

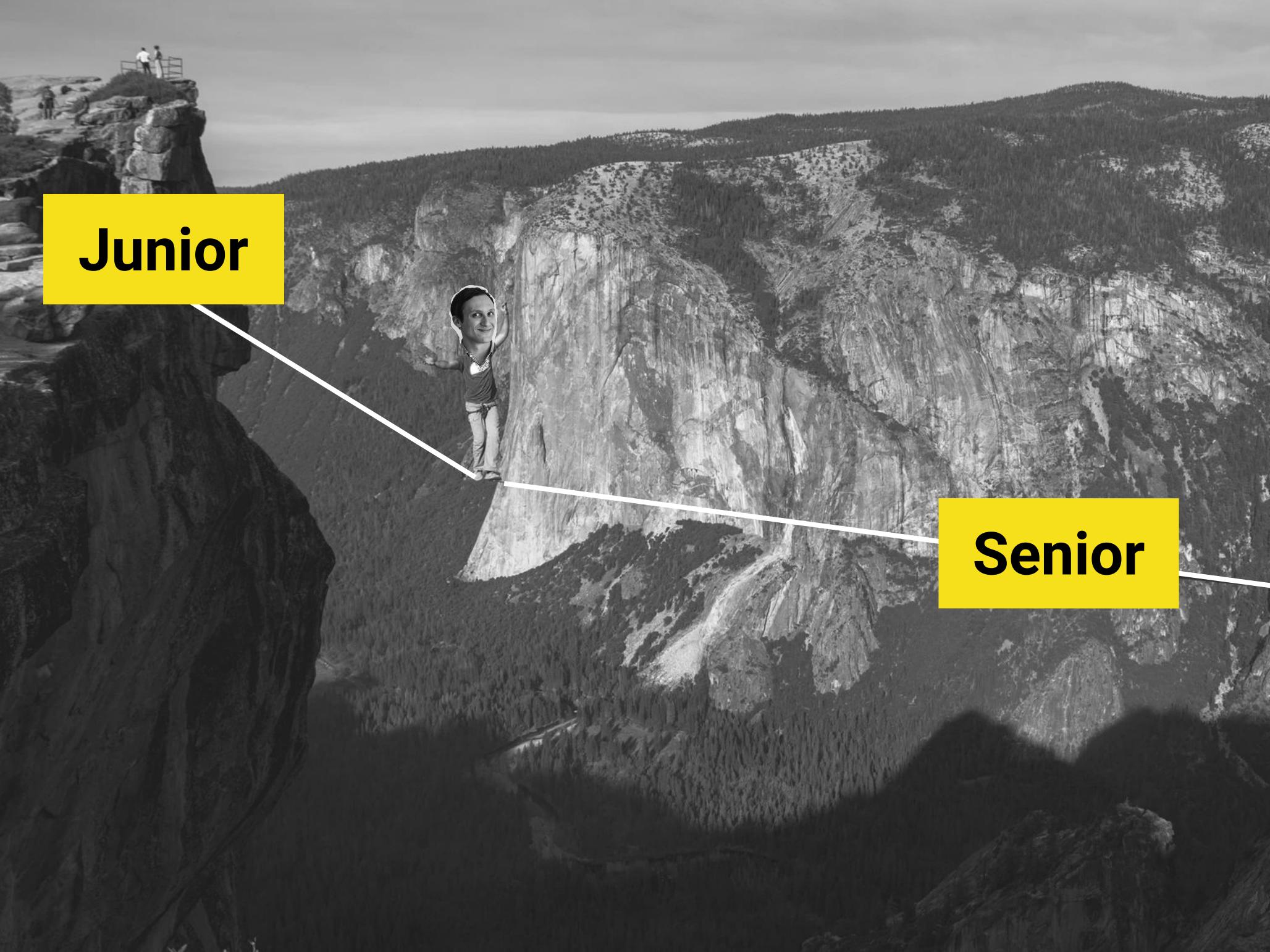
Curso
Profesional
de JavaScript

Richard B. Kaufman López
@sparragus

Introducción

Qué significa ser
un profesional
de JavaScript





Junior

Senior



Junior

Senior

**El duro camino lleno
de experiencia**

¿Qué forma a un profesional?

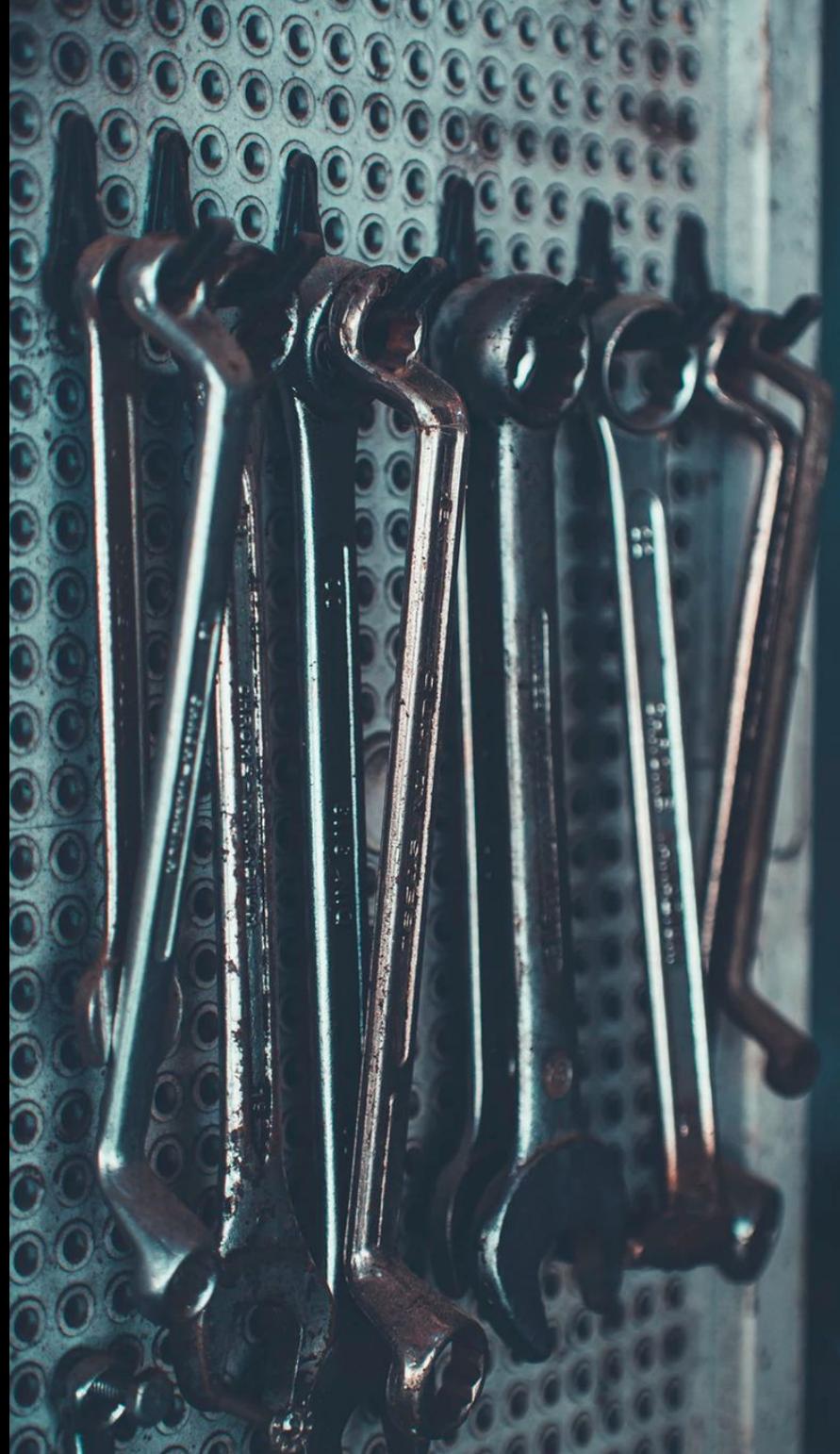
- Conocimiento del lenguaje
- Conocimiento de los entornos de programación
- Mejores prácticas
- Versado en código
- Herramientas
- Ética / Profesionalismo
- Experiencia

El lenguaje: JavaScript

Fundamentos

No-fundamentos

Cómo funciona



No Fundamentos

Promesas (Nivel Pro)

Getters, Setters

Proxies

Generadores

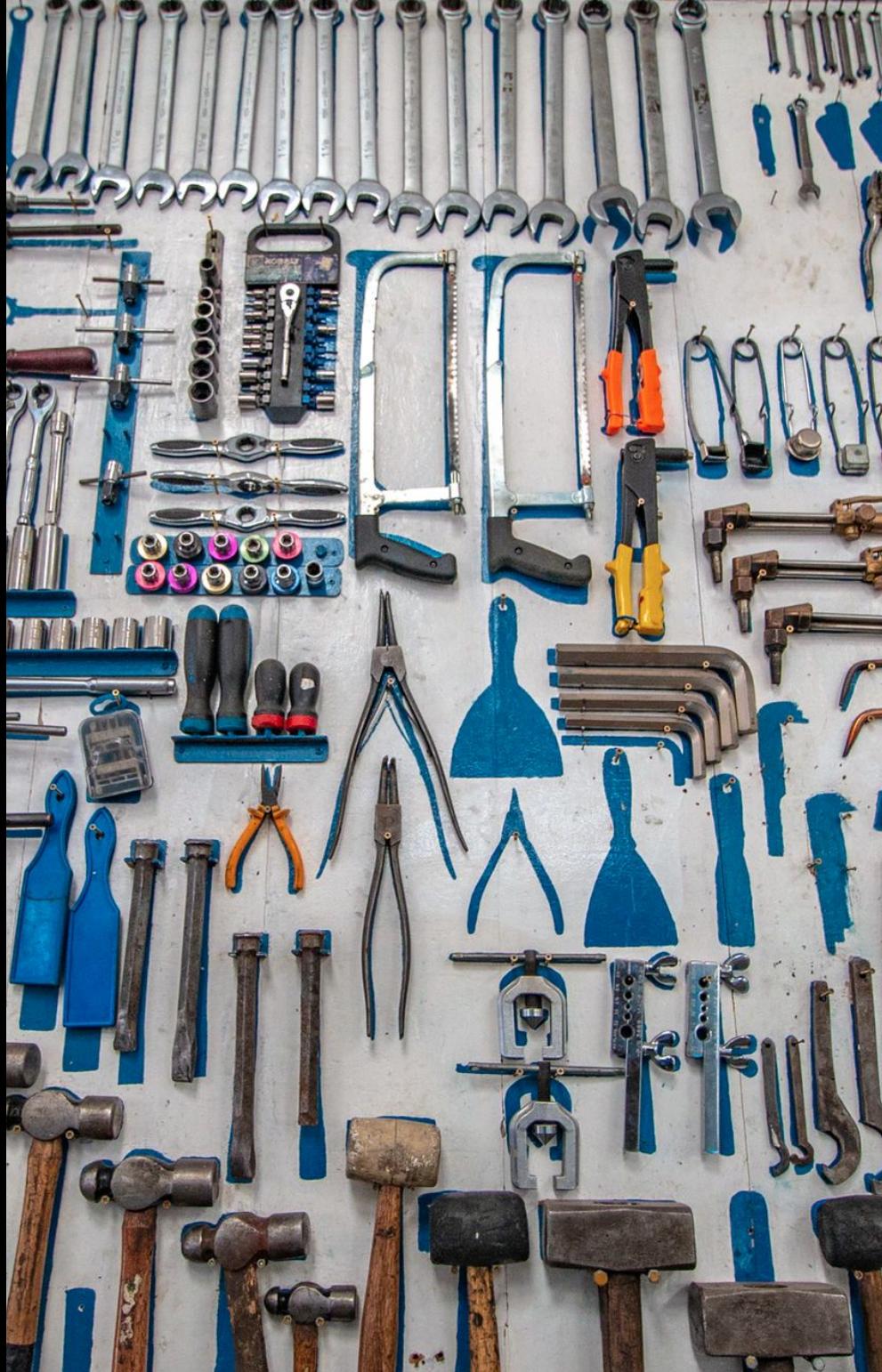


Cómo funciona

JavaScript Engine

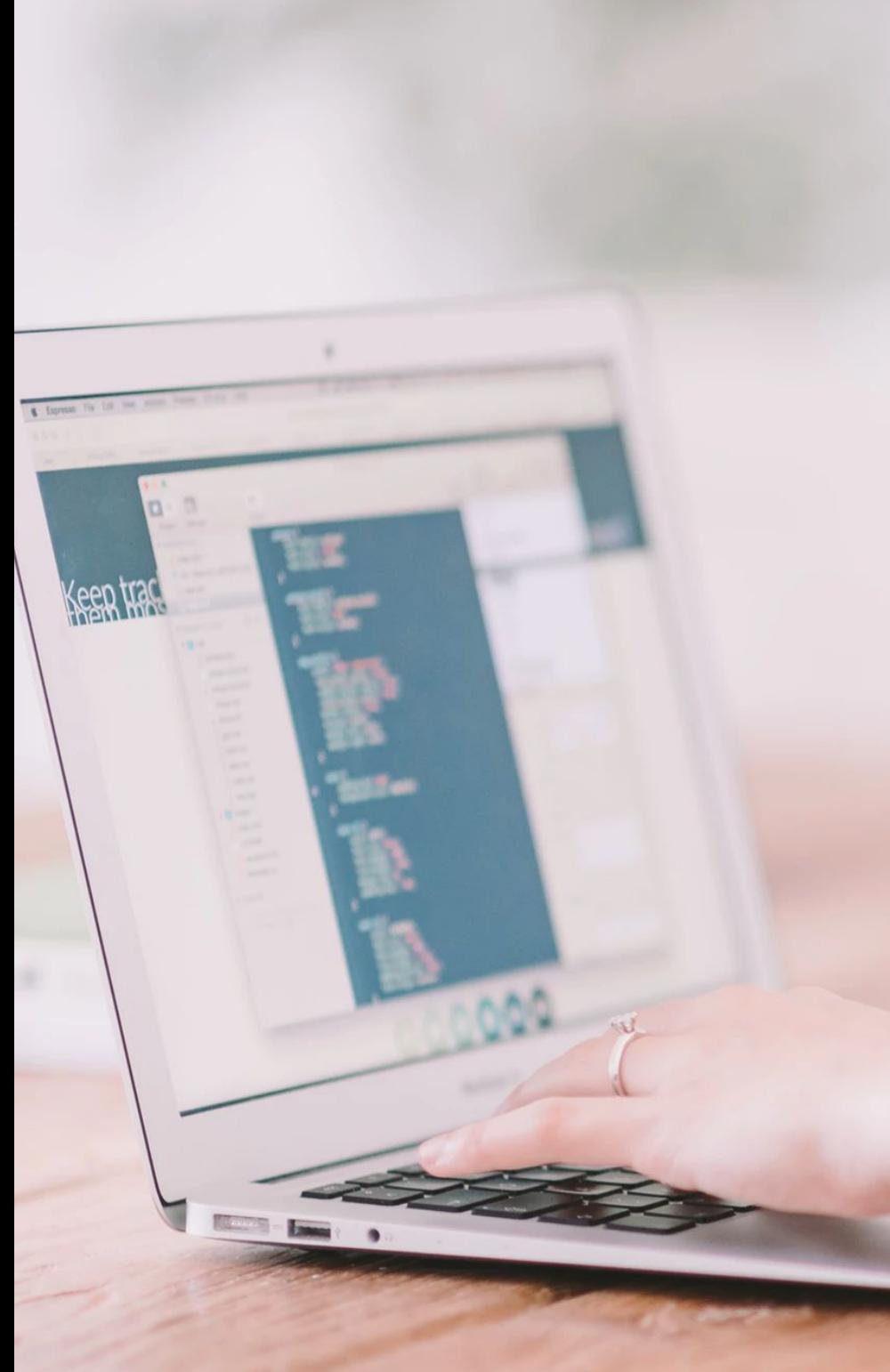
Herencia prototípal

Event loop



Entornos de Programación

Browser y el DOM API



Versado en código

Hay que leer código

Mucho

Constantemente



Mejores prácticas

No reinventamos la rueda

Probamos nuestro código



Ética

Ser responsable

Entregar a tiempo

Saber decir que no

No hacer daño



Experiencia

Nada le gana a esto

No se puede enseñar

Está en ti

Perseverancia



Cómo funciona JavaScript

Cómo llega un **script**
al navegador

DOM

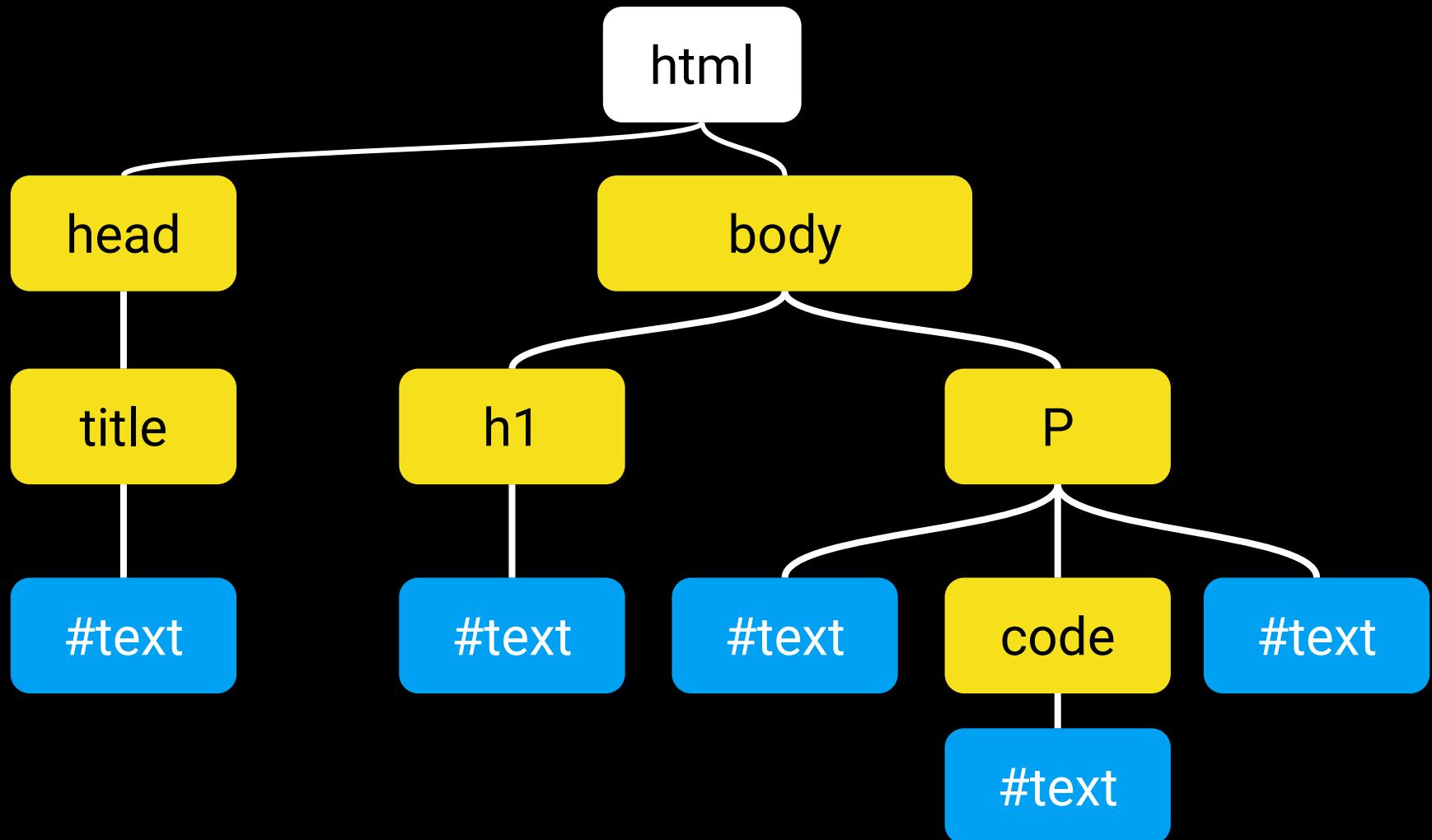
```
<html>
<head><title>DOM</title></head>
<body>
  <h1>DOM</h1>
  <p>
```

Cuando llega el HTML al browser, este lo empieza a parsear:
va leyendo etiqueta por etiqueta y va creando el DOM.

