ASYNCHRONICITY

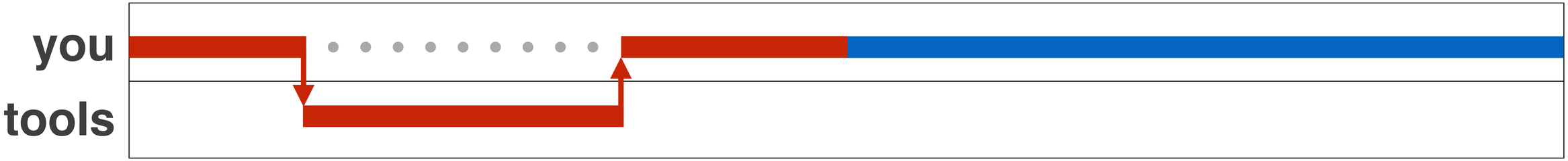
CONCURRENCY

"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

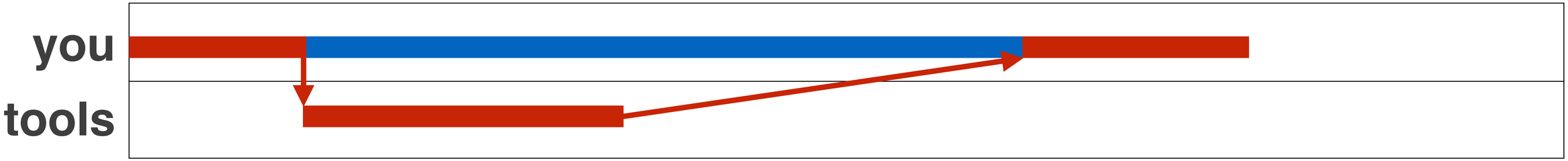
Blocking…



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

CONCURRENCY

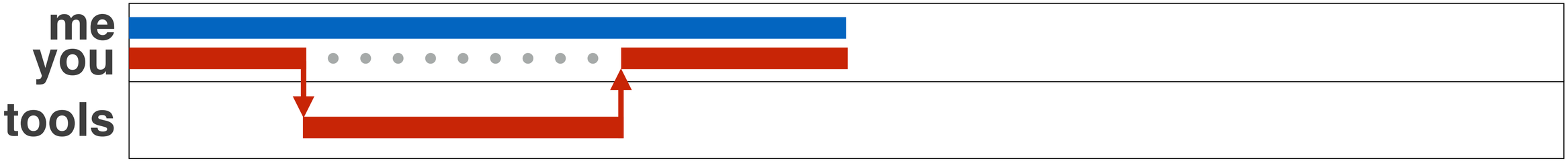
Non-blocking…



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

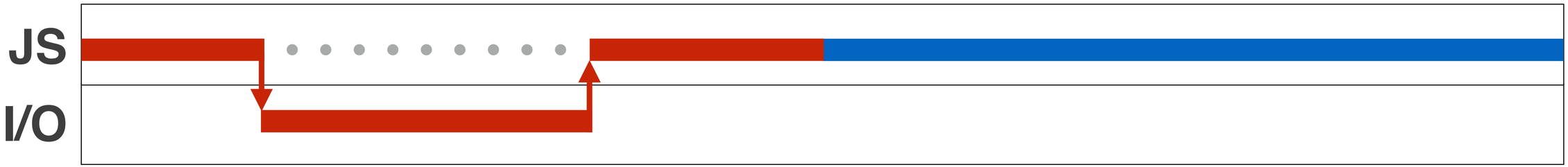
CONCURRENCY

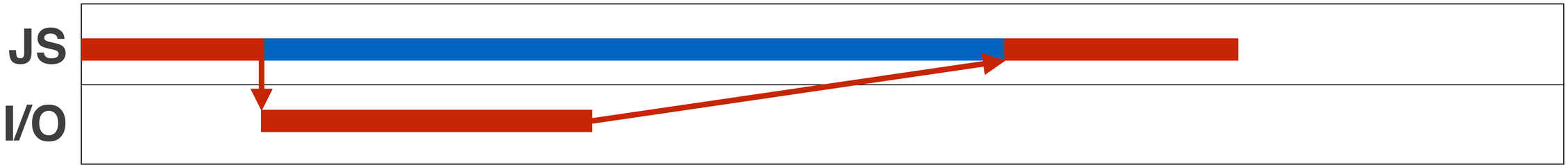
Parallel…

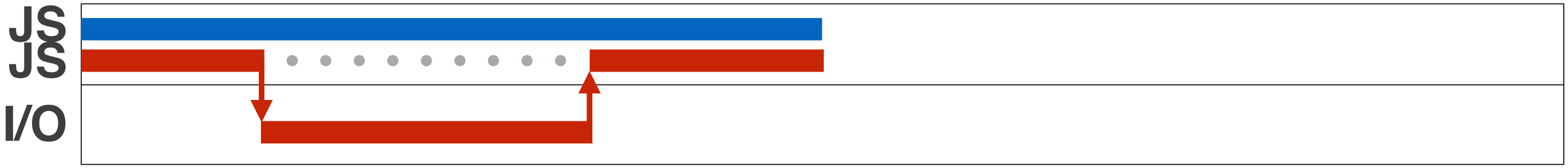


3. I only make the icing and you only make the cake

WHICH DESCRIBES JAVASCRIPT?







