



# Let's build a VS Code extension for automated refactorings

WeAreDevs JS Congress 2021 – Workshop

 [bit.ly/vscode-extension-slides](https://bit.ly/vscode-extension-slides) (slides)

Slides



[bit.ly/vscode-extension-slides](https://bit.ly/vscode-extension-slides)

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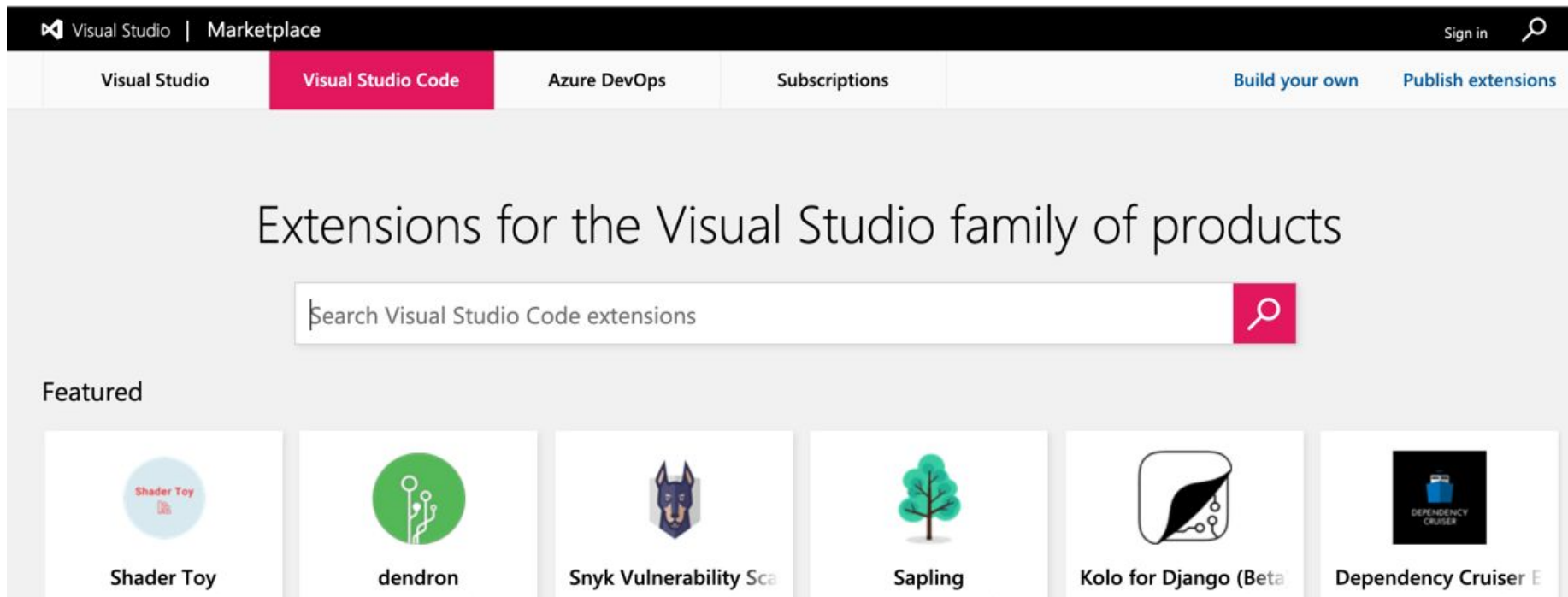
Refactoring JavaScript in VS Code  
is slow and risky

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What if you could refactor safely,  
with a snap?! 🤞 ⚡

# You can build your own extension, using JS/TS

👉 [code.visualstudio.com/api/references/vscode-api](https://code.visualstudio.com/api/references/vscode-api) (the documentation is helpful)



**You will learn how to build such automations in VS Code here!**

—



Hi, I'm Nicolas 🖐️



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Senior Software Developer  
@ Centered

understandlegacycode.com



Author of Abracadabra   
(refactoring extension for JS/TS in VS Code)

Let's do it for real?



—





# A repository to follow along

👉 [bit.ly/vscode-extension-code](https://bit.ly/vscode-extension-code)



Checkout the **tags** I give you 😊

You may code along... or simply follow

`git stash` if necessary

# Let's get Centered

We'll use [Centered.app](#) as we work to make sure we're in time!