Cuando este proceso termina por completo, es cuando
obtenemos el evento `DOMContentLoaded`.

```
  </p>
</body>
</html>
```

DOM



“

DOMContentLoaded

”

El Navegador

Scripts externos o embedido

```
<html>
<head>
  <!-- Global site tag (gtag.js) - Google Analytics -->
  <script async
src="https://googletagmanager.com/gtag/js?id=U-123456-1"></script>
  <script>
    window.dataLayer = window.dataLayer || [];
    function gtag(){dataLayer.push(arguments);}
    gtag('js', new Date());
    gtag('config', 'GA_MEASUREMENT_ID');
  </script>
</head>
<body><!-- ... --></body>
</html>
```

Scripts embedidos

HTML

Script Execution

```
<script>  
  window.dataLayer = window.dataLayer || [];  
  function gtag(){dataLayer.push(arguments);}  
  gtag('js', new Date());  
  gtag('config', 'GA_MEASUREMENT_ID');  
</script>
```

```
<body>

<script>

  let formEl = document.querySelector("#loginForm");
  formEl.addEventListener("submit", function (event) {
    // ...
  });

</script>

<form id="loginForm" action="/login" method="POST">
  <!-- ... -->
</form>

</body>
```

```
<body>  
  <script>  
    let formEl = document.querySelector("#loginForm");  
    formEl.addEventListener("submit", function (event) {  
      event.preventDefault();  
    });  
  </script>  
  
  <form id="loginForm" action="login" method="POST">  
    <input type="text" name="username" placeholder="Username" />  
    <input type="password" name="password" placeholder="Password" />  
    <input type="submit" value="Login" />  
  </form>  
</body>
```



```
<body>

  <form id="loginForm" action="/login" method="POST">
    <!-- ... -->

  </form>

<script>
  let formEl = document.querySelector("#loginForm");
  formEl.addEventListener("submit", function (event) {
    // ...
  });
</script>

</body>
```

Scripts externos

HTML

Script Fetching
Script Execution

```
<form id="loginForm"><!-- ... --></form>
<script
src="https://unpkg.com/jquery@3.4.1/dist/jquery.js"></script>
<script>
  $("#loginForm").submit(function (event) {/*...*/});
</script>
```

Scripts externos (async)

HTML

Script Fetching
Script Execution

```
<head>  
  <!-- Global site tag (gtag.js) - Google Analytics -->  
  <script async  
    src="https://googletagmanager.com/gtag/js?id=U-123456-1"></script>  
</head>  
<body><!-- ... --></body>
```

Orden de ejecución (async)

HTML



Script Fetching



Script Execution



Script Fetching



Script Execution



```
<body>
```

```
  <script async src="/hugeScript.js"></script>
```

```
  <script async src="/smallScript.js"></script>
```

```
</body>
```

Scripts externos (defer)

HTML

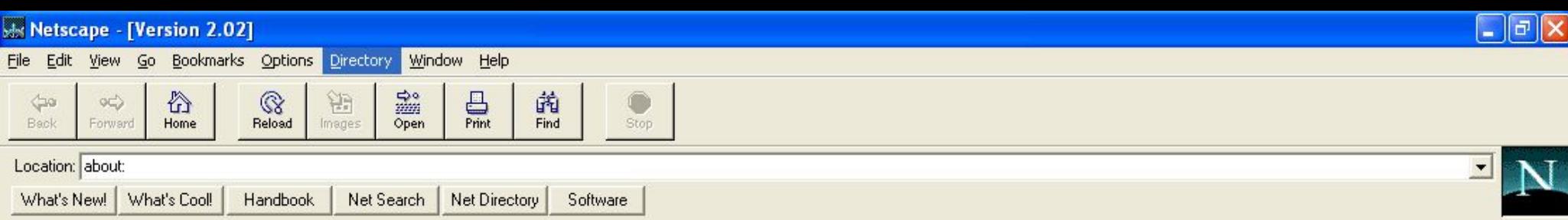
Script Fetching
Script Execution

```
<body>  
  <script defer src="/index.js"></script>  
  <!-- A bunch of html -->  
</body>
```

Cómo funciona JavaScript

Parsers y el Abstract Syntax Tree

JavaScript es interpretado



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JAVA COMPATIBLE

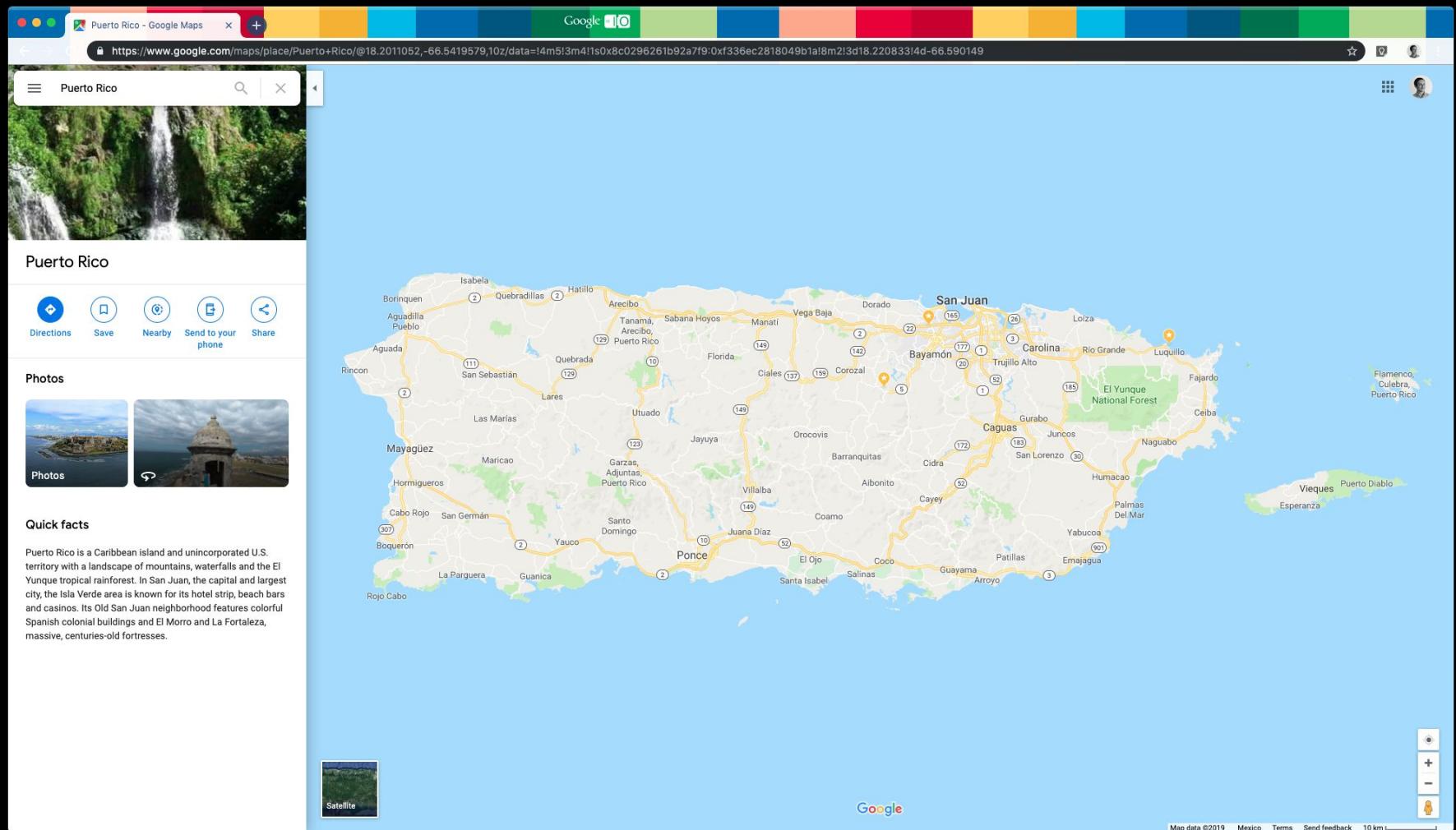


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La web no es como antes



JavaScript Engines

V8 - Chrome, Node.js

SpiderMonkey - Firefox

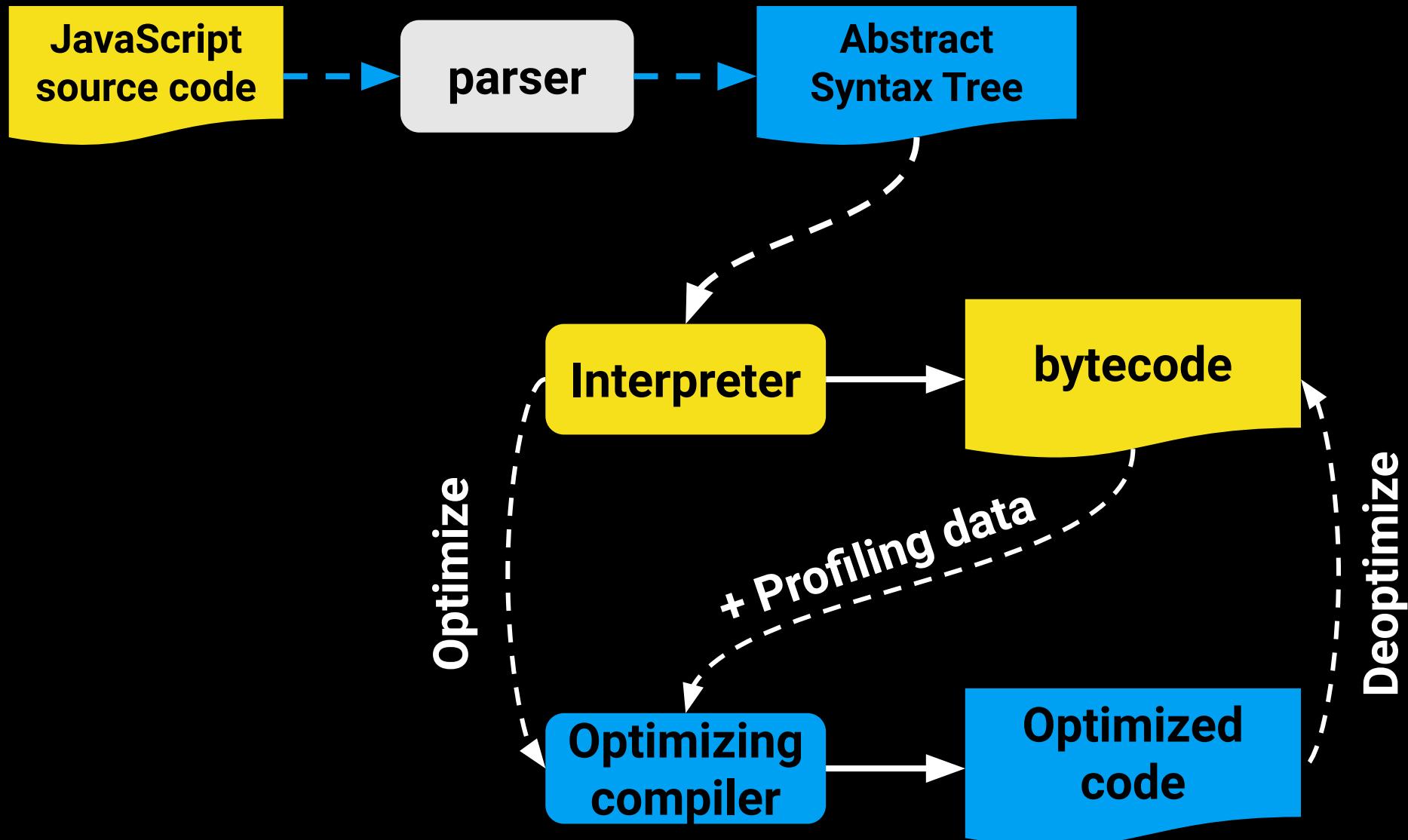
JavaScriptCore - Safari

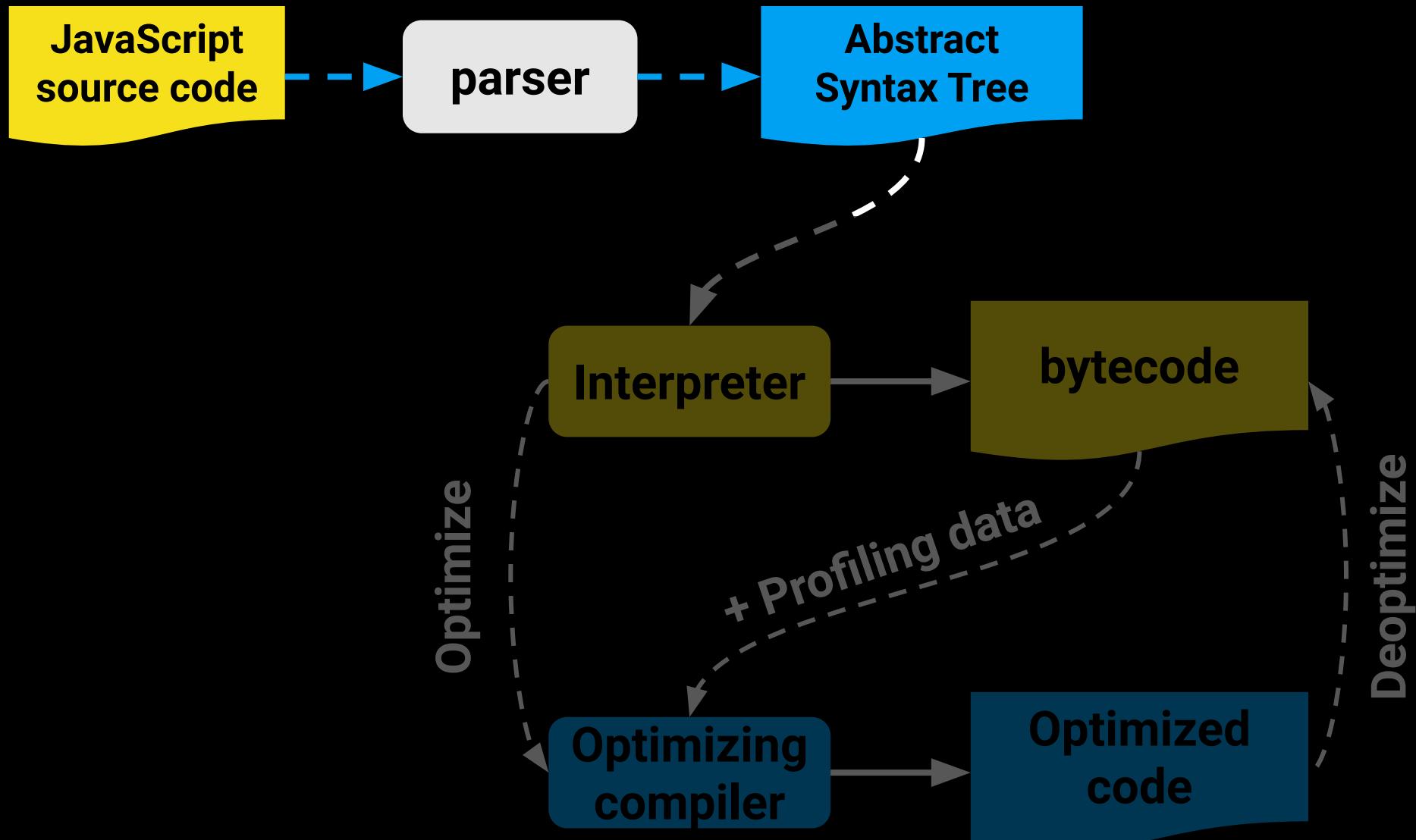
Chakra - Edge



| ¿Qué hace un JS Engine?

- Recibe código fuente
- Parsea el código y produce un Abstract Syntax Tree (AST)
- Se compila a bytecode y se ejecuta
- Se optimiza a machine code y se reemplaza el código base





¿Qué hace un parser?



¿Qué hace un parser?

Un **SyntaxError** es lanzado cuando el motor de JavaScript se encuentra con partes de código que no forman parte de la sintaxis del lenguaje al momento analizar el código.

https://developer.mozilla.org/es/docs/Web/JavaScript/Referencia/Objetos_globales/SyntaxError



Google dice:

- Parsing es **15-20%** del proceso de ejecución.
- La **mayoría** del JavaScript en una página nunca se ejecuta.
- Esto hace que **bundling** y **code splitting** sea muy importante!