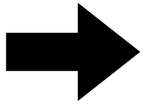
"JavaScript is single-threaded" …arguably yes

– 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
(3000ms elapse)
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)

WHAT HAPPENS?

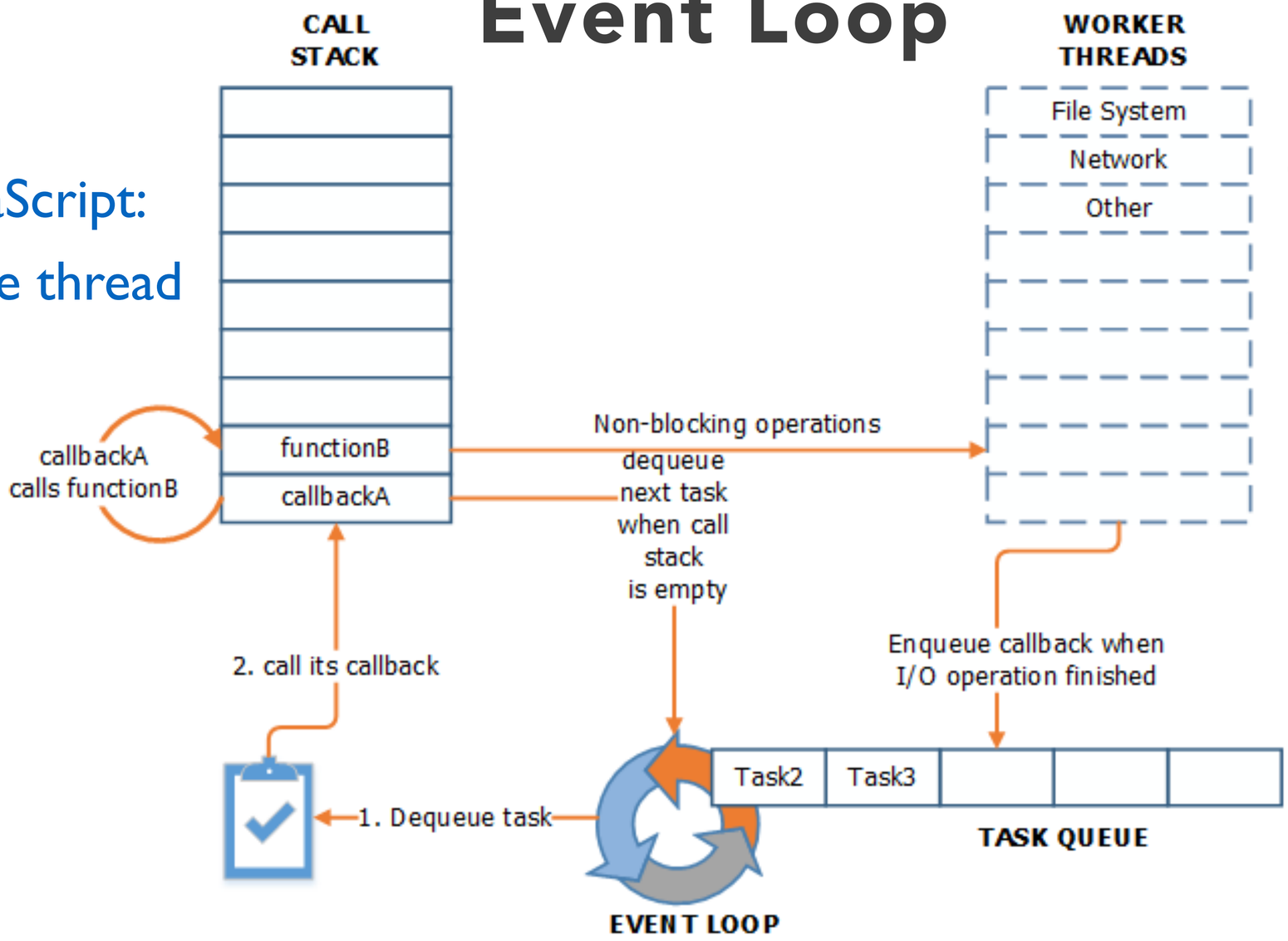
```
var start = new Date;
setTimeout(function(){
  var end = new Date;
  console.log('Time elapsed:', end - start, 'ms');
}, 500);

while (new Date - start < 1000) {};
```

```
=> Time elapsed: 1000 ms
```

Event Loop

JavaScript:

One thread



Thread pool (libeio):

Slow stuff, multiple threads

Event loop (libuv):

One thread

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