JavaScript

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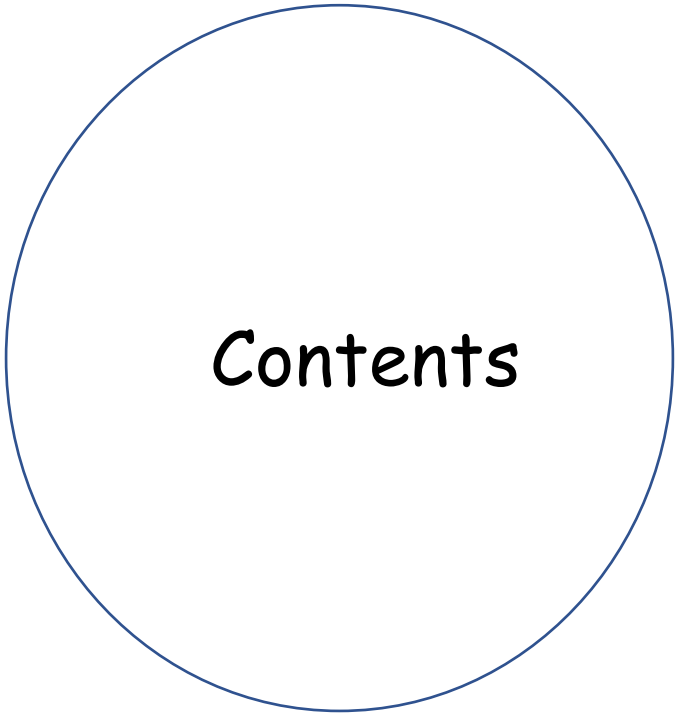
- Basics
  - How to create a js program?
  - Hello World
- Execution Context
- Hoisting
- Scope in JS
- Call Stack
- Syntax
- Arrays
  - For loop
- Anonymous Functions
- Arrow Functions
- Events



JavaScript is not Java

- A scripting language. We write it and run it.
- We saw it since mid 90s.
  - Brandon Eich of Netscape/Mozilla
- JavaScript, HTML & CSS is what we experience on the Internet.
- JavaScript runs in the client side
  - Say we want to check if the user enters passwords match during registration.

The Basics

- Create a file with .js
- Do not need code delimiters
- We include them in the script tag

```
1. <script src="your JavaScript.js"></script>
2. <script> Write the code here </script>
```

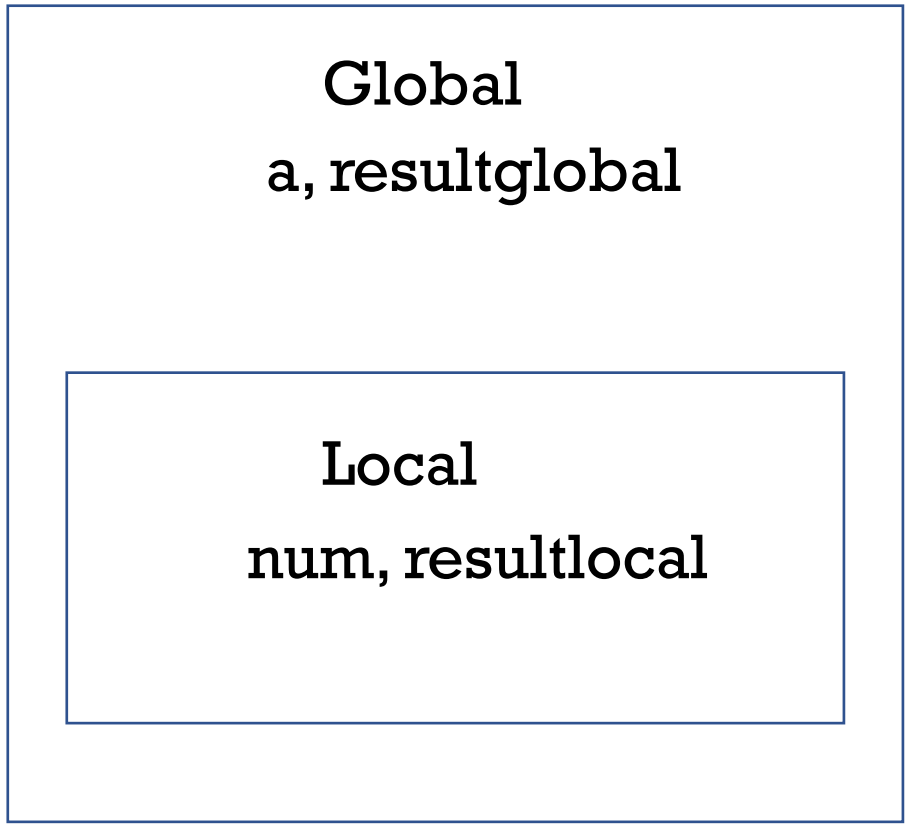
- We put the script in the same file or a different file.
- Put them in a separate file and link it using the script tag.
- Doing so looks good and is efficient.

```
<html>

<head> <title> Hello World</title> </head>

<body>



    <script>
            function doAnything(){
                alert('Hello World');
              }

          doAnything();
      </script>

</body>
</html>
```