Parser de V8

Eager Parsing:

- Encuentra errores de sintaxis
- Crea el AST
- Construye scopes

Lazy Parsing:

- Doble de rápido que el eager parser
- No crea el AST
- Construye los scopes parcialmente

Demo - Tokens

Abstract Syntax Tree (AST)

Es un grafo (estructura de datos) que representa un programa.

Se usa en:

- JavaScript Engine
- Bundlers: Webpack, Rollup, Parcel
- Transpilers: Babel
- Linters: ESLint, Prettify
- Type Checkers: TypeScript, Flow
- Syntax Highlighters

Demo - AST

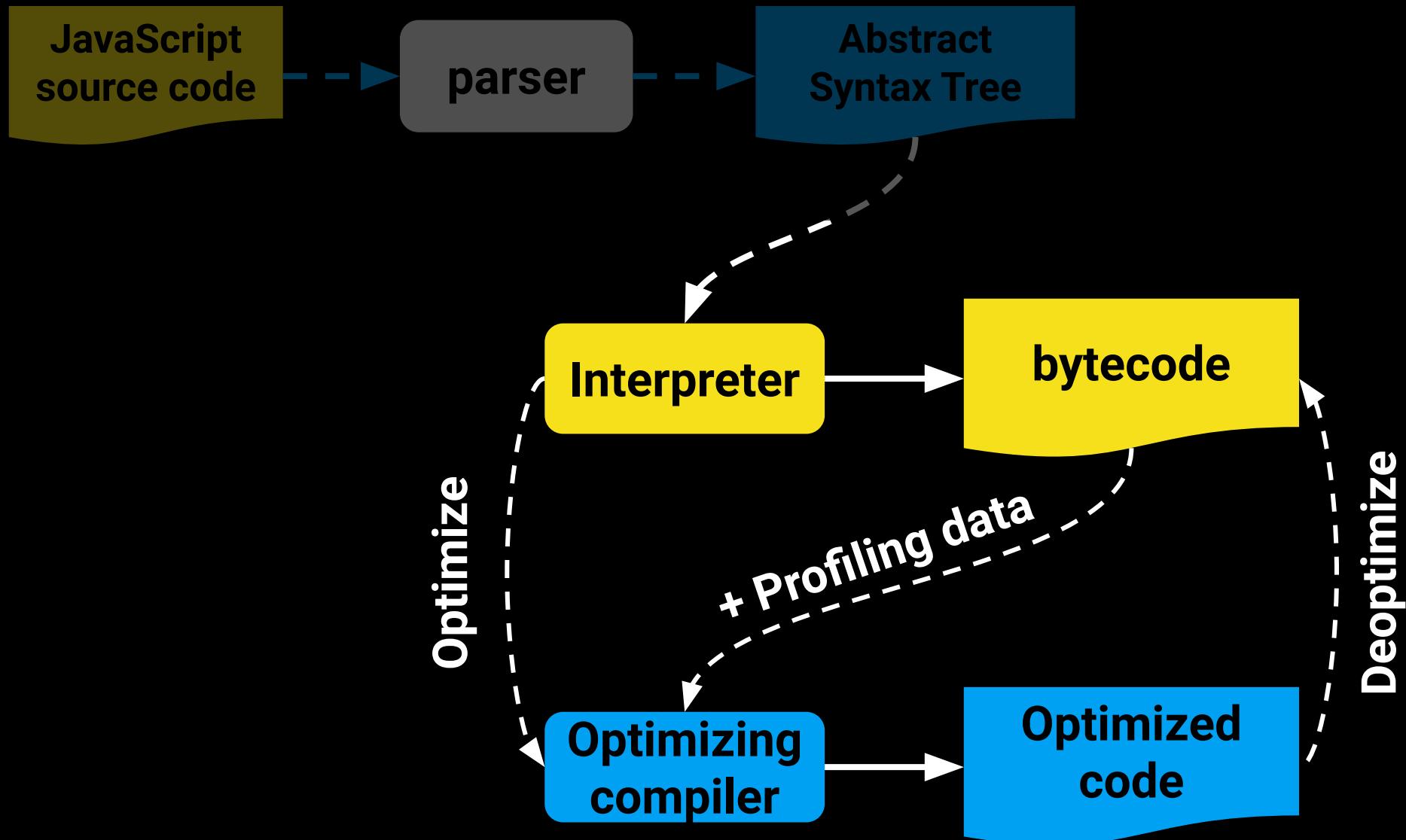
Demo - ESLint Rule

Cómo funciona JavaScript

JavaScript Engine: Interpreter, Compiler & Código Optimizado

| ¿Qué hace un JS Engine?

- Recibe código fuente
- Parsea el código y produce un Abstract Syntax Tree (AST)
- Se compila a bytecode y se ejecuta
- Se optimiza a machine code y se reemplaza el código base



Interpreter vs Optimizing Compiler

Interpreter:

Interpretador
Genera bytecode

Optimizing Compiler:

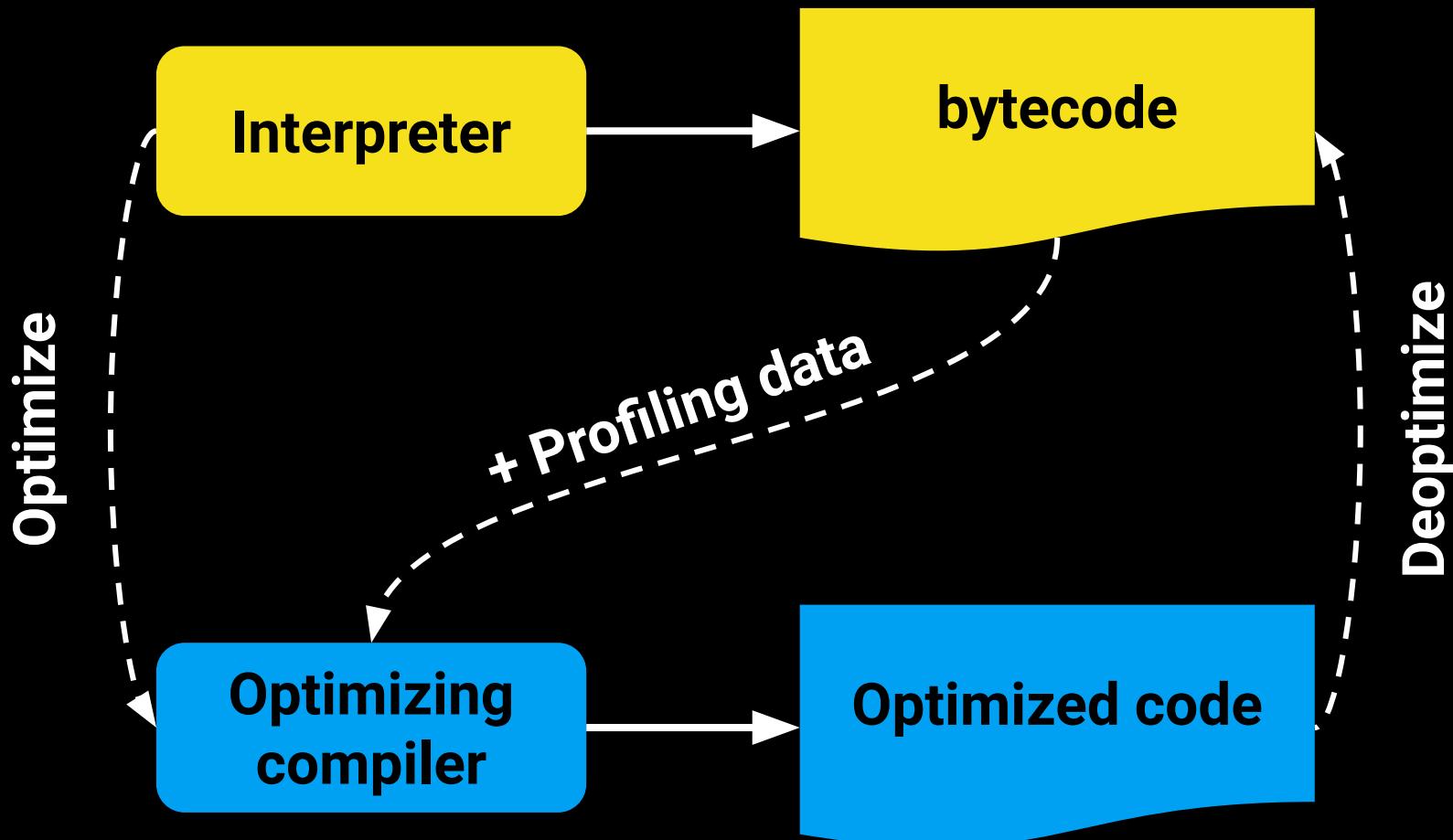
Genera machine code
Optimiza el bytecode
usando estadísticas de
ejecución
Just In Time compiler

Bytecode vs Machine Code

- Código parecido a assembly.
 - Portatil.
 - Ejecutado por una virtual machine.
- Binario.
 - Instrucciones específicas a una arquitectura o procesador.



V8



```
function add (a, b) {  
    return a + b;  
}
```

```
for (let i = 0; i < 1000; i++) {  
    add(i, i);  
}
```

```
function add (a, b) {  
    return a + b;  
}
```

```
for (let i = 0; i < 1000; i++) {  
    add(i, i);  
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```
function add (a, b) {  
    return a + b;  
}
```

```
for (let i = 0; i < 1000; i++) {  
    add(i, i);  
}
```

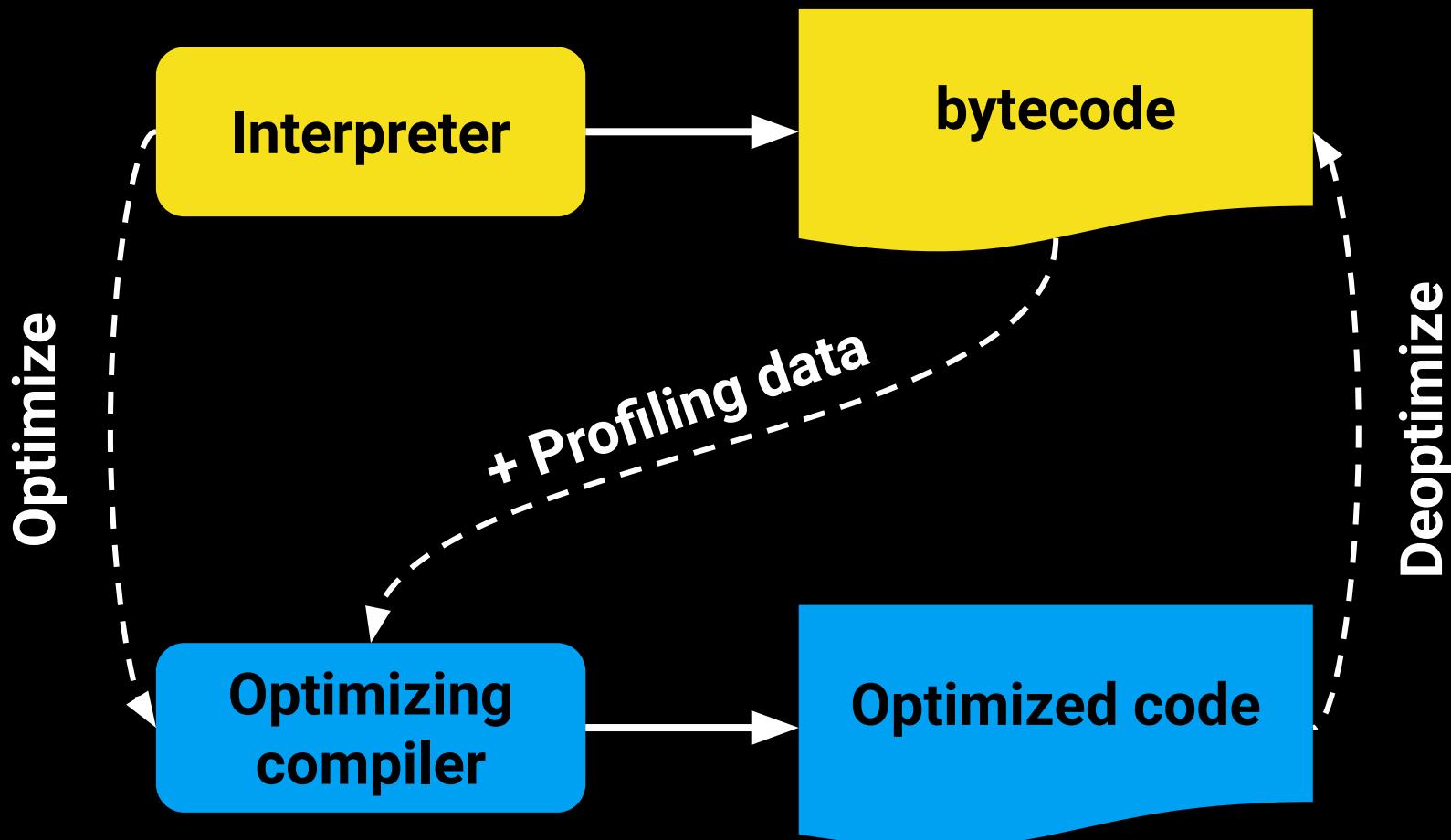
```
function add (a, b) {  
    return a + b;  
}
```



```
for (let i = 0; i < 1000; i++) {  
    add(i, i);  
}
```



V8

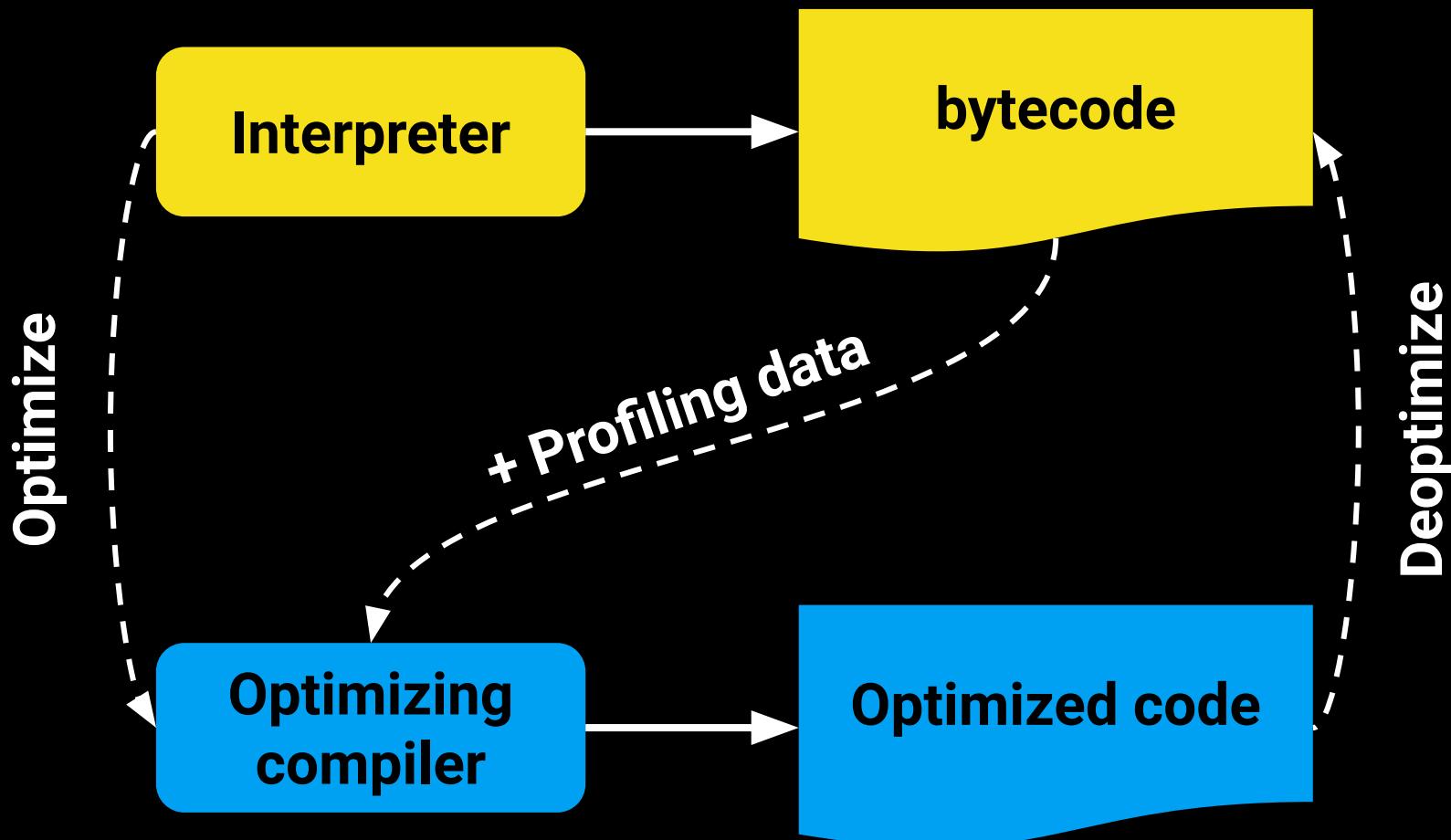


```
function add (a, b) {  
    return a + b;  
}  
for (let i = 0; i < 1000; i++) {  
    add(i, i);  
}  
add(1, "uno");
```

