JS Interpreted or Compiled or both ?

One most **debated question in JS**: Is JS an interpreted or a compiled Language?

I'm **not** gonna *CONFUSE* you and I will try to keep it crisp and to the point with indepth explanation.

As we all know from very beginning that

- Computers doesn't understand our programming languages like **C, Java, Javascript, Python** ...etc (called as **high level programming languages**).

- So our ultimate goal is to **convert** our source code in **high level languages** to computer understandable code called **Machine code**.

- Compilers and interpreters helps us to do this.

C , python, JS etc....

0 or 1's

Interpreter

An interpreter **translates** your **source code** into **byte code** which will be further converted to **machine code**, through line by line.

So the next step is that CPU exceutes this line of code before the interpreter moves to next line to translate.

Finally the source code will be read and directly executed, line by line.

Byte code

Machine code

Takes each line of the code

Executes that line

swipe
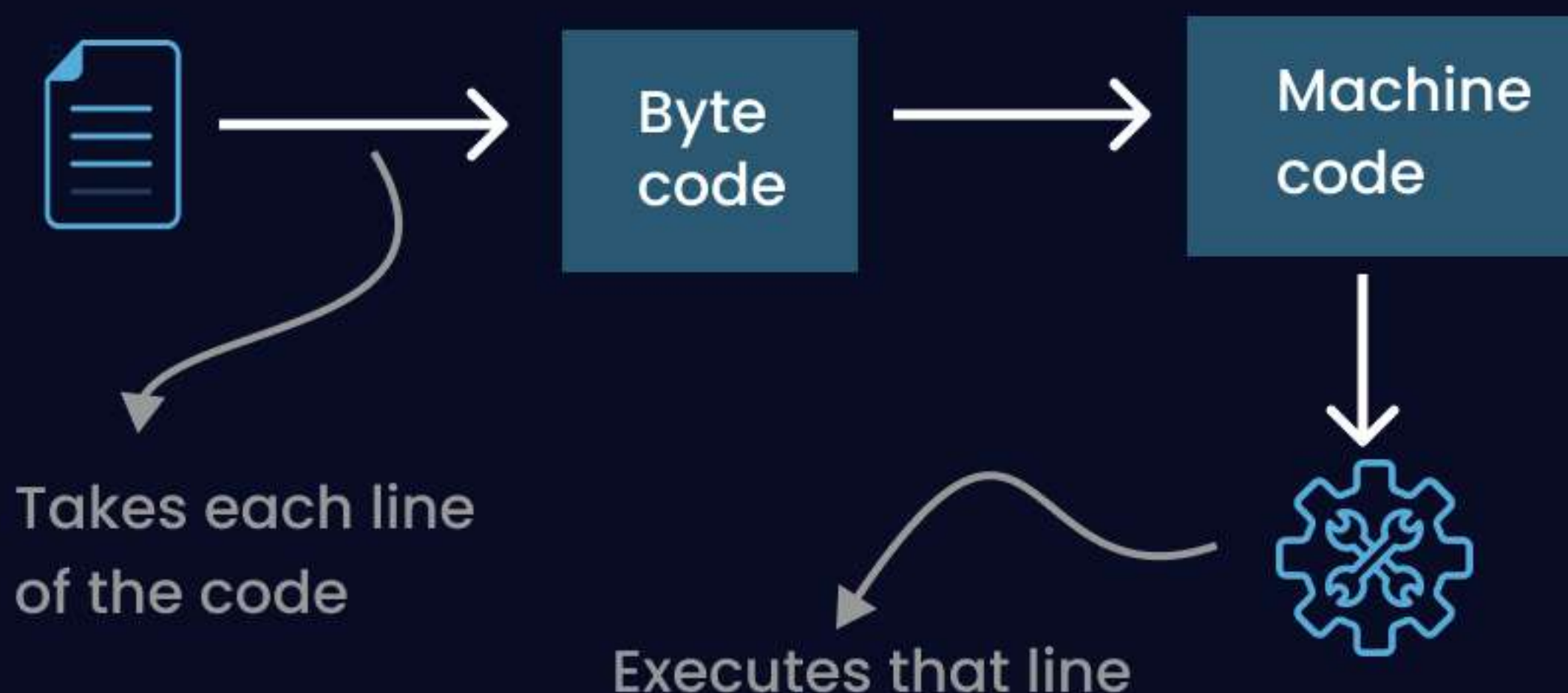
Compiler

An compiler takes an entire source code file.

