

About this document

This cheat-sheet explains the most important parts of the JavaScript language, defines some key terms and shows the syntax through small examples. However, it's no substitute for proper studying - you can't learn to program off of a cheat sheet (sorry!).

Variables - Explained

What is a variable?

A variable is a storage location, a "box", which we associate with a name (an identifier). The variable can hold a single value and its value may be changed

What is an identifier?

It's the "name" affixed the variable. Later on, whether updating or retrieving its value, we'll use refer to the variable by its identifier.

What can a variable hold?

Any `string`, `number`, `boolean`, `array`, `object` or `Function`.

Why use variables?

Use them to "remember" things in the program. Sometimes, the collection of all variables (everything the program remembers) is called *the state* of the program.

Where to read more

Read the section "Variables" at: eloquentjavascript.net/02_program_structure.html

</> Variables - Examples

Define a variable

```
var name = "Ada lin a";
```

NB - subsequent examples assume we have defined this variable.

Retrieve the variable's value

Simply refer to the variable's *identifier*.
`consol e.l og( name);`
 is (in this case) the same as:
`consol e.l og( "Ada lin a");`

Update the variable's value

```
name = "Emm a";
```

NB - The syntax is the same as defining the variable, *sans* the `var` keyword!

Objects - Explained

What is an object?

If a variable is a "box" which can hold a value, then an object is a box of boxes, holding many values - each of which is a *property*.

What is a property?

A property is some small part of an object which holds some data (e.g. `string`) or a `Function`. Each property has an *identifier*, just like variables.

Where to read more

eloquentjavascript.net/04_data.html - The introduction and the paragraphs "Properties" and "Objects"

</> Objects - Examples

Define an object

Define an object with two properties whose identifiers are "name" and "species":

```
var my_pet = {
  name: "spot",
  species: "dog"
}
```

NB Subsequent examples will assume we start with this object.

NB It isn't necessary to define a variable to hold the array (but you almost always will).

Retrieve a property

Get the value of the `name` property:

```
my_pet ["na me"]
or
my_pet.name
```

Update a property

To change the value of the `name` property (i.e. rename our pet):

```
my_pet ["na me"] = "spa rky "
;
or
my_pet.name = "spa rky ";
```

Add a property

```
my_pet ["br eed "] = 'bulldog'
;
or
my_pet.breed = 'bulldog';
```

NB adding/updating a property uses the same syntax - if the property didn't exist, it is added.

Remove a property

To remove the `species` property:

```
delete my_pet ["sp eci es"];
or
delete my_pet.sp ecies;
```

Comparisons

<code>x === y</code>	true if x is equal to y
<code>x !== y</code>	true if x is different from y
<code>x >= y</code>	true if x is greater than, or equal to y
<code>x <= y</code>	true if x is less than, or equal to y
<code>x > y</code>	true if x is greater than y
<code>x < y</code>	true if x is less than y
<code>!x</code>	true if x is false
<code>x && y</code>	true if <i>both</i> x <i>and</i> y are true
<code>x y</code>	true if <i>either</i> (or both) x or y are true

Conditions - False & True

What's a condition?

A condition is really just an expression. When we use an expression as a condition, we're not interested in its value, but whether or not that value is *truthy*.

What's a truthy value?

In JavaScript, all but 6 values are *truthy*, that is, unless your *condition* evaluates to one of those 6 values, the code guarded by the if-block will be run.

Conditions - False & True (cont)

What are the falsy values?

These 6 values will cause the condition to fail and the code it guards to be skipped:

- false
- 0 - (the number zero)
- " " - (the empty string)
- null
- undefined
- NaN - not a number

Where are conditions used?

Conditions determine which code block to evaluate in if-statements and when to terminate a loop.

Functions - Explained

What is a function?

Functions group code together into a block which is given a name (an *identifier*). Functions often accept arguments to modify their behaviour.

What is an argument?

Think of function arguments as variables which are defined & available to the code inside the function. The value of an argument is determined by the point the function is called and the argument(s) is supplied.

Why use functions?

Functions are the primary way of defining more complex or specific actions than is built into JavaScript and to organise code.

In other words - functions are handy when we wish to use a piece of code more than once.

Where to read more

eloquentjavascript.net/03_functions.html

</> Functions - Syntax

Define a function

Define a function called `takeFive`, which returns the number 5 when called:

```
function takeFive() {
    return 5;
}
```

NB - we will be using this function in some of examples below.

Call a function

Call `takeFive`, which takes no arguments:

```
takeFive();
```

NB - Note the parentheses' that follow the function's identifier - *that's* what tells JavaScript call the function rather than just returning it a `Function` value.

Define a function (with arguments)

```
function add5(num) {
    console.log( "I got num"
+ num);
    return num + 5;
}
```

NB - To have more arguments than just `num`, add additional identifiers (names) of arguments and add a comma (,) between each.

Call a function (with arguments)

```
var x = add5(10);
var y = add5(-5);
```

NB - This amounts to manually typing:

```
var num1 = 5;
console.log( "I got num=" + num1 );
;
var x = num1 + 5;
var num2 = -5;
console.log( "I got num=" + num2 );
;
var y = num2 + 5;
```

🎓 if-statement - Explained

What's an if-statement?

If-statements are used to group code together into a block which is *only* evaluated if the *condition* evaluates to true.