Centered





# “Your First Extension”

👉 [code.visualstudio.com/api/get-started/your-first-extension](https://code.visualstudio.com/api/get-started/your-first-extension)

The “Getting Started” docs is really good.

It would guide you until the publication of your extension 🏆

# Yeoman will scaffold a new extension for you

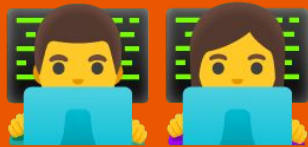
THE WEB'S  
SCAFFOLDING  
TOOL FOR  
MODERN  
WEBAPPS



Quickly get started with an  
up-to-date infrastructure

 [yeoman.io](https://yeoman.io)

Let's do it!



```
git checkout start
```

---

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# Interacting with the code



# VS Code API Editor allows you to read code

👉 [code.visualstudio.com/api/references/vscode-api](https://code.visualstudio.com/api/references/vscode-api)

TypeScript helps getting familiar with the API

`window.activeTextEditor` returns the currently active [TextEditor](#)

Then you can get the text editor [document](#) to `getText()`



# VS Code API Editor allows you to write code

`workspace.applyEdit()` to edit the code

It takes a [WorkspaceEdit](#) which may contain multiple [TextEdit](#)

We can also use [Range](#) and [Position](#) to adapt the selection

We'll also use the `uri` of the active text editor document.





# You can configure keyboard shortcuts

👉 [code.visualstudio.com/api/references/contribution-points](https://code.visualstudio.com/api/references/contribution-points)

You can provide different type of “contributions”

[keybindings](#) is the one that allows you to configure a default shortcut

Users may customize it

```
{
  "contributes": {
    "keybindings": [
      {
        "command": "extension.sayHello",
        "key": "ctrl+f1",
        "mac": "cmd+f1",
        "when": "editorTextFocus"
      }
    ]
  }
}
```

Let's do it!



```
git checkout 1-yeoman
```

---

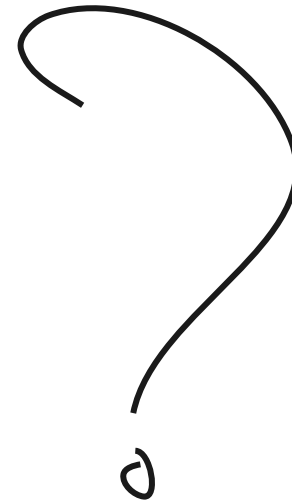
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# Abstract Syntax Tree (AST)



# A data structure to represent code

```
console.log("Hello world!")
```





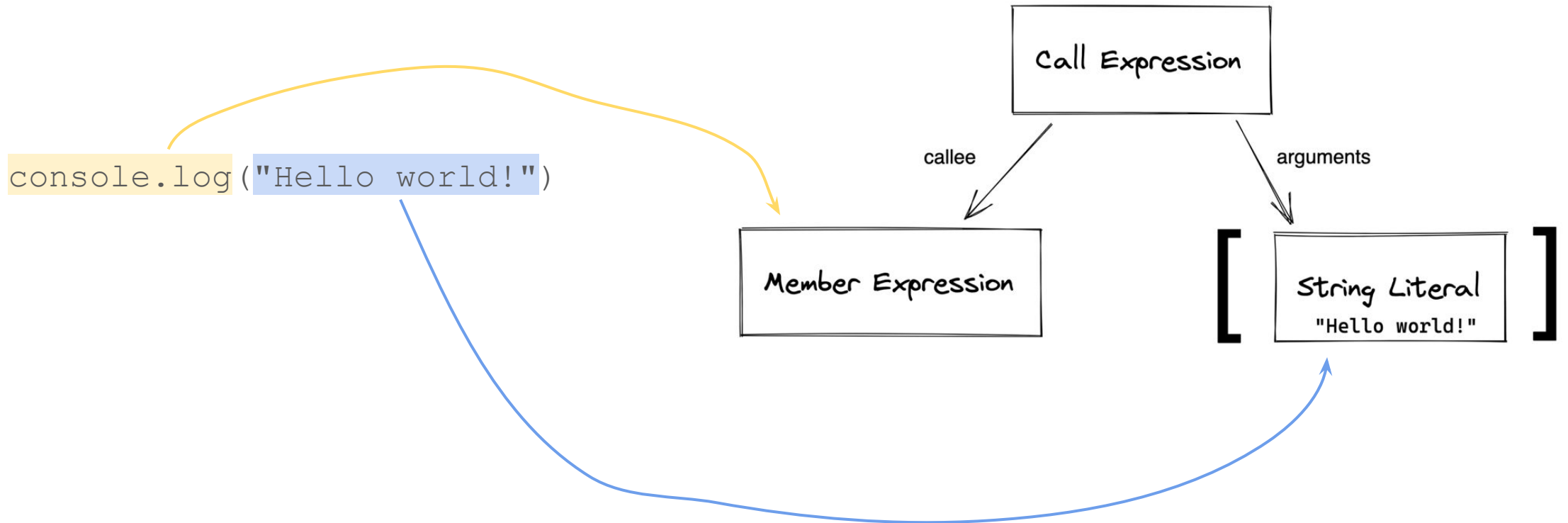
## A data structure to represent code

```
console.log("Hello world!")
```

