ASYNCHRONICITY

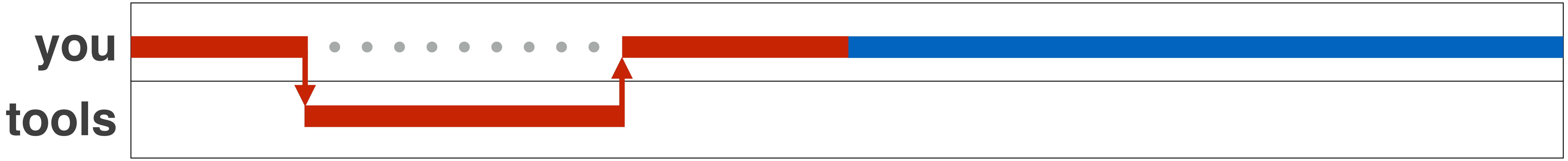
CONCURRENCY

“Let’s bake a cake”

1. You only make the icing after the cake comes out of the oven
2. You make the icing while the cake is in the oven
3. I only make the icing and you only make the cake

CONCURRENCY

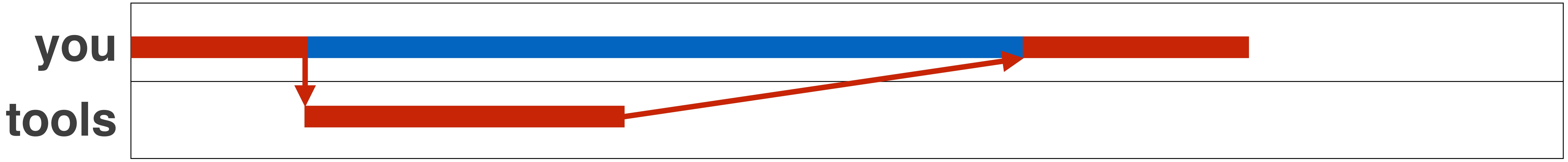
Blocking…



1. You only make the icing after the cake comes out of the oven

CONCURRENCY

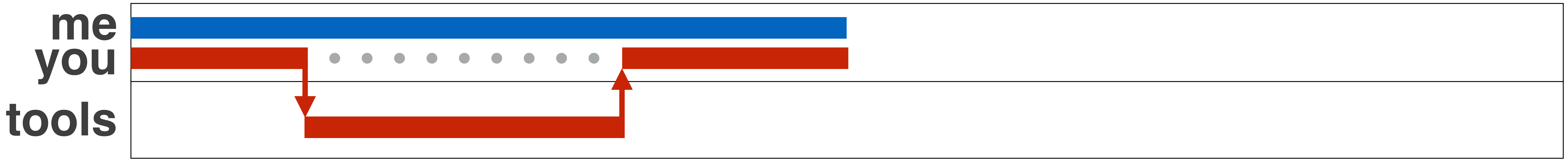
Non-blocking…



2. You make the icing while the cake is in the oven

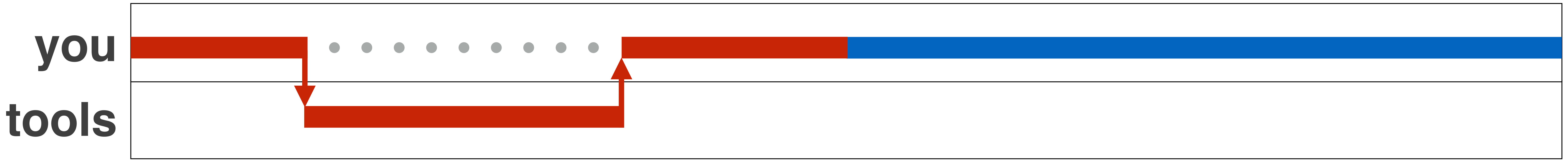
CONCURRENCY

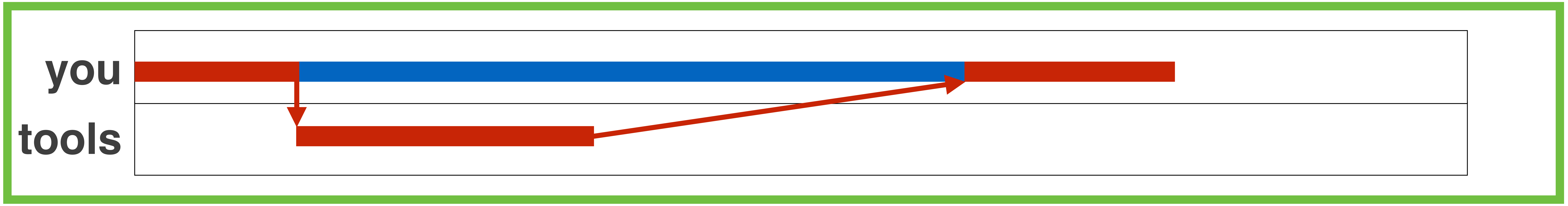
Parallel…

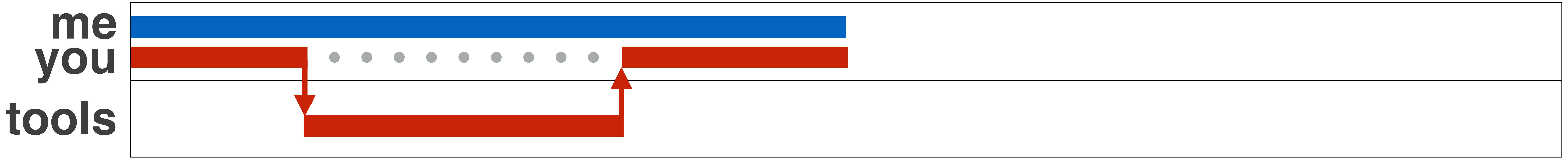


3. I only make the icing and you only make the cake

WHICH DESCRIBES JAVASCRIPT?