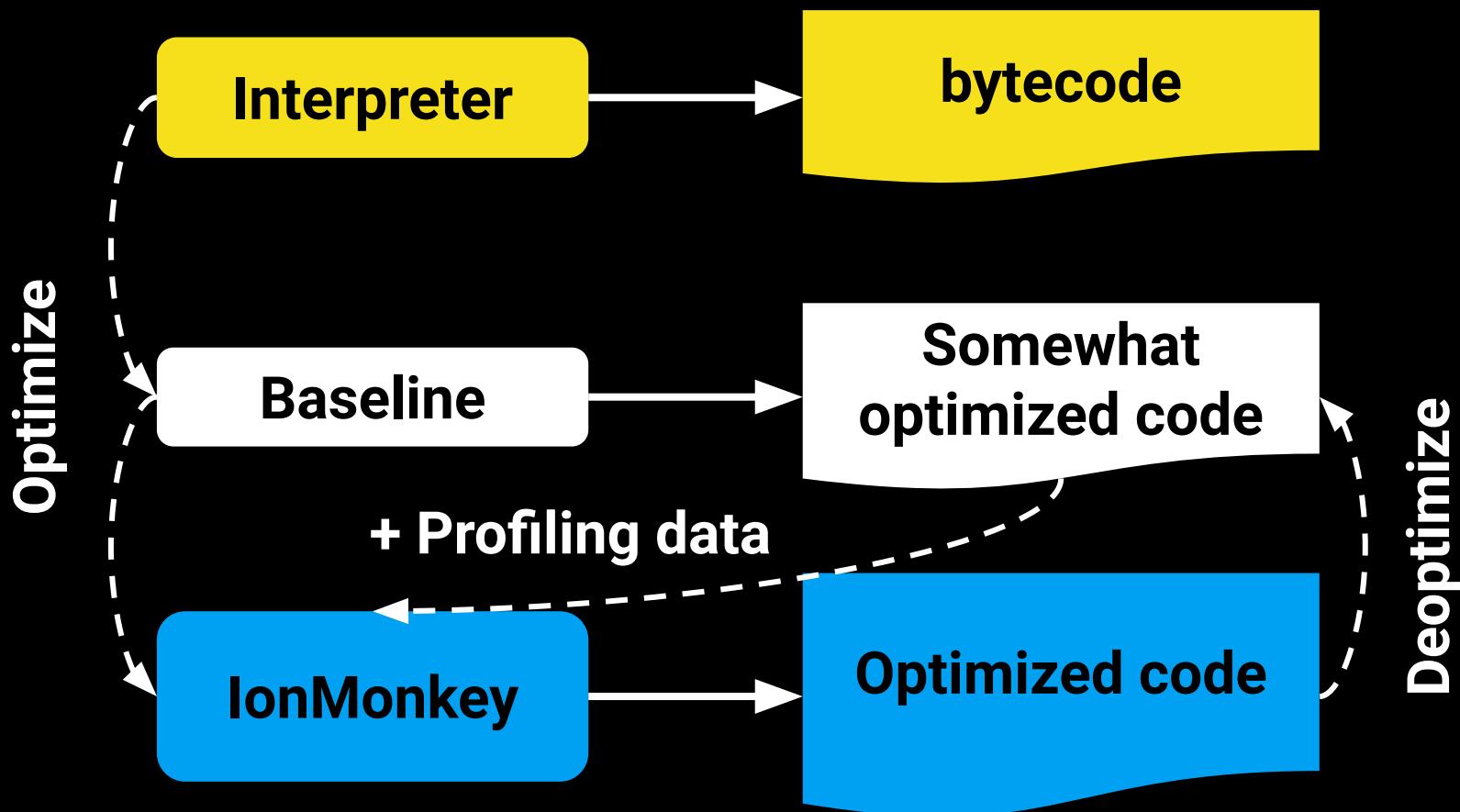




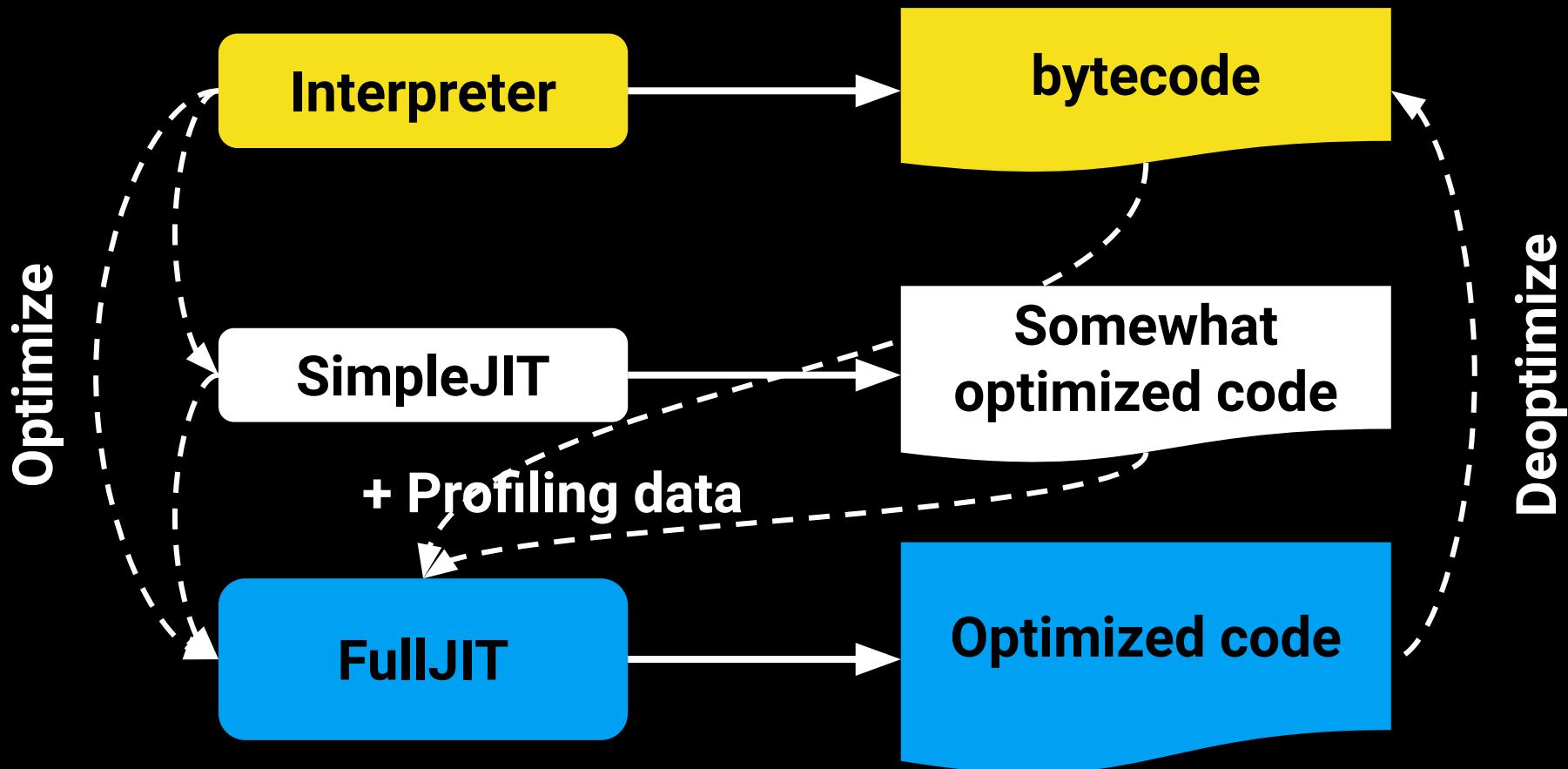
V8



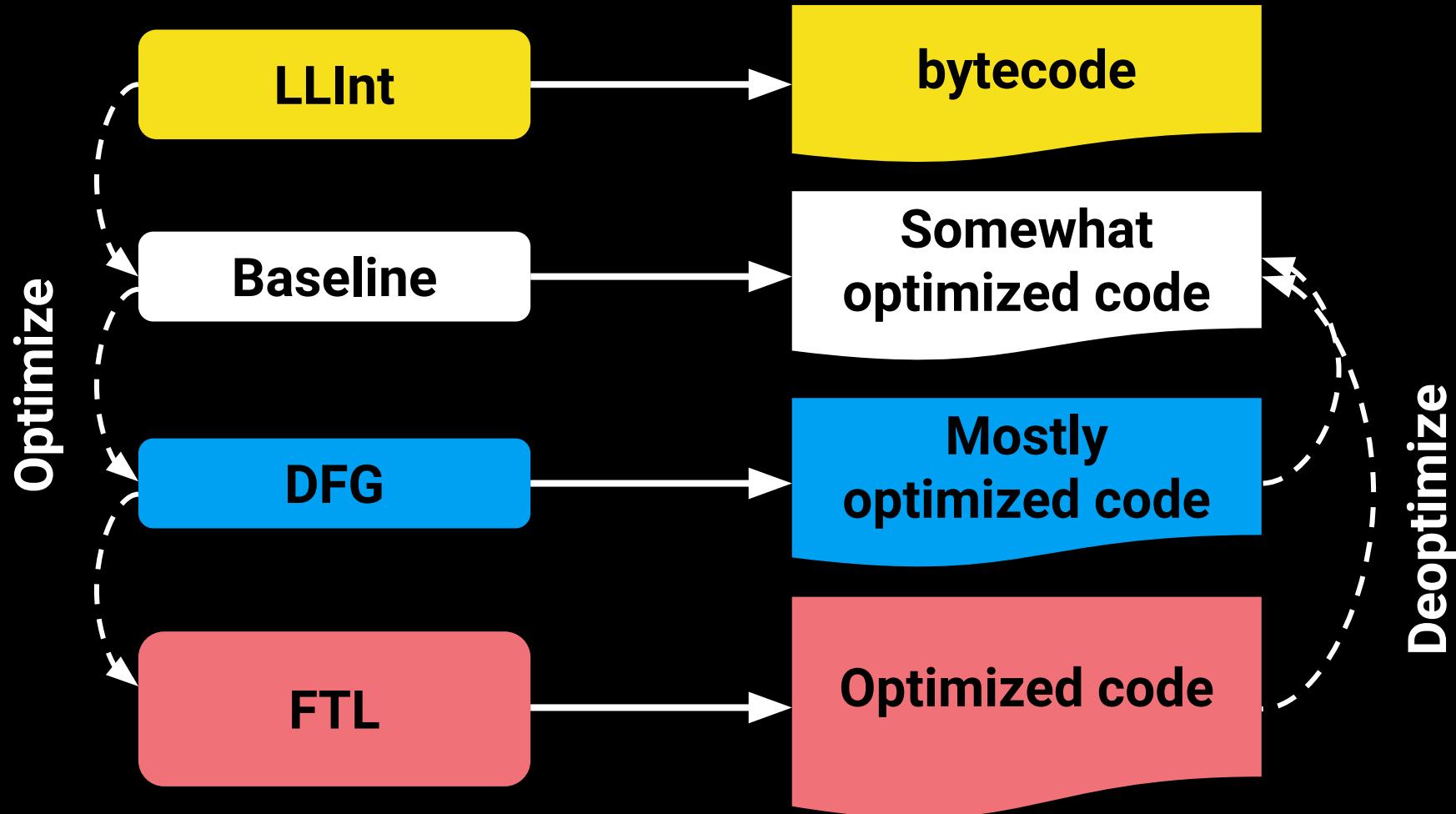
SpiderMonkey



Chakra



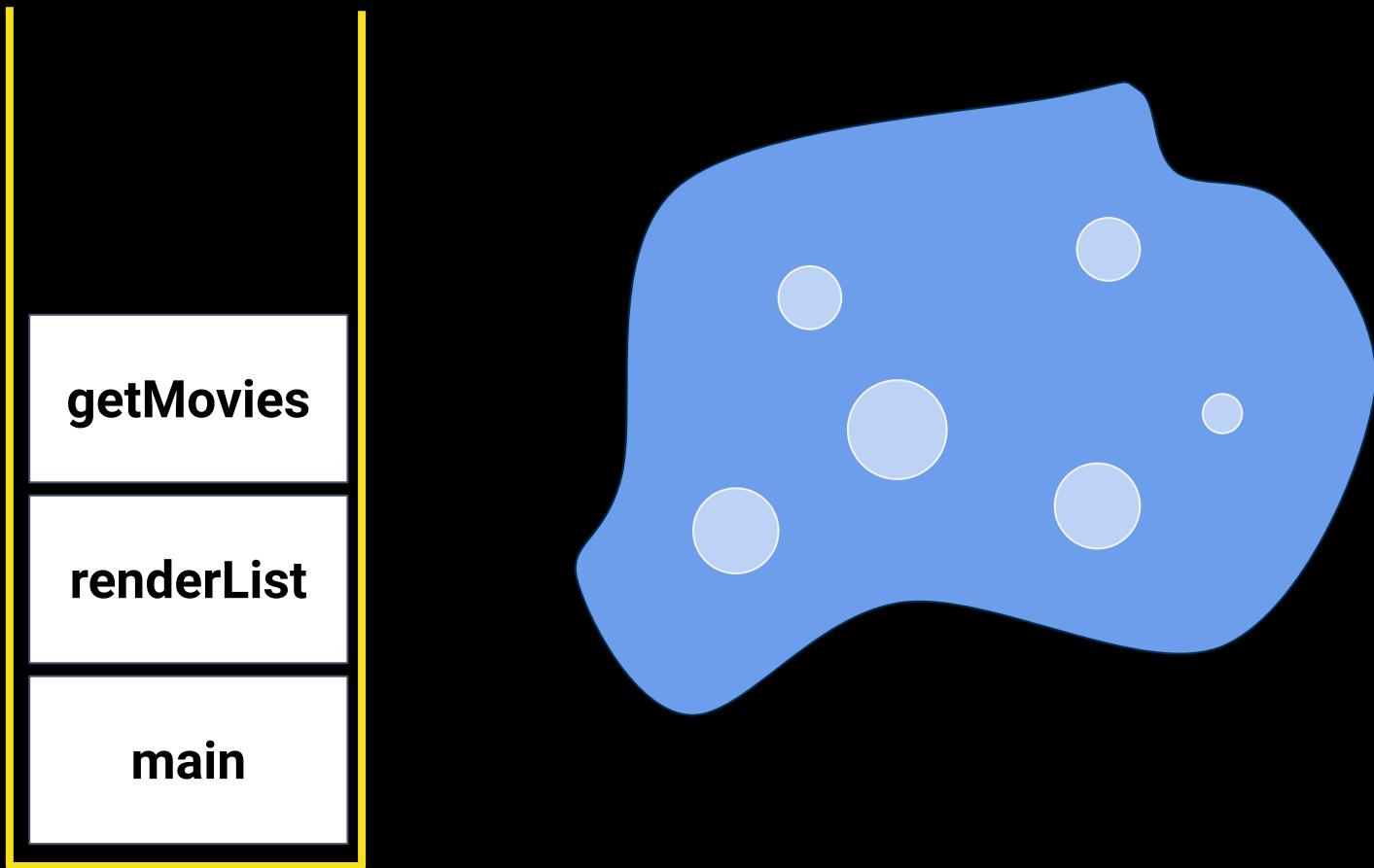
JavaScriptCore



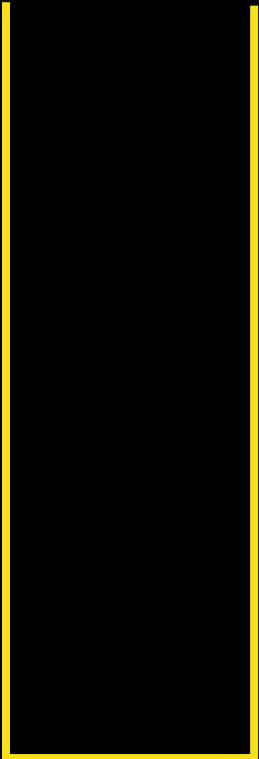
Cómo funciona JavaScript

Event loop

Stack y Memory Heap



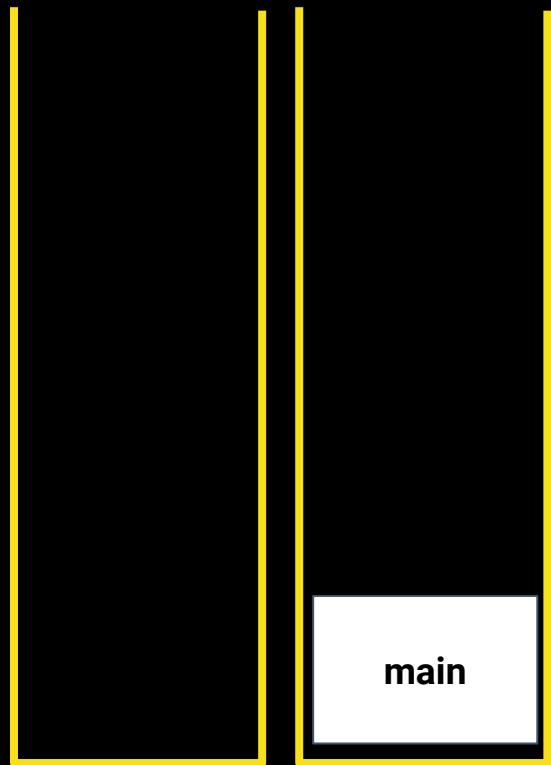
Stack





Stack

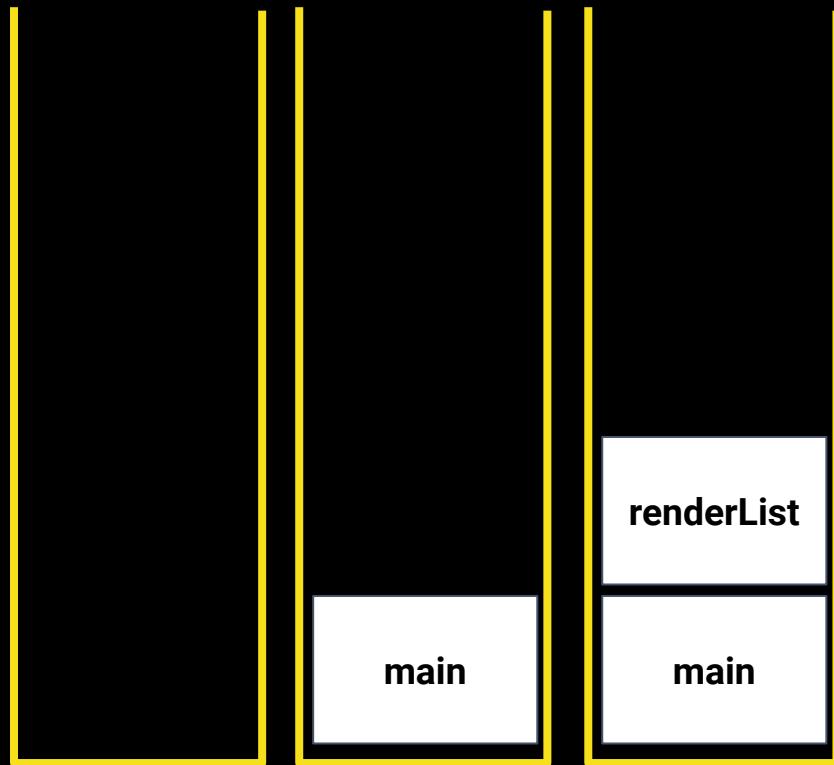
Push





Stack

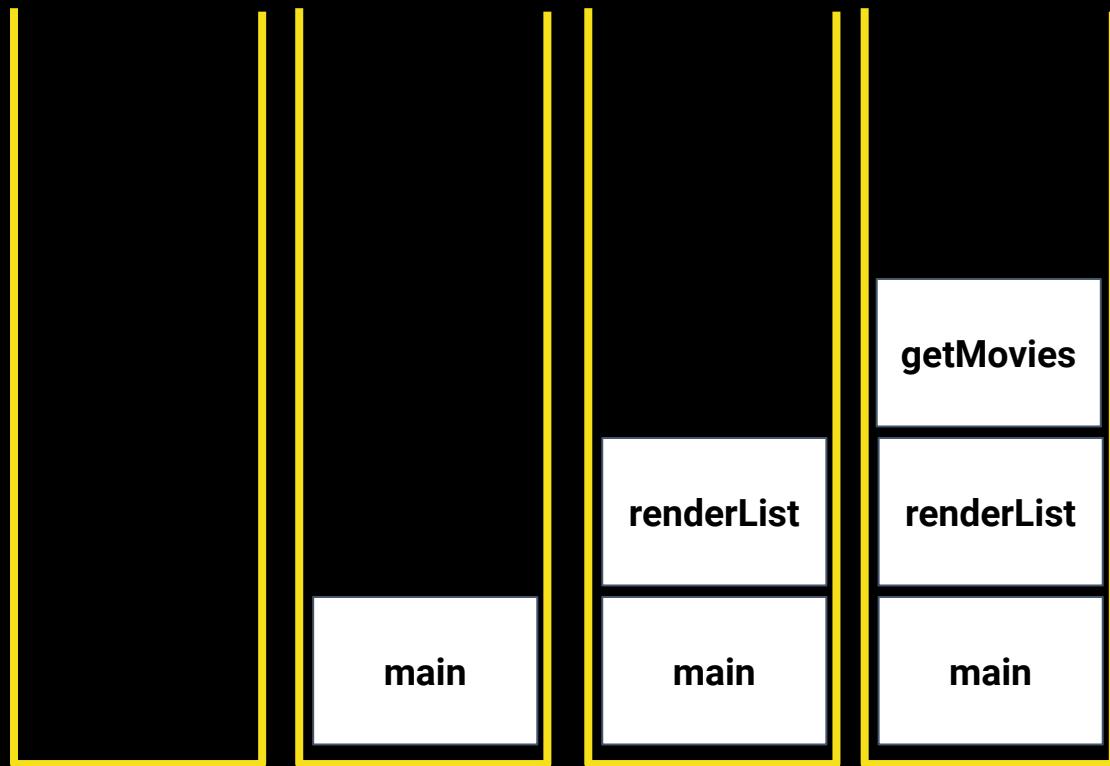
Push





Stack

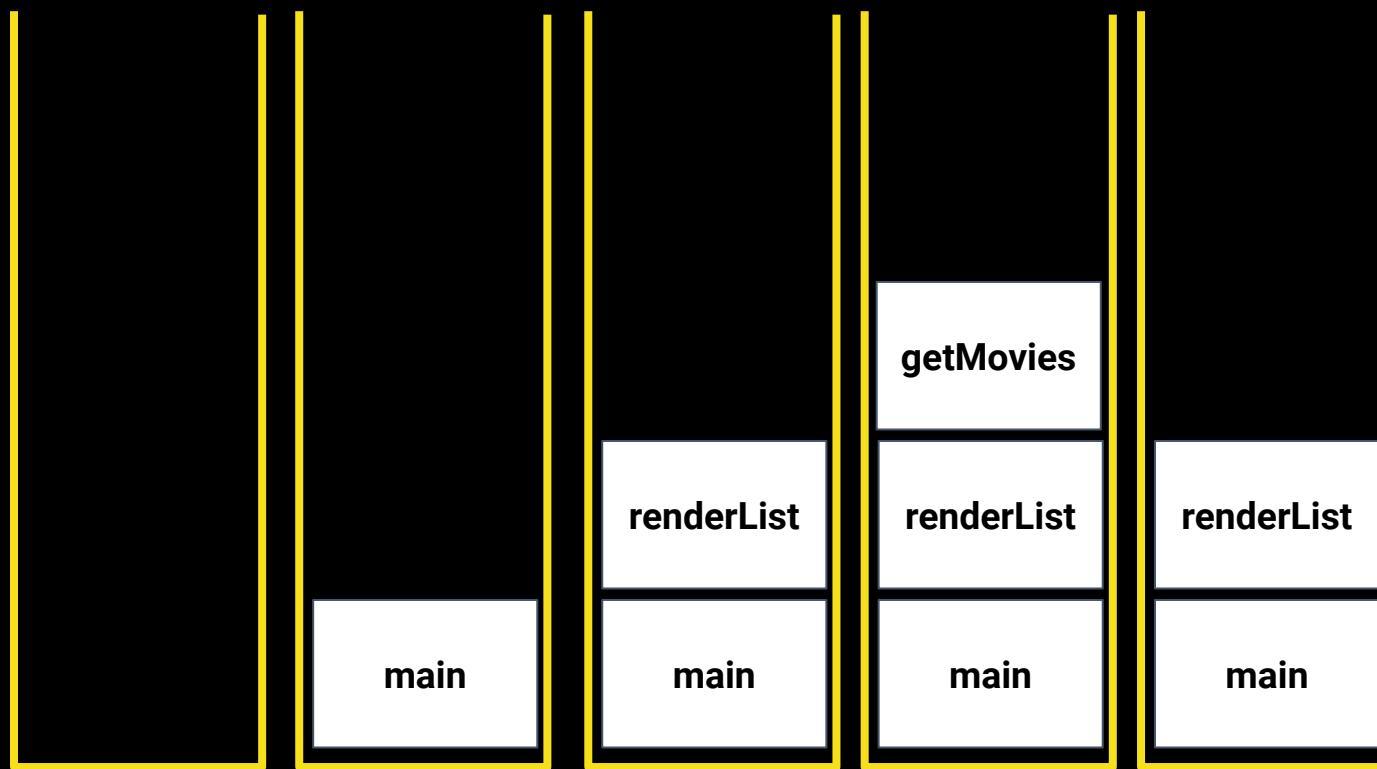
Push





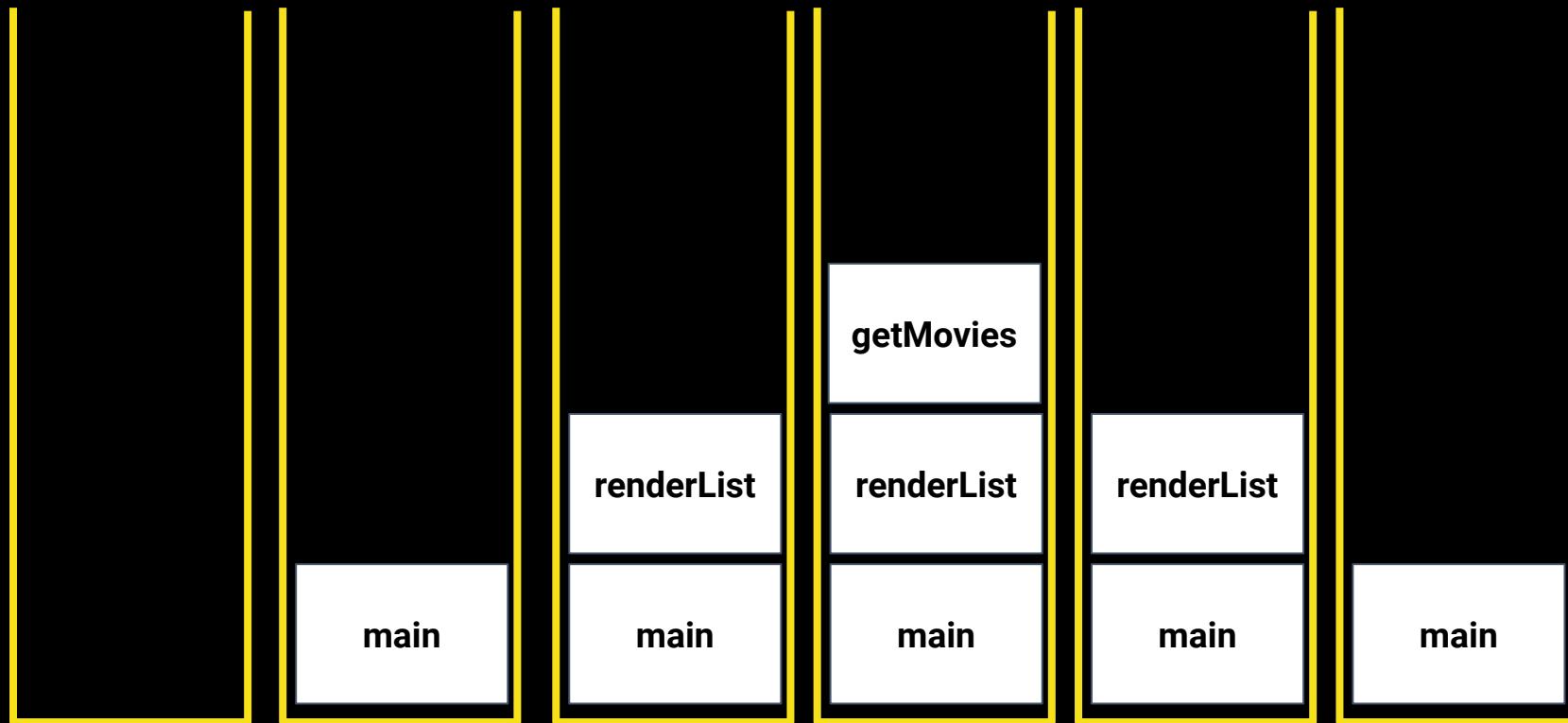
Stack

Pop



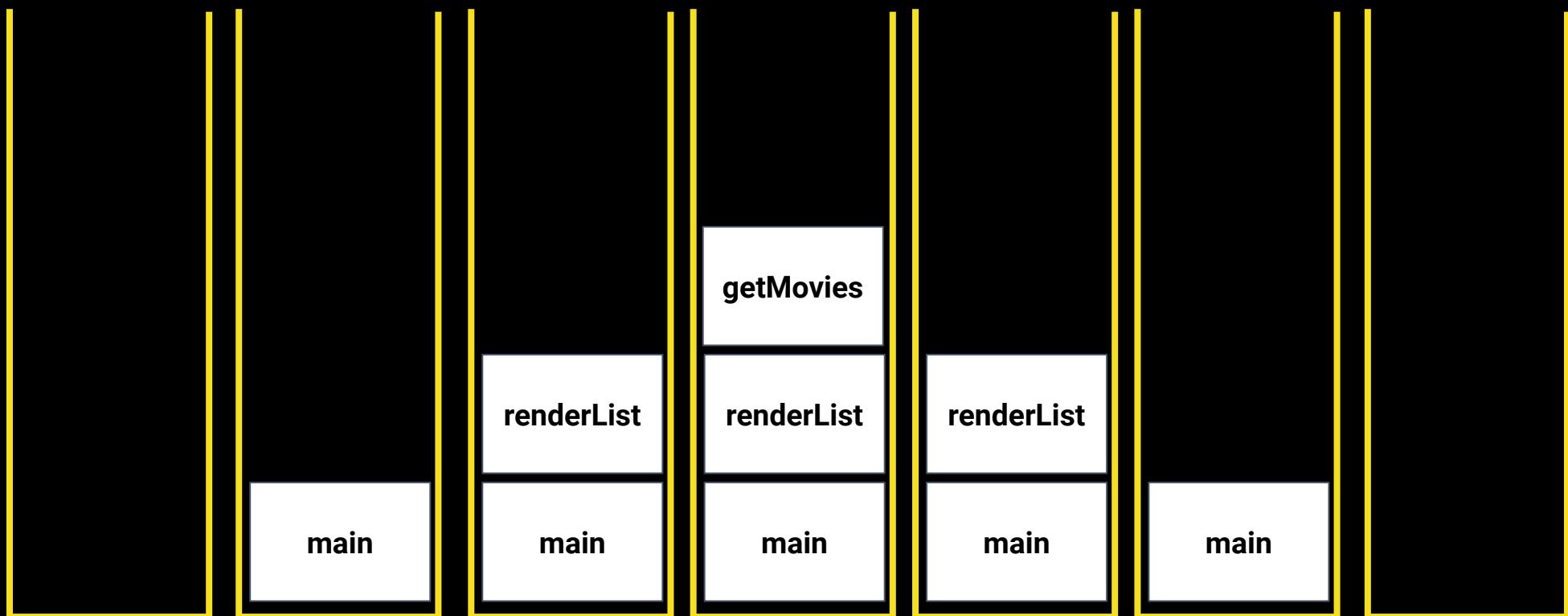
Stack

Pop



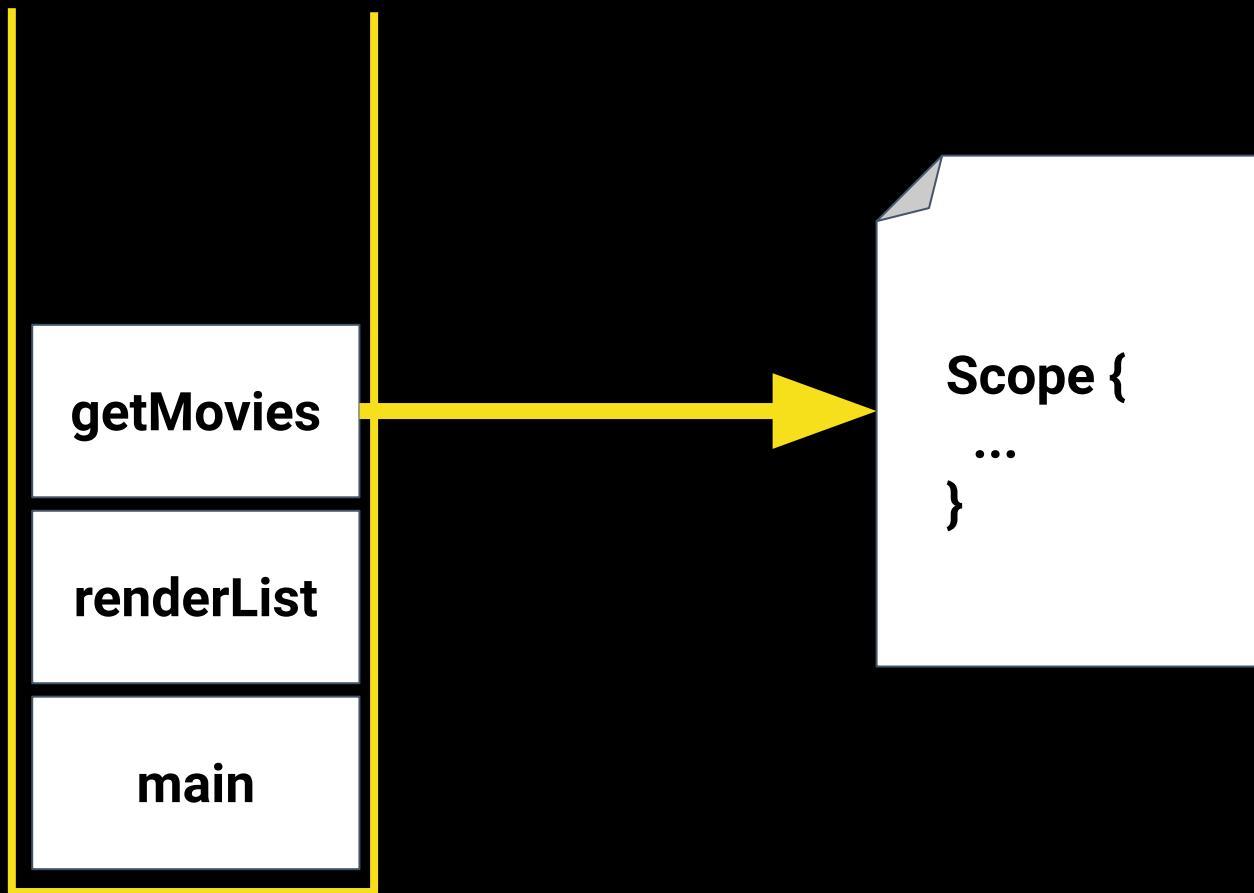
Stack

Pop

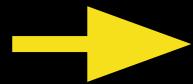




Stack



