

# Industrialisation de JavaScript



Réseau régional

*ProDev*

# Industrialisation de JavaScript

2

- Nombreux outils disponibles pour créer une usine logicielle JS
- Automatisation des tâches récurrentes
  - ▣ Gain de temps
  - ▣ Diminution des erreurs dues à la gestion de tâches répétitives

# Plan

3

- **Coder**
- Gérer les dépendances du projet
- Déboguer
- Optimiser
- Tester
- Générer la documentation
- Mesurer la qualité du code
- Automatiser et déployer



JSDT



Enide  
Studio



**NetBeans**



**IntelliJ IDEA**



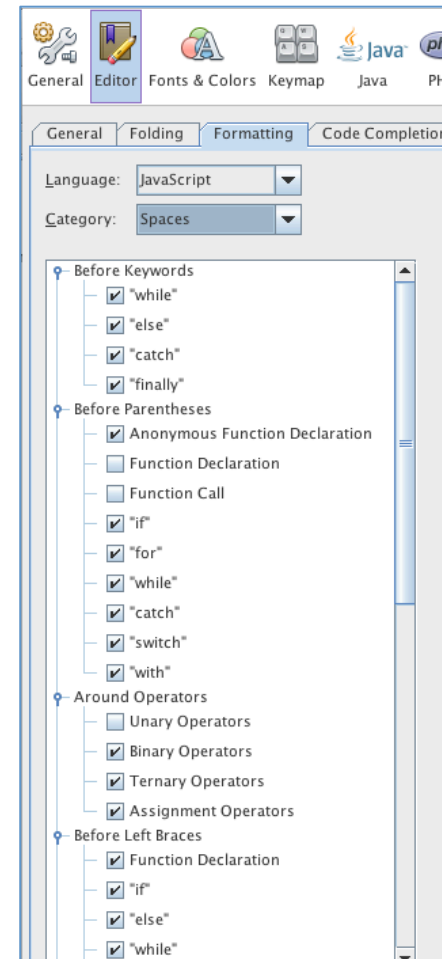
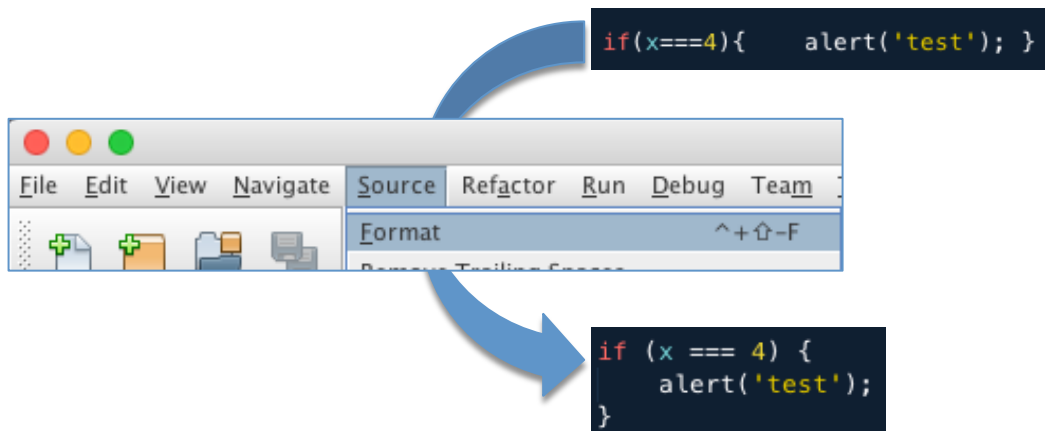
**WebStorm**

- Arborescence du projet
- Editeur de code source
  - ▣ Coloration syntaxique
  - ▣ Mise en évidence des erreurs
  - ▣ Recherche / remplacement avancés (expressions régulières, refactoring)
  - ▣ Visualisation simultanée de plusieurs fichiers
  - ▣ Indentation automatique
  - ▣ Correspondance parenthèses, accolades ouvrantes/fermantes
  - ▣ Conventions de codage et de nommage
- Complétion de code
- Génération de documentation d'API
- Gestion de version
- Débogage

- Bonnes pratiques de programmation
    - ▣ Utiliser le mode strict
    - ▣ Déclarer les variables et fonctions avant de les utiliser
    - ▣ Accolades pour les if/for qui n'ont qu'une instruction
  - Conventions de codage
    - ▣ Indentation : pas de tabulation, utiliser 4 espaces
    - ▣ Longueur de ligne : 80 caractères
    - ▣ Noms de variables : caractères : alphabet, nombres et \_
    - ▣ Noms de fonctions : camelCase
    - ▣ Mettre l'accolade ouvrante du bloc sur la même ligne que if, for, function, ...
    - ▣ Mettre un caractère espace entre if, while, for, ... et (
    - ▣ Utiliser === et !== plutôt que == et !=
- ⇒ **Configurer l'EDI**
- ⇒ **Utiliser des outils d'analyse statique**

### Configurer l'EDI

définir le formatage



### Configurer l'EDI

définir les indications d'alertes et erreurs

```
44  ⚠ if (x === 4) {  
    ! alert('test')  
47  }
```

The screenshot shows the NetBeans IDE configuration window for JavaScript. The 'Hints' tab is selected, and the 'Language' is set to 'JavaScript'. The 'Show As' dropdown menu is open, showing options: Error, Error, Warning, Suggestion for current line, and Info. The 'JS Convention' section is expanded, showing several checked options: Assignment in condition, Duplicate Property Name, Missing semicolon (highlighted), Trailing comma in array literal, Trailing comma in object literal, and Using === or !== instead == or !=. The 'JS Documentation' section is also expanded, showing 'Incorrect Documented Parameter' and 'Undocumented Parameter' checked. The 'Other' section is expanded, showing 'The global variable is' and 'Weird assignment' checked. The NetBeans logo is visible in the bottom right corner.

### Configurer l'EDI

Partager les règles entre développeurs d'une même équipe et entre EDI

<http://editorconfig.org/>

### What is EditorConfig?

EditorConfig helps developers define and maintain consistent coding styles between different editors and IDEs. The EditorConfig project consists of a **file format** for defining coding styles and a collection of **text editor plugins** that enable editors to read the file format and adhere to defined styles. EditorConfig files are easily readable and they work nicely with version control systems.



```
# 4 spaces indentation  
[*.*js]  
indent_style = space  
indent_size = 2
```



.editorconfig

#### No Plugin Necessary

These editors come bundled with native support for EditorConfig. Everything should just work.



#### Download a Plugin

To use EditorConfig with one of these editors, you will need to install a plugin.





- Vérifier que le code suit les bonnes pratiques de programmation
- Vérifier que le code suit des conventions de codage et des règles de nommage
- Détecter les problèmes potentiels
  - ▣ Affectation dans if `if (a = b)`
  - ▣ Oubli de déclaration de variable
  - ▣ Code jamais exécuté (`return` avant le code)
- Détecter ce qui n'est pas utilisé (variables)
- Détecter les erreurs de syntaxe

```
/* ....  
    /* ... */  
... */
```



```
var x = 5  
var y = 4;  
var z;  
if(x = y)  
    statut = 'egal';  
else  
    statut= 'different';
```



```
var x = 5
var y = 4;
var z;
if(x = y)
  statut = 'egal';
else
  statut= 'different';
```

JSLint, support jQuery, plugin Eclipse, Netbeans, ...

Douglas Crockford

<http://www.jshint.com/>

Expected ';' and instead saw 'var'.

```
var x = 5
```

Expected exactly one space between 'if' and '('.

```
if(x = y)
```

Unexpected assignment expression.

```
if(x = y)
```

Expected exactly one space between ')' and 'statut'.

```
  statut = 'egal';
```

Expected '{' and instead saw 'statut'.

```
  statut = 'egal';
```

<http://www.jshint.com/>



```
1  var x = 5
2  var y = 4;
3  var z;
4  if(x = y)
5      statut = 'egal';
6  else
7      statut= 'different';
8
```

Support jQuery et Node.JS

Configurable

Plugin pour Eclipse, NetBeans

NB : JSHint se recentre vers la détection de problèmes dans le code, la prochaine version majeure ne vérifiera plus le style

```
CONFIGURE

Two warnings
1  Missing semicolon.
4  Expected a conditional expression and instead saw an
   assignment.

One undefined variable
5  statut
7  statut

One unused variable
3  z
```

JavaScript code style checker : <http://jscs.info/>



Plusieurs jeux de règles disponibles

```
Extra comma following the final element of an array or object literal at q4.js :
28 |      prenom: {required: "entrer un prenom", maxlength: "trop long"},
29 |      mail: {required: "obligatoire", email: "entrer une adresse mail"}
30 |    },
-----^
31 |  });
```

Configuration d'un jeu de règles

```
pc6:test magali$ jscs --auto-configure q4.js
Checking q4.js against the presets
Preset      #Errors #Rules
1  airbnb      75     11
2  crockford   28      3
3  google      70      7
4  grunt       68      5
5  jquery      89     12
6  mdcs        53      6
7  node-style-guide 75      9
8  wikimedia  116     11
9  wordpress   84     12
10 yandex     39      4
Please choose a preset number: 8
You chose the wikimedia preset
q4.js violates 11 rules
validateIndentation (28 violations in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself?
requireSpacesInsideParentheses (28 violations in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself? e
requireSpaceAfterBinaryOperators (26 violations in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself?
requireSpacesInsideObjectBrackets (16 violations in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself? a 2
validateQuoteMarks (11 violations in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself?
requireSpacesInsideArrayBrackets (2 violations in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself? e
requireCamelCaseOrUpperCaseIdentifiers (1 violation in 1 file):
  Create an (e)xception for this rule, or (f)ix the errors yourself? e
```

`jscs --preset=crockford test.js`

```
Illegal trailing whitespace at test.js :
86 |
87 |
88 |
-----^
89 | });
90 |
175 code style errors found.
```

