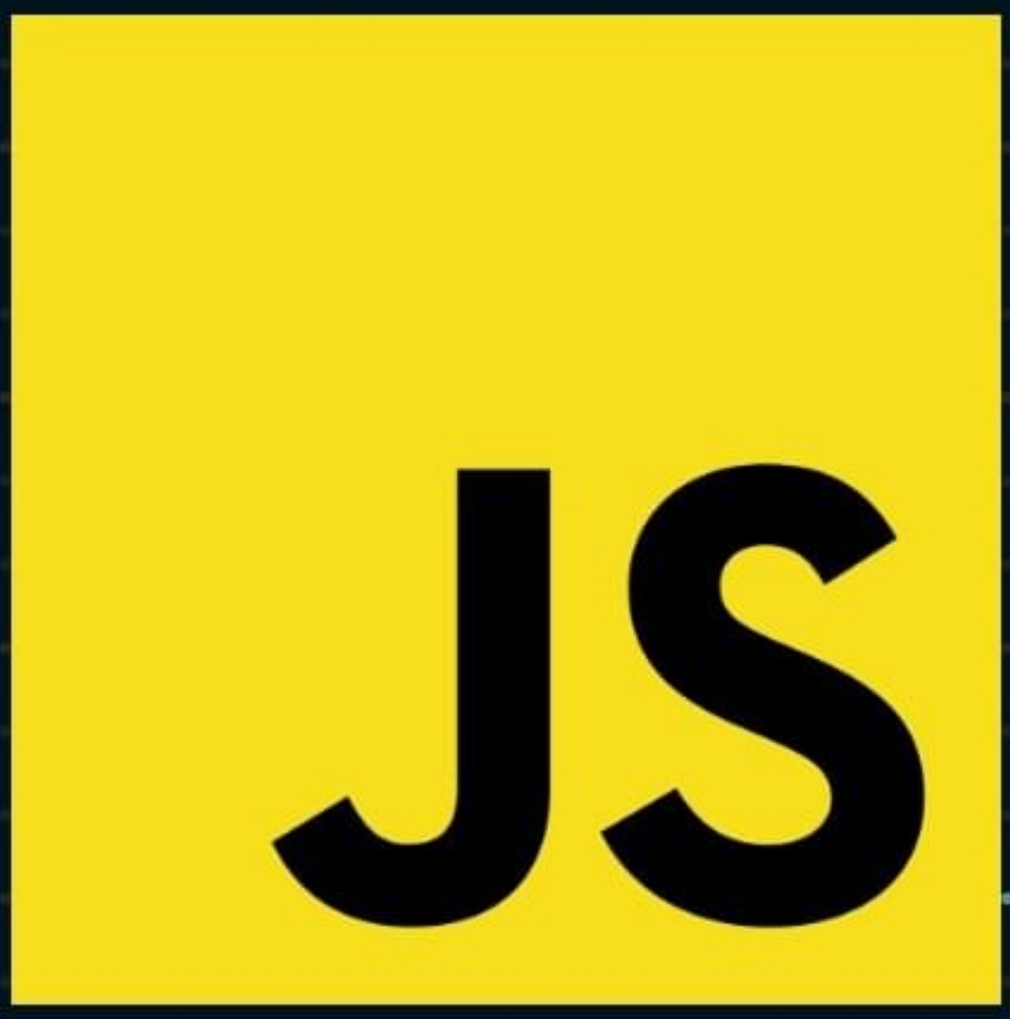
2022

How Does JavaScript Work?

[You Don't Want to Miss this]



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Save it for later

Almost everyone has already heard of the V8 Engine as a concept, and most people know that JavaScript is single-threaded or that it is using a callback queue.

In this post, we'll learn how JS actually runs. You'll be able to write better, non-blocking apps.