Programa



```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```

(anonymous)

Programa

```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
function main() {  
    hello();  
    world();  
}  
main();
```

(anonymous)

Programa

```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```



(anonymous)

Programa

```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```

(anonymous)

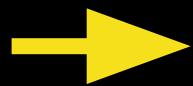
Programa

```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```

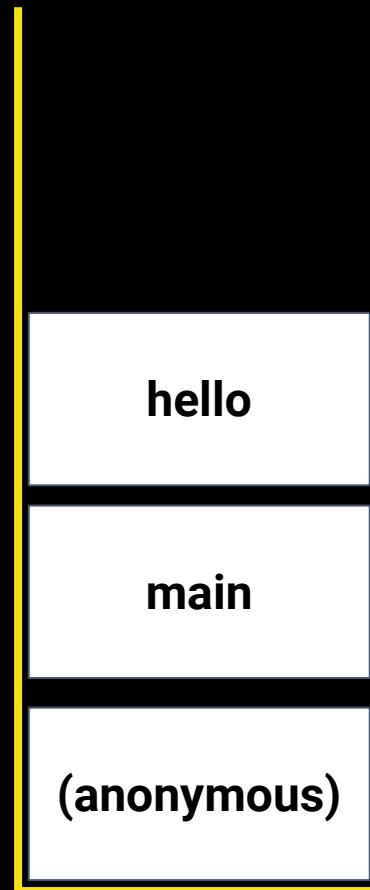


```
main  
-----  
(anonymous)
```

Programa

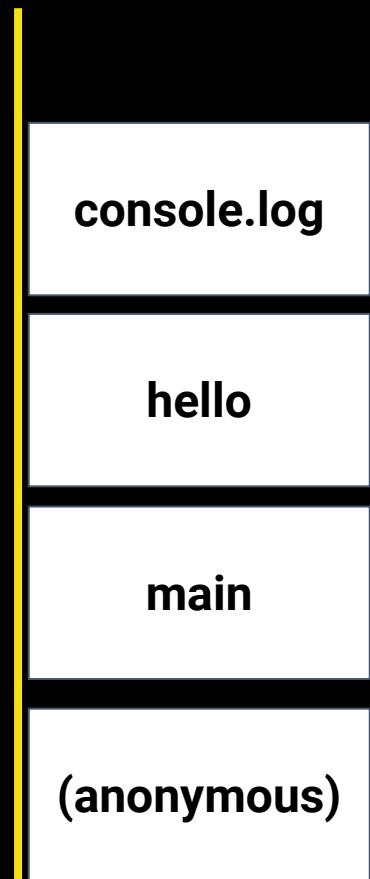


```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```



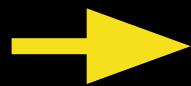
Programa