L'option -x corrige le fichier

`jscs --preset=crockford -x test.js`

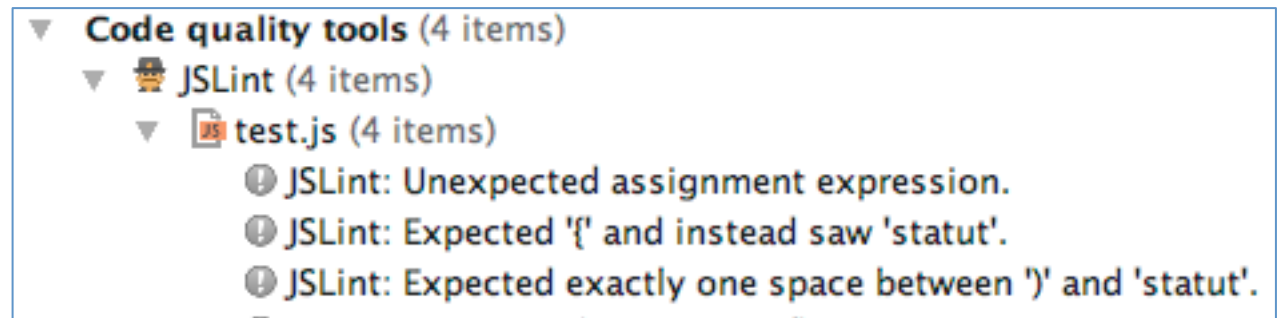
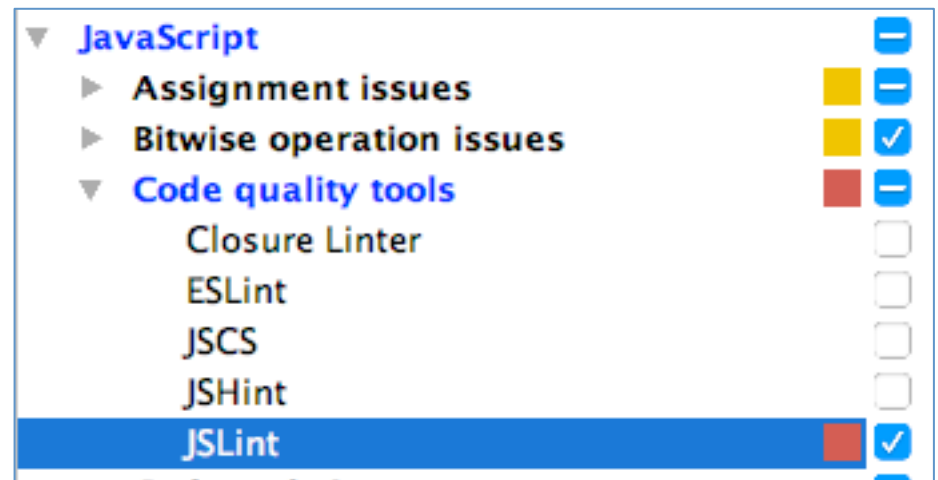
```
29 code style errors found.
```

=> correction automatique de 146 erreurs



### Intégration dans les IDE

```
1 var x = 5
2 var y = 4;
3 var z;
4 if(x = y)
5     statut = 'egal';
6 else
7     statut= 'different';
```





# NetBeans

Intégration dans les IDE

```
40 function test(x, y, z, t, a, b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w){
41     if (x = 4) {
42         alert('test')
43     }
44 }
45
46 if (x = 4){
47     if (y = 2){
48         switch(x){
49             case 1: x=1
50             case 2: x=2;
51         }
52     }
53 }
54 }
```

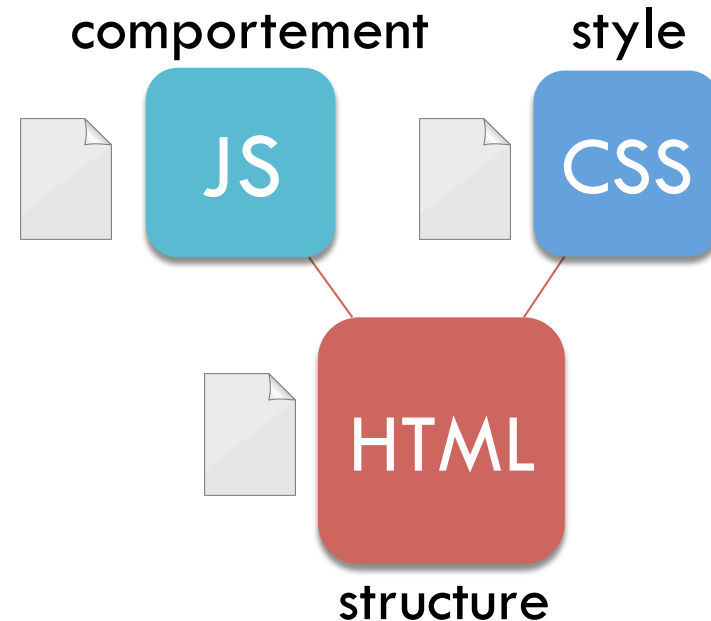
Action Items	
	Description
	't' is already defined.
	Expected a 'break' statement before 'case'.
	Expected a conditional expression and instead saw an assignment.
	Expected a conditional expression and instead saw an assignment.
	Expected a conditional expression and instead saw an assignment.
	Missing semicolon.
	Missing semicolon.



### ▣ Séparation comportement / structure

Le fichier HTML ne contient que des liens vers des fichiers JS et CSS

Utilisation du DOM pour l'accès aux éléments



```
<form action='test.php' onsubmit="return confirm('envoyer?')">  
  <div>  
    <input type="text" name="nb" onchange="verifNb(this)">  
    <input type="submit" value="envoyer">  
  </div>  
</form>
```

The code block shows HTML form elements with JavaScript event handlers. Red dashed boxes highlight the event handlers: `onsubmit="return confirm('envoyer?')"` on the form tag, `onchange="verifNb(this)"` on the text input, and `value="envoyer"` on the submit button. To the right, three more red dashed boxes contain IDs: `id="formtest"` (linked to the form tag), and `id="nb"` (linked to both the text input and the submit button). Curved arrows show the mapping from the event handlers to their respective DOM elements.

- ▣ **Accessibilité : contenu accessible et navigation possible** sans JS ou avec un support partiel de JavaScript



avec JS (jQuery UI)



sans JS



▣ **Echec silencieux**, si JS non activé ou fonctionne partiellement

- pas de message d'erreur

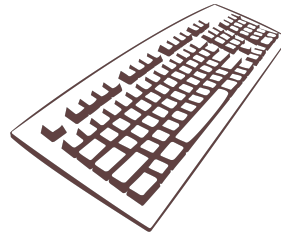
✖ ▶ Uncaught TypeError:

- détection des fonctionnalités avant utilisation



<https://modernizr.com/>

- Indépendance vis à vis du périphérique par rapport aux événements



mouseover



### ▣ Code sans effet de bord



#### Contexte global

```
var tab = ['a', 'b', 'c', 'd'];  
  
for (var i = 0; i < tab.length; i++) {  
  console.log('for : i = ', i);  
  test();  
}  
console.log('end : i = ', i);
```

#### Contexte local ? **NON**

```
function test() {  
  i = 4;  
}
```

```
function test() {  
  i = 0;  
}
```

Console

```
for : i = 0  
end : i = 5  
> |
```



```
for : i = 0  
158510 for : i = 1  
> |
```

### ▣ Code sans effet de bord

Toujours déclarer les variables avec var

#### Contexte global

```
var tab = ['a', 'b', 'c', 'd'];  
  
for (var i = 0; i < tab.length; i++) {  
  console.log('for : i = ', i);  
  test();  
}  
console.log('end : i = ', i);
```

#### Contexte local ? OUI

```
function test() {  
  var i = 4;  
}
```

```
function test() {  
  var i = 0;  
}
```

Console

```
for : i = 0  
for : i = 1  
for : i = 2  
for : i = 3  
end : i = 4
```

>

### ▣ Code sans effet de bord

Visibilité publique pour les propriétés et méthodes



```
var compteur = {  
  cpt : 0,  
  next : function() {  
    this.cpt++;  
  },  
  reset : function() {  
    this.cpt = 0;  
  },  
  getCpt : function() {  
    return this.cpt;  
  }  
}
```

```
compteur.next();  
compteur.next();  
console.log( compteur.getCpt() );  
compteur.reset();  
console.log( compteur.getCpt() );  
compteur.cpt = 5;  
console.log( compteur.getCpt() );
```

Console

2  
0  
5  
>



### ▣ Code sans effet de bord

Créer des modules (ES5)

fonction  
anonyme

```
var compteur = ( function () {  
  var cpt = 0;  
  function next() { cpt++; };  
  function reset() { cpt = 0; };  
  function getCpt () { return cpt; };  
  
  return { inc : next,  
          val : getCpt  
        }  
      }  
    )();
```

**compteur** est un objet comportant  
2 méthodes **inc** et **val**

```
compteur.inc();  
compteur.inc();  
cpt = 5;  
compteur.cpt = 5;  
console.log( compteur.val() );  
compteur.reset();
```

Console

```
2  
✖ ▶ Uncaught TypeError: Object #<Object>  
  has no method 'reset'  
>
```

### ▣ Code sans effet de bord

Créer des modules

- **ES 6**
- 2 formats de modules utilisés avec ECMAScript 5
  - **Asynchronous Module Definition (AMD)**
  - **CommonJS (CJS)**

- Utiliser des bibliothèques



<https://jquery.com/>



# UNDERSCORE.JS

<http://underscorejs.org/>

```
function display(val) {  
    console.log(val);  
}  
  
// crée une liste de nombres de 0 à 30 par pas de 5  
var tab = _.range(0, 30, 5);  
  
// exécute la fonction display pour chaque élément de tab  
_.each(tab, display);
```

Console



0

5

10

15

20

25





- Utiliser des frameworks MV\*

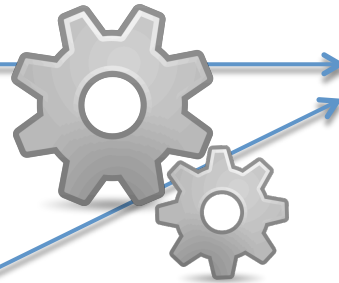


- Utiliser des outils de templating : mustache, handlebars

{{ }}

template

```
<div class="entry">
  <h1>{{title}}</h1>
  <div class="body">
    {{body}}
  </div>
</div>
```