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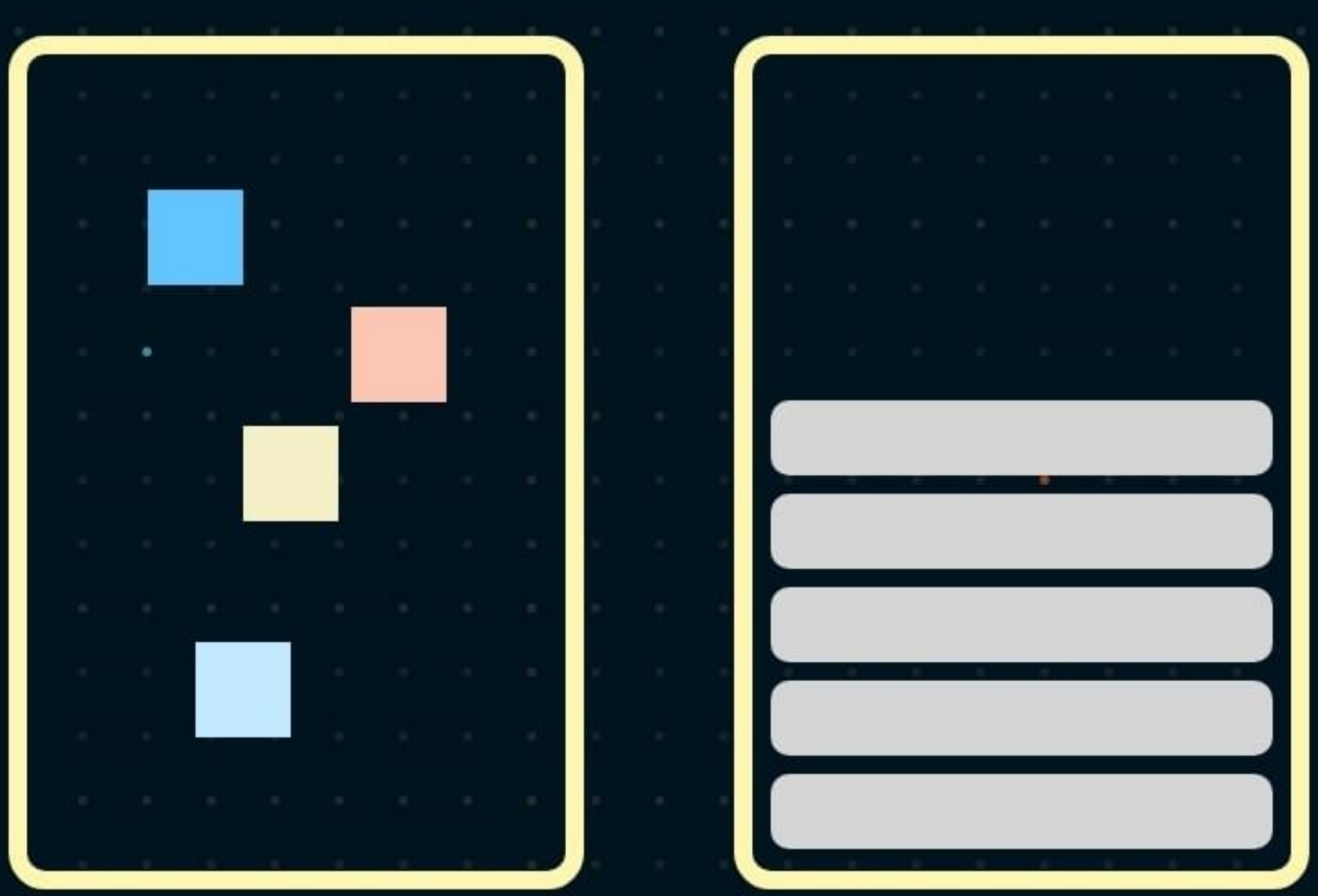
The JavaScript Engine

The V8 Engine is used inside Chrome and Node.js
Here's the visual representation of how it looks



The Engine consists of two components:

⚡ Memory Heap — this is where the memory allocation happens

⚡ Call Stack — this is where your stack frames are as your code executes

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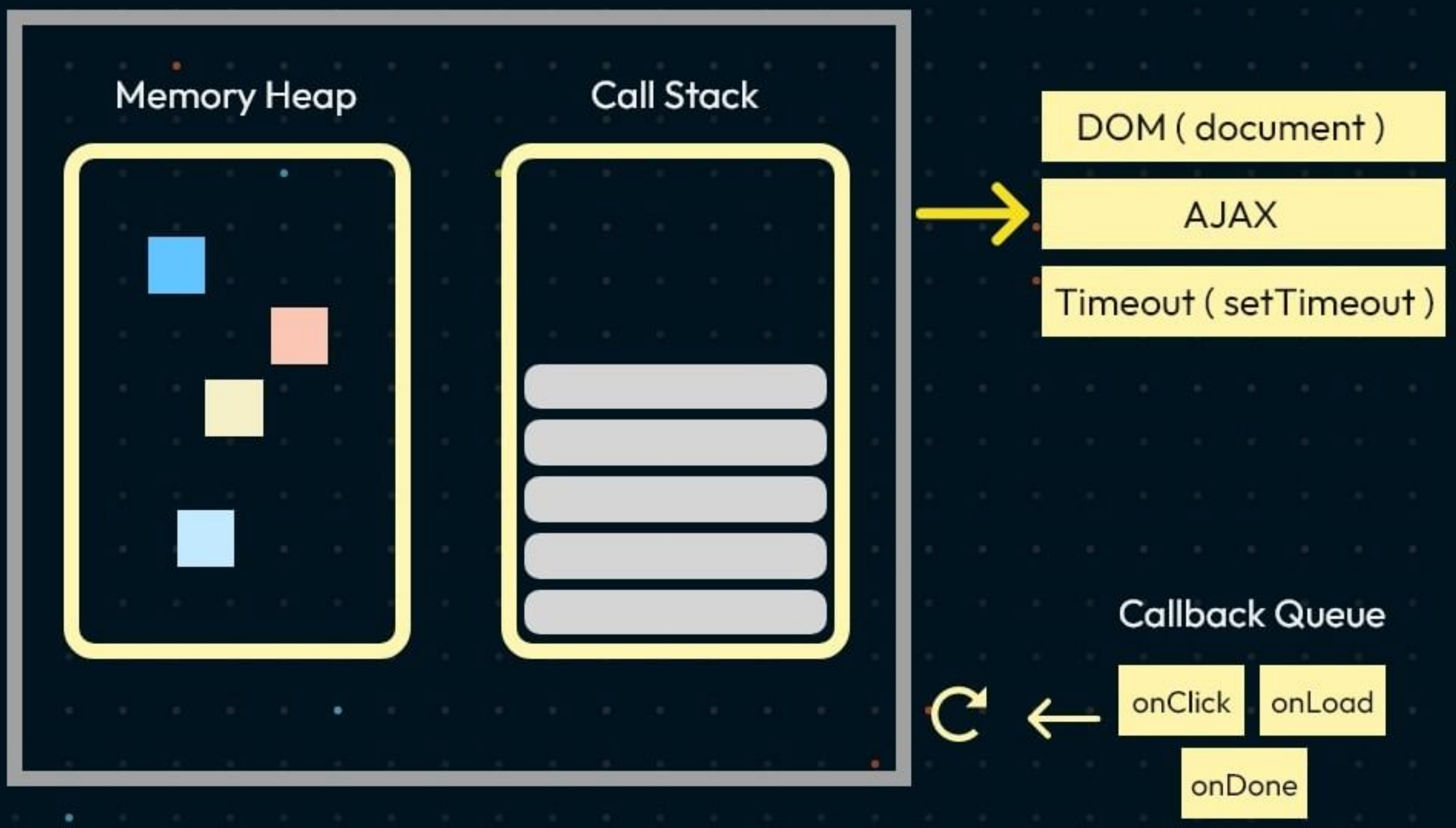
The Runtime

There are APIs in the browser that has been used by almost any JavaScript developer out there (e.g. “setTimeout”). Those APIs, however, are not provided by the Engine.

