JavaScript
Introduction

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How to run it
on the server

- **Running Node.js on a .js file in which you have written the code**

withFile

```
$ node hello-world.js
```

- **Using Node.js in interactive mode**

interactiveMode

```
$ node
Welcome to Node.js v23.6.1.
Type ".help" for more information.
> console.log('Hello world');
Hello world
```

The mailman has arrived

package.json

- Creation -> npm init -y
- Importance on dependencies

Out with the old, in with the new

- **Directive “use strict” or ‘use strict’**
- **It can be enabled in a function alone**
- **Make sure that it’s at the top of your script so it is enabled**
- **Beware, there’s no going back**

Differences from what we know

Semicolons
and when to insert them

- **What is a statement**

  Syntax contructs and commands that performs actions

- **In JavaScript we can omit a semicolon**

  When a line break exists JavaScript interprets it as an “implicit” semicolon

- **Not such a good idea though!**

  There are cases when a newline does not mean a semicolon

statement.js

```
console.log('Hello');
console.log('World');
```

semicolons.js

```
console.log('Hello')
console.log('World')
```

error.js

```
console.log("Hello");
[1, 2].forEach(console.log);

console.log("Hello")
[1, 2].forEach(console.log);
```

The art of declaring a variable

- **Remember: JS is weakly and dynamically typed**
- **So...**
- **let, var, const keywords**

variables.js

```
let hello = "Hello world!";
var message = "Don't use this!";
const same = "This will stay the same";
```

What is this?

typeof

- **7 primitive types**
  - Boolean
  - Number
  - String
  - Symbol
  - Null
  - Undefined
- ***typeof*: an amazing operator...**

  ...or not, let's see it

No strings attached

strings.js

```
let name = "John";
let str = 'Single quotes are ok too';
let phrase = can embed another ${str};

// embed a variable
alert(`Hello, ${name}!`);

// embed an expression
alert(`the result is ${1 + 2}`);
```

- Simple quotes
- Double quotes
- Backticks

Numbers

nan.js

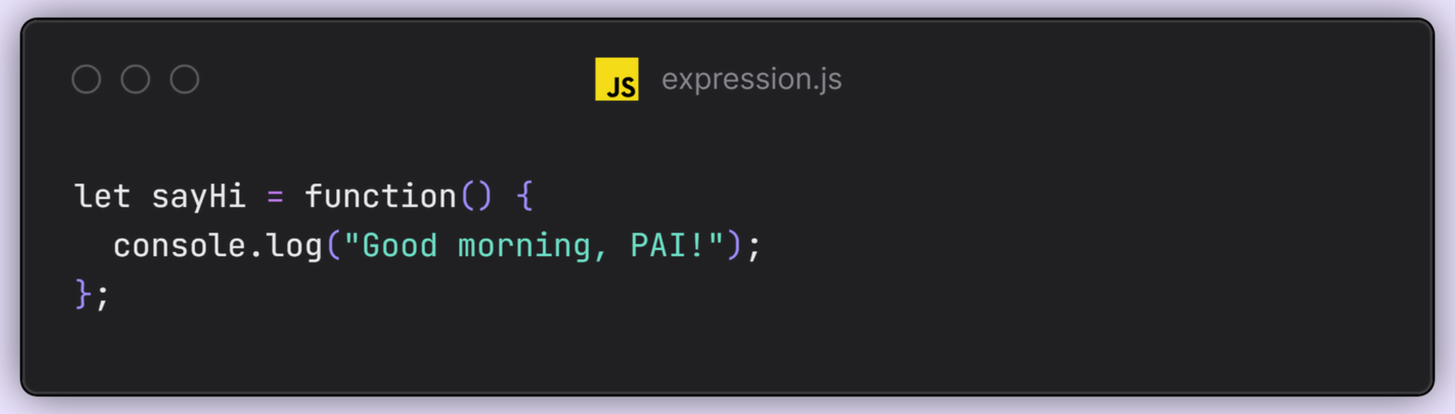
```
console.log("not a number" / 2);
```

propagation.js

```
console.log(NaN + 1);
console.log(3 * NaN);
console.log("not a number" / 2 - 1);
```

Functions

- Function Declaration
- Function Expression
- What’s different?



