in the console?

undefined

```
var productId = null;

console.log(typeof productId);
```

What shows in the console?

object

```
console.log(typeof null);
```

What shows in the console?

object

```
console.log(undefined == null);
```

What shows in the console?

Answer

true

```
console.log(undefined === null);
```

What shows in the console?

false

Global Scope

```
var productId = 'PRD-2000';

console.log(productId);
console.log(window.productId);
```

What shows in the console?

PRD-2000

PRD-2000

```
console.log(this === window);
```

What shows in the console?

true

```javascript
var description = 'hardware product';

function updateProduct() {
    description = 'updated product';
}

updateProduct();
console.log(description);
```

What shows in the console?

updated product

```
//var description = 'hardware product';

function updateProduct() {
    description = 'updated product';
}


updateProduct();
console.log(description);
```

What shows in the console?

Answer

updated product

```
'use strict';

//var description = 'hardware product';

function updateProduct() {
    description = 'updated product';
}

updateProduct();
console.log(description);
```

What shows in the console?

ReferenceError:
description is not
defined

Function Scope

```
var description = 'original product';

function updateProduct() {
    var description = 'updated product';
}

updateProduct();
console.log(description);
```

What shows in the console?

original product

```
function updateProduct() {

    var description = 'updated product';
    var updateProductId = function () {
        console.log(description);
    }


    updateProductId();
}


updateProduct();
```

What shows in the console?

updated product

```
var description = 'original product';

function updateProduct() {
    var description = 'updated product';
    var updateProductId = function () {
        console.log(description);
    }

    updateProductId();
}

updateProduct();
```

What shows in the console?

updated product

```
var description = 'original product';

function updateProduct() {

    var updateProductId = function () {
        console.log(description);
    }

    updateProductId();
}

updateProduct();
```

What shows in the console?

original product

```javascript
// var description = 'original product';

function updateProduct() {

    var updateProductId = function () {
        console.log(description);
    }

    updateProductId();
}

updateProduct();
```

What shows in the console?

Answer

RerefenceError:
description is not
defined

Block Scope

```
'use strict';

try {
    throw 123;
}
catch (e) {
    console.log(e);
}
```

What shows in the console?

123

```
'use strict';
console.log(e);
try {
    throw 123;
}
catch (e) {
}
```

What shows in the console?

ReferenceError: e is
not defined

```
'use strict';

try {
    console.log('in try:' + e);
    throw 123;
}
catch (e) {
    console.log(e);
}
```

What shows in the console?

ReferenceError: e is
not defined

```
'use strict';

console.log(insideCatch);
try {
    throw 123;
}
catch (e) {
    var insideCatch = 'insideCatch';
    console.log(e);
}
```

What shows in the console?

A nswer

undefined

123

```javascript
'use strict';
try {
    throw 'myArtificialBlockLevelVar'
}
catch (blockLevelVar) {
    // blockLevlVar is in block scope
    // …
};

console.log(blockLevelVar);
```

What shows in the console?

ReferenceError:
blockLevelVar is not
defined

Summary

- Hoisting

- Primitive Types (number, string and boolean)

- undefined and null

- Global Scope

- Function Scope

- Block Scope