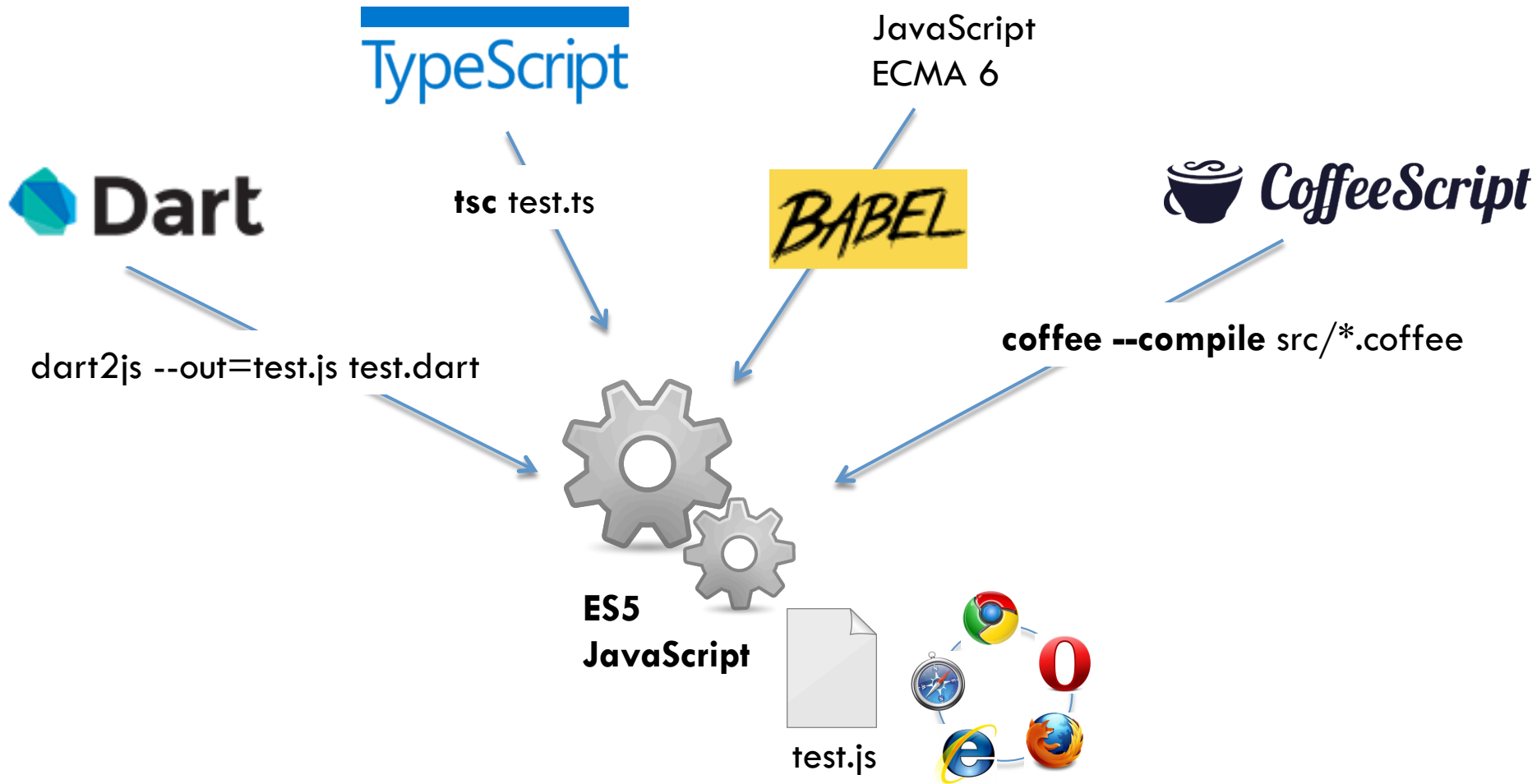
```
<div class="entry">
  <h1>All About &lt;p&gt; Tags</h1>
  <div class="body">
    <p>This is a post about &lt;p&gt; tags</p>
  </div>
</div>
```

Résultat HTML

Objet JSON

```
{
  title: "All about <p> Tags",
  body: "<p>This is a post about &lt;p&gt; tags</p>"
}
```

- Transpiler ou compiler JavaScript



Sur-ensemble de JavaScript. Ajoute : types, classes, modules, interfaces

# TypeScript

PREVIEW

learn

play

get it

run it

join in

TypeScript

Walkthrough: Classes

Share

Run

JavaScript

```
1 class Greeter {
2   greeting: string;
3   constructor(message: string) {
4     this.greeting = message;
5   }
6   greet() {
7     return "Hello, " + this.greeting;
8   }
9 }
10
11 var greeter = new Greeter("world");
12
13 var button = document.createElement('button');
14 button.textContent = "Say Hello";
15 button.onclick = function() {
16   alert(greeter.greet());
17 }
18
19 document.body.appendChild(button);
20
```

```
1 var Greeter = (function () {
2   function Greeter(message) {
3     this.greeting = message;
4   }
5   Greeter.prototype.greet = function () {
6     return "Hello, " + this.greeting;
7   };
8   return Greeter;
9 })();
10
11 var greeter = new Greeter("world");
12
13 var button = document.createElement('button');
14 button.textContent = "Say Hello";
15 button.onclick = function () {
16   alert(greeter.greet());
17 };
18
19 document.body.appendChild(button);
20
```

# JS

Plus concis. Blocs marqués par l'indentation. Ajout de classes, sucres syntaxiques (@ pour this)

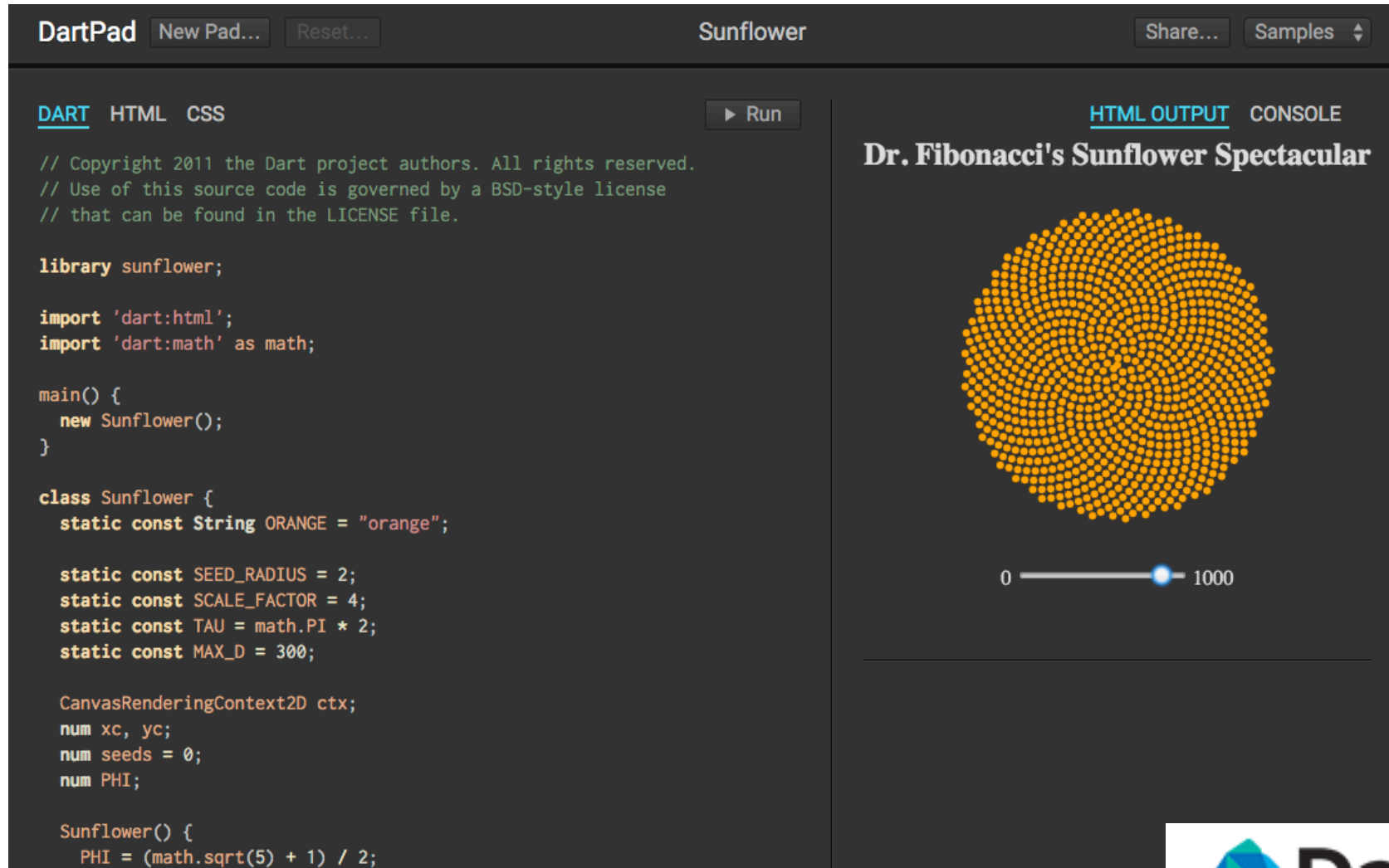
```
switch day
  when "Mon" then go work
  when "Tue" then go relax
  when "Thu" then go iceFishing
  when "Fri", "Sat"
    if day is bingoDay
      go bingo
      go dancing
  when "Sun" then go church
  else go work
```

```
switch (day) {
  case "Mon":
    go(work);
    break;
  case "Tue":
    go(relax);
    break;
  case "Thu":
    go(iceFishing);
    break;
  case "Fri":
  case "Sat":
    if (day === bingoDay) {
      go(bingo);
      go(dancing);
    }
    break;
  case "Sun":
    go(church);
    break;
  default:
    go(work);
}
```



load

JS



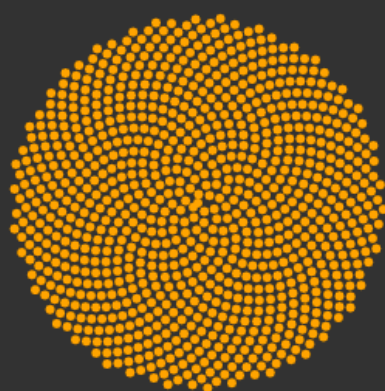
DartPad New Pad... Reset... Sunflower Share... Samples

DART HTML CSS ▶ Run

```
// Copyright 2011 the Dart project authors. All rights reserved.  
// Use of this source code is governed by a BSD-style license  
// that can be found in the LICENSE file.  
  
library sunflower;  
  
import 'dart:html';  
import 'dart:math' as math;  
  
main() {  
  new Sunflower();  
}  
  
class Sunflower {  
  static const String ORANGE = "orange";  
  
  static const SEED_RADIUS = 2;  
  static const SCALE_FACTOR = 4;  
  static const TAU = math.PI * 2;  
  static const MAX_D = 300;  
  
  CanvasRenderingContext2D ctx;  
  num xc, yc;  
  num seeds = 0;  
  num PHI;  
  
  Sunflower() {  
    PHI = (math.sqrt(5) + 1) / 2;
```