Er, not exactly

“Node.js is a ~~single-threaded,~~ event-driven, non-blocking I/O platform”

– SOME PEOPLE ON THE INTERNET

“JavaScript is single-threaded” …arguably yes

– OTHER PEOPLE ON THE INTERNET

ASYNC

(Code is asynchronous if) the execution order is not dependent upon the command order

WHAT HAPPENS?

```
console.log(‘Some callbacks');
setTimeout(function(){
  console.log('you');
}, 3000);
console.log('love');
```

```
Some callbacks
love
you
```

EVENT BASED

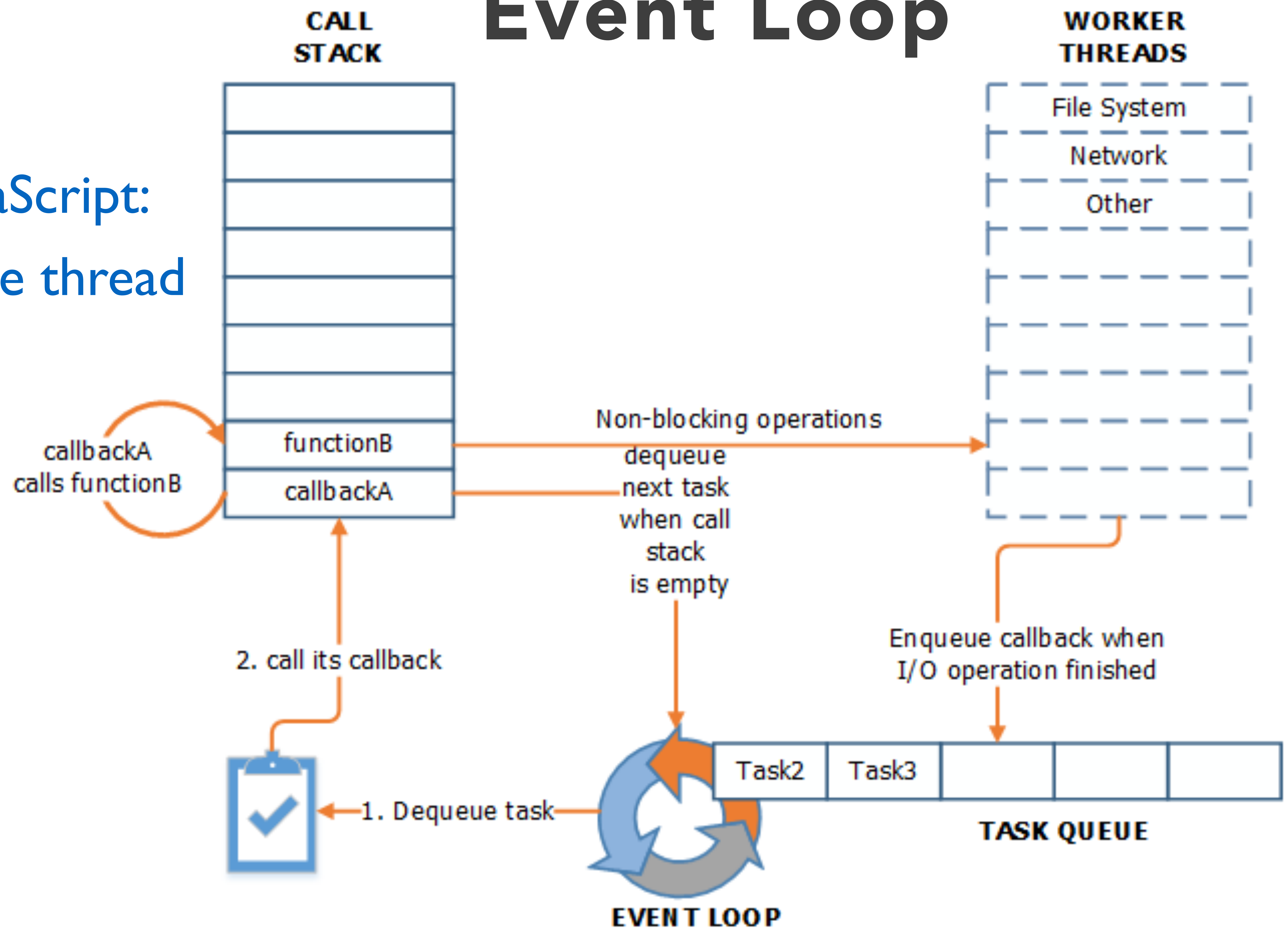
A function that executes asynchronously…

1. Kicks off some external process
2. Registers an event handler for when that process finishes (callback)

Event Loop

JavaScript:

One thread



Thread pool (libeio):

Slow stuff, multiple threads

Event loop (libev):

One thread

How do I know if a function is asynchronous?

That doesn’t help

If you want to be sure, you have to look it up

…Wait really?

Well, async operations often have the following callback pattern:

```
asyncThing(function(err,data){…})
```

SUMMARY

- JavaScript is single-threaded but its runtime environment is not
- A callback executes when its async event finishes
- Anything you wish to do *after* the async event completes *must* happen in the callback