It will scan it completely and then it converts the entire source code into machine code and then it executes it completely.

Machine code

Takes entire source code.

Executes the code

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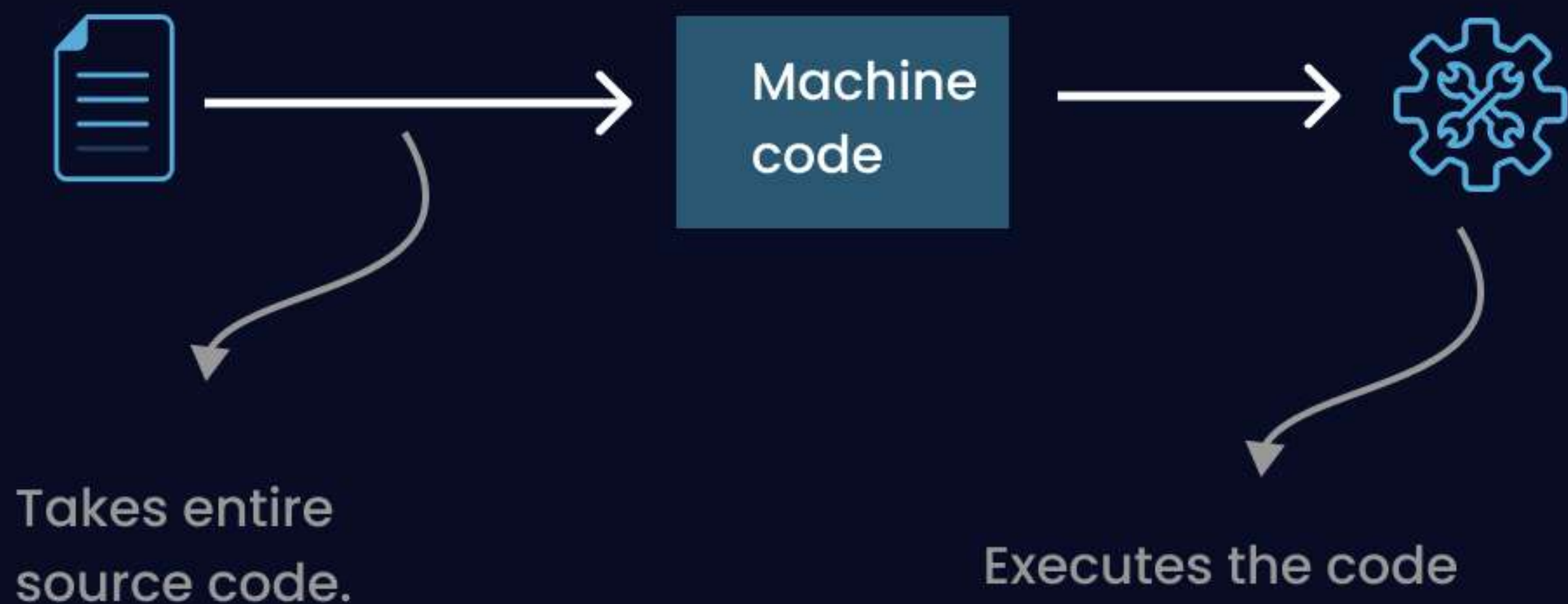
Interpreter   Vs   Compiler

Interpreter	Compiler
Interpreter gets up fastly intially and start running.	It will take a bit long intially because it has to go through that compilation step at the beginning but eventually it will run faster.
An error on line 8 of a program won't be discovered until lines 1 through 7 have already executed.	An error on line 8 of a program would be caught during the parsing phase, before any execution has begun.
when you are in a loop, things get really slow because unlike compilers it doesn't give optimized code.	when it sees repeated code or loops, it will simplify the code and gives optimized code.

swipe

So they both have their own pros and cons.

Intially when javascript was created it was an interpreted language.