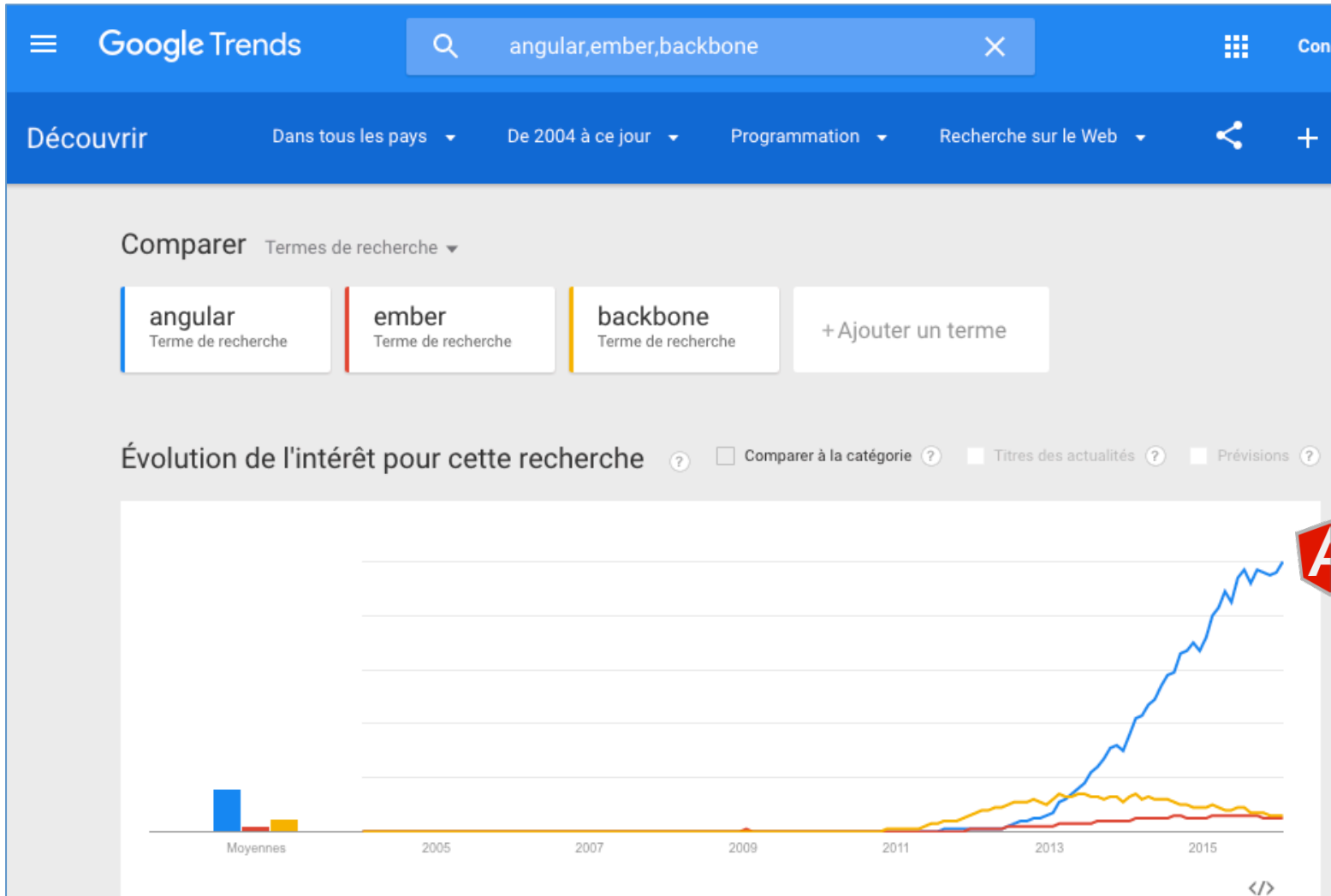
HTML OUTPUT CONSOLE

### Dr. Fibonacci's Sunflower Spectacular

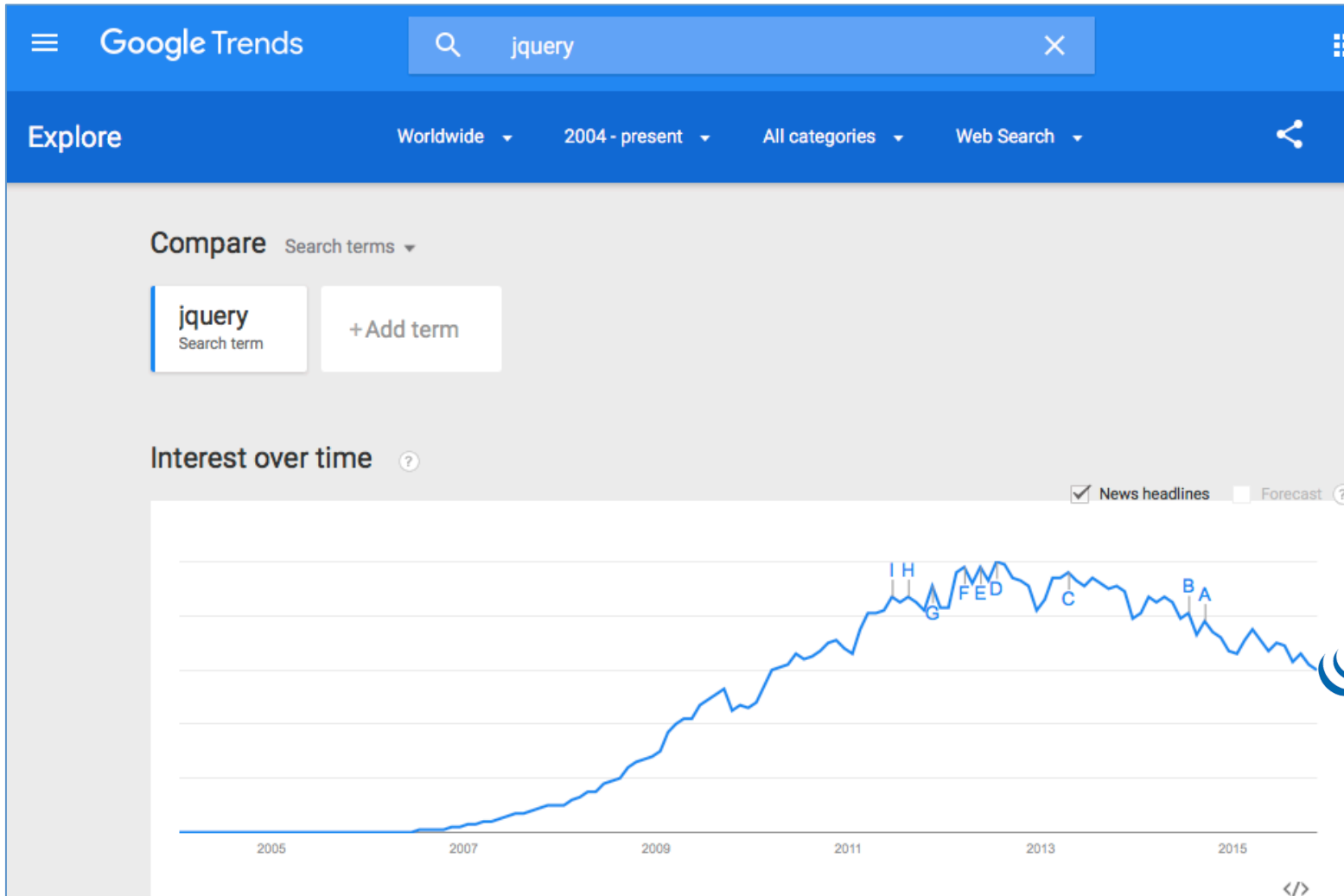


0 ————— 1000

- Critères
  - ▣ Fonctionnalités offertes
  - ▣ Licence
  - ▣ Facilité de prise en main pour le développeur
  - ▣ Pérennité
    - Support des normes
    - Documentation
    - Forge logicielle
    - Communauté active
    - Tendances ?









Learn more  
**LIBSCORE**

Libscore scans the top million sites on the web to collect stats on **JavaScript library** usage. Explore this month's data.

[Top Libs](#)

[Top Scripts](#)

[Top Sites](#)

### LIBRARY

### SITE COUNT

<a href="#">jQuery ↗</a>	698,359
<a href="#">\$.ui ↗</a>	196,525
<a href="#">FB ↗</a>	183,760
<a href="#">Modernizr ↗</a>	152,926
<a href="#">\$.fn.modal ↗</a>	149,322
<a href="#">\$.fn.dropdown ↗</a>	142,215

# Plan

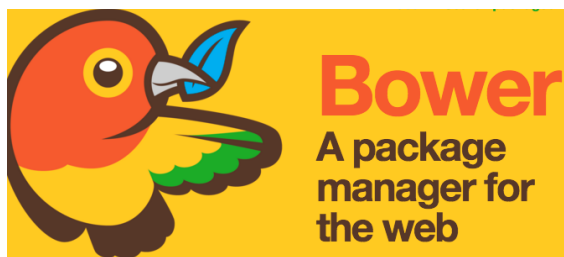
36

- Coder
- **Gérer les dépendances du projet**
- Déboguer
- Optimiser
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- Générer la documentation
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- Automatiser et déployer

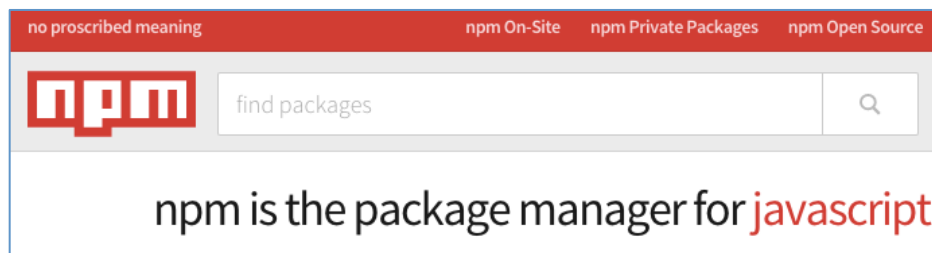
# Gérer les dépendances du projet

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Installation et mise à jour de paquets et bibliothèques