Execution Context

- The browser sees our js code….
- Creates a box to run our code --- Execution context
  - That has our variables
  - That has our code
- Global & Local execution context
  - Functions are local and reside within the global context

Execution Context




```
var a = 2;

function add (num) {

  var resultlocal = num + 10;

}

var resultglobal = add(a);
```

Hoisting

```
1    console.log(x);
2
3    var x = 10;
```

```
PROBLEMS    OUTPUT    DE

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Debugger attached.
undefined
```

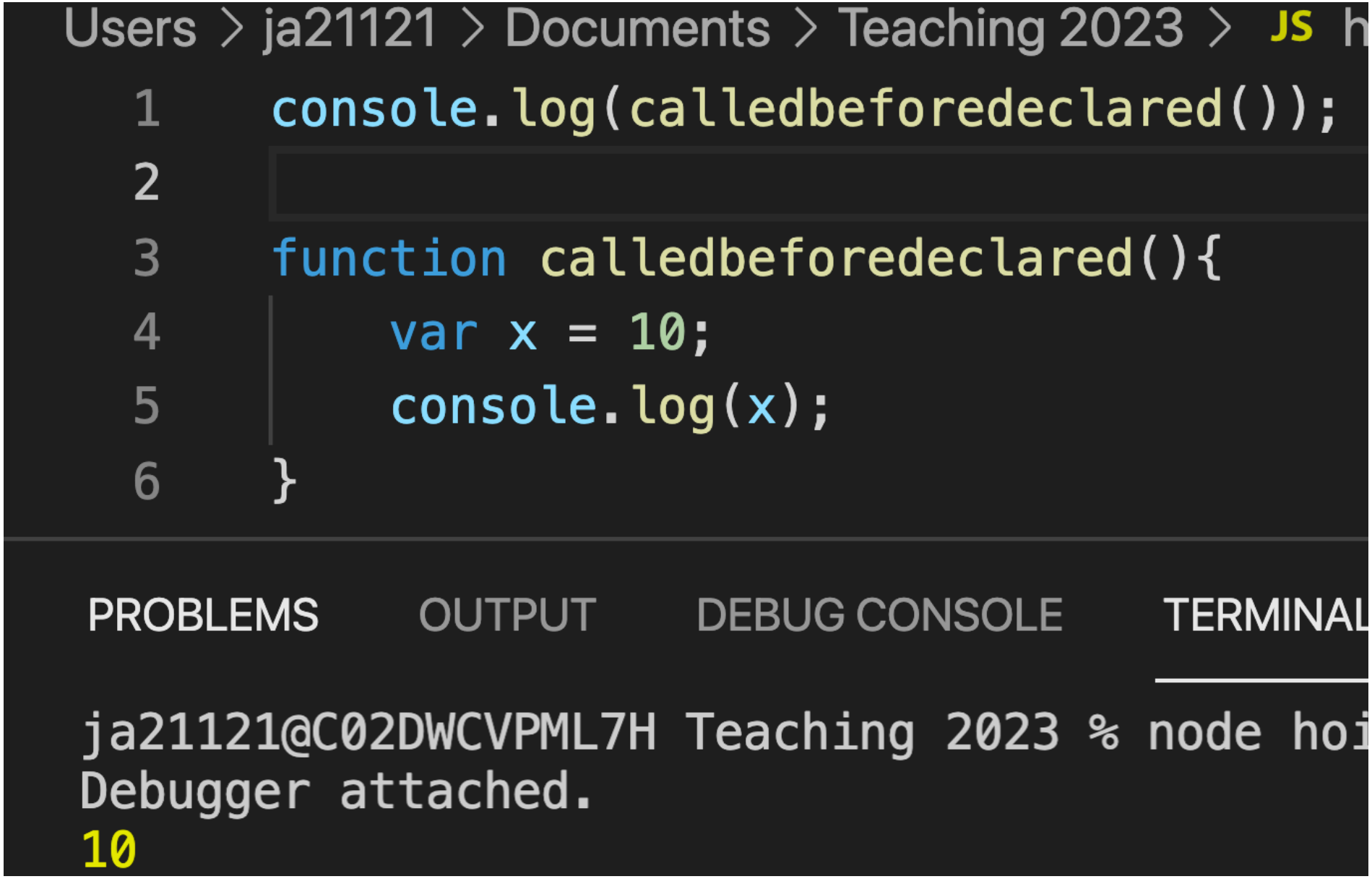
```
1    console.log(x);
2
3    //var x = 10;
```

```
PROBLEMS    OUTPUT    DEBUG CONSOL

    at Function.executeUserEntryP
ja21121@C02DWCVPML7H Teaching 202
Debugger attached.
Waiting for the debugger to disco
/Users/ja21121/Documents/Teaching
console.log(x);
            ^


ReferenceError: x is not defined
```