```
function hello () {  
    console.log("Hello")  
}  
function world() {  
    console.log("World")  
}  
function main() {  
    hello();  
    world();  
}  
main();
```



```
console.log  
hello  
main  
(anonymous)
```

Programa

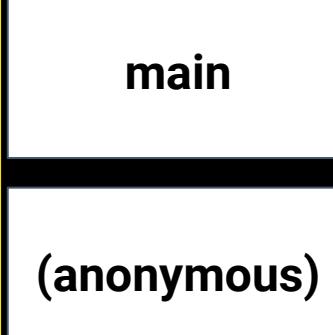


```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```



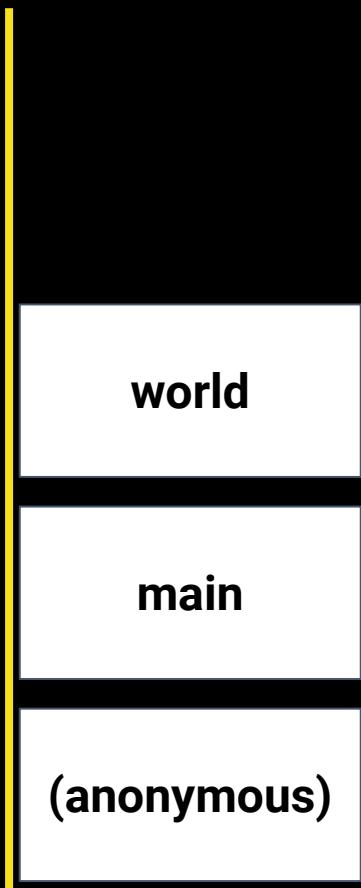
Programa

```
function hello () {  
    console.log("Hello")  
}  
  
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    console.log("World")  
}  
  
function main() {  
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    world();  
}  
  
main();
```



Programa

```
function hello () {  
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}  
  
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    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```



Programa

```
function hello () {  
    console.log("Hello")  
}  
  
function world() {  
    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```

console.log

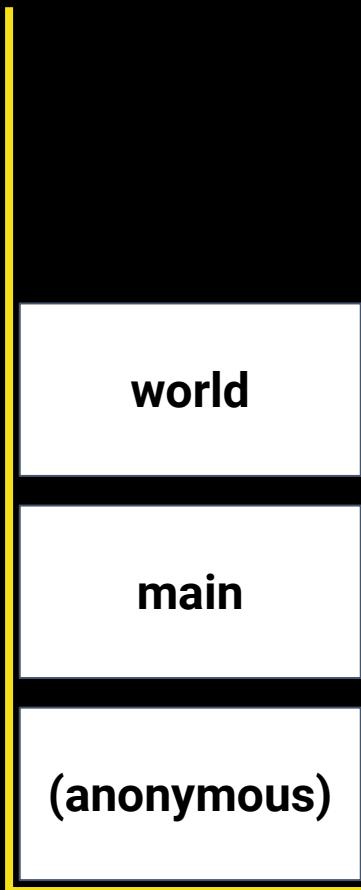
world

main

(anonymous)

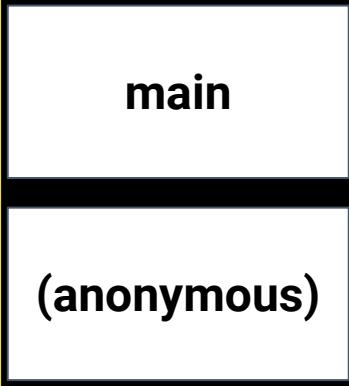
Programa

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function main() {  
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    world();  
}  
  
main();
```



Programa

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}  
  
main();
```



Programa

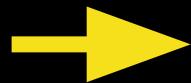
```
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    console.log("World")  
}  
  
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```

(anonymous)

Programa

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}  
  
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    console.log("World")  
}  
  
function main() {  
    hello();  
    world();  
}  
  
main();
```

Programa Asíncrono



```
function asyncHelloWorld () {  
    setTimeout(() => {  
        console.log("hello")  
    }, 1000);  
    console.log("world!");  
}
```

```
asyncHelloWorld();
```

(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
    setTimeout(() => {  
        console.log("hello")  
    }, 1000);  
    console.log("world!");  
}
```

```
→ asyncHelloWorld();
```

(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
  → setTimeout(() => {  
    console.log("hello")  
  }, 1000);  
  console.log("world!");  
}  
  
asyncHelloWorld();
```

setTimeout

asyncHelloWorld

(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
  setTimeout(() => {  
    console.log("hello")  
  }, 1000);  
  console.log("world!");  
}
```

```
asyncHelloWorld();
```

console.log

asyncHelloWorld

(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
    setTimeout(() => {  
        console.log("hello")  
    }, 1000);  
    console.log("world!");  
}
```

```
→ asyncHelloWorld();
```

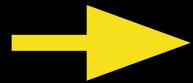
(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
    setTimeout(() => {  
        console.log("hello")  
    }, 1000);  
    console.log("world!");  
}  
  
asyncHelloWorld();
```

Programa Asíncrono

```
function asyncHelloWorld () {  
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(anonymous)

Programa Asíncrono

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    setTimeout(() => {  
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}
```

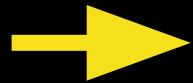
```
asyncHelloWorld();
```

console.log

(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
    setTimeout(() => {  
        console.log("hello")  
    }, 1000);  
    console.log("world!");  
}  
  
asyncHelloWorld();
```

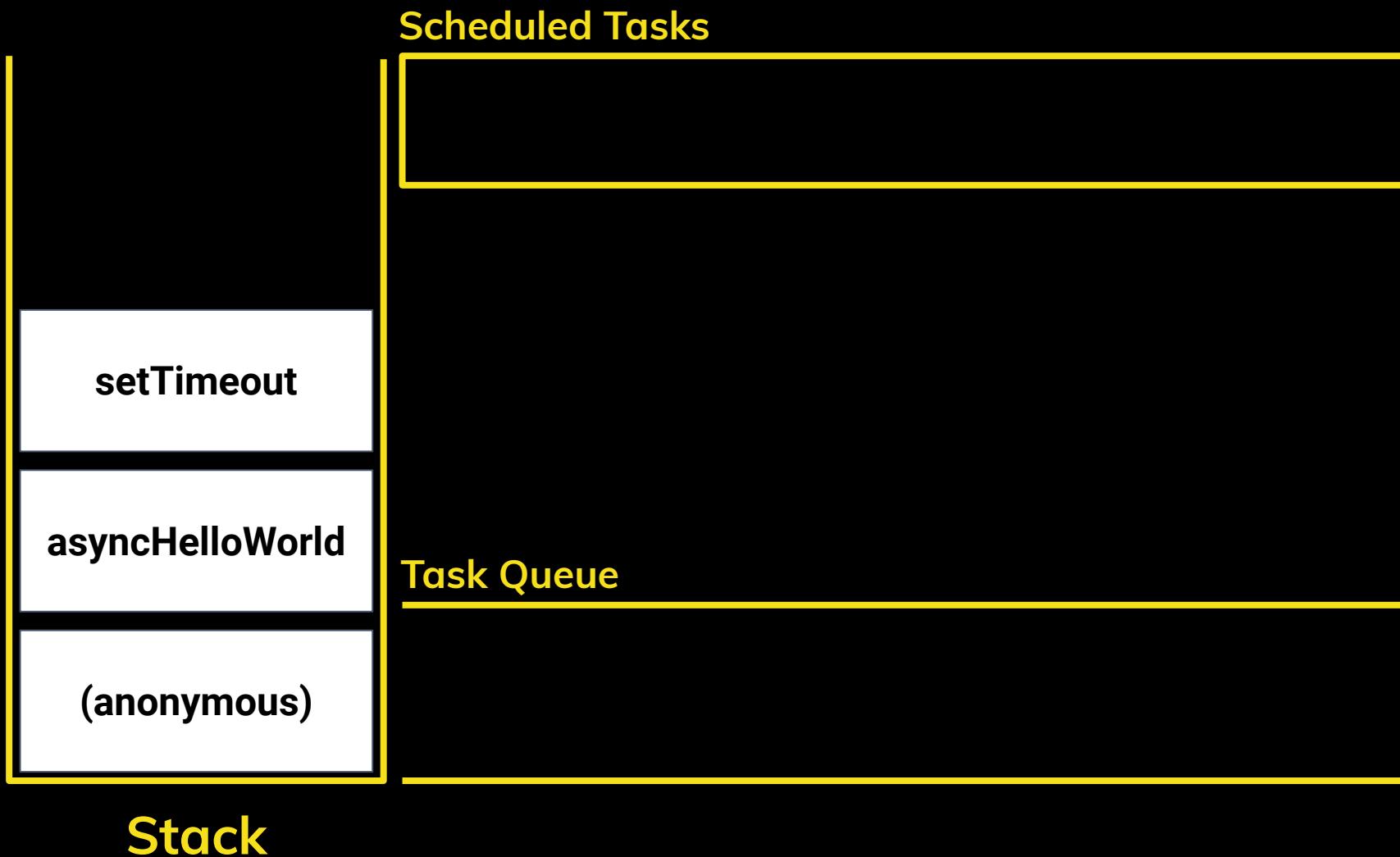


(anonymous)

Programa Asíncrono

```
function asyncHelloWorld () {  
    setTimeout(() => {  
        console.log("hello")  
    }, 1000);  
    console.log("world!");  
}  
  
asyncHelloWorld();
```