<http://bower.io/>



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



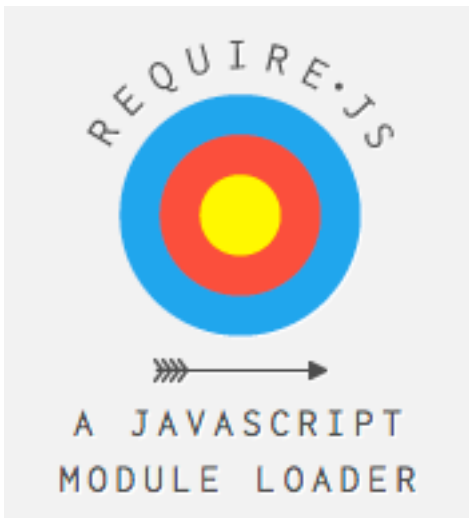
bower.json

```
{
  "name": "mon_projet",
  "dependencies": {
    "html5shiv": "latest",
    "modernizr": "latest",
    "jquery": "1.12.0"
  }
}
```

# Gérer les dépendances du projet

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Chargement dynamique  
asynchrone de bibliothèques

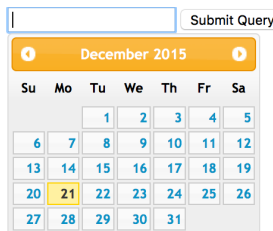
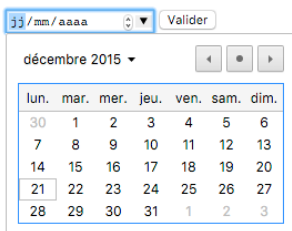


<http://requirejs.org/>

systemjs

<https://github.com/systemjs>

`<input type='date' name='d' required>`



jQuery  
user interface

```
if (!Modernizr.inputtypes.date){
  requirejs(["jquery.min.js", "jquery-ui/jquery-ui.min.js"],
    function() {
      $('input[type=date]').datepicker();
    });
}
```



# Gérer les dépendances du projet

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<http://browserify.org/>



<http://webpack.github.io/>

# Plan

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- Coder
- Gérer les dépendances du projet
- **Déboguer**
- Optimiser
- Tester
- Générer la documentation
- Mesurer la qualité du code
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# Déboguer

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Inspecteur du document : débogueur



The screenshot displays the Chrome DevTools interface. The top toolbar includes buttons for Console, Inspector, Debugger, Style Editor, Profiler, and Network. The current file being debugged is 'showCities ajax.js:7'. The code editor shows the following JavaScript function:

```
1 function showCities(pays, id_elt) {
2
3     var node = null;
4     var xml_http = null;
5     try {
6         node = document.getElementById(id_elt);
7         if (pays.length == 0) { // si aucun
8             node.innerHTML = '';
9             return;
10        }
11        xml_http = new XMLHttpRequest();
12        xml_http.onreadystatechange = function(){
13            var tab_villes = new Array();
14            var code_html = '';
15
```

The 'Debugger' pane on the right shows the 'Function scope [showCities]' with the following variables:

- this:** Window
- pays:** "Angleterre" (highlighted with a red box)
- id\_elt:** "cities" (highlighted with a red box)
- arguments:** Arguments
- node:** HTMLSpanElement
- xml\_http:** null

# Déboguer

42

Inspecteur du document : échanges HTTP AJAX



Method	File	Domain	Type	Size	0 ms	Headers	Cookies
GET	ajax-loader.gif	localhost	gif	9.58 KB	→ 35 ms		
GET	liste_villes.php?pays=Angleterre	localhost	plain	0.01 KB	→ 5079 ms	Request URL: http://localhost/... Request method: GET Status code: 200 OK	



URL et paramètres envoyés par GET

Format réponse

Statut

Paramètres GET et POST

Method	File	Domain	Type	Size	0 ms	Headers	Cookies	Params	Response
GET	ajax-loader.gif	localhost	gif	9.58 KB	→ 35 ms				
GET	liste_villes.php?pays=Angleterre	localhost	plain	0.01 KB	→ 5079 ms				1 Londres; Manchester 2

Corps de la réponse

# Plan

43

- Coder
- Gérer les dépendances du projet
- Déboguer
- **Optimiser**
- Tester
- Générer la documentation
- Mesurer la qualité du code
- Automatiser et déployer

# Optimiser

44

- Placer les inclusions de scripts en fin de page pour ne pas bloquer les téléchargements parallèles



# Optimiser

45

- Diminuer le poids en utilisant des « minifieurs »

```
/*!
 * jQuery JavaScript Library v2.2.0
 * http://jquery.com/
 *
 * Includes Sizzle.js
 * http://sizzlejs.com/
 *
 * Copyright jQuery Foundation and other contributors
 * Released under the MIT license
 * http://jquery.org/license
 *
 * Date: 2016-01-08T20:02Z
 */

(function( global, factory ) {

    if ( typeof module === "object" && typeof module.exports === "object" ) {
        // For CommonJS and CommonJS-like environments where a proper `window`
        // is present, execute the factory and get jQuery.
        // For environments that do not have a `window` with a `document`
        // (such as Node.js), expose a factory as module.exports.
        // This accentuates the need for the creation of a real `window`.
        // e.g. var jQuery = require("jquery")(window);
        // See ticket #14549 for more info.
        module.exports = global.document ?
            factory( global, true ) :
```

258 Ko

YUI Compressor

Closure Compiler

UglifyJS 2



Jasc



```
/*! jQuery v2.2.0 | (c) jQuery Foundation | jquery.org/license */
!function(a,b){"object"===typeof module&&"object"===typeof module.exports?module.exports=a.document?b(a,!0):function(a){if(!a.document)throw new Error("jQuery requires a window with a document");return b(a)}:b(a)}("undefined"!==typeof window?window:this,function(a,b){var c=[],d=a.document,e=c.slice,f=c.concat,g=c.push,h=c.indexOf,i={},j=i.toString,k=i.hasOwnProperty,l={},m="2.2.0",n=function(a,b){return new n.fn.init(a,b)},o=/^\s\uFEFF\xA0+|[\s\uFEFF\xA0]+$/g,p=/^-ms-/,q=/(\/\da-z)\/gi,r=function(a,b){return b.toUpperCase()};n.fn=n.prototype={jquery:"m",constructor:n,selector:"",length:0,toArray:function(){return e.call(this)}.get:function(a)
```