Hoisting


Users > ja21121 > Documents > Teaching 2023 > JS h
1 console.log(calledbeforedeclared());
2
3 function calledbeforedeclared(){
4 var x = 10;
5 console.log(x);
6 }
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
ja21121@C02DWCVPML7H Teaching 2023 % node hoi
Debugger attached.
10

Hoisting

- Left it says undefined and right it says not defined.
- Let's remember execution context
- Context has all the variables & functions.
- That's is called hoisting.
- In case of var it is declaration hoisting.
- In case of functions its value hoisting.

var variables are hoisted
let variables are not

Scope

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```
1  function first(){
2      console.log(a);
3      function second(){
4
5      }
6  }
7  var a = 10;
8  first();
```

PROBLEMS OUTPUT DEBUG CONS

```
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10
```

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```
1  function first(){
2      console.log(a);
3      function second(){
4          var a = 10;
5      }
6  }
7
8  first();
```

PROBLEMS OUTPUT DEBUG CONSOL

```
    console.log(a);
                ^

ReferenceError: a is not defined
```

Scope

- Scope in JavaScript is lexical
- Means where a variable is created and its parents'
- But not the child.

- In our example
- First() has access to the global execution context
- First does not have access to its child which is Second()
- So, we have the error on the right picture.

As one moves up to parents and grand parents that defines the scope chain.

var can only be accessed by child or the function it's self
let has block scope, but var doesn't has