So, where are they coming from?



We have Engine but there is actually a lot more. We have DOM, AJAX, SetTimeout, and much more.

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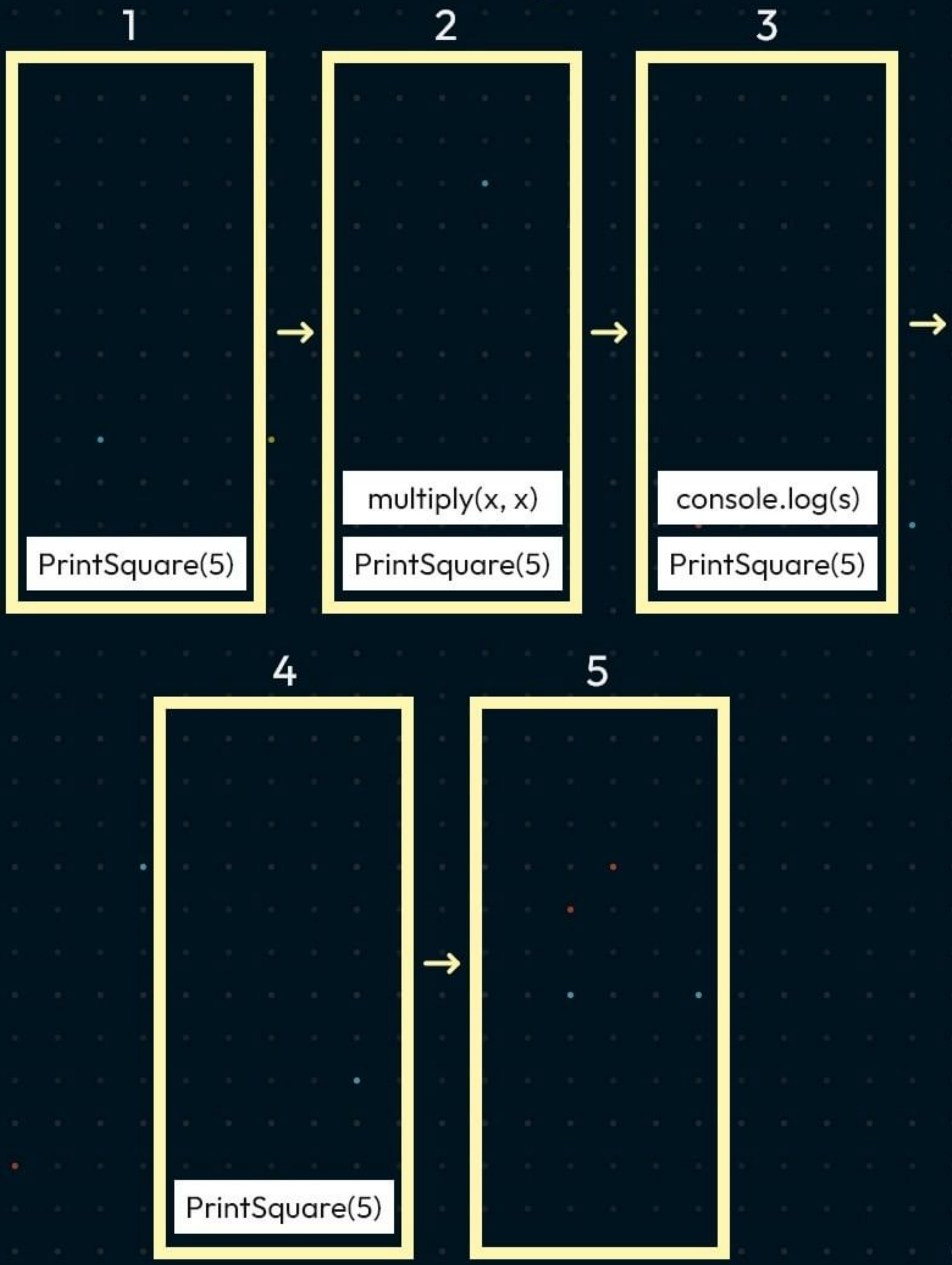
The Runtime

JS is a single-threaded Language which means It has a single call stack. Means It can do one thing at a time.



