Loops, Functions and Callbacks in JS

Loops

Calculate sum from 0 to 100

Loops

Dumb way

```
1  let ans = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 +
   11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 + 20 +
   21 + 22 + 23 + 24 + 25 + 26 + 27 + 28 + 29 + 30 +
   31 + 32 + 33 + 34 + 35 + 36 + 37 + 38 + 39 + 40 +
   41 + 42 + 43 + 44 + 45 + 46 + 47 + 48 + 49 + 50;
2
3  console.log(ans);
4                                          Generate ⌘ I
```

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = 0

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5     ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 0

I = 1

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5       ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 0

I = 1

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = 1

I = 1

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = 1

I = 2

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = 1

I = 2

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5       ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 3

I = 2

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5     ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 3

I = 3

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = 3

I = 3

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = 6

I = 3

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5     ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 6

I = 4

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5     ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 6

I = 4

Loops

Better way - For loops

```
1
2   let ans = 0;
3
4   for (let i = 1; i <= 50; i++) {
5       ans = ans + i;
6   }
7
8   console.log(ans);
```

ans = 10

I = 4

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = very big value

I = 51

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = very big value

I = 51

Loops

Better way - For loops

```
1
2  let ans = 0;
3
4  for (let i = 1; i <= 50; i++) {
5    ans = ans + i;
6  }
7
8  console.log(ans);
```

ans = very big value

I = 51

Loops

Great way to visualise this - http://latentflip.com/loupe/

Functions

What is a function?

A function in JavaScript is a set of statements that performs a task or calculates a value

It should take some input and return an output where there is some obvious relationship between the input and the output.

Functions

Syntax?

```
1
2  function findSum(n) {
3    let ans = 0;
4    for (let i = 1; i < n; i++) {
5      ans = ans + i
6    }
7    return ans;
8  }
9
```

Functions

Syntax?

```
1
2  function findSum(n) {
3    let ans = 0;
4    for (let i = 1; i < n; i++) {
5      ans = ans + i
6    }
7    return ans;
8  }
9
```

Function keyword

Functions

Syntax?

```
1
2  function findSum(n) {
3    let ans = 0;
4    for (let i = 1; i < n; i++) {
5      ans = ans + i
6    }
7    return ans;
8  }
9
```

Name of fn

Functions

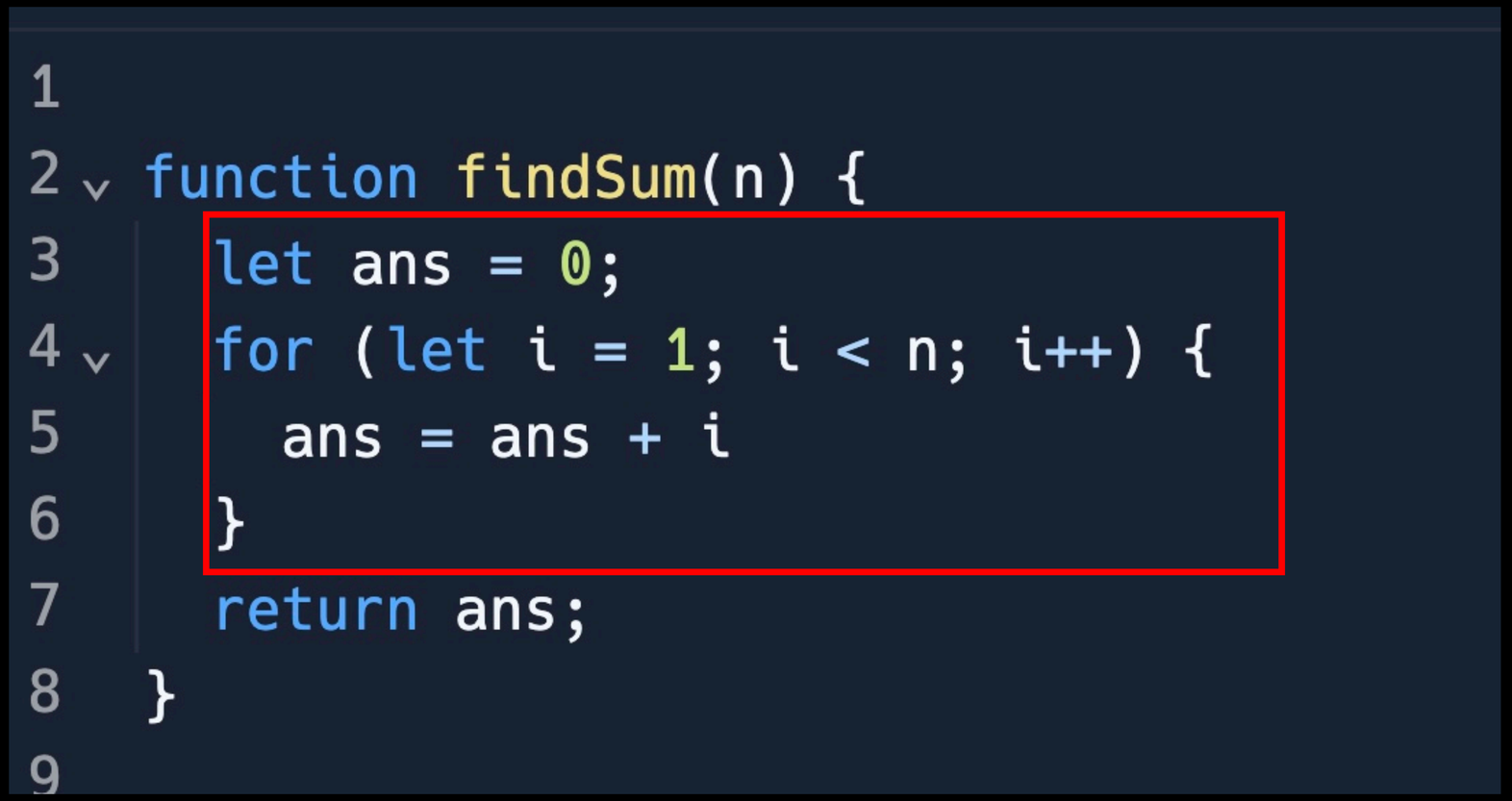
Syntax?

```
1
2  function findSum(n) {
3    let ans = 0;
4    for (let i = 1; i < n; i++) {
5      ans = ans + i
6    }
7    return ans;
8  }
9
```