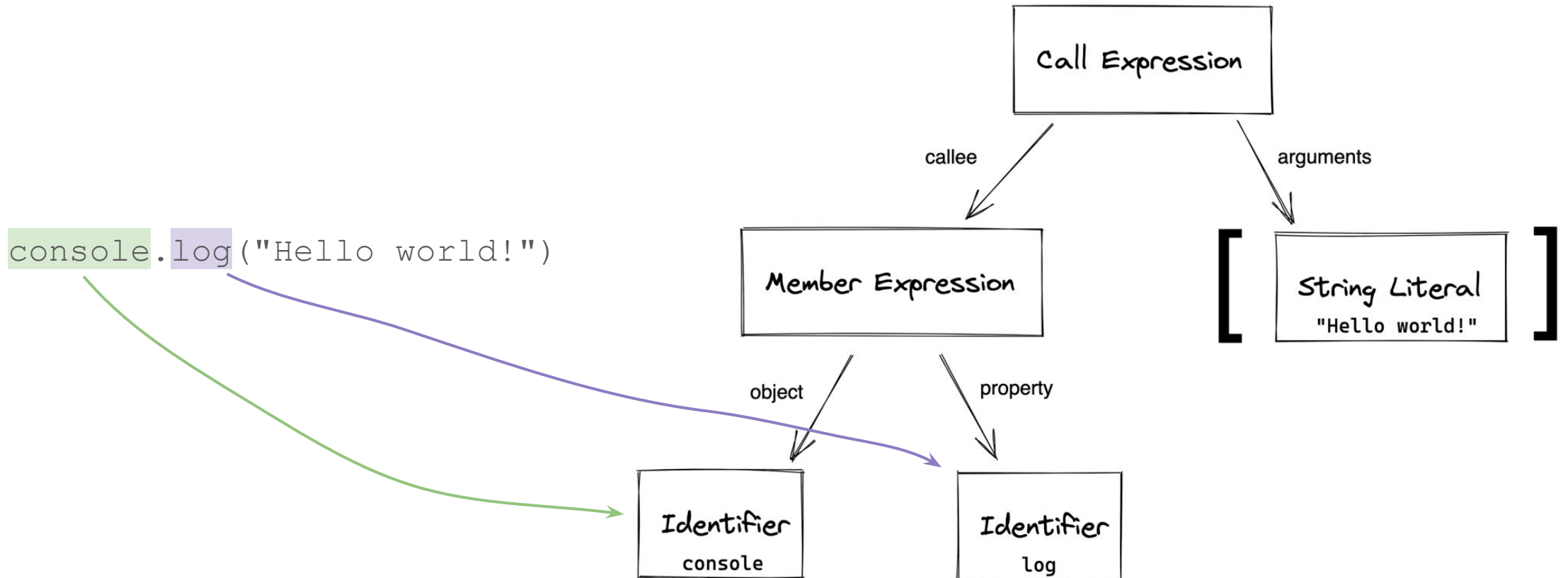


Call Expression

# A data structure to represent code

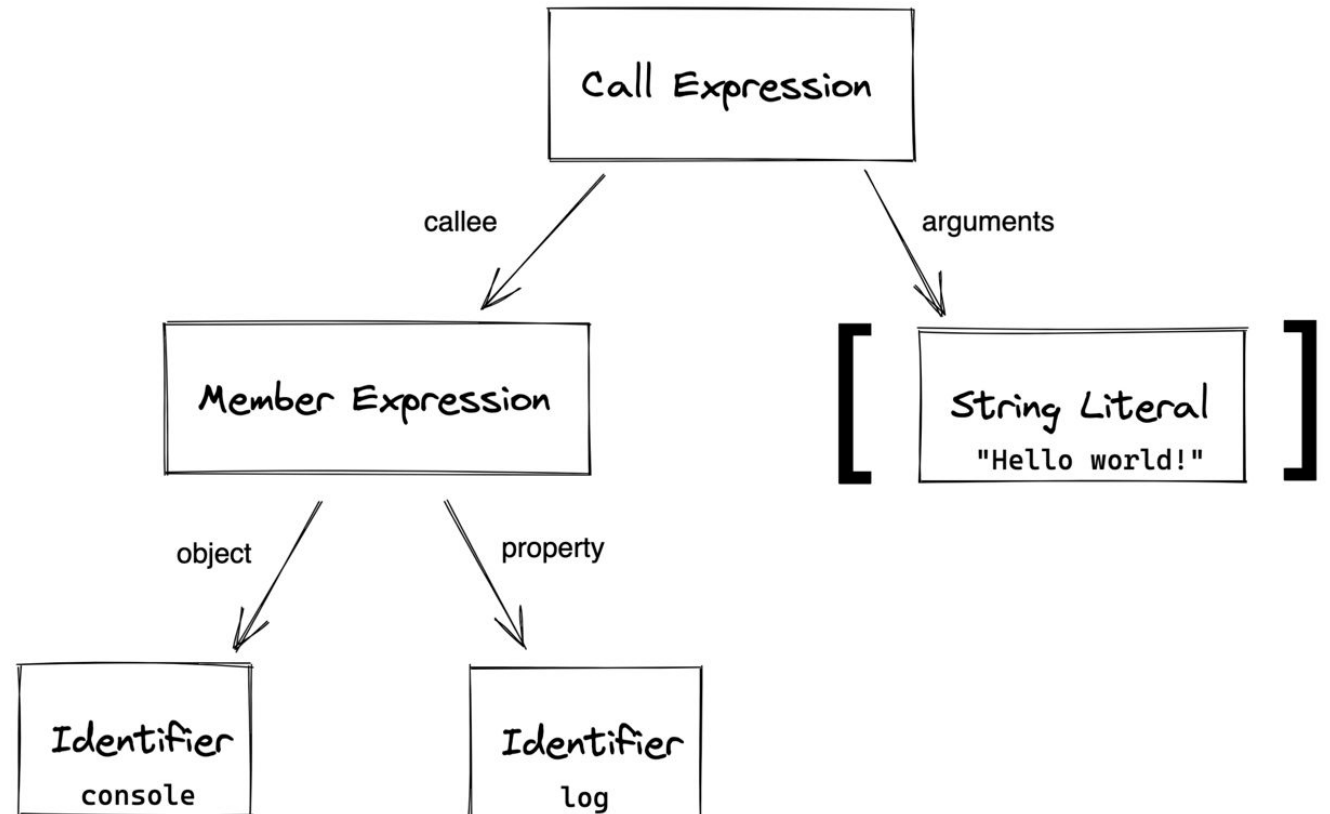


# A data structure to represent code



# A data structure to represent code

```
console.log("Hello world!")
```

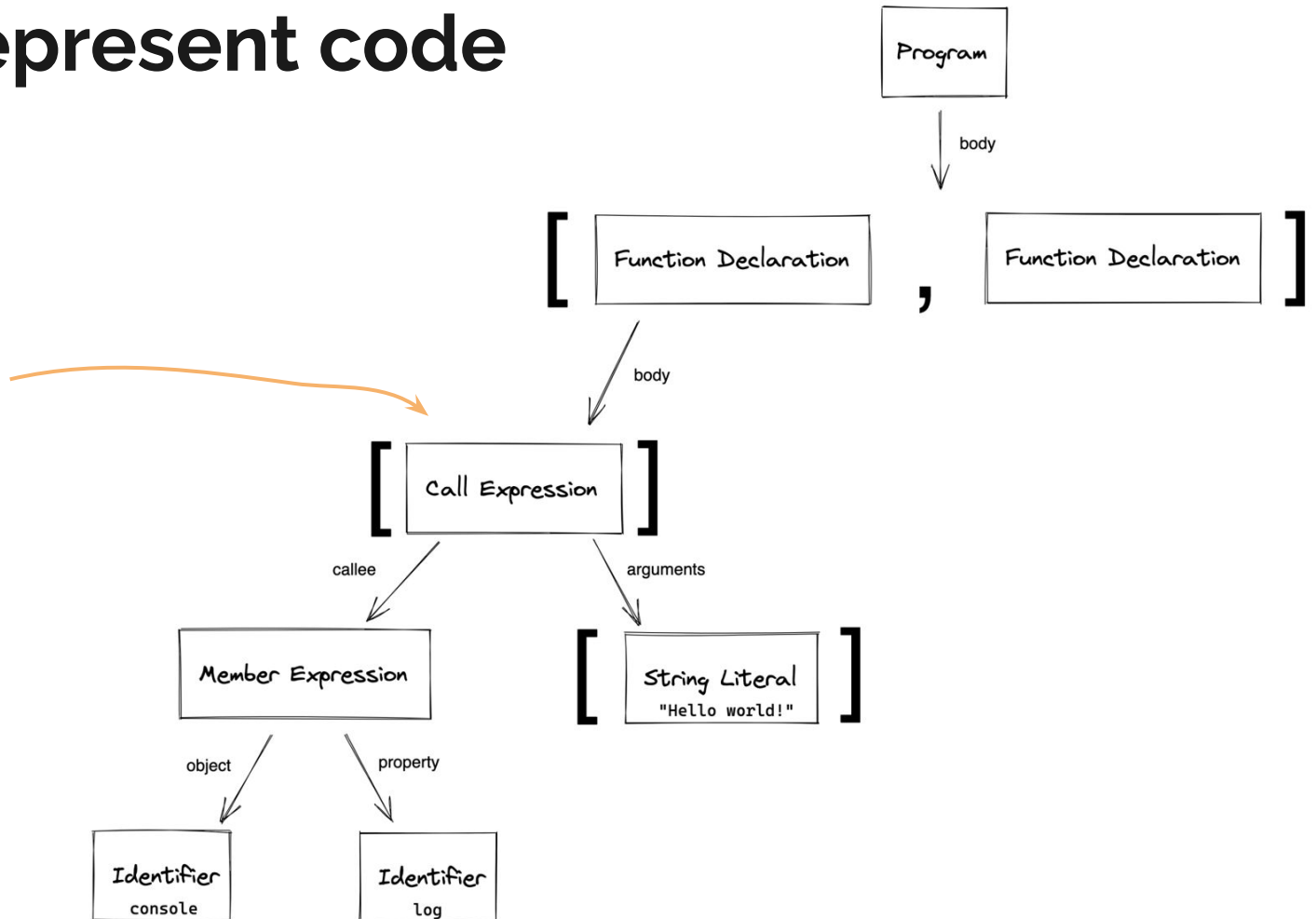