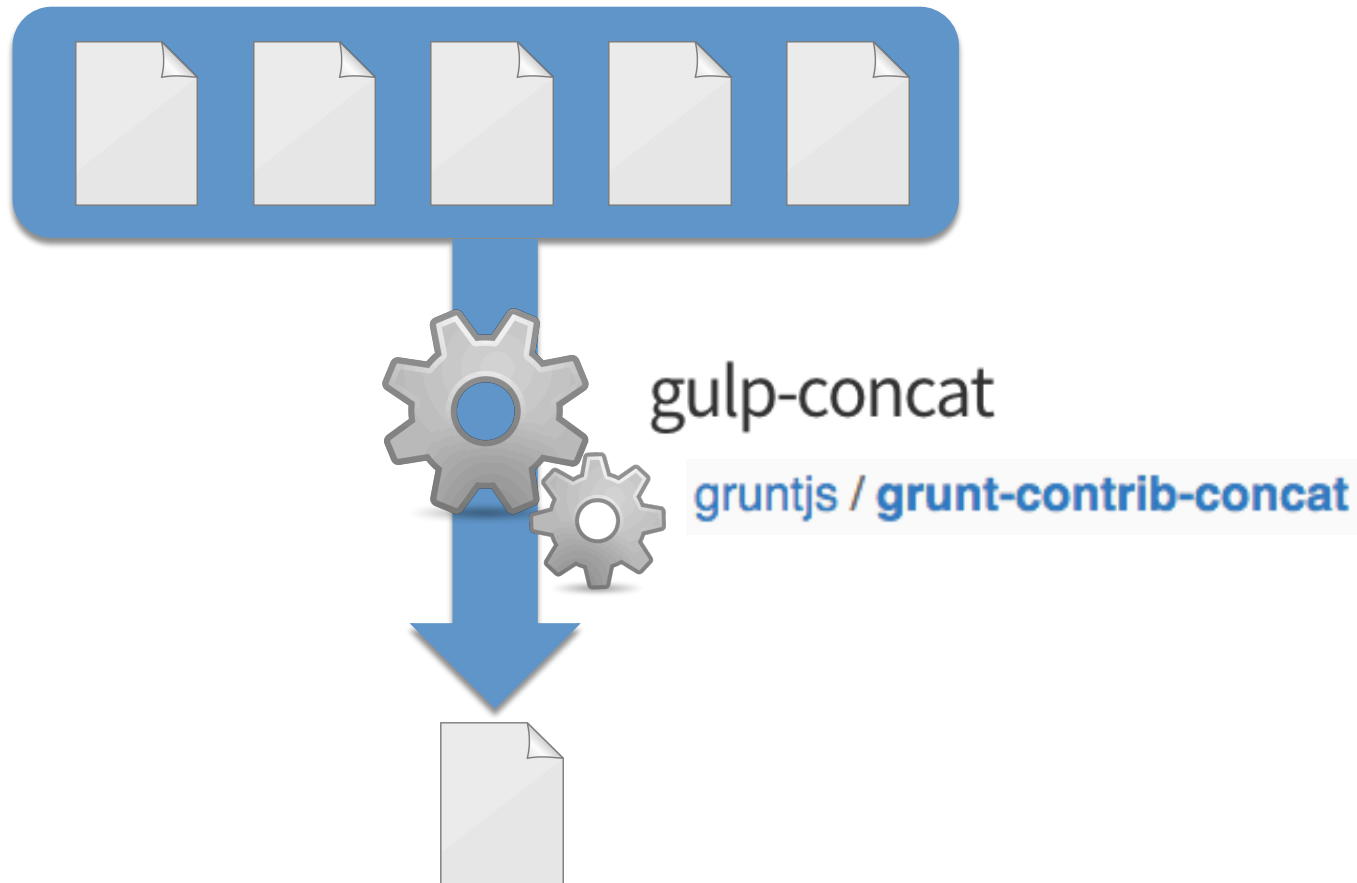
86 Ko

.min.js

# Optimiser

46

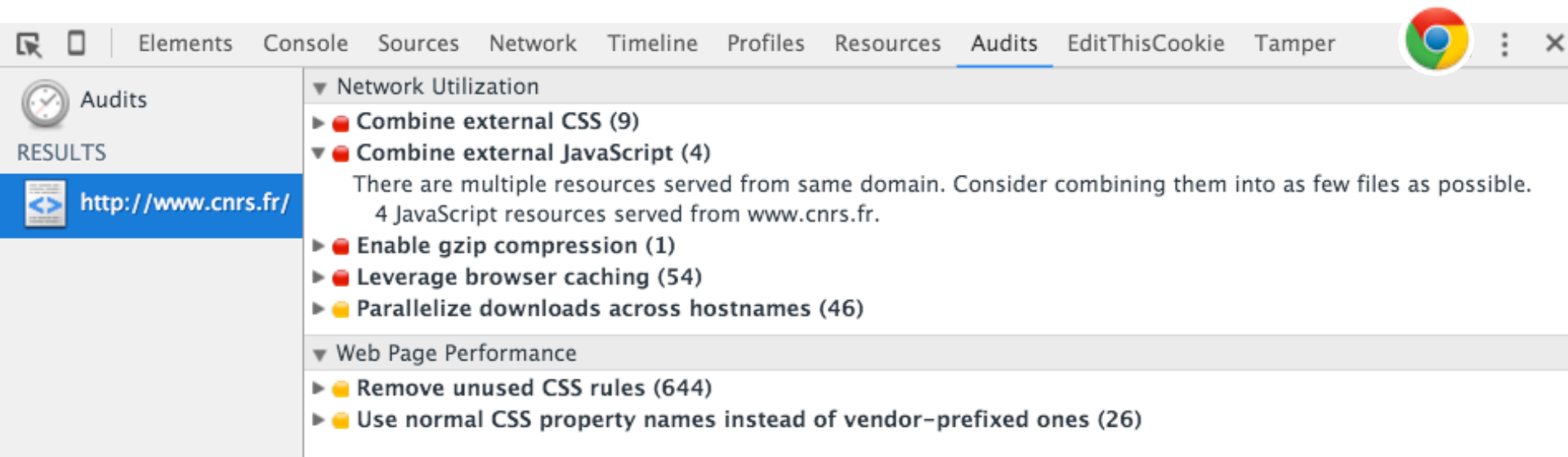
- Utiliser des CDN
- Limiter les échanges HTTP en concaténant les fichiers JS



# Optimiser

47

- Outils d'audit : Inspecteur du document



The screenshot shows the Chrome DevTools interface with the Audits panel open. The browser's address bar displays <http://www.cnrs.fr/>. The Audits panel is titled "Audits" and shows "RESULTS" for the current page. The "Network Utilization" section is expanded, listing several recommendations:

- Combine external CSS (9)
- Combine external JavaScript (4)
  - There are multiple resources served from same domain. Consider combining them into as few files as possible. 4 JavaScript resources served from www.cnrs.fr.
- Enable gzip compression (1)
- Leverage browser caching (54)
- Parallelize downloads across hostnames (46)

The "Web Page Performance" section is also expanded, listing:

- Remove unused CSS rules (644)
- Use normal CSS property names instead of vendor-prefixed ones (26)

# Optimiser

48

□ Outils d'audit : extension YSlow

<http://yslow.org/>

Home | **Grade** | Components | Statistics |

Rulesets    |  Help ↓

**Grade** 

Overall performance score 72 Ruleset applied: YSlow(V2) URL: <http://www.cnrs.fr/>

ALL (23) FILTER BY: [CONTENT \(6\)](#) | [COOKIE \(2\)](#) | [CSS \(6\)](#) | [IMAGES \(2\)](#) | [JAVASCRIPT \(4\)](#) | [SERVER \(6\)](#)



F	Make fewer HTTP requests
F	Use a Content Delivery Network (CDN)
A	Avoid empty src or href
F	Add Expires headers
F	Compress components with gzip
A	Put CSS at top
B	Put JavaScript at bottom
A	Avoid CSS expressions
n/a	Make JavaScript and CSS external
A	Reduce DNS lookups
A	Minify JavaScript and CSS
A	Avoid URL redirects
A	Remove duplicate JavaScript and CSS

## Grade F on Make fewer HTTP requests

This page has 5 external Javascript scripts. Try combining them into one.  
This page has 9 external stylesheets. Try combining them into one.  
This page has 34 external background images. Try combining them with CSS sprites.

Decreasing the number of components on a page reduces the number of HTTP requests required to render the page, resulting in faster page loads. Some ways to reduce the number of components include: combine files, combine multiple scripts into one script, combine multiple CSS files into one style sheet, and use CSS Sprites and image maps.

[»Read More](#)

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## □ Outils d'audit : outils développeurs Google

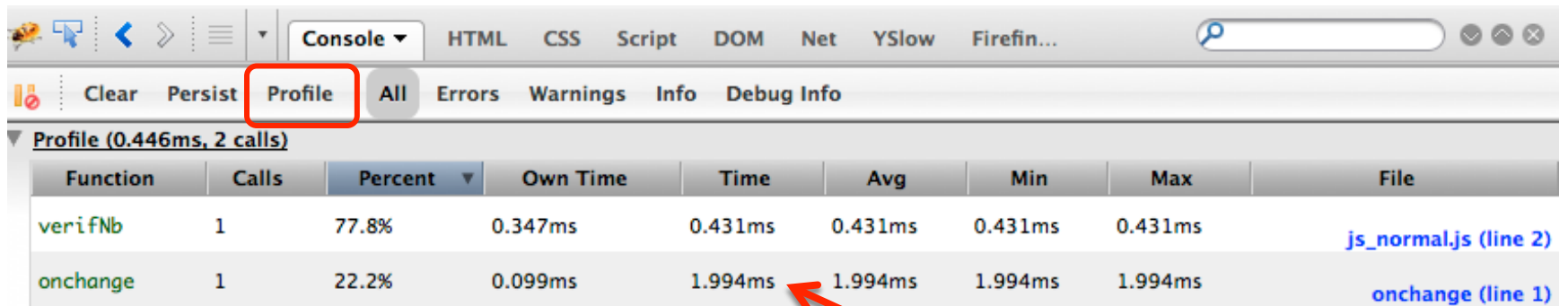


The screenshot shows the Google Developers PageSpeed Insights interface. At the top, the Google Developers logo is visible. Below it, the breadcrumb 'Produits > PageSpeed Insights' is shown. The main heading is 'PageSpeed Insights' with a small Google Assistant icon. A text input field contains the URL 'http://www.cnrs.fr/'. Below the input field, there are two tabs: 'Mobile' (selected) and 'Ordinateur'. The main result is a score of '48 / 100 Vitesse'. Below this, a section titled 'À corriger :' lists the following issue: 'Éliminer les codes JavaScript et CSS qui bloquent l'affichage du contenu au-dessus de la ligne de flottaison'. A summary below the issue states: 'Votre page contient 3 ressources de script et 8 ressources CSS qui bloquent l'affichage de votre page, et donc le retardent.'

# Optimiser

50

- Outils d'audit : profiler de l'inspecteur du document



The screenshot shows the Firebug Profiler interface. The 'Profile' tab is selected and highlighted with a red box. Below it, a table displays the performance data for two function calls. The table has columns for Function, Calls, Percent, Own Time, Time, Avg, Min, Max, and File. The 'onchange' function is highlighted in grey, and a red arrow points to its 'Time' column.

Function	Calls	Percent	Own Time	Time	Avg	Min	Max	File
verifNb	1	77.8%	0.347ms	0.431ms	0.431ms	0.431ms	0.431ms	js_normal.js (line 2)
onchange	1	22.2%	0.099ms	1.994ms	1.994ms	1.994ms	1.994ms	onchange (line 1)

nombre d'appels

% temps passé dans chaque fonction par rapport au temps total

temps passé hors exécution des appels

temps passé avec exécution des appels



# Plan

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- Coder
- Gérer les dépendances du projet
- Déboguer
- Optimiser
- **Tester**
- Générer la documentation
- Mesurer la qualité du code
- Automatiser et déployer

# Tester

52

Tests unitaires



simple, flexible, fun



Mocks pour JS

**Tape**

**Sinon.JS**

# Tester

53

Tests fonctionnels : Selenium (<http://www.seleniumhq.org/>)

- Ecrire et exécuter des jeux de tests dans le navigateur
- Relancer les tests ultérieurement (non régression)

A screenshot of the Selenium IDE interface. On the left, a browser window shows a form titled "Test validation formulaire" with input fields for "nom", "prénom", and "adresse email", and a "Submit Query" button. On the right, the Selenium IDE interface is open, showing a test case named "F\_email". Below the test case name, it displays "Runs: 1" and "Failures: 0". A table with columns "Command", "Target", and "Value" is visible, containing the following entries:

Command	Target	Value
type	name=nom	aaa
type	name=prenom	bbb
type	name=mail	ccc
click	css=input[type="submit"]	

Below the table, there are input fields for "Command", "Target", and "Value", and a "Find" button.

# Tester

54

Tests fonctionnels : interagir avec une page web dans un navigateur sans interface graphique, à partir d'une API JS



A scriptable browser for Web developers

```
var webpage = require('webpage').create();
webpage
  .open('http://somewhere') // loads a page
  .then(function(){ // executed after loading
    // store a screenshot of the page
    webpage.viewportSize =
      { width:650, height:320 };
    webpage.render('page.png',
      {onlyViewport:true});
    // then open a second page
    return webpage.open('http://somewhere2');
  })
  .then(function(){
    // click somewhere on the second page
    webpage.sendEvent("click", 5, 5,
      'left', 0);

    slimer.exit()
  });
```

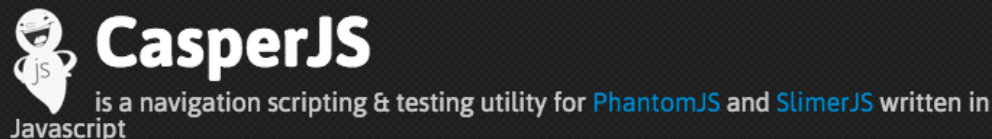
<http://docs.slimerjs.org/>

```
console.log('Loading a web page');
var page = require('webpage').create();
var url = 'http://phantomjs.org/';
page.open(url, function (status) {
  //Page is loaded!
  phantom.exit();
});
```



<http://phantomjs.org/>

<http://casperjs.org/>



```
niko@NikoBook:casperjs (0.6*$) $ bin/casperjs samples/googletesting.js
PASS google homepage title is the one expected
PASS main form is found
PASS google title is ok
PASS search term has been submitted
PASS google search for "foo" retrieves 10 or more results
PASS 5 tests executed, 5 passed, 0 failed.
niko@NikoBook:casperjs (0.6*$) $
```

# Tester

55

## JSFiddle(<http://jsfiddle.net/>)

JSFIDDLE α ▶ Run ✎ Save ◀ TidyUp ✓ JSHint 👤 Collaboration Login/Sign up 👤

**Frameworks & Extensions**

jQuery 1.7.2 ▾

jQuery UI 1.8.18

jQuery Lint (13 June '11)