Arguments

Functions

Syntax?



Function body

Functions

Syntax?

```
1
2  function findSum(n) {
3    let ans = 0;
4    for (let i = 1; i < n; i++) {
5      ans = ans + i
6    }
7    return ans;
8  }
9
```

Return value

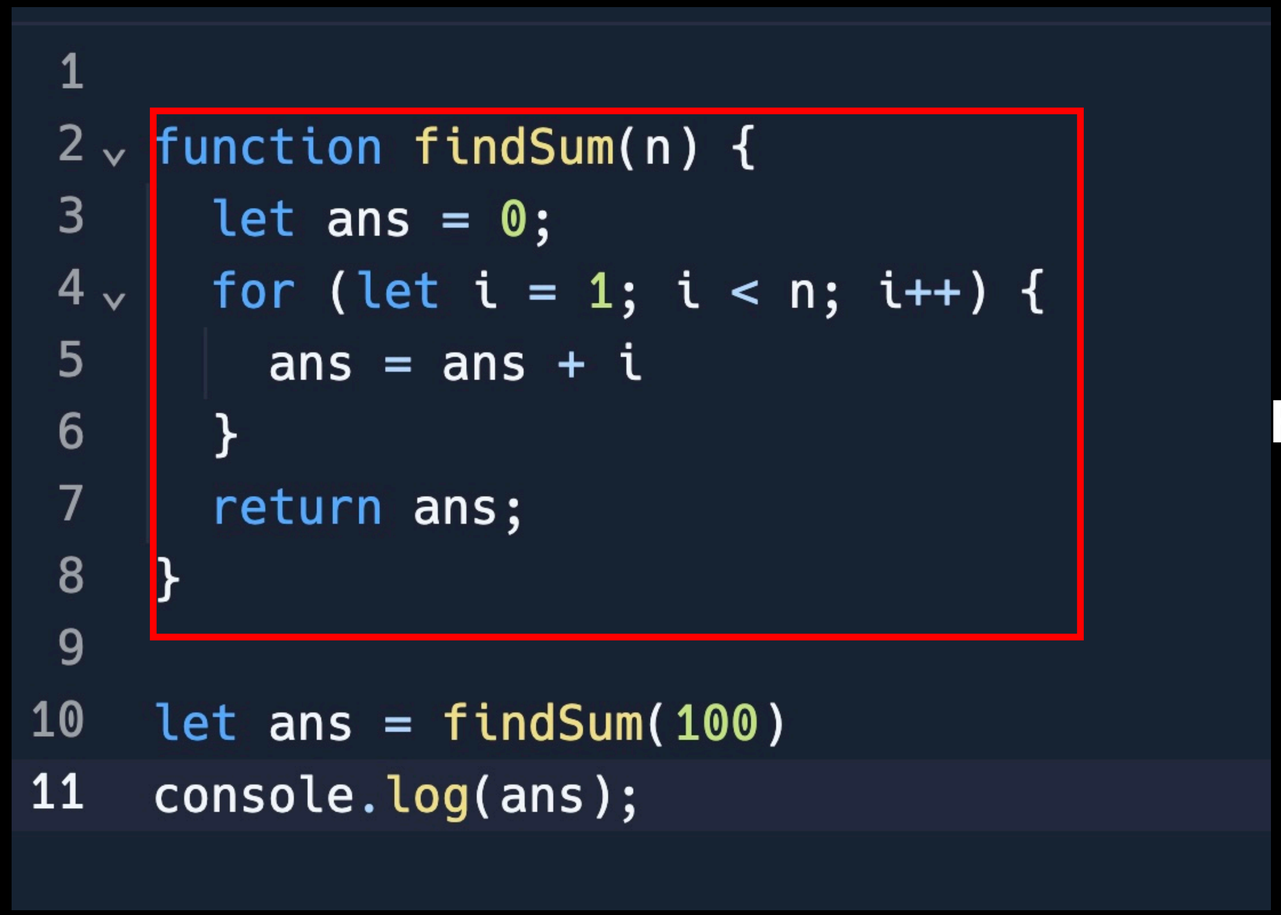
Functions

Another example

```
1
2  function sum(a, b) {
3      return a + b;
4  }
5
```

Functions

How to call a fn?



Function body

Functions

How to call a fn?

```
1
2  function findSum(n) {
3    let ans = 0;
4    for (let i = 1; i < n; i++) {
5      ans = ans + i
6    }
7    return ans;
8  }
9
10 let ans = findSum(100)
11 console.log(ans);
```

Calling function

Functions

Why do we need functions?

Functions

Why do we need functions?

```
function findSum(n) {
  let ans = 0;
  for (let i = 1; i < n; i++) {
    ans = ans + i
  }
  return ans;
}

let ans = findSum(100)
console.log(ans);

let ans2 = findSum(1000)
console.log(ans2);
```

index.js > ...

```
let n = 100;
let ans = 0;

for (let i = 1; i < n; i++) {
  ans = ans + i
}
console.log(ans);

let n2 = 1000;
let ans2 = 0;

for (let i = 1; i < n; i++) {
  ans2 = ans2 + i
}
console.log(ans2);
```

Functions

You are repeating yourself (DRY)

```
function findSum(n) {
  let ans = 0;
  for (let i = 1; i < n; i++) {
    ans = ans + i
  }
  return ans;
}

let ans = findSum(100)
console.log(ans);

let ans2 = findSum(1000)
console.log(ans2);
```

index.js > ...

```
let n = 100;
let ans = 0;

for (let i = 1; i < n; i++) {
  ans = ans + i
}
console.log(ans);

let n2 = 1000;
let ans2 = 0;

for (let i = 1; i < n; i++) {
  ans2 = ans2 + i
}
console.log(ans2);
```

Callback Functions

Step 1 - Can you call one function inside another function?

Callback Functions

Step 1 - Can you call one function inside another function?

Yes

index.js > ...

```
1  // finds the square of the input
2  function square(n) {
3    return n * n
4  }
5
6  // finds the sum of the squares of the inputs
7  function sumOfSquares(a, b) {