# A data structure to represent code

```
function sayHello() {  
  console.log("Hello world!")  
}
```

```
function sayBye() {}
```





# The Abstract Syntax Tree

Tree representation of the structure (abstract syntax) of the code – [see definition](#)

A richer model of the source code we can:

- traverse
- transform
- generate

👉 [astexplorer.net](https://astexplorer.net) is super useful to visualize the AST of some code

# One code, many ASTs

Many ASTs can represent the same code. Details vary.

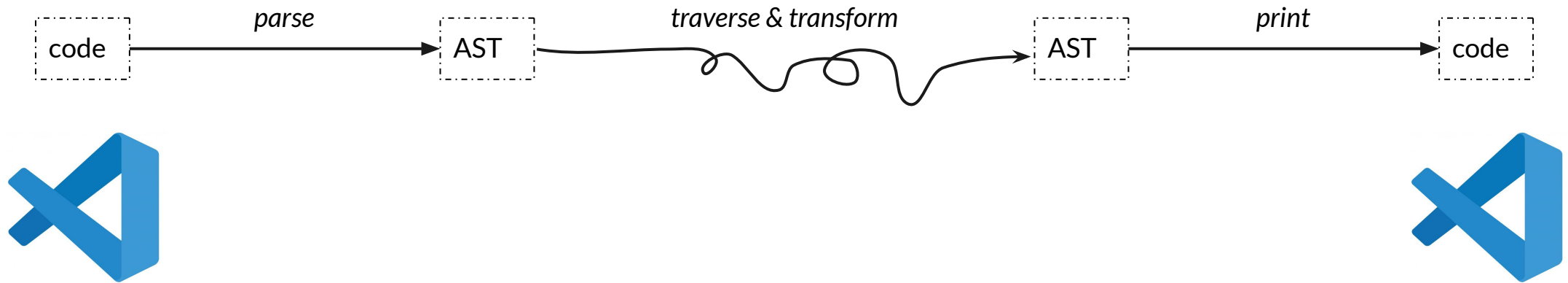
=> **Many** solutions exist (parsers). You may build your own. 🙋