The Runtime

JS is a single-threaded Language which means It has a single call stack. Means It can do one thing at a time.

Remember,
The Call stack is a Data Structure that records basically wherein the program we are.

For Example,
If we step into a function, we put it on the top of the stack.
If we return from a function, we pop off the top of the stack.

```
function multiply(x, y) {
    return x * y;
}
function printSquare(x) {
    var s = multiply(x, x);
    console.log(s);
}
printSquare(5);
```

When the engine starts executing this code, the Call Stack will be empty. Afterward, the steps will be the following:

Each entry in the Call Stack is called Stack Frame.

this is exactly how stack traces are being constructed when an exception is being thrown — it is basically the state of the Call Stack when the exception happened.

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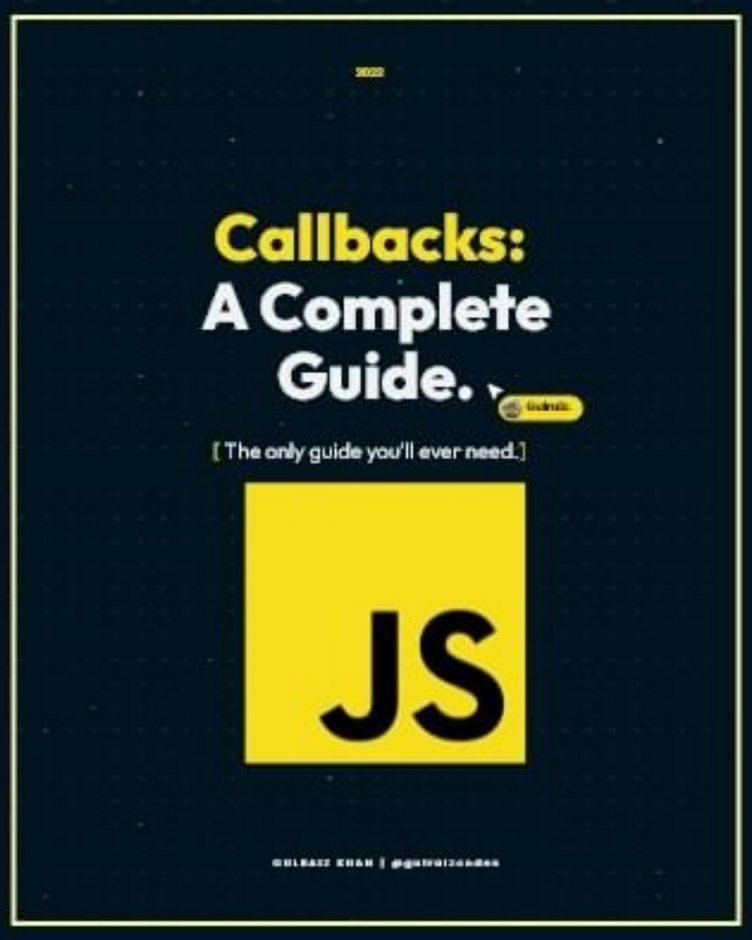