8    const val1 = square(a);
9    const val2 = square(b);
10
11   return val1 + val2;
12 }
13
14 console.log(sumOfSquares(1, 2));
```

Callback Functions

Step 1 - Can you call one function inside another function?

Yes

index.js > ...

```
1  // finds the square of the input
2  function square(n) {
3    return n * n
4  }
5
6  // finds the sum of the squares of the inputs
7  function sumOfSquares(a, b) {
8    const val1 = square(a);
9    const val2 = square(b);
10
11   return val1 + val2;
12 }
13
14 console.log(sumOfSquares(1, 2));
```

Callback Functions

index.js > cube

```
1
2  function square(n) {
3    return n * n
4  }
5  function cube(n) {
6    return n * n * n
7  }
8
9  function sumOfSquares(a, b) {
10   const val1 = square(a);
11   const val2 = square(b);
12
13   return val1 + val2;
14 }
15 function sumOfCubes(a, b) {
16   const val1 = cube(a);
17   const val2 = cube(b);
18
19   return val1 + val2;
20 }
21 console.log(sumOfCube(1, 2));
```

Callback Functions

index.js > cube

```
1
2  function square(n) {
3    return n * n
4  }
5  function cube(n) {
6    return n * n * n
7  }
8
9  function sumOfSquares(a, b) {
10   const val1 = square(a);
11   const val2 = square(b);
12
13   return val1 + val2;
14 }
15 function sumOfCubes(a, b) {
16   const val1 = cube(a);
17   const val2 = cube(b);
18
19   return val1 + val2;
20 }
21 console.log(sumOfCube(1, 2));
```

Is DRY being violated here?

Callback Functions

index.js > square

```
1  function square(a) {
2    return a * a
3  }
4
5  function sumOfSomething(a, b, fn) {
6    const val1 = fn(a);
7    const val2 = fn(b);
8    return val1 + val2;
9  }
10
11 sumOfSomething(a, b, square)
```

Solution

Anonymous functions

index.js > ...

```
1
2  function sumOfSomething(a, b, fn) {
3    const val1 = fn(a);
4    const val2 = fn(b);
5    return val1 + val2;
6  }
7
8  sumOfSomething(a, b, function(a) {
9    return a * a
10 })
11
```

It is a function that does not have any name associated with it