Programming with JavaScript in one page – tecnun 2015

In the browser (Chrome) open the console: Ctrl + Shift + J

Operations

```
3+2
2*(3+5)*4
```

Variables

```
m = 8
m*2
a=(1+2)*6
```

Types of variables

```
greeting = "Hello"
name ="Peter"
greeting + " " + name
"Hello Peter"
isMan=true
isWoman = !isMan
```

Functions

```
Math.cos(0)
Math.pow(5,4)
Math.log(10)
```

We can define our own functions

```
function sum (a, b) { ↵ Shift + Return
 return a+b;          ↵
}
sum(2,3)
```

Equation: $ax^2+bx+c=0$.

The answer is $(-b\pm\sqrt{(b^2-4ac)})/2a$

```
function root1(a, b, c) {
 t1= b*b - 4*a*c
 t2=Math.sqrt(t1)
 return (-b + t2) / (2 * a)
}
```

And

```
function root2(a, b, c) {
 t1= b*b - 4*a*c
 t2=Math.sqrt(t1)
 return (-b - t2) / (2 * a}
}
```

And the execution of the functions:

```
root1(1,-5,6)
root2(1,-5,6)
```

Conditions

The conditional statement has the syntax:

```
if (condition) {
 statements
}
```

The condition uses a comparison with the comparator symbols: <, >, <=, >=, ==, !=

The result of a condition is a boolean value:

```
1 < 5
1 == 5
```

In the condition we can use numbers or variables:

```
if (a < 0)  {
 number = “negativo”
}
```

Example

Example of root1 taking into account imaginary roots:

```
function root1(a, b, c) {
 t1= b*b - 4*a*c
 if (t1 >= 0) {
   t2=Math.sqrt(t1)
   return (-b + t2) / 2 * a
 } else {
   t2=Math.sqrt( -t1)
   return (" " + (-b/(2 * a)) +
" + " + ((t2) / (2 * a)) + "i")
 }
}
```

And we can run the function with the sentence:

```
root1(1,4,8)
```

result: " -2 + 2i"

The value of a comparison can be stored in a variable.

```
odd = true
if (odd) {
 odd = false
}…
```

Logical operators

In Javascript, they are written:

and: &&

or: ||

not: !

Example of “and” table:

```
0 && 0 = 0
0 && 1 = 0
1 && 0 = 0
1 && 1 = 1
```

Loops

The “for” loop structure:

```
for (i = 0; i <= 5; i = i +1) {
 document.write(i)
}
```

The “while” structure:

```
while (condition) {
 statements
}
```

The same example implemented with a while:

```
i = 0
while (i <= 5) {
 document.write(i)
 i = i +1
}
```

Arrays

In JavaScript you define an array with the statement:

```
vec = new Array()
vec = []
vec[2] = 25
a = vec[2]
```

For example, the next loop put the first 100 even numbers in an array.

```
vec = []
for (i = 1; i <= 100; i++) {
 vec[i] = i * 2
}
```

Loops with arrays

Another way to write a loop with an Array is with the method forEach of an Array:

```
v=[4,7,9];
v.forEach(function(e){
 console.debug(e*2);
})
```

Objects

We've used Math. Math is an object. If you type Math, you can see the functions and properties.

Examples of functions: sin(), cos(), pow().

Examples of properties: E, LN2, LN10.

```
Math.E
```

We can define our Objects with:

```
myObj = new Object()
myObj = {}
myObj.argument = 25
a = myObj.argument
```

We can create and object and assign several properties in one statement:

```
b = {argument: 25, angle: 180}
```

Programs

Create a HTML file: open a text editor, like Notepad, and put this two tags at the beginning and the end of the file:

```
<SCRIPT>

</SCRIPT>
```

And store it with the name fileNAME.html

Open the file in a browser.

Example

With a general function, we can use the Secant Method:

$x_{i+1} = x_i - f(x_i) / fd\ (x_i)$

Code in the file (secant.html) is:

```
<SCRIPT>
var x;
var y;
var dh;

function fx(x) {
 y = x * x - 9;
 return y;
}
function fdx(x) {
 dh = 0.0001;
 y = (fx(x + dh) - fx(x)) / dh;
 return y;
}

x = 4;
for (var i = 0; i < 8; i++) {
  x = x - fx(x) / fdx(x);
  window.alert(x);
}
</SCRIPT>
```