Arrow functions

multiline.js

```
let sum = (a, b) => {
  let result = a + b;
  return result;
};

console.log(sum(1, 2));
```

sum.js

```
let sum = (num1, num2) => num1 + num2;

console.log(sum(1, 2));
```

Syntax and Formatting Rules

Curly Braces

Same Line as the Declaration

Incorrect example

incorrect.js

```
const sumDigits = function(num)
{
  let result = 0;
  while(num > 0)
  {
    result += num % 10;
    num = Math.floor(num / 10);
  }
  return result;
};
```

Correct example

correct.js

```
const sumDigits = function(num) {
  let result = 0;

  while (num > 0) {
    result += num % 10;
    num = Math.floor(num / 10);
  }

  return result;
};
```

When to Use Curly Braces

Incorrect use

incorrect.js

```
if (n < 0) {alert( `Power ${n} is not supported`);}
```

incorrect.js

```
if (n < 0)
  alert( `Power ${n} is not supported`);
```

When to Use Curly Braces

Correct use

correct.js

```
if (n < 0) alert(`Power ${n} is not supported`);
```

correct.js

```
if (n < 0) {
  alert(`Power ${n} is not supported`);
}
```

Indents

Two Types of Indentations

Horizontal indentation

Use **2 or 4 spaces** or the horizontal **tab symbol**.

Vertical indentation

Empty lines for splitting code into **logical blocks**.

Example

correct.js

```
function pow(x, n) {
  let result = 1;
  // ←
  for (let i = 0; i < n; i++) {
    result *= x;
  }
  // ←
  return result;
}
```

Nesting Levels

incorrect.js

```
for (let i = 0; i < 10; i++) {
  if (cond) {
    // ... one more nesting level
  }
}
```

correct.js

```
for (let i = 0; i < 10; i++) {
  if (!cond) continue;
  // ... no extra nesting level
}
```

incorrect.js

```
for (let i = 0; i < 10; i++) {
  if (i % 2 === 0) {
    console.log(i);
  }
}
```

correct.js

```
for (let i = 0; i < 10; i += 2) {
  console.log(i);
}
```

Function Placement

There are three ways to organize helper functions and their usage.

Above the code.

above-the-code.js

```
// function declarations
function createElement() {
  ...
}

function setHandler(elem) {
  ...
}

function walkAround() {
  ...
}

// the code which uses them
let elem = createElement();
setHandler(elem);
walkAround();
```

Below the code.

below-the-code.js

```
// the code which uses the functions
let elem = createElement();
setHandler(elem);
walkAround();

// --- helper functions ---
function createElement() {
  ...
}

function setHandler(elem) {
  ...
}

function walkAround() {
  ...
}
```

Anonymous or arrow functions

example.js

```
const sumar = (a, b) => a + b;
console.log(sumar(2, 3));
```

Google Style Guide

Source File Basics

File Name

- Must be in **lower case**.
- Underscores (_) or hyphens (-) may be used, with no other punctuation.
- The extension must be **.js**.

File Encoding

- All files must be **UTF-8** encoded.

example-file-name.js

```
'use strict';

/* Suma dos números. */
const add = (a, b) ⇒ a + b;

console.log( `Resultado: ${add(5, 10)}` );
```

When to Use Braces

Control structures (if, else, for, while, etc.) **must use** braces, even for a single instruction.

incorrect.js

```
if (isValid())
  doSomething();

for (let i = 0; i < items.length; i++)
  processItem(items[i]);
```

correct.js

```
if (isValid()) {
  doSomething();
}

for (let i = 0; i < items.length; i++) {
  processItem(items[i]);
}
```

When to Use Braces

Exception: A simple if that fits on a **single line and no else** can be omitted.

exception.js

```
if (isReady()) doSomething();
```

Position of the Opening Brace

According to K&R style, the opening brace { must be placed on the **same line** as the statement (e.g., if, for, function, class, etc.).

incorrect.js

```
if (condition)
{
  // block content
}
```

correct.js

```
if (condition) {
  // block content
}
```

Line Break After the Opening Brace

Once the opening brace is written, the **block's content should start on a new line**. This improves readability and clearly separates the declaration from its content.

incorrect.js

```
if (condition) { doSomething();
}
```

correct.js

```
if (condition) {
  doSomething();
}
```

Line Break Before the Closing Brace

Before writing the closing brace, ensure that the **block's content ends on its own line**. This way, the closing brace is clearly separated from the block content.

incorrect.js

```
if (condition) {
  doSomething(); }
```

correct.js

```
if (condition) {
  doSomething();
}
```

Line Break After the Closing Brace

Insert a line break after a closing brace unless it's followed by else, catch, while, or characters such as a comma, semicolon, or right parenthesis.

JS incorrect.js

```
if (condition) {
  doSomething();
} doAnotherThing();
```

JS correct.js

```
if (condition) {
  doSomething();
}
doAnotherThing();
```

Exceptions: Cases with else, catch, etc.

Do **not insert a line break** if { is followed by **else**, **catch**, **while**, or characters such as a **comma**, **semicolon**, or **right parenthesis**.