NB - see "Conditions - Falsy & Truthy" for an explanation of conditions.

What does an if-statement look like?

```
if (CONDITION) {
    //evaluate this code if CONDITION
    //is true
} else if (OTHER-CONDITION) {
    //evaluate this code if CONDITION
    //is false, but OTHER-CONDITION
    //is true
} else {
    //evaluate this code if no condition
    //evaluated to true.
}
```

Which parts are needed?

Only the if-part is needed. else if and else blocks are optional.

Also, you can have as many else if blocks as you'd like.

</> if-statements - Examples

if-statement

```
if (pet_type === " dog ") {
    //done if var 'pet_type' is "dog"
}
```

if/else statement

```
if (pet_type === " dog ") {
    //if var 'pet_type' is "dog"
} else {
    //if var 'pet_type' is something else
}
```

</> if-statements - Examples (cont)

if/else if/else statement

```
if (pet_type === " dog ") {
    //if var 'pet_type' is "dog"
} else if (pet_type === " cat ") {
    //if var 'pet_type' is "cat"
} else {
    //if var 'pet_type' is something else
}
```

</> (while) Loops - Examples

How do I loop forever

```
while (true) {
    //keep doing this until time ends
}
```

How do I loop X times?

To loop X times (say 3), we ensure the condition evaluates to false at the start of the fourth loop:

```
var count = 0;
while (count < 4) {
    //increase count by 1
    count = count + 1;
    //evaluate this code until count
    //is 4 or more
}
```

NB - if we don't ensure our condition eventually becomes invalid, we will loop forever.

🎓 (while) Loops - Explained

What is a (while) loop?

Loops allow repeating a block of code for as long as a *condition* remains true.

🎓 (while) Loops - Explained (cont)

Real world (tm) loop example

Think of this exchange:

Passenger: *Are we there yet?*

Driver: *No, not yet*

...

Passenger: *Are we there yet?*

else
If the passenger is really obnoxious and keeps repeating the question, and the driver patiently answers each time - they are essentially in a conversational *loop*!

Syntax Example

```
while (CONDITION) {
    //evaluate code in this block
    lock
}
```

📖 Where to read more

Mid-way through the page linked below, look for the heading "while and do loops":
eloquentjavascript.net/02_program_structure.html

📦 Data Types

Number Any numeric value - 3, 3.14, 2e10

String Any sequence of characters inside quotation marks. " d", " dog ", 'ute dog'

Boolean Two possible values, true or false. Used as conditions in if-statements & loops. Every expression can be boiled down into a boolean.

Array A sequence of elements grouped together. E.g. [1, 2, 3] is an array of 3 numbers.

Object An object which groups other values
{ name: " Rachel ", age: 2 }

</> Syntax - (basic) data types

String

```
" d"
"To be or not to be"
" 300 " //in quotes, this is a string
'single quotes also work'
```

Number

```
300
3.1415
2e10
```

Boolean

```
true
false
```

Terminology

Syntax

The collection of rules about "what goes where" to form valid JavaScript code.
NB - if you get a syntax error, you've written some code which isn't legal javascript.

Statement

A piece of code (usually a single line) which represents something we want done - some small task.

Expression

Some piece of code which, when evaluated, will yield a value back. E.g. `3 + 6`

Evaluation

The thing which happens when the JavaScript interpreter analyses a piece of code and either does something in response (a statement) or yields a value (an expression).

Terminology (cont)

JavaScript Interpreter

Some program which can understand, and act on JavaScript. Your browser (Firefox/Chrome) is a JavaScript interpreter.

(Code) Block

Blocks are delimited by `{ }` and used by if-statements, loops and functions to encapsulate some series of *statements* which should be executed.

Arrays - Explained

What is an array?

An array is a sequence of elements. Each element can be retrieved from the array by its index number.

What is an array element?

An element part of an array, it can be any data type (string, number, boolean, array, object) but it could also be a Function.

How can I get elements from the array?

The first element has index 0, the second has index 1 and so on.

Where to read more

Read the introduction and the paragraph "data sets" at:
eloquentjavascript.net/04_data.html

</> Arrays - Examples

Defining an array

Define an array with 3 elements, the string " one ", the number 2 and the boolean false, in that order:
`["one", 2, false]`

</> Arrays - Examples (cont)

Retrieve an element from the array

Get the second element of the array, " b", into the array using the index number 1:
`["a", " b", " c"][1]`

Updating an element

```
var pets = ['dog', 'cat', 'canary'];
pets[1] = 'lion';
Now the array would be:
['dog', 'lion', 'canary']
```

Add an element

Use the method `push`. **NB** push adds element *end* of the array.
`var pets = ['dog', 'cat', 'canary'];`
`pets.push('crocodile');`
Now the array would be:
`['dog', 'cat', 'canary', 'crocodile']`

Remove element(s)

Use `splice` - splice needs two arguments of where to start and a number of elements to remove.
`var pets = ['dog', 'cat', 'fish'];`
`pets.splice(1,2);`
Now the array would be:
`['dog', 'bird']`

Get number of elements in array

Use the `length` property on the array:
`pets.length`

Yes, arrays are actually a kind of object(!) - it has some properties (like `length`) and methods attached to it.



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Introduction/Guide to JQuery

api.jquery.com

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