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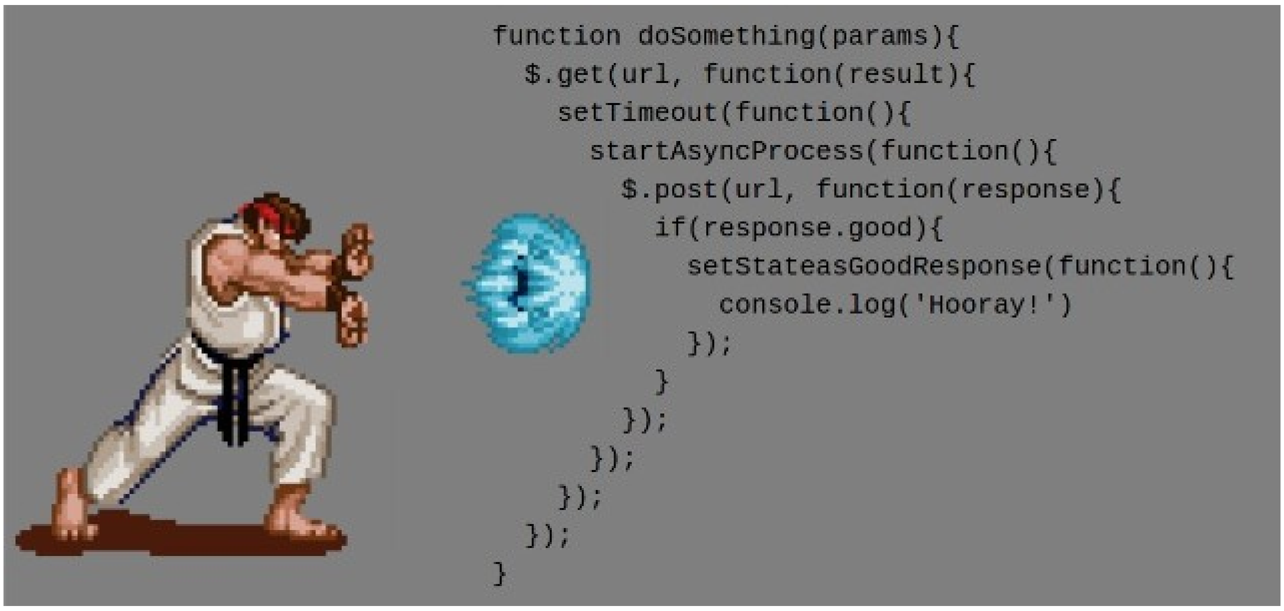
> “ /

- `[Basic]` Promise
- `[Doc]` Events ( )
- `[Doc]` Timers ( )
- `[Point]` /
- `[Point]` /

? .

Promise



```
function doSomething(params){
  $.get(url, function(result){
    setTimeout(function(){
      startAsyncProcess(function(){
        $.post(url, function(response){
          if(response.good){
            setStateasGoodResponse(function(){
              console.log('Hooray!')
            });
          }
        });
      });
    });
  });
}
```

`Callback Hell` Q, , async, EventProxy `Promise` , ES6 JavaScript .

Promise / .

> “ Promise .then .catch ?

We have a problem with promises

, , Promise :

```
let doSth = new Promise((resolve, reject) => {
  console.log('hello');
  resolve();
});

doSth.then(() => {
  console.log('over');
});
```

:

```
hello
over
```

, Promise , then ?

`setTimeout` 10s `.then` `hello` 10s , ?

```
let doSth = new Promise((resolve, reject) => {
  console.log('hello');
  resolve();
});

setTimeout(() => {
  doSth.then(() => {
    console.log('over');
  })
}, 10000);
```

): (

```
setTimeout(function() {
  console.log(1)
}, 0);
new Promise(function executor(resolve) {
  console.log(2);
  for( var i=0 ; i<10000 ; i++ ) {
    i == 9999 && resolve();
  }
  console.log(3);
}).then(function() {
  console.log(4);
});
console.log(5);
```

, . Promise , Promise , Promise ,

Events

`Events` Node.js core , node `Stream` (`Events` I `fs`, `net`, `http` `Stream`, `Events`

EventEmitter node event , emitter, (emit) cb listener. D

> Eventemitter emit ?

Node.js Eventemitter emit . :

> The EventListener calls all listeners synchronously in the order in which they were registered. This is important to ensure the proper sequencing of events and to avoid race conditions or logic errors.

`hi 1` `hi 2`?

```
const EventEmitter = require('events');

let emitter = new EventEmitter();

emitter.on('myEvent', () => {
  console.log('hi 1');
});

emitter.on('myEvent', () => {
  console.log('hi 2');
});
```

```
emitter.emit('myEvent');
```

?

```
const EventEmitter = require('events');

let emitter = new EventEmitter();

emitter.on('myEvent', () => {
  console.log('hi');
  emitter.emit('myEvent');
});

emitter.emit('myEvent');
```

?

```
const EventEmitter = require('events');

let emitter = new EventEmitter();

emitter.on('myEvent', function sth () {
  emitter.on('myEvent', sth);
  console.log('hi');
});

emitter.emit('myEvent');
```

emitter , TCP , , .emit .once

, emitter , emitter, emitter listener

/

> “ ? ?