Task Queue



Queue

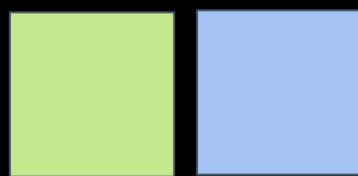
Queue

Queue



Queue

Queue



Queue

Queue



Queue

Queue



Queue

Queue

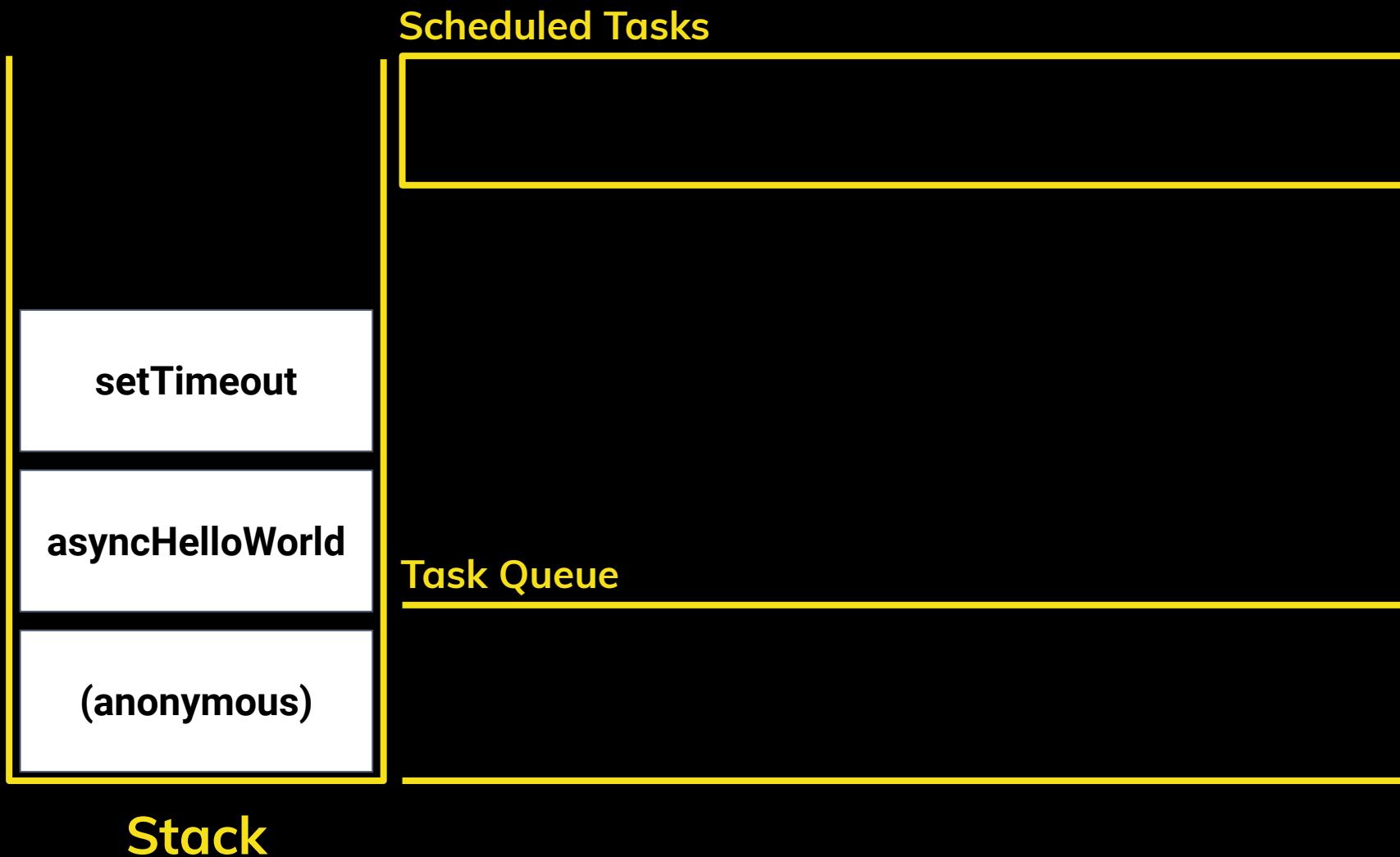


Queue

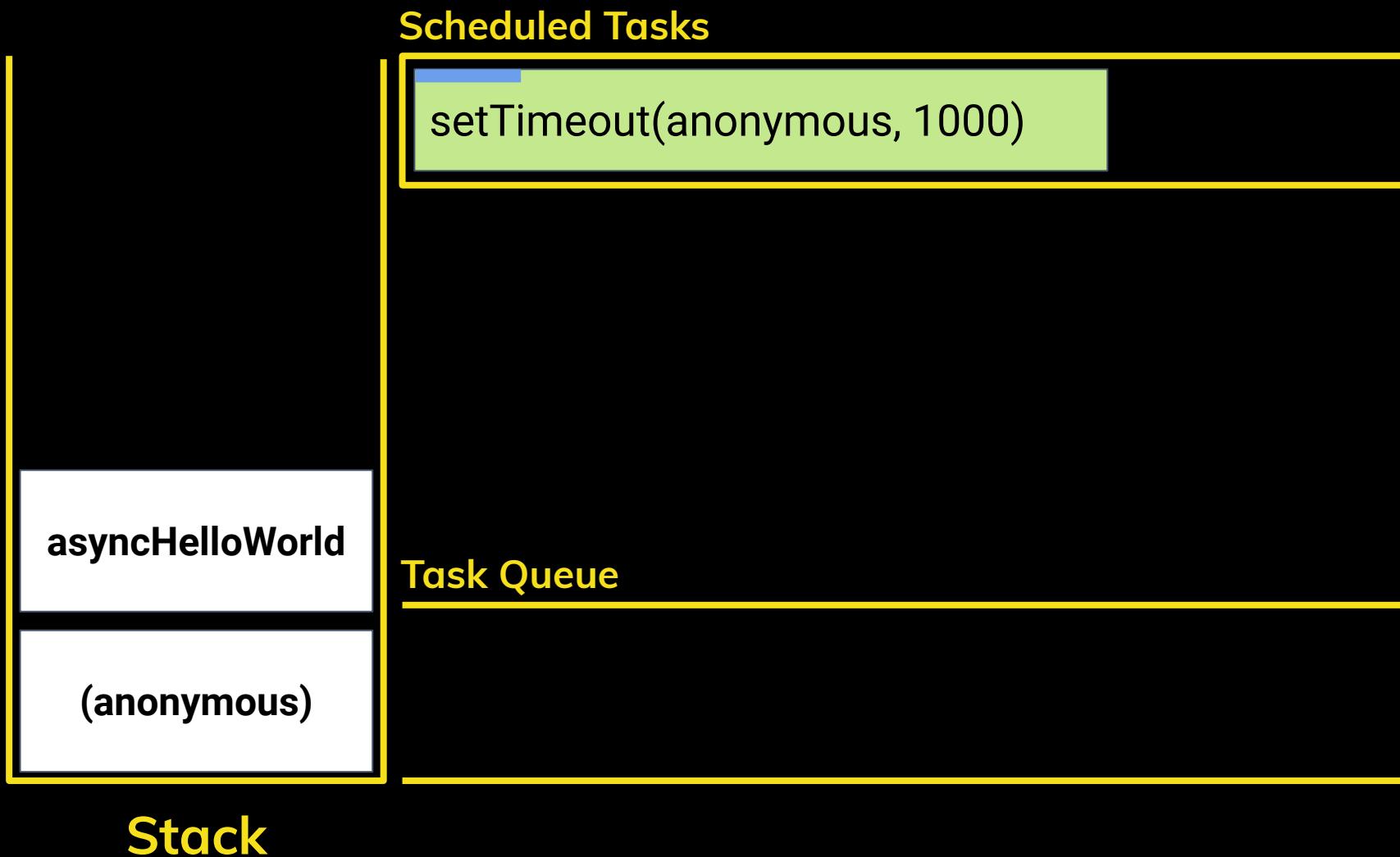
Queue

Queue

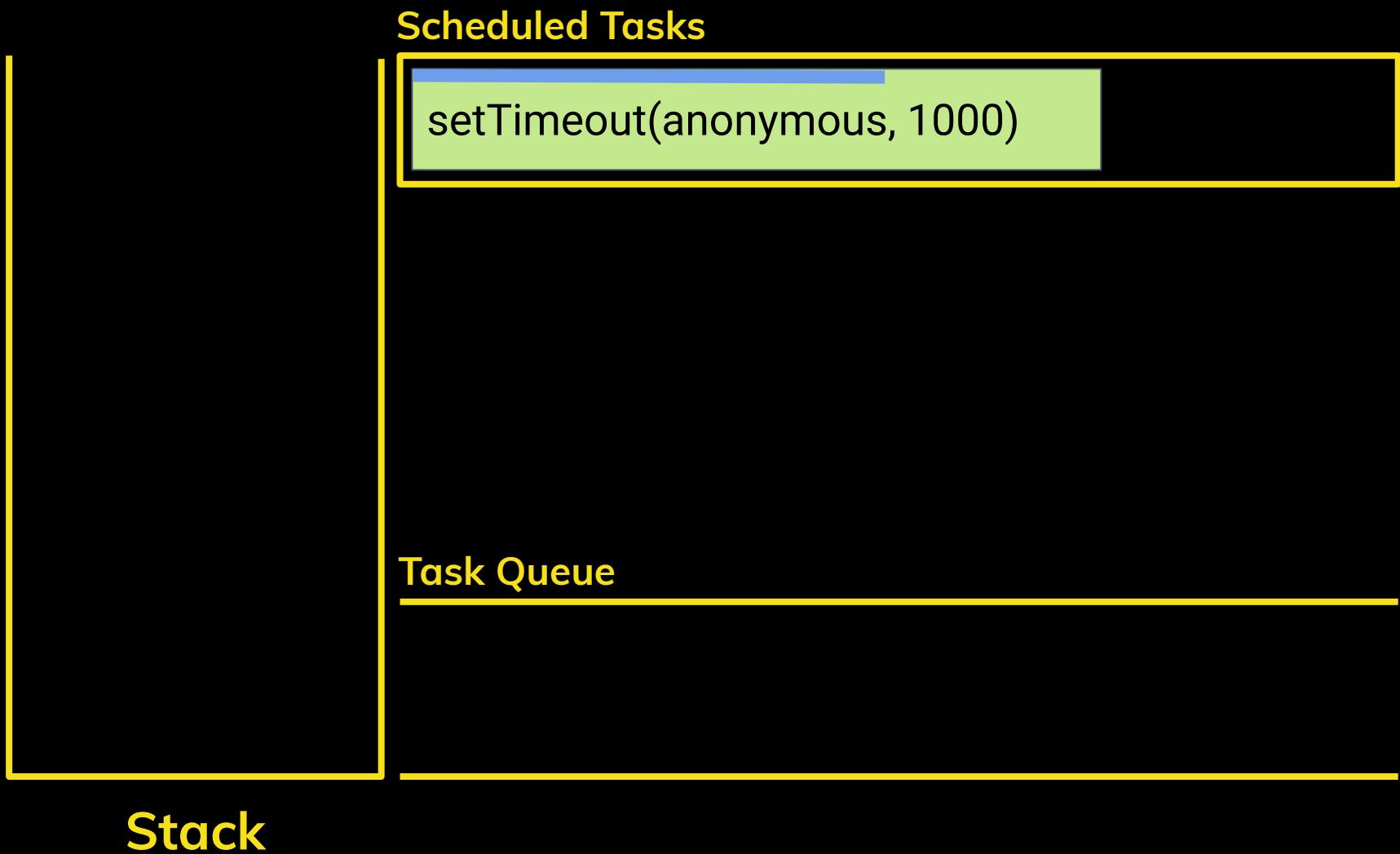
Task Queue



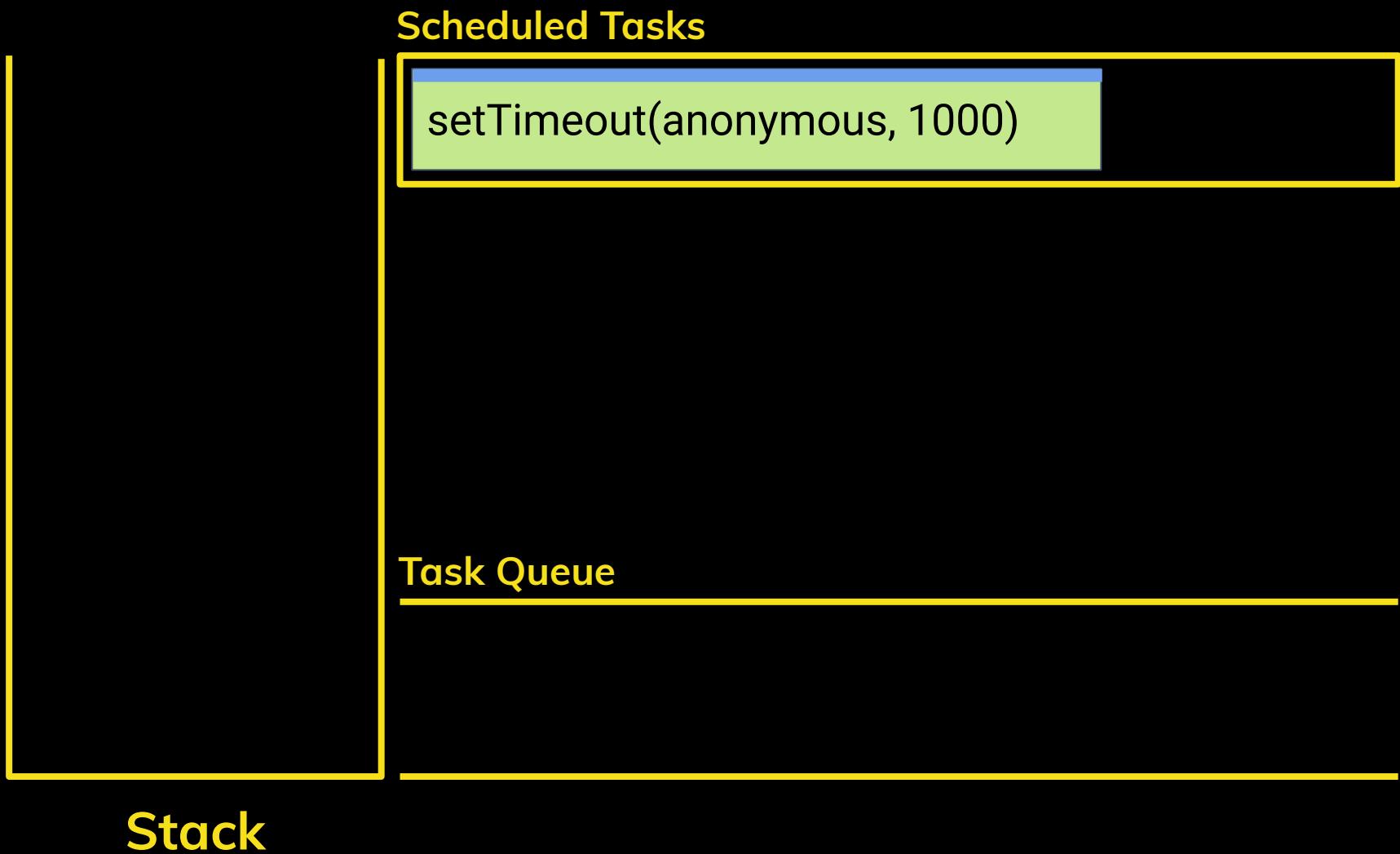
Task Queue



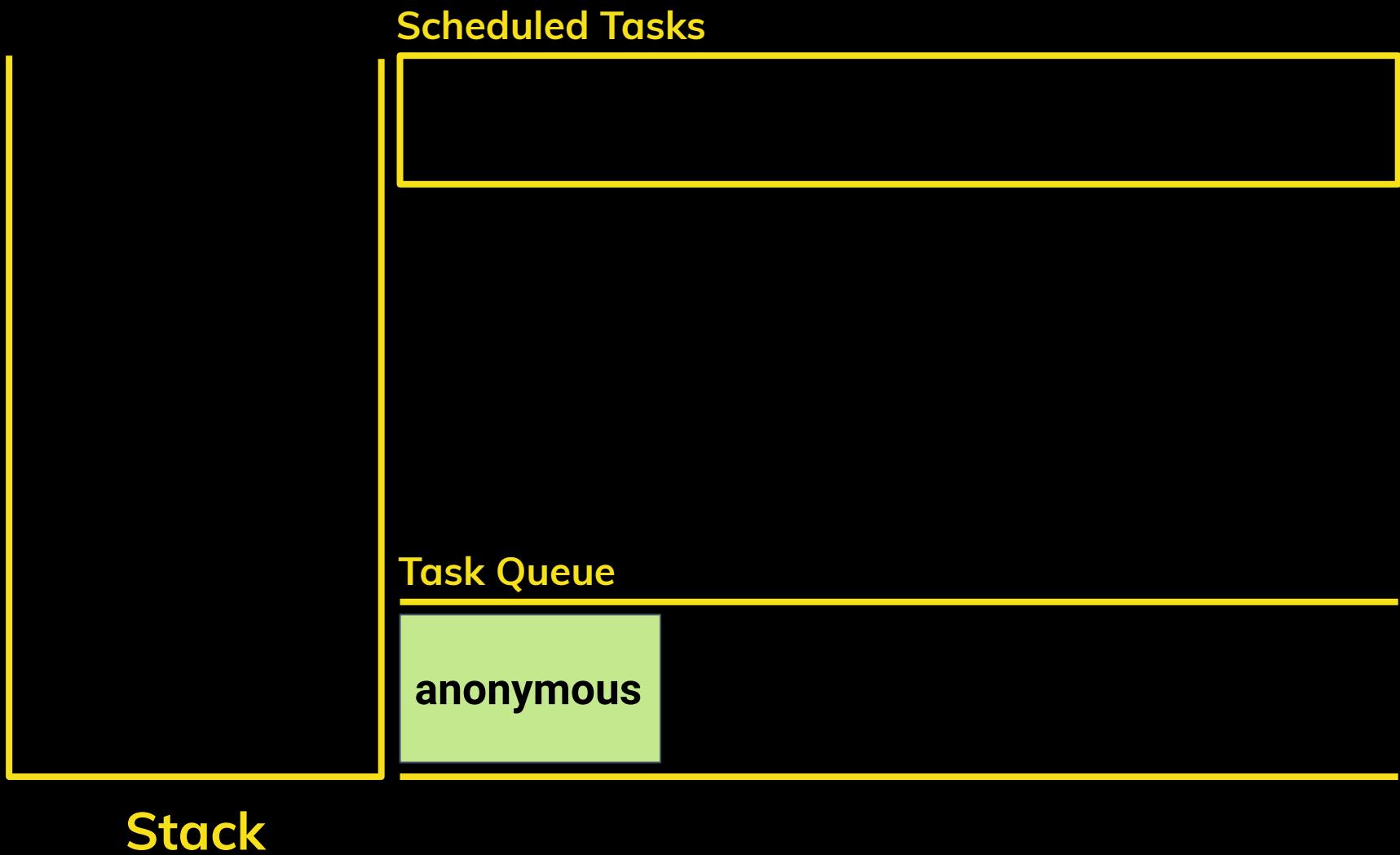