Call Stack

- Push and pop as contexts are created
- Known by various names

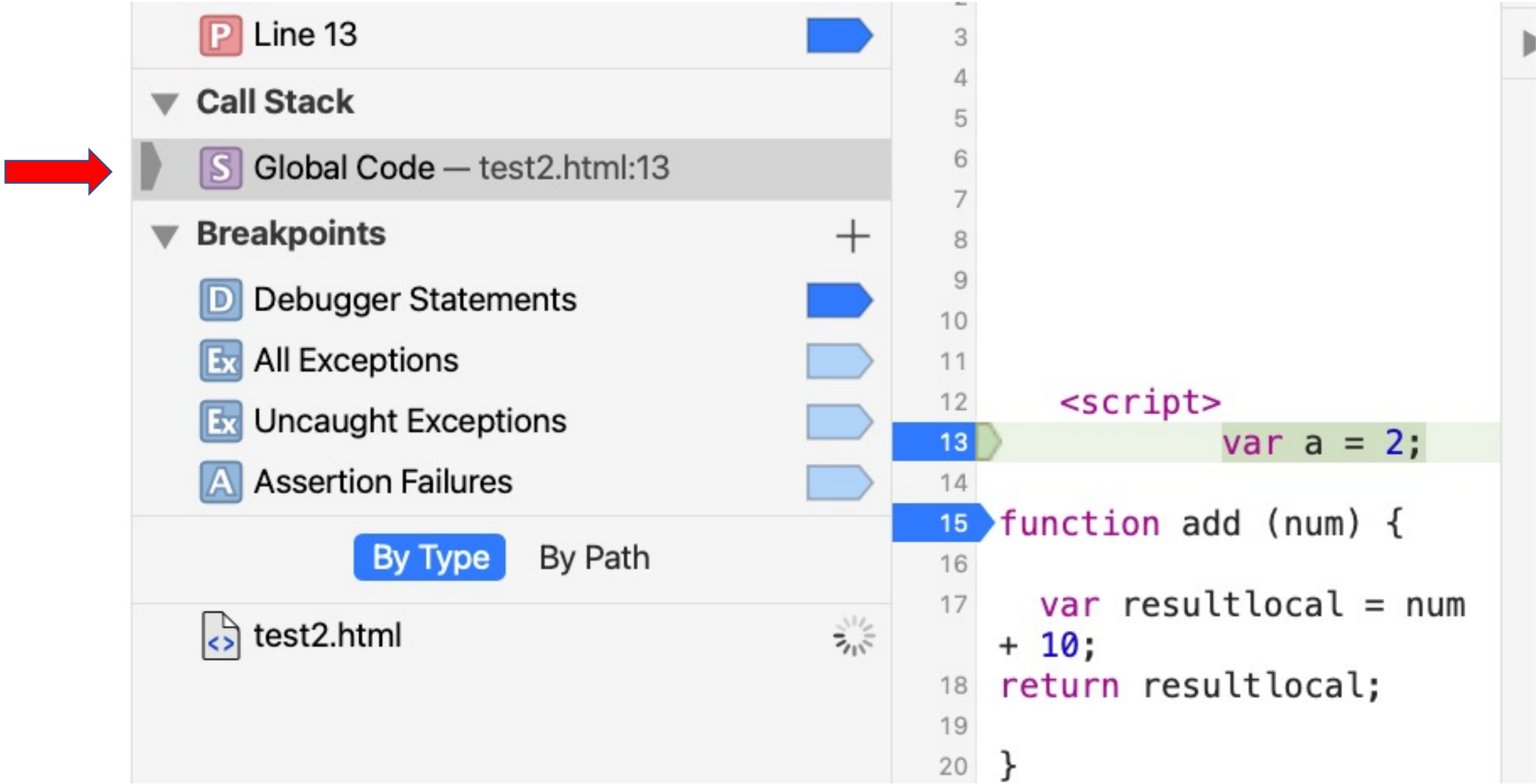
Global

a, resultglobal

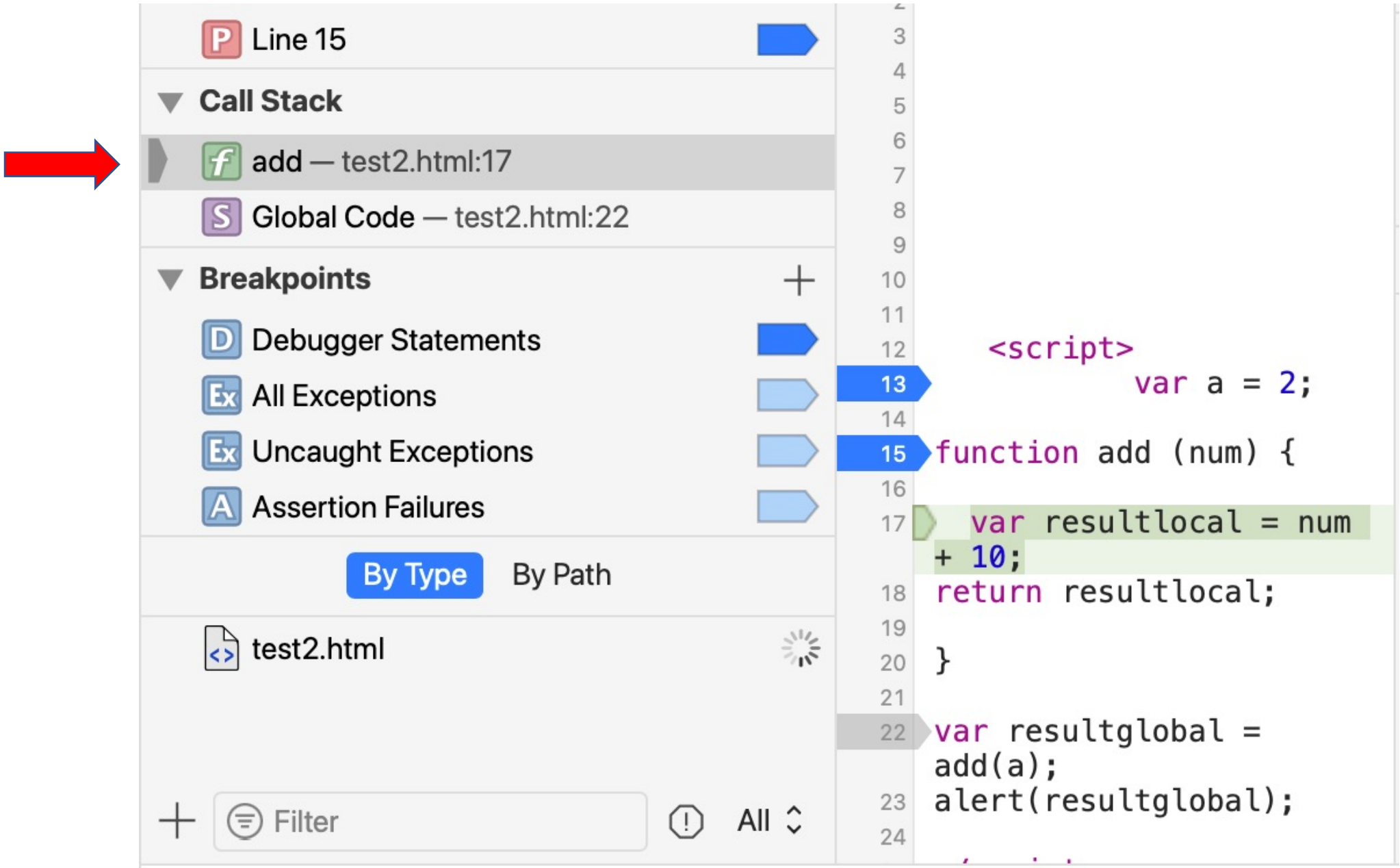
Local

num, resultlocal

Call Stack


Line 13
Call Stack
Global Code — test2.html:13
Breakpoints
Debugger Statements
All Exceptions
Uncaught Exceptions
Assertion Failures
By Type
By Path
test2.html
<script>
var a = 2;
function add (num) {
var resultlocal = num + 10;
return resultlocal;
}

Call Stack


Line 15
Call Stack
add — test2.html:17
Global Code — test2.html:22
Breakpoints
Debugger Statements
All Exceptions
Uncaught Exceptions
Assertion Failures
By Type
By Path
test2.html
Filter
All
<script>
var a = 2;
function add (num) {
var resultlocal = num + 10;
return resultlocal;
}
var resultglobal = add(a);
alert(resultglobal);

Syntax

We have all of these, we are perhaps familiar with

- break
- If…else
- for….
- function
- do….while
- var, let & const
- return
- switch
- throw
- try…catch
- ……
- arrays (You can have mixed arrays)
  - var example = [1, joe, 5.555]

Syntax

And these too….

- Comparison operators : <,<=,>,>=, ==, ===
- Logical Operators: &&, ||, !
- ("3.0"=== 3) ("3.0"== 3)

We don't need to declare types

- Language makes the best guess
- It mostly gets it right, when it doesn't use parseInt for Integers.
- Many operators automatically convert types so happens in many operations.
- var name = prompt("What's your name?");
- var age = 20;

Arrays

```
var name = ``johndoe";

console.log(name.length);   = 7


console.log(name[0]); = 'j'
console.log(name[name.length]); = undefined
console.log(name[name.length-1]); = 'e'
```

Arrays & for loop

```
var example = [1, joe, 5.555]
```

A mixed array

```
for var element in
example {
    console.log(element);
    }
for var element of
example {
    console.log(element);
    }
```

- Please see the functions that you can apply to arrays like map(),pop() etc.