Bootstrap 2.0.2 (js only)

jQuery Mobile 1.1.1

No wrap - in <head> ▾

Fiddle Options

External Resources

Languages

Ajax Requests

Legal, Credits and Links

1 `<script` HTML

2 `src="http://code.highcharts.com/highcharts.js">`

3 `</script>`

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

1 `$(function () {`

2  `$('#container').highcharts({`

3  `chart: {`

4  `},`

5  `xAxis: {`

6  `categories: ['Jan', 'Feb', 'Mar',`

7 `'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep',`

8 `'Oct', 'Nov', 'Dec']`

9  `},`

10  `plotOptions: {`

11  `series: {`

12  `color: '#FF0000'`

13  `}`

14  `},`

15  `series: [{`

16  `data: [29.9, 71.5, 106.4, 129.2,`

17 `144.0, 176.0, 135.6, 148.5, 216.4, 194.1, 95.6,`

18 `54.4]`

19  `}]`

20  `});`

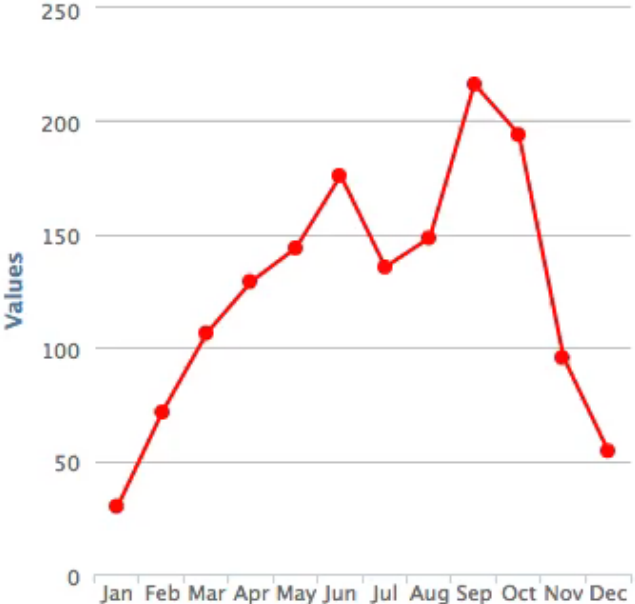
21 `});`

22 `});`

1  CSS

1

Chart title Result

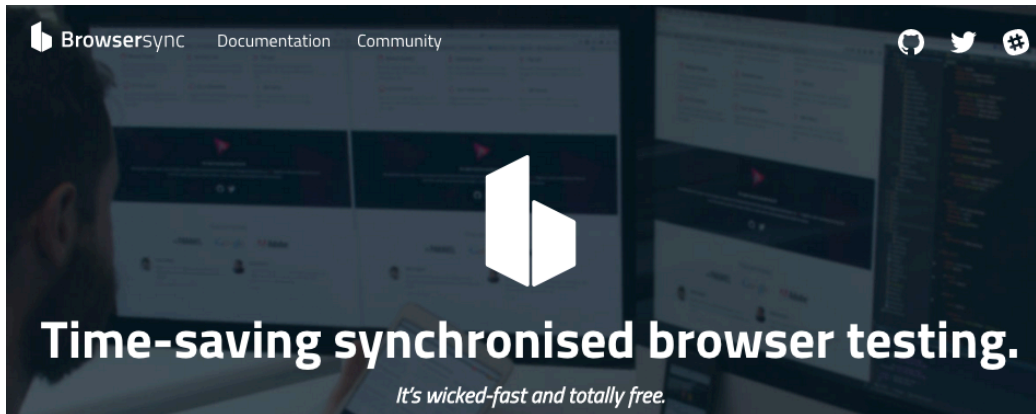
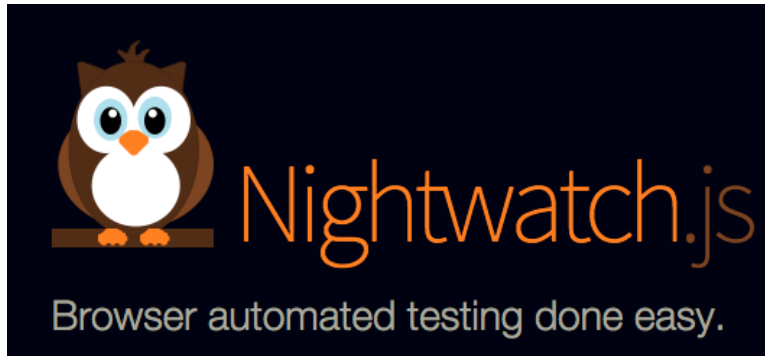


Month	Value
Jan	29.9
Feb	71.5
Mar	106.4
Apr	129.2
May	144.0
Jun	176.0
Jul	135.6
Aug	148.5
Sep	216.4
Oct	194.1
Nov	95.6
Dec	54.4

Keyboard shortcuts

# Tester

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Browsersync synchronise la navigation sur les différents navigateurs (mobiles, fixes) et actualise en cas de modification du code HTML, CSS, ...



Exécute une suite de tests sur un ensemble de navigateurs (dont PhantomJS)



# Plan

57

- Coder
- Gérer les dépendances du projet
- Déboguer
- Optimiser
- Tester
- **Générer la documentation**
- Mesurer la qualité du code
- Automatiser et déployer

# Générer la documentation

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```
function showCities(pays, id_elt) {  
    var node = null;  
    var xml_http = null;  
    try {  
        node = document.getElementById(  
            if (pays.length == 0) {
```

Generate comment 

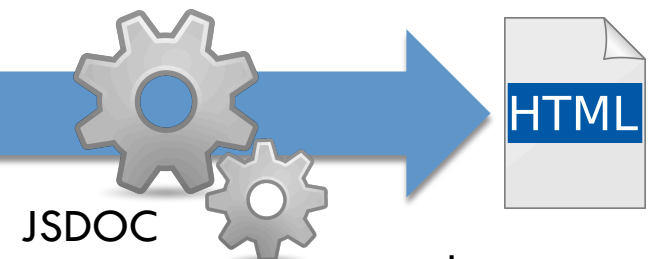
Ajouter des méta-informations  
dans le code

<http://smartcomments.github.io/>

**SMART+**  
//comments

```
/**  
 * Description  
 * @method showCities  
 * @param {} pays  
 * @param {} id_elt  
 * @return  
 */  
function showCities(pays, id_elt) {  
    var node = null;  
    var xml_http = null;  
    try {
```

Générer la  
documentation



JSDOC  
Doxygen  
...

documentation  
du code

# Générer la documentation

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- ❑ JSDoc <https://github.com/jsdoc3/jsdoc>
- ❑ Doxygen <http://www.stack.nl/~dimitri/doxygen/helpers.html>
- ❑ ESDoc (ES6) <https://esdoc.org/>
- ❑ YUIDoc <http://yui.github.io/yuidoc/>
- ❑ Slate <https://github.com/tripit/slate>

[Home](#) [Manual](#) [Reference](#) [Source](#) [Test](#) 

- ESDoc
- ESDocCLI
- Doc
  - AbstractDoc
  - AssignmentDoc
  - ClassDoc
  - ExternalDoc
  - FileDoc
  - FunctionDoc
  - MemberDoc
  - MethodDoc
  - TestDoc
  - TestFileDoc
  - TypedefDoc
  - VariableDoc
- Factory
  - DocFactory
  - TestDocFactory
- Parser

```
import FileDoc from 'esdoc/out/src/Doc/FileDoc.js'  
public class | source
```

## FileDoc

**Extends:**  
AbstractDoc → FileDoc

**Direct Subclass:**  
TestFileDoc

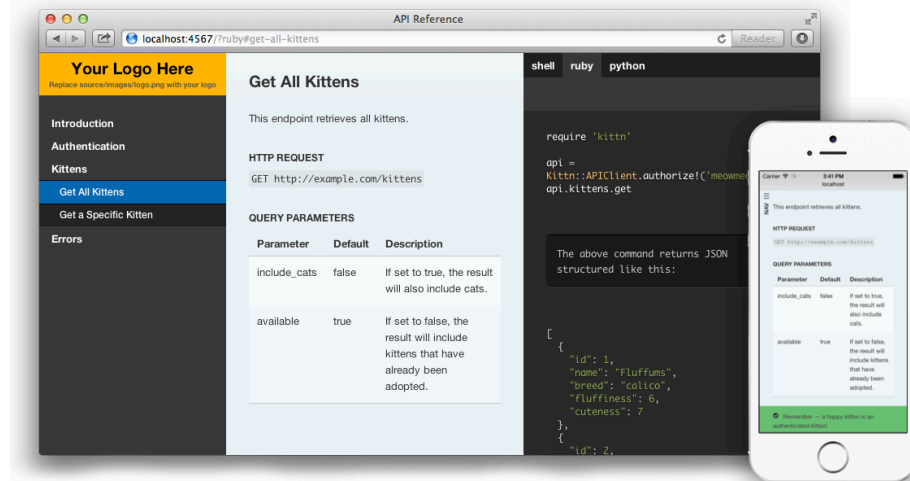
Doc Class from source file.

## Method Summary

### Public Methods

public	<code>[@_content]()</code> specify file content to value.content
public	<code>[@_kind]()</code>

ESDoc



API Reference

localhost:4567/ruby#get-all-kittens

Your Logo Here

Replace source/images/logo.png with your logo

Introduction

Authentication

Kittens

Get All Kittens

Get a Specific Kitten

Errors

### Get All Kittens

This endpoint retrieves all kittens.

**HTTP REQUEST**

GET http://example.com/kittens

**QUERY PARAMETERS**

Parameter	Default	Description
include_cats	false	If set to true, the result will also include cats.
available	true	If set to false, the result will include kittens that have already been adopted.