Task Queue



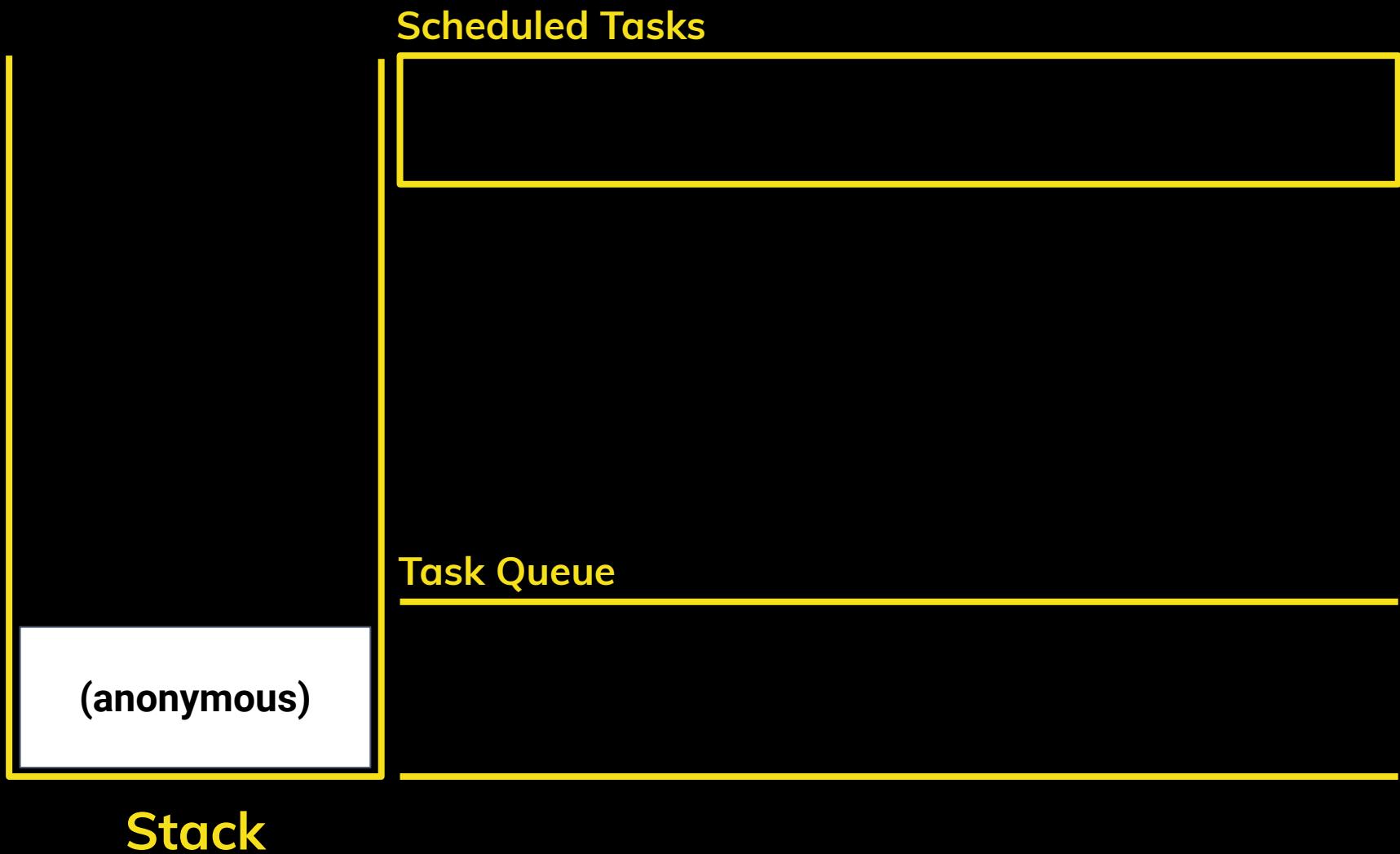
Task Queue



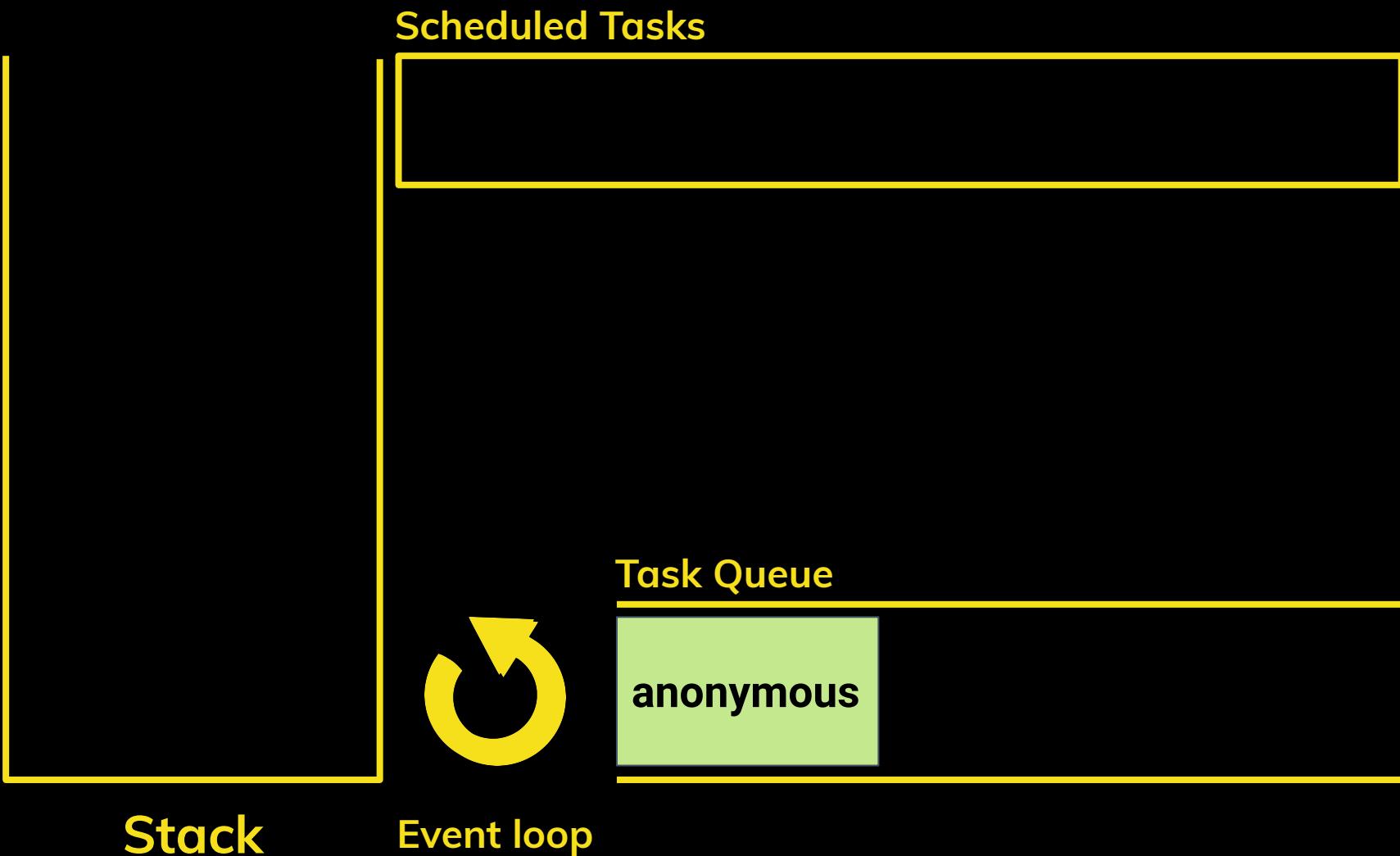
Task Queue



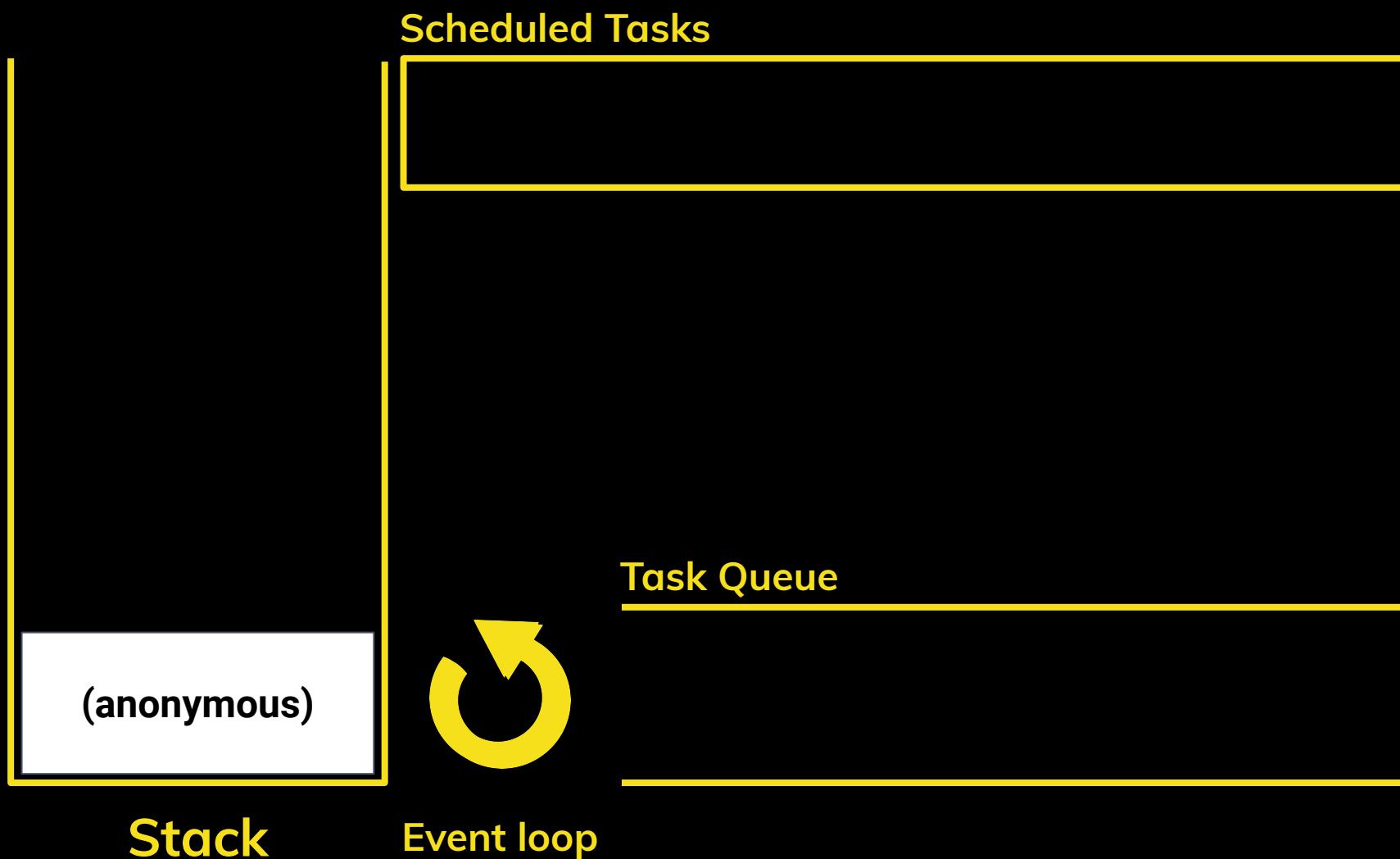
Task Queue



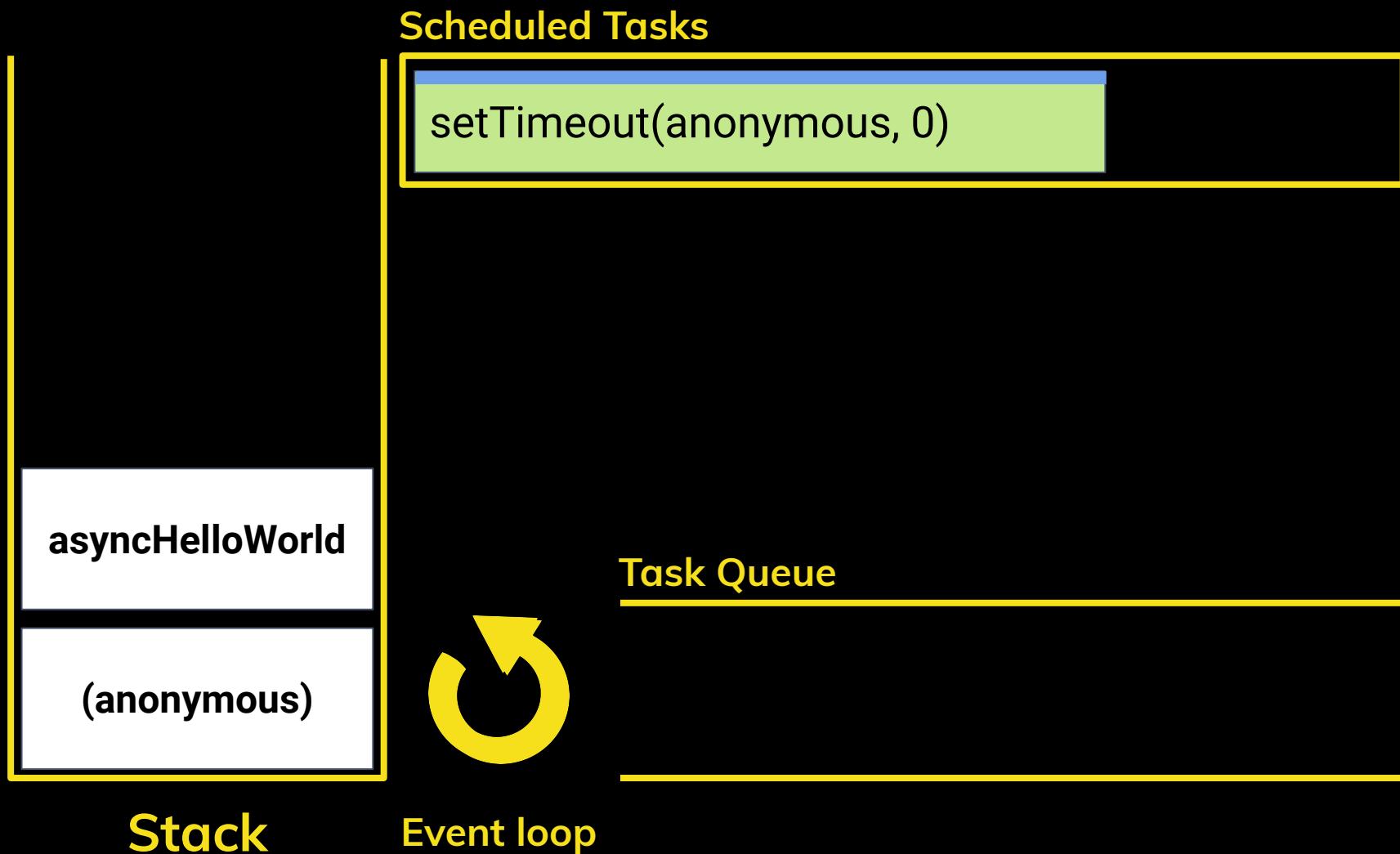
Event loop



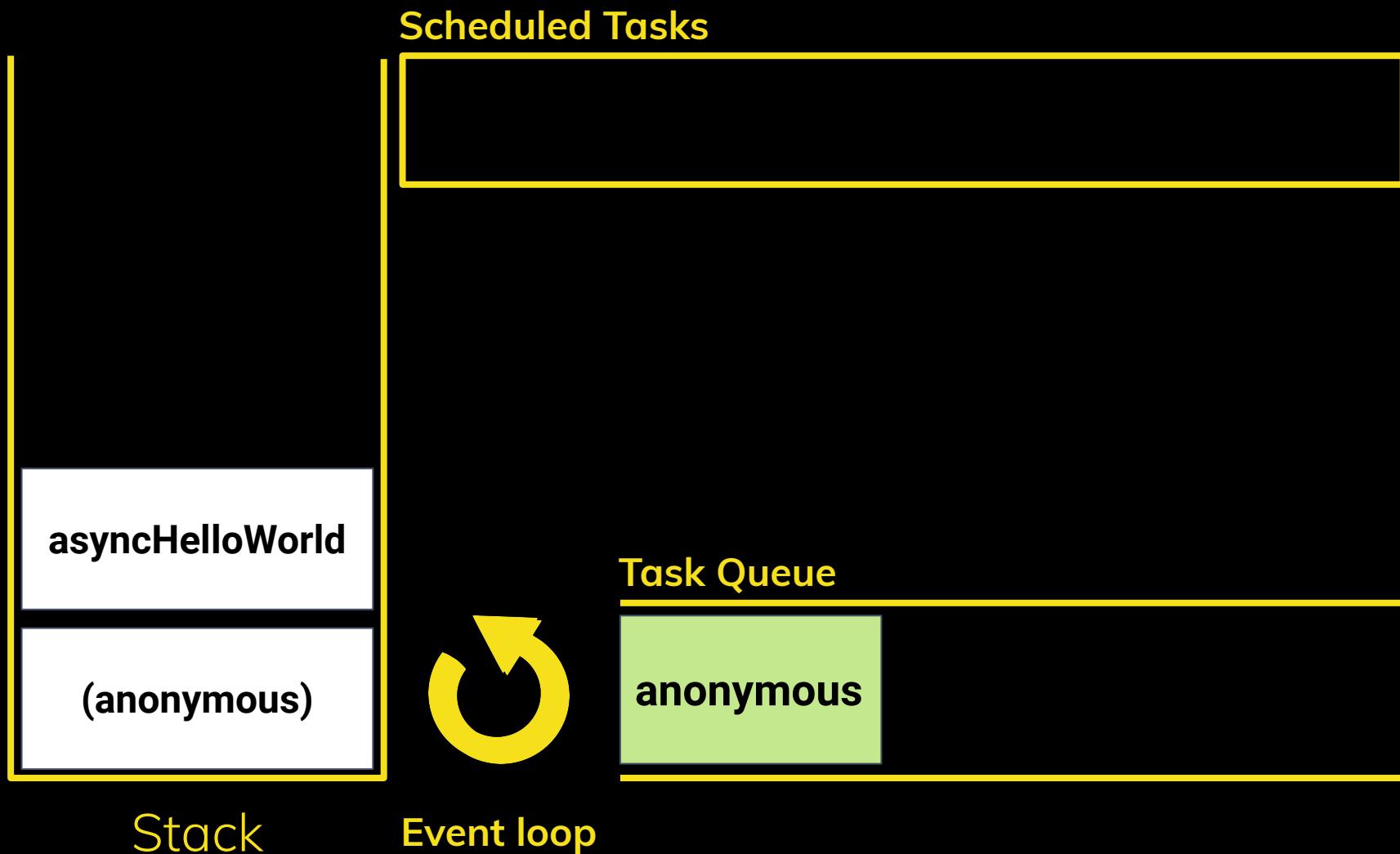
Event loop



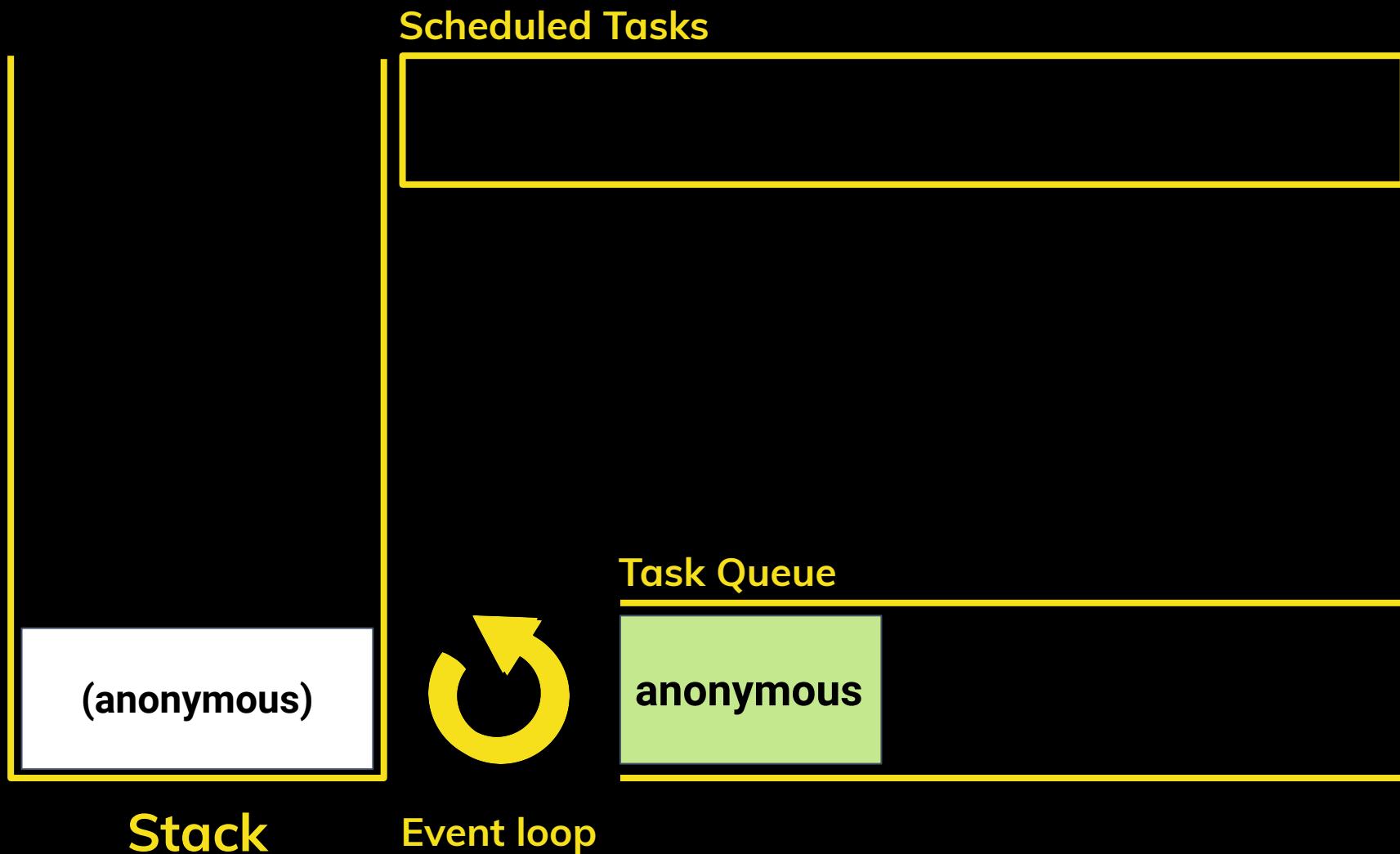
Event loop (ii)



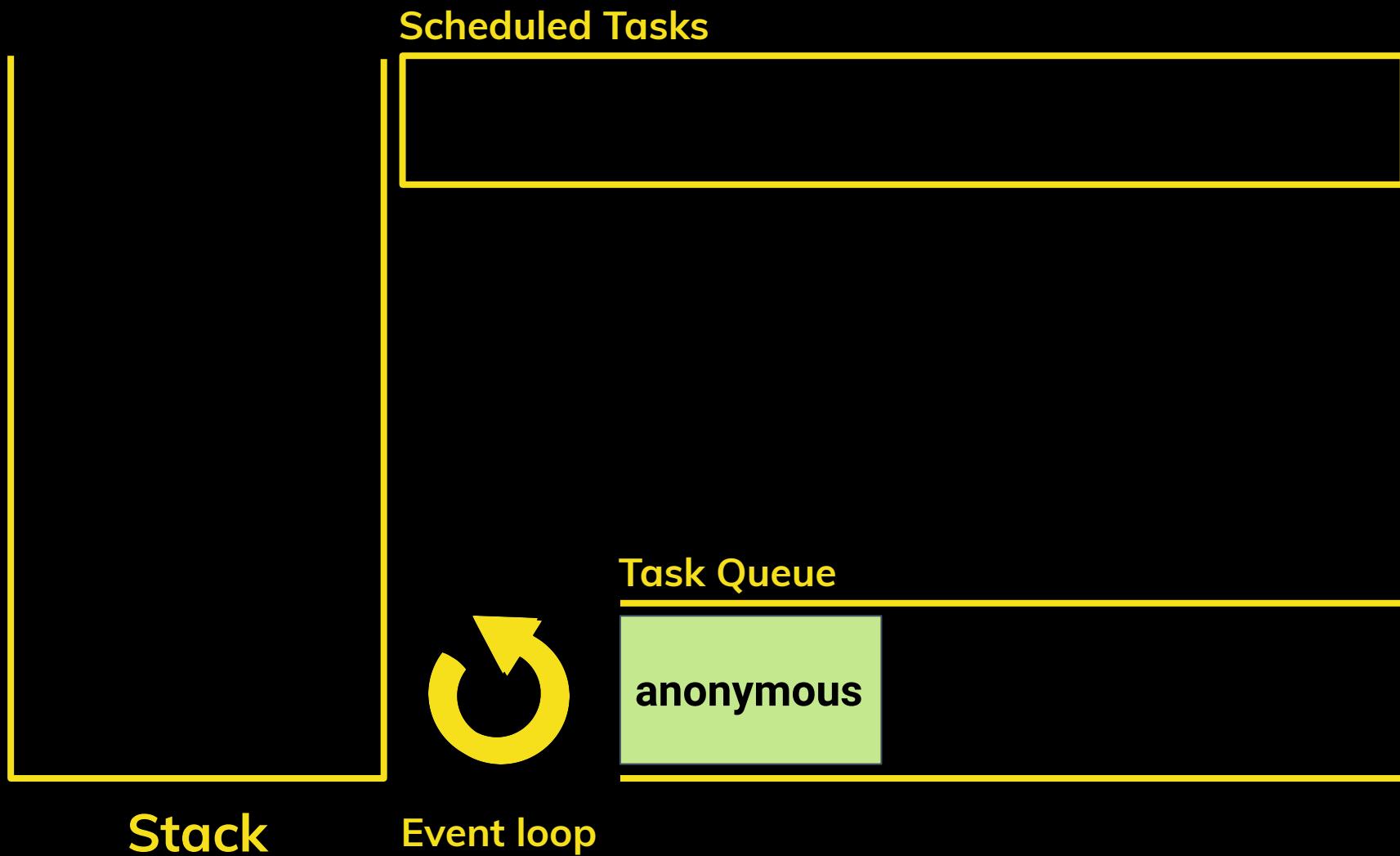
Event loop (ii)