JS incorrect.js

```
if (condition) {
  doSomething();
}
else {
  doSomethingElse();
}
```

JS correct.js

```
if (condition) {
  doSomething();
} else {
  doSomethingElse();
}
```

Empty Blocks May Be Concise

Close empty blocks immediately ({}) unless part of a multi-block statement like if/else or try/catch/finally.

correct.js

```
function doNothing() {}
```

Use an empty function as the default for a callback parameter to avoid errors if no callback is provided.

empty-block.js

```
function doSomething(callback = function() {}) {
  // Perform operations
  callback();
}
```

Block Indentation: 2 Spaces

Indent by **2 spaces** when opening a block; return when closing. Applies to **code** and **comments**.

incorrect.js

```
if (condition) {
doSomething();
}
```

correct.js

```
if (condition) {
  // Code indented with +2 spaces
  doSomething();
}
```

Switch Statements

incorrect.js

```
switch (animal) {
case Animal.BANDERSNATCH:
handleBandersnatch();
break;
case Animal.JABBERWOCK:
handleJabberwock();
break;
default:
throw new Error('Unknown animal');
}
```

correct.js

```
switch (animal) {
  case Animal.BANDERSNATCH:
    handleBandersnatch();
    break;

  case Animal.JABBERWOCK:
    handleJabberwock();
    break;

  default:
    throw new Error('Unknown animal');
}
```

- **Indetation**
  Switch block contents are indented +2.
- **Switch labels**
  Add a newline and increase indentation +2, like opening a block.
- **Next label**
  Resets indentation, as if closing a block.
- **Blank line**
  Optional after break.

One Statement Per Line

Each statement must be on **its own line**.

incorrect.js

```
let a = 5; let b = 10; console.log(a + b);
```

correct.js

```
let a = 5;
let b = 10;
console.log(a + b);
```

Semicolons are Required

Each statement **must end with a semicolon**.

incorrect.js

```
let a = 5
console.log(a)
```

correct.js

```
let a = 5;
console.log(a);
```

Column Limit

80 Characters

When wrapping lines, every subsequent line must be indented at least **4 spaces** beyond the original line.

correct.js

```
const example = someFunction(
    argument1,
    argument2,
    argument3
);
```

Vertical Whitespace

✅ When to Use a Single Blank Line

- Between consecutive methods in a class or object literal.
- Within a method, to logically group statements.

Exception

- Between properties in an object literal: optional for logical grouping.

❌ When to Avoid Blank Lines

- At the start or end of a method.
- Multiple consecutive blank lines: allowed but not recommended.

incorrect.js

```
class MyClass {
  methodOne() {

    console.log("Start of method one");

    console.log("End of method one");

  }

  methodTwo() {

    console.log("Method two with extra blank lines");

  }
}
```

correct.js

```
class MyClass {
  methodOne() {
    console.log("Start of method one");
    // Logical grouping of statements without blank lines at the beginning or end
    console.log("End of method one");
  }

  methodTwo() {
    console.log("Method two without unnecessary blank lines");
  }
}
```

Horizontal Whitespace

- **Trailing Whitespace:** Forbidden

- **Internal Whitespace:** Use exactly one ASCII space only:
  - **After reserved words:** e.g., if (
  - **Around binary/ternary operators:** e.g., a === b
  - After commas, semicolons, and colons.
  - **Before** an opening **{**: (with exceptions)

JS incorrect.js

```
if  (a===b){doSomething();
```

Issues:

- *Extra space after if*
- *No spaces around ===*
- *Missing space before {*

JS correct.js

```
if (a === b) { doSomething(); }
```

JS correct.js

```
function logData(data) {
  console.log(data);
}

logData({ key: "value" });  // No space before `{`
```

exception

Features: Local Variables

- Use only **const** and **let**.

  Use **const** by default unless the variable needs to be reassigned.

  Use **let** for variables whose values will change.

- **One** variable per declaration.

  Avoid declaring multiple variables in the same statement.

- Declare variables as **close** as possible to their first use.

JS correct.js

```
const value1 = 10; // Use const by default
const value2 = 20;
const result = value1 + value2; // Declare variables near usage
```

Naming

General Rules for Identifiers

Use only ASCII **letters** and **digits**.

Underscores are allowed, and **$** is permitted in **very specific cases** (e.g., for Angular).

Names must be as descriptive as possible!

incorrect.js

```
let n = 0;           // Too generic.
let nErr = 0;        // Ambiguous abbreviation.
let cstmrId = 12345; // Removed letters.
let kSecondsPerDay = 86400; // Hungarian notation is not allowed.
```

correct.js

```
let errorCount = 0;
let dnsConnectionIndex = 1;
let referrerUrl = "https://example.com";
let customerId = 12345;
```

Constant Names

Use CONSTANT_CASE for **deeply immutable global constants**, and **lowerCamelCase for local variables**, even if declared with const.

correct.js

```
// CONSTANT_CASE for global constants
const MAX_USERS = 100;
const HTTP_STATUS_OK = 200;

// lowerCamelCase for local variables
const result = calculateSum(10, 20);
console.log(result);
```

Class Names

Format: **UpperCamelCase**.