Babel is a JavaScript compiler. To do so, it needs to parse code into AST, and vice-versa!

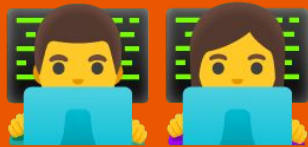
Useful libs: [@babel/parser](https://babeljs.io/docs/en/babel-parser), [@babel/traverse](https://babeljs.io/docs/en/babel-traverse), [@babel/types](https://babeljs.io/docs/en/babel-types) and [@babel/generator](https://babeljs.io/docs/en/babel-generator)



Parse code into AST. Print AST into code.



Let's do it!



```
git checkout 2-read-write
```

—

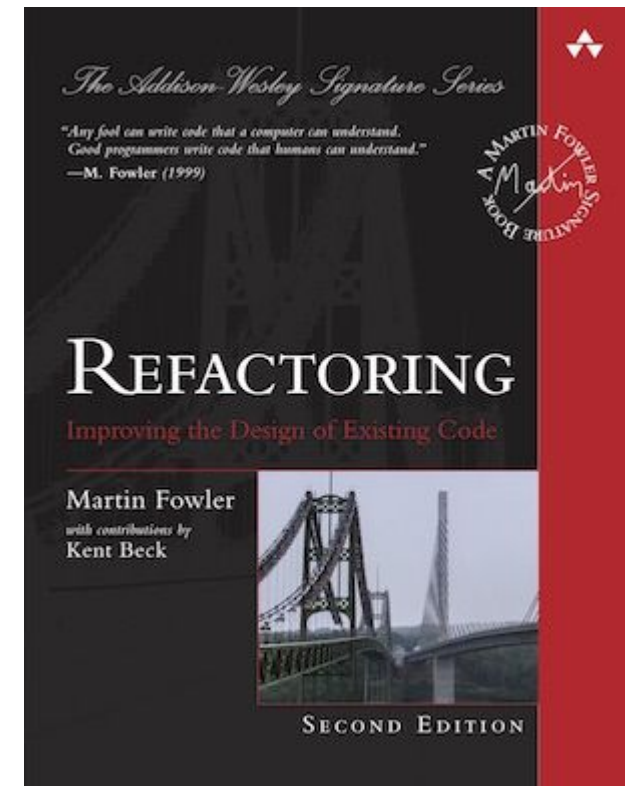
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# Refactorings

# What I mean when I say “Refactoring”?

**Refactoring** (noun): a change made to the internal structure of software to make it easier to understand and **cheaper to modify without changing its observable behavior**.

— *Martin Fowler*





# Make the change easy, *then* do the easy change

Ways to refactor JavaScript code fast & safe:

- Automated Refactorings
- Atomic Refactorings (manual)
- Automated Tests

 I'm building [an interactive course](#) to teach you **Atomic Refactoring** moves in JavaScript