In late 2000's some engineers came up with an idea of **combining both** of them and create something called a **JIT (Just in time compilation) compilation.**

This is something that browsers like Chrome started doing to make the engines faster.
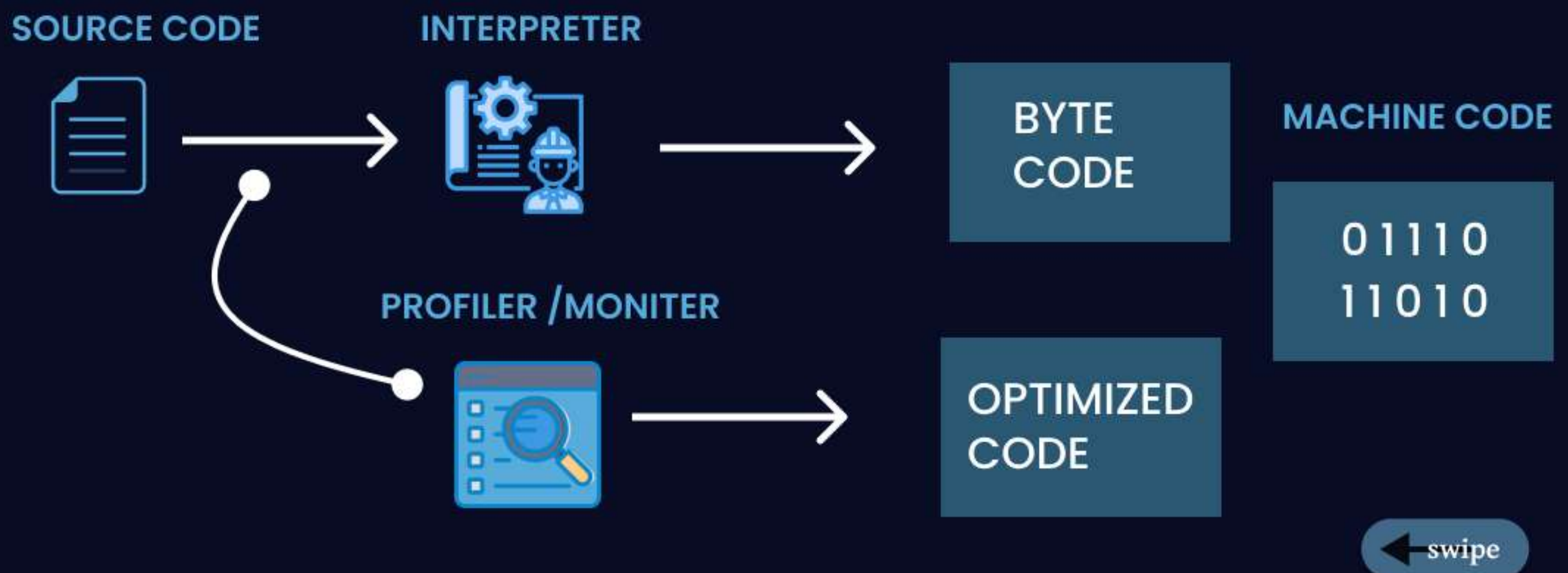
Interpreter   +   Compiler   =   JIT Compiler

Understanding JIT compiler

The interpreter will take our source code starts it interpreting the code line by line.There is something called as *profiler/Monitor*

PROFILER MAIN JOB: It will keep monitoring or watching the code running through interpreter.If it somehere sees that the interpreter is doing the same task again and again..it understands that this piece of code needs to be optimized.

It will grab and it and optimize it and then replaces this piece of code with optimized one.....

SOURCE CODE   **INTERPRETER**

BYTE CODE

MACHINE CODE

01110
11010

PROFILER /MONITER

OPTIMIZED CODE

swipe

Answer to the main question

So all together while the code is being interpreted ...the compiler helps interpreter to optimize the code in run time.so it is called **JIT compiler.**

well what about JS ...is it interpreted or compiled??

So basically JS can **act as both interpreted and compiled** language.It completely **depends on the JS engine** that you have been using. Well most of the modern browsers or JS engines using JIT compilation.

To conclude, JavaScript is more closer to be Compiled than Interpreted. It is compiled every time. Next time, when you are answering this question.Just give out this wonderful underhood explanation.

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