Names are typically **nouns** or **noun phrases** (e.g., Request, ImmutableView)

incorrect.js

```
class request {
  // ...
}

class immutableview {
  // ...
}
```

correct.js

```
class Request {
  // ...
}

class ImmutableView {
  // ...
}
```

Method Names

Format: **lowerCamelCase**.

Names should be **verbs** or **verb phrases** (e.g., sendMessage).

Private methods may end with an **underscore** (_).

incorrect.js

```
class Messenger {
  SendMessage(message) {
    // ...
  }

  Stop(message) {
    // ...
  }
}
```

correct.js

```
class Messenger {
  sendMessage(message) {
    // Send message
  }

  stop_() {
    // Private method
  }
}
```

Enum Names

Format: **UpperCamelCase** (singular).

Enum items use **CONSTANT_CASE** (uppercase with underscores).

incorrect.js

```
enum userRoles {
  GuestUser,
  admin_role,
}
```

correct.js

```
enum UserRole {
  ADMIN,
  GUEST_USER,
}
```

Parameters and Local Variables

Format: **lowerCamelCase**.

incorrect.js

```
function processUserData(uName, user_age) {
  let r = [];

  if (user_age > 18) {
    r.push({ name: uName, age: user_age });
  }
  return r;
}
```

correct.js

```
function processUserData(userName, userAge) {
  let activeUsers = [];

  if (userAge > 18) {
    activeUsers.push({ name: userName, age: userAge });
  }
  return activeUsers;
}
```

Single quotes ‘’, rather than double quotes “” for **strings**

JSDoc

JSDoc Key Rules

incorrect.js

```
/** @param {number} a @param {number} b @return {number} */
function add(a, b) { return a + b; }
```

- Used in **classes**, **methods**, and **fields**.
- Format:
  - Multi-line: **/** ... */**
  - Single-line: **/** ... */**
- Use Markdown for lists and text formatting.
- Allowed **tags**: @param, @return, @private, @const, etc.
- Do **not** combine **multiple tags on a single line**.
- Indentation: +4 spaces when wrapping lines.

correct.js

```
/**
 * Calculates the sum of two numbers.
 * @param {number} a First number to be added.
 * @param {number} b The second number, which
 *     will be added to the first one.
 * @return {number} The total sum of `a` and `b`.
 */
function add(a, b) {
  return a + b;
}
```

ESLint

JavaScript linter

eslint.config.mjs

```
rules: {
  ...googleConfig.rules, // Reglas de Google
  'quotes': ['error', 'single'], // ✅ Fuerza comillas simples
  'semi': ['error', 'always'],   // ✅ Punto y coma obligatorio
  'indent': ['error', 2, { 'SwitchCase': 1 }]
},
```

What is a Linter?

Get better habits

Detects possible problems and errors

Correct, coherent and consistent code

How to Use ESLint?

```
//  Initialize ESLint in our project by running
npx eslint --init
```

```
//  Analyze our code
npx eslint nombre-del-archivo.js
```

```
//  Automatically fix errors
npx eslint nombre-del-archivo.js --fix
```

Reference for installation here

ESLint Examples

```
  1:1   error  Unexpected var, use let or const instead      no-var
  1:14  error  Strings must use singlequote                  quotes
  1:20  error  Missing semicolon                             semi
  3:21  error  'city' is assigned a value but never used     no-unused-vars
  5:1   error  Missing JSDoc comment                         require-jsdoc
  5:10  error  'greetUser' is defined but never used         no-unused-vars
  5:21  error  Missing space before opening brace            space-before-blocks
  6:1   error  Expected indentation of 2 spaces but found 0  indent
  6:59  error  Missing semicolon                             semi
  9:1   error  Expected space(s) after "if"                  keyword-spacing
 11:7   error  'numbers' is assigned a value but never used  no-unused-vars
 11:17  error  A space is required after ','                 comma-spacing
 11:19  error  A space is required after ','                 comma-spacing
 11:21  error  A space is required after ','                 comma-spacing
 11:23  error  A space is required after ','                 comma-spacing
```

Reference for installation here

References

- package.json
- JavaScript Tutorial
- Eloquent JavaScript
- Gemini (dudas puntuales)
- Coding Style
- Google Style Guide
- ESLint
- ChatGPT

Thank You.

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