

Introduction to programming

A computer programme is a set of instructions for a computer. Computers understand two states on and off. The programme will send a sequence of these states that sequence will produce an output from the computer.

This is the sequence for hello:

off on on off on off off off off on on off off on off on off on on off off off on on off on on
off off off on on off on on on on

We programme in a language that is closer to one we understand, this then gets translated into one the computer understands.

As it only understands two states, on and off the programme gets translated into **binary numbers**

Decimal System

In the decimal system we represent all numbers with 10 digits, we can represent any number with those 10 digits, 0 1 2 3 4 5 6 7 8 9

1000's	100's	10's	1's
2	1	2	6

Binary System

The binary system represents all numbers with two digits 0 and 1

8's	4's	2's	1's
1	0	1	0

0	1	2	3	4	5	6	7	8	9
0	1	01	11	001	101	011	111	0001	1001

Hello in binary

01101000 01100101 01101100 01101100 01101111

Open a chrome browser and open the developer tools

Mac - alt + command + i

PC - alt + shift + I

To get a new line

Command + shift

Click on the console tab

Operators

add/concatenate	Used to add numbers or join together strings	2+2; or "hello " + "there";
Subtract, multiply and divide	They are used for maths	9 - 3; 8 * 2; 9 / 3;
Assignment operator	Giving something a value	x = 10;
Identity operator	Test if two things are the same	"Cat" === "Cat" is true
Negation or not equal	When somethings is not	"Cat" !== "Cat" false
Remainder (modulo)	It gives you the remainder of a sum	2 % 3 = 2 7 % 2 = 1

Variables

Variables are named references to values e.g. var x = 5;

- variables allow us to store, change and access information as the program runs.

When x is referenced in the script the computer will see it as the number 5. So x + x = 10

Variable types in javascript

String	a single or series of characters they are normally surrounded by " "
Number	digits they can be whole numbers or decimal numbers (floats)
Boolean	the value is either true or false
Array	a structure that allows you to put multiple values in one variable. You can Reference each element of an array by its position in an array.
Object	an object contains the characteristics. Real world objects have characteristics e.g. a glass will have a level of transparency, a weight and a height. An object in a computer will have key value pairs where the key is that characteristic.

String

```
var x = "hello"
```

Number

```
var x = 4
```

Boolean

```
var x = true
```

Array

```
var x = [1,2,3] (each number can be accessed by the position of the number in the array.  
Positions start at 0    x[2] = 3
```

Object

```
var x = {city: "bratislava", latitude:48.128596, longitude:17.107748}  
x.city = "bratislava"
```

Conditionals

With conditionals the code checks if the condition is true or false

```
var today = 'tuesday';  
if(today === 'tuesday'){  
    console.log('today is tuesday');  
} else {  
    console.log('it is not tuesday it is ' + today);  
}
```

Loops

With a loop you can repeat the same code, you need to give it a condition to end it. In the following loop a variable called i is given an initial value. Then there is a condition, if the number in i is less than 10 carry out the following bit of code. Finally the variable i is incremented.

```
for (var i = 0; i < 10; i++) {  
    console.log('i is: ' + i);  
}
```

Functions

Functions store code that you use multiple times, you can pass the function arguments if you want to. You call a function with its name and the arguments. It does not have to have arguments.

```
function multiply(num1,num2) {  
  var result = num1 * num2;  
  return result;  
}
```

```
multiply(2,5);
```

Learn to code online

<https://www.codecademy.com/>

You can learn a number of different programming languages

<https://www.w3schools.com/>

Learn to create web pages

<https://ocw.mit.edu/courses/intro-programming/>

Introductory courses from MIT

<https://www.coursera.org/>

Coursera have a number of programming courses

<https://github.com/getify/You-Dont-Know-JS>

A free online book