Coming  **SOON** early 2022

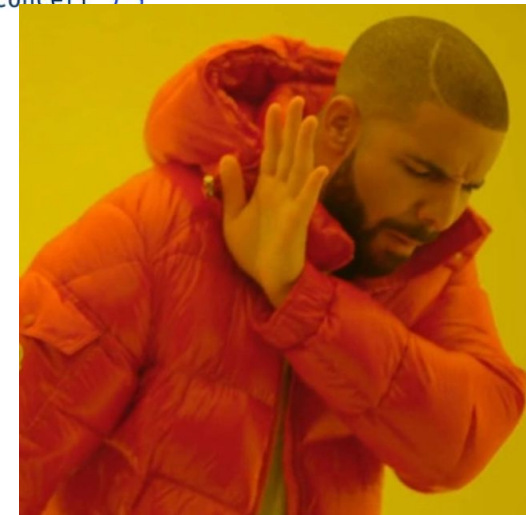


**REFACTORING**  
JAVASCRIPT



# The problem with nesting (bumpy road smell)

```
updateQuality() {  
  for (let i = 0; i < this.items.length; i++) { +1  
    if (this.items[i].name !== 'Aged Brie' && this.items[i].name !== 'Backstage passes to a TAFKAL80ETC concert') {  
      if (this.items[i].quality > 0) {  
        if (this.items[i].name !== 'Sulfuras, Hand of Ragnaros') {  
          this.items[i].quality = this.items[i].quality - 1;  
        }  
      }  
    } else { +2  
      if (this.items[i].quality < 50) { +3  
        this.items[i].quality = this.items[i].quality + 1;  
        if (this.items[i].name === 'Backstage passes to a TAFKAL80ETC concert') { +4  
          if (this.items[i].sellIn < 11) {  
            if (this.items[i].quality < 50) {  
              this.items[i].quality = this.items[i].quality + 1;  
            }  
          }  
          if (this.items[i].sellIn < 6) { +5  
            if (this.items[i].quality < 50) {  
              this.items[i].quality = this.items[i].quality + 1; ←  
            }  
          }  
        }  
      }  
    }  
  }  
}
```



... need to tweak code while keeping  
5 concepts in our working memory 🤯

# Guard Clauses to the rescue!

```
updateQuality() {  
  for (let i = 0; i < this.items.length; i++) { +1  
    if (  
      this.items[i].name !== "Aged Brie" &&  
      this.items[i].name !== "Backstage passes to a TAFKAL80ETC concert"  
    ) { ...  
      }  
  
    if (this.items[i].quality ≥ 50) continue;  
  
    this.items[i].quality = this.items[i].quality + 1;  
    if (this.items[i].name !== "Backstage passes to a TAFKAL80ETC concert") continue;  
  
    if (this.items[i].sellIn < 11) {  
      if (this.items[i].quality ≥ 50) continue;  
      this.items[i].quality = this.items[i].quality + 1;  
    }  
  
    if (this.items[i].sellIn ≥ 6) continue;  
    if (this.items[i].quality ≥ 50) continue;  
  
    this.items[i].quality = this.items[i].quality + 1; ←  
  }  
}
```




Early exits = not in your working memory anymore 😊

# Refactoring: Introduce Guard Clauses

```
function getPayAmount() {  
  let result;  
  if (isDead) {  
    result = deadAmount();  
  } else {  
    if (isSeparated) {  
      result = separatedAmount();  
    } else {  
      if (isRetired) {  
        result = retiredAmount();  
      } else {  
        result = normalPayAmount();  
      }  
    }  
  }  
  return result;  
}
```

*traverse & transform*

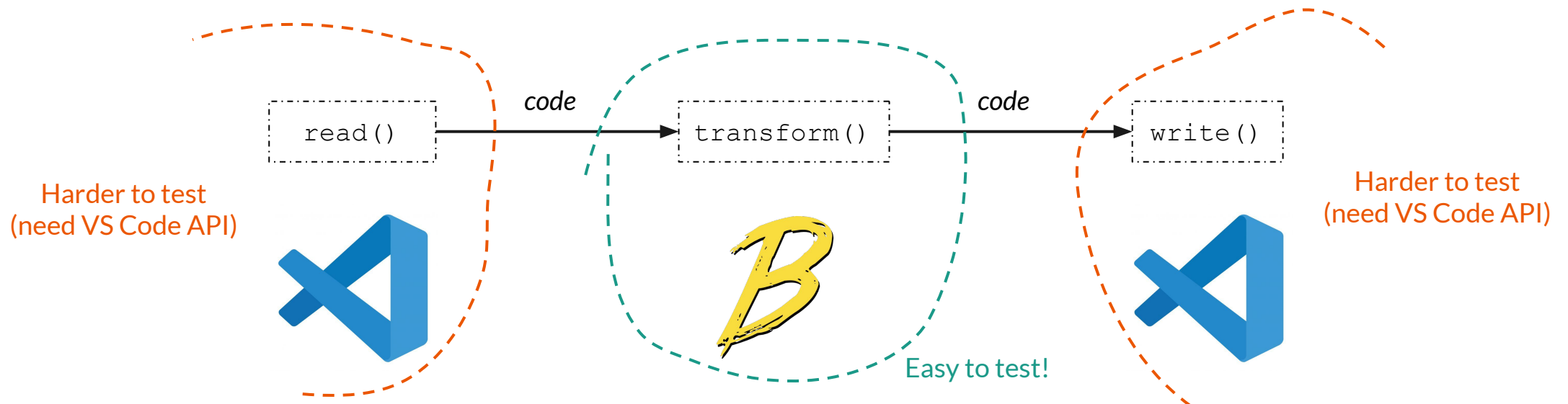


```
function getPayAmount() {  
  if (isDead) {  
    return deadAmount();  
  }  
  if (isSeparated) {  
    return separatedAmount();  
  }  
  if (isRetired) {  
    return retiredAmount();  
  }  
  return normalPayAmount();  
}
```