, node .

- console.log

- IO

, IO , setTimeout .

> , koa , A, A . , ,

Node.js js . , , pop . ① sleep ,

> sleep ? ①

```
function sleep(ms) {
  var start = Date.now(), expire = start + ms;
  while (Date.now() < expire) ;
  return;
}
```

, libuv (C/C++ libev libevent) .

, , , , js , .

> reduce? (: reduce)

reduce , n n+1 , n+2 . , .

Timers

Node.js , .

IO libuv . , readFileSync, execSync , node ,

, setTimeout nextTick, setTimeout setImmediate

Event loop

```
   ┌───────────────────────┐
┌─>│        timers         │
│  └──────────┬────────────┘
│  ┌─────────────┴─────────────┐
│  │       I/O callbacks       │
│  └─────────────┬─────────────┘
│  ┌─────────────┴─────────────┐
│  │       idle, prepare       │
│  └─────────────┬─────────────┘      ┌───────────────┐
│  ┌─────────────┴─────────────┐      │   incoming:   │
│  │           poll            │<─────┤  connections, │
│  └─────────────┬─────────────┘      │   data, etc.  │
│  ┌─────────────┴─────────────┐      └───────────────┘
│  │           check           │
│  └─────────────┬─────────────┘
│  ┌─────────────┴─────────────┐
└──┤      close callbacks      │
   └───────────────────────────┘
```

, Timers nextTick The Node.js Event Loop, Timers, and process.nextTick() Tasks, microtasks, queues and schedules

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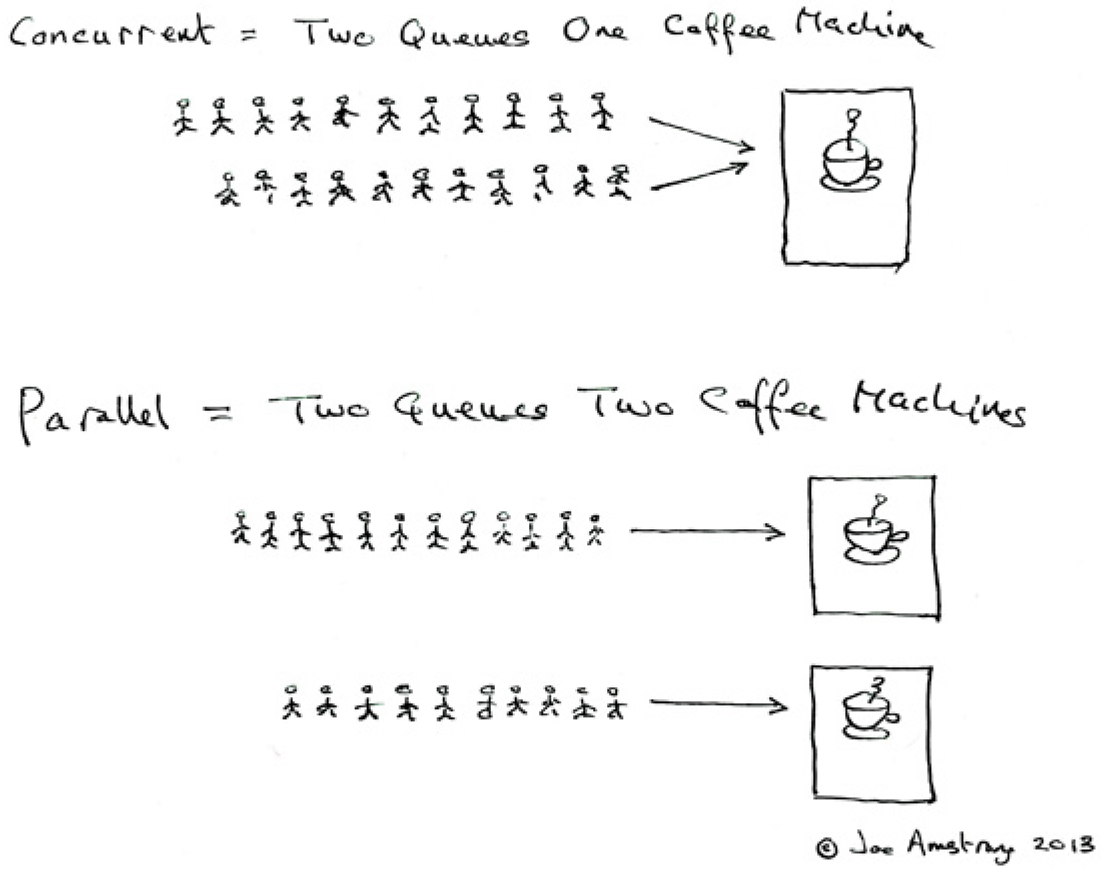
(Parallel) (Concurrent) .

Erlang Joe Armstrong (Concurrent and Parallel)


Concurrent = Two Queues One Coffee Machine
Parallel = Two Queues Two Coffee Machines
© Joe Armstrong 2013

(Concurrent) = 2 1 .

(Parallel) = 2 2 .

Node.js `2` 1 Task / , , .

node , cluster .

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