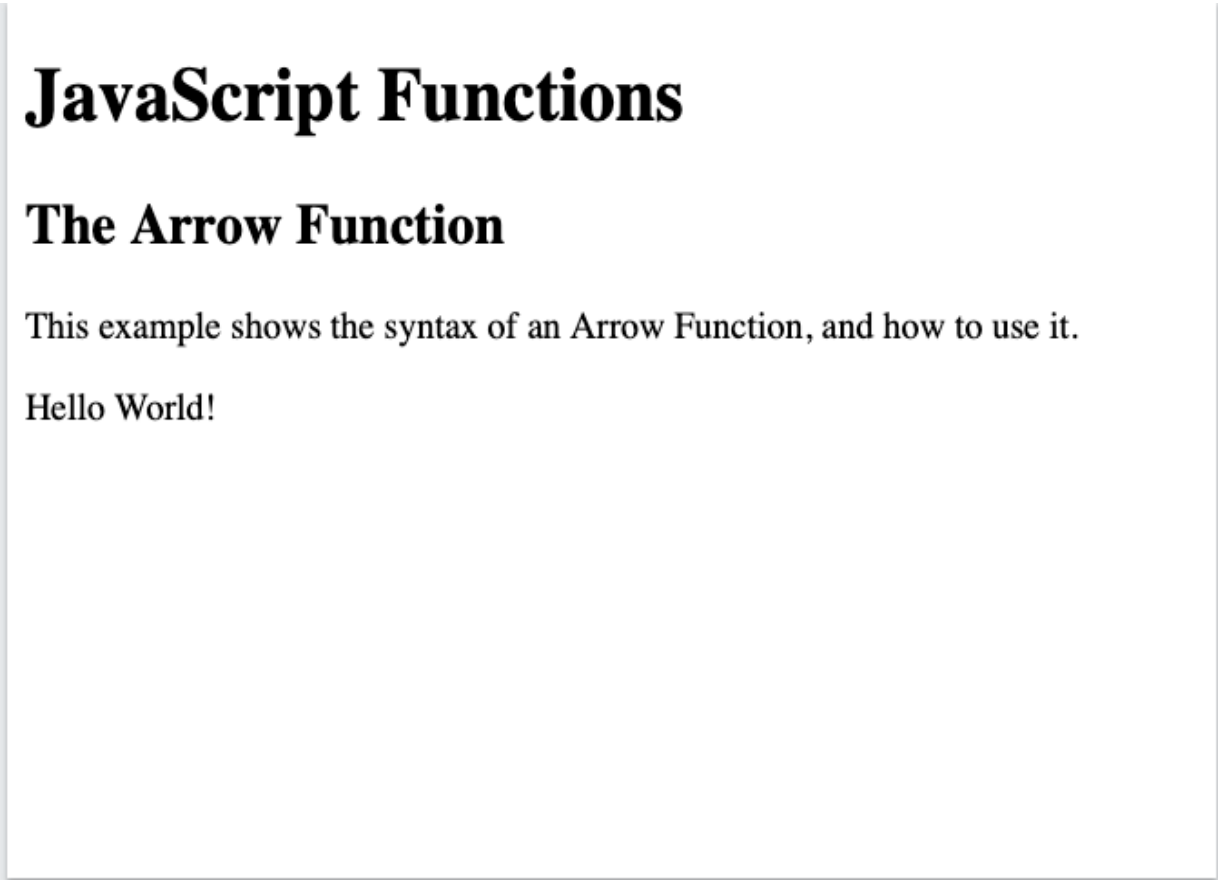
Anonymous Functions

- All functions do not need to have a name. Let's use map() and an array.
- map() allows you to apply a function to all the elements of an array.
  - var age = [20,25,30,35]
  - Let's use map to add 10 years to each of the values in the array.
  - age = age.map(function(any)
    {
        return age + 10;
    })

Arrow Functions

- https://www.w3schools.com/js
- Write shorter functions

```
<!DOCTYPE html>
<html>
<body>

<h1>JavaScript Functions</h1>
<h2>The Arrow Function</h2>

<p>This example shows the syntax of an Arrow Function,
and how to use it.</p>

<p id="demo"></p>

<script>
let hello = "";

hello = () => {
  return "Hello World!";
}

document.getElementById("demo").innerHTML = hello();
</script>
```



Events in JavaScript

- Anything we do on a web page is an event
  - Click on buttons, enter a text, hover our mouse
  - HTML pages can capture the event which can be passed to an event handler in JavaScript.

```
<html>

<head> <title> Event Handlers </title> </head>

<body>

        <button onclick="alertName(event)">Button 1 </button>
        <button onclick="alertName(event)">Button 2 </button>


  <script>
        function alertName(event)
          {
            var trigger = event.srcElement;
            alert('You clicked on ' + trigger.innerHTML);
           }

   </script>

</body>

</html>
```

Thank You