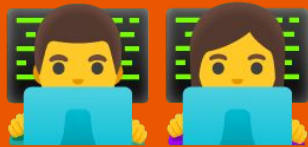
# Let's automate this... guided by tests!

We want tests that make us **code faster**:

- High-level enough so it doesn't break on refactoring
- Not dependent on things that are hard/slow/fragile to test



Let's do it!



```
git checkout 3-parse-ast
```

—

---


# Package & Publish your extension



## Follow the docs

 [code.visualstudio.com/api/working-with-extensions/publishing-extension](https://code.visualstudio.com/api/working-with-extensions/publishing-extension)

You need to:

- **Install vsce** (tip: install it locally to your project & provide npm scripts to run it)
- [Create an org](#) in Azure DevOps and get a [Personal Access Token](#)
- [Create a publisher](#) on VS Marketplace
- Configure your extension for publication
- Publish! 



## Just packaging the extension

 [code.visualstudio.com/api/working-with-extensions/publishing-extension#packaging-extensions](https://code.visualstudio.com/api/working-with-extensions/publishing-extension#packaging-extensions)

`vsce package` in the root folder to generate a **VSIX** file

Then anyone can install it with:

`code --install-extension my-extension-0.0.1.vsix`





Let's package it! 

```
git checkout 4-implement-refactoring
```

---

YOU DID IT 🙌 🎉 🙌

`git checkout end`

—



# What you learned here 🎓

- ★ Use VS Code API to
  - Read code
  - Write code
- ★ Transform code
  - Parse code into AST
  - Traverse and transform the AST
  - Print AST into code
- ★ A bit about
  - **#testing** and **#softwareArchitecture**
  - **#refactoring** and making code easier to maintain
  - **#productivity** and staying focused
- ★ Package the extension so you can use & distribute it

---

Going further



## What's next?

- Handle more cases (e.g. throw, continue, no explicit return but no sibling neither, etc.)
- Finer selection (e.g. only the `IfStatement` below cursor)
- Expose it as a [Quick Fix](#) 💡

Regarding tests:

- Most of the logic is tested
- Blind spots on the VS Code API => we can write a few tests to cover these
- Advanced scenario may require the editor in `transform()` => [Hexagonal Architecture](#)



# Learn to Refactor JS safely & meet deadlines

Ways to refactor JavaScript code fast & safe:


- Automated Refactorings
- **Atomic Refactorings (manual)**
- Automated Tests

 I'm building [an interactive course](#) to teach you **Atomic Refactoring** moves in JavaScript

Coming  early 2022



## REFACTORING JAVASCRIPT

 *Subscribe, so you don't miss out*



# Wanna try Centered for yourself?

You can use the core features for free!



Centered


 Use **WEAREDEVS2021** before 2022 to get 1 month of FREE Premium 



# Wanna continue the fun?

[Abracadabra](#) is open-source. More than 35 automated refactorings.

First-contributors-friendly, [check out the guide](#) (34+ contributors).



## Abracadabra, refactor this!

Nicolas Carlo | 📄 19,316 installs | ★★★★★ (17) | Free

Automated refactorings for VS Code, in JavaScript and TypeScript.

[Install](#) [Trouble Installing?](#) ↗



# Useful links

👉 [bit.ly/vscode-extension-slides](https://bit.ly/vscode-extension-slides) to get the slides

👉 [bit.ly/vscode-extension-code](https://bit.ly/vscode-extension-code) to follow along with the source code

👉 [twitter.com/nicoespeon](https://twitter.com/nicoespeon) to contact me and ask questions (DMs open)