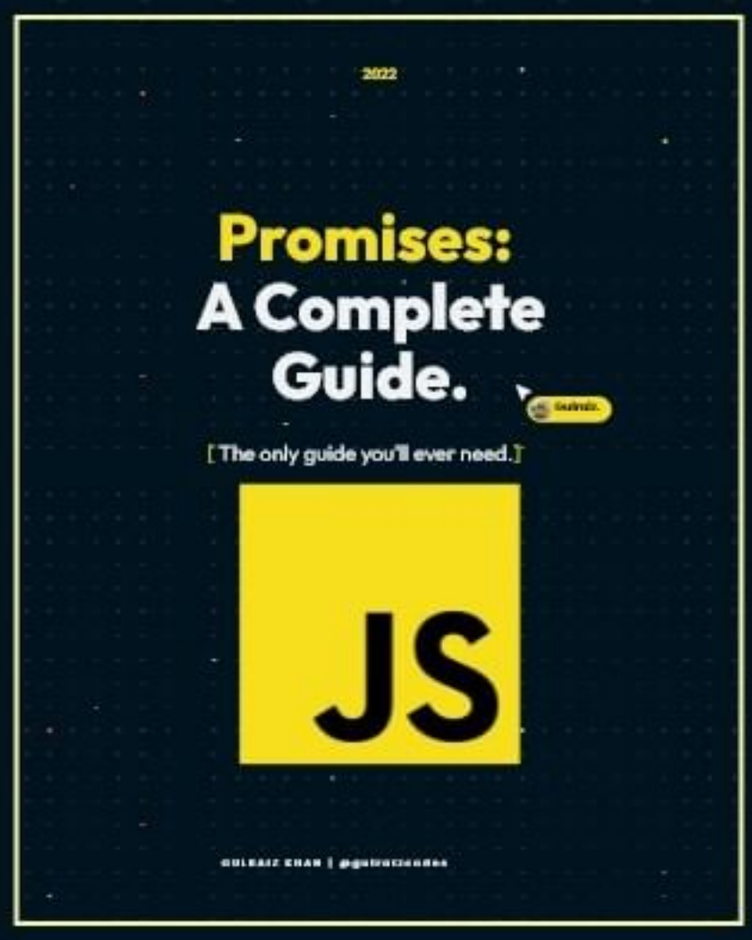

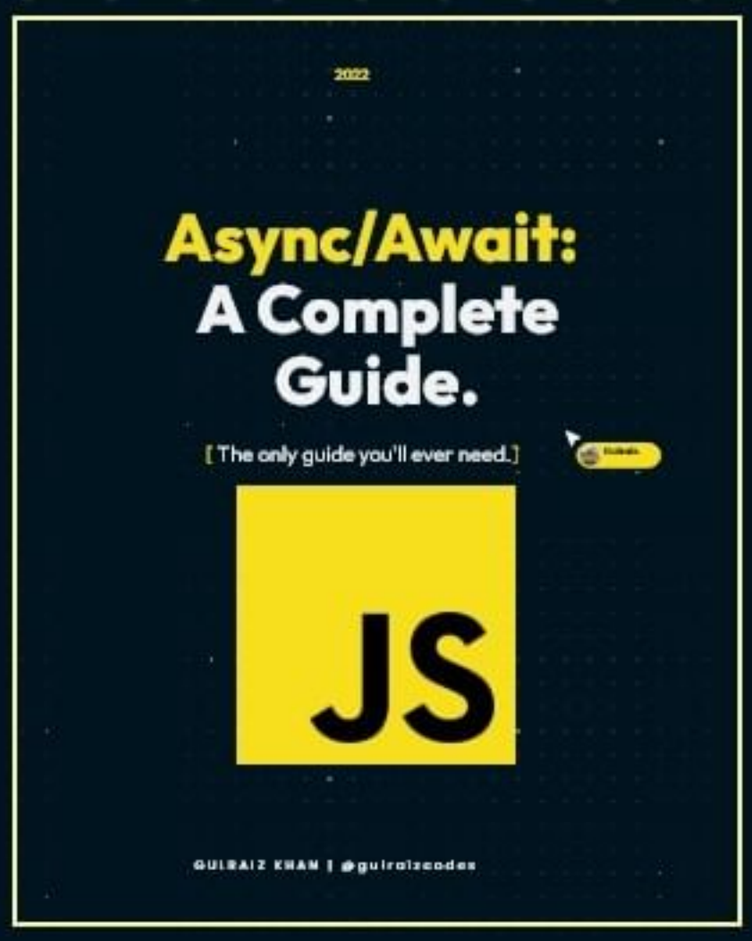

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