```
shell ruby python  
require 'kitten'  
api = Kitten::APIClient.authorize('meowies')  
api.kittens.get
```

The above command returns JSON structured like this:

```
{  
  "kittens": [  
    {  
      "id": 1,  
      "name": "Fluffins",  
      "breed": "calico",  
      "fluffiness": 6,  
      "cuteness": 7  
    },  
    {  
      "id": 2,
```

Slate

# Plan

60

- ❑ Coder
- ❑ Gérer les dépendances du projet
- ❑ Déboguer
- ❑ Optimiser
- ❑ Tester
- ❑ Générer la documentation
- ❑ **Mesurer la qualité du code**
- ❑ Automatiser et déployer

# Mesurer la qualité du code

## Taux de documentation du code

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Taux de documentation = lignes de commentaires / lignes de code

Outil cloc « count lines of code »

<http://cloc.sourceforge.net/>

```
> cloc --by-percent c src/js
  13 text files.
  13 unique files.
   0 files ignored.
```

**nombre de lignes de  
commentaires ou %  
de documentation**

```
http://cloc.sourceforge.net v 1.64 T=0.24 s (53.4 files/s, 80623.1 lines/s)
```

Language	files	blank %	comment %	code
Javascript	6	18.97	12.74	12633
CSS	6	3.06	5.60	2287
HTML	1	20.29	3.62	414
SUM:	13	16.64	11.43	15334

**nombre de fichiers  
utilisant le langage**

**nombre ou %  
de lignes vides**

**nombre de lignes de code hors  
lignes vides et commentaires**

# Mesurer la qualité du code

## Taux de couverture des tests unitaires

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<http://tntim96.github.io/JSCover/>

**BLANKET.JS**

<http://blanketjs.org/>

**Istanbul**

<https://github.com/gotwarlost/istanbul>

Détecter la duplication de code et le code structurellement identique



PMD CPD

<https://pmd.github.io/>



<https://github.com/danielstjules/jsinspect>

jscpd

<https://github.com/kucherenko/jscpd>

copy-paste-detector

<https://github.com/hpbuniat/copy-paste-detector>

# Mesurer la qualité du code

Style, détection de bugs, code non optimal, code mort

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<http://jshint.com/>



<http://jscs.info/>



<http://jshint.com/>



<http://pmd.sourceforge.net/pmd-5.3.2/pmd-javascript/>



<http://eslint.org/>



- indicateurs triviaux
  - nombre total de lignes de codes (outil **cloc**)
  - nombre de lignes de code par fonction
  - ...



Règles :

- maxdepth : profondeur maximale de blocs
- maxstatements : nombre d'instructions autorisé par fonction/méthode
- maxparams : nombre de paramètres autorisés par fonction/méthode

# Mesurer la qualité du code

## Règle de responsabilité unique du code

66

- Indicateur : complexité cyclomatique ou indice de McCabe

= nombre de points de décision dans le code

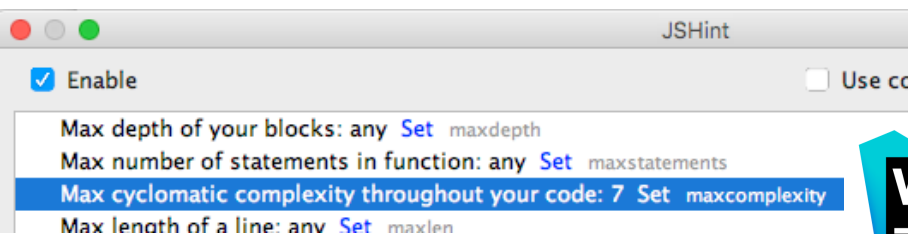
(mesuré à partir des boucles et branchements conditionnels)

Complexité d'une fonction déterminée à partir de la complexité cyclomatique :

1-4 basse, 5-7 modérée, 8-10 haute,  $\geq 11$  très grande complexité



Règle maxcomplexity



grunt-complexity

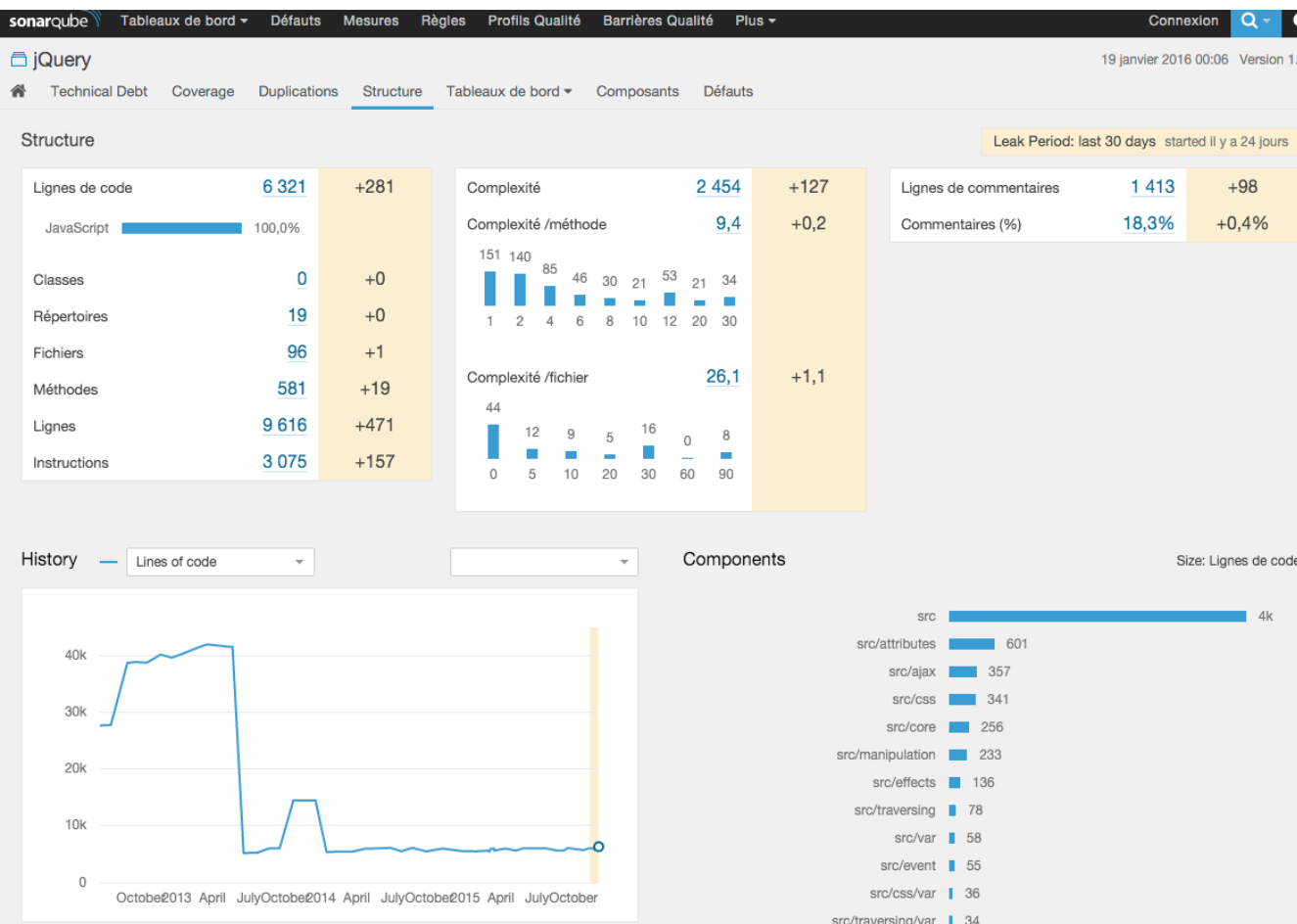


gulp-complexity

# Mesurer la qualité du code

## Mesurer et agréger les résultats

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taux de documentation  
taux de couverture des tests  
conventions de nommage  
bogues  
code mort  
code dupliqué  
complexité cyclomatique

dette technique

historique

Plugins / Plugin Library / ... / JavaScript Plugin  
JavaScript Plugin

<http://nemo.sonarqube.org/overview?id=jquery>

<http://www.sonarqube.org/>

[http://dist.sonarsource.com/reports/coverage/rules\\_in\\_javascript.html](http://dist.sonarsource.com/reports/coverage/rules_in_javascript.html)

# Plan

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- Coder
- Gérer les dépendances du projet
- Déboguer
- Optimiser
- Tester
- Générer la documentation
- Mesurer la qualité du code
- **Automatiser et déployer**

# Automatiser et déployer

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Automatisation des tâches répétitives : optimisation (minification, concaténation), tests unitaires, analyse statique, transpilation, ...

→ Getting Started

🔧 Plugins

📄 Documentation



# GRUNT

## The JavaScript Task Runner

Plugin : JSHint, Handlebars, concat, complexity, responsive-image, ...

<http://gruntjs.com/>

# Automatiser et déployer

70

Automatisation des tâches répétitives : optimisation (minification, concaténation), tests unitaires, analyse statique, transpilation, ...



*Gulp*

Automate and enhance your workflow

# Automatiser et déployer

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Exécute le générateur,  
crée le squelette et la  
configuration



Automatise les tâches



Gère les dépendances

Générateurs de squelette d'application : react, angular, wordpress, backbone, ember, ...

# Automatiser et déployer

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```
pc6:testyo magali$ yo webapp
```



```
'Allo 'allo! Out of the
box I include HTML5
Boilerplate, and a
Gruntfile to build your
app.
```

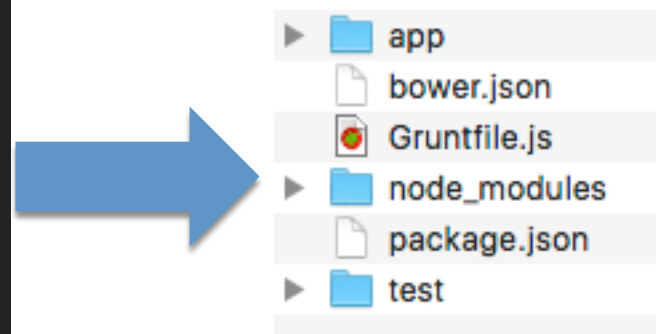
? What more would you like?

- Sass
- Bootstrap
- Modernizr



```
? What more would you like? Bootstrap, Modernizr
create bower.json
create package.json
create Gruntfile.js
create .gitignore
create .gitattributes
create .bowerrc
create .editorconfig
create app/scripts/main.js
create app/styles/main.css
create app/index.html
create app/favicon.ico
create app/apple-touch-icon.png
create app/robots.txt
create test/spec/test.js
create test/index.html
```

I'm all done. Running **npm install & bower install** for you to install the required dependencies.





# Automatiser et déployer

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Intégration continue



# Jenkins

<https://jenkins-ci.org/>

# Merci

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# Questions ?

# Licences

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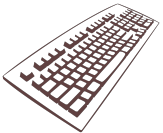
<https://openclipart.org/detail/83893/file-icon>



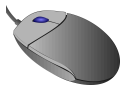
<https://openclipart.org/detail/211860/gears>



<https://openclipart.org/detail/171856/icon-html-a-cone>



<https://openclipart.org/detail/16895/keyboard>



<https://openclipart.org/detail/16285/mouse-scroll-raton-con-rueda>



<https://openclipart.org/detail/212776/touchscreen-landscape-mode>



<https://openclipart.org/detail/1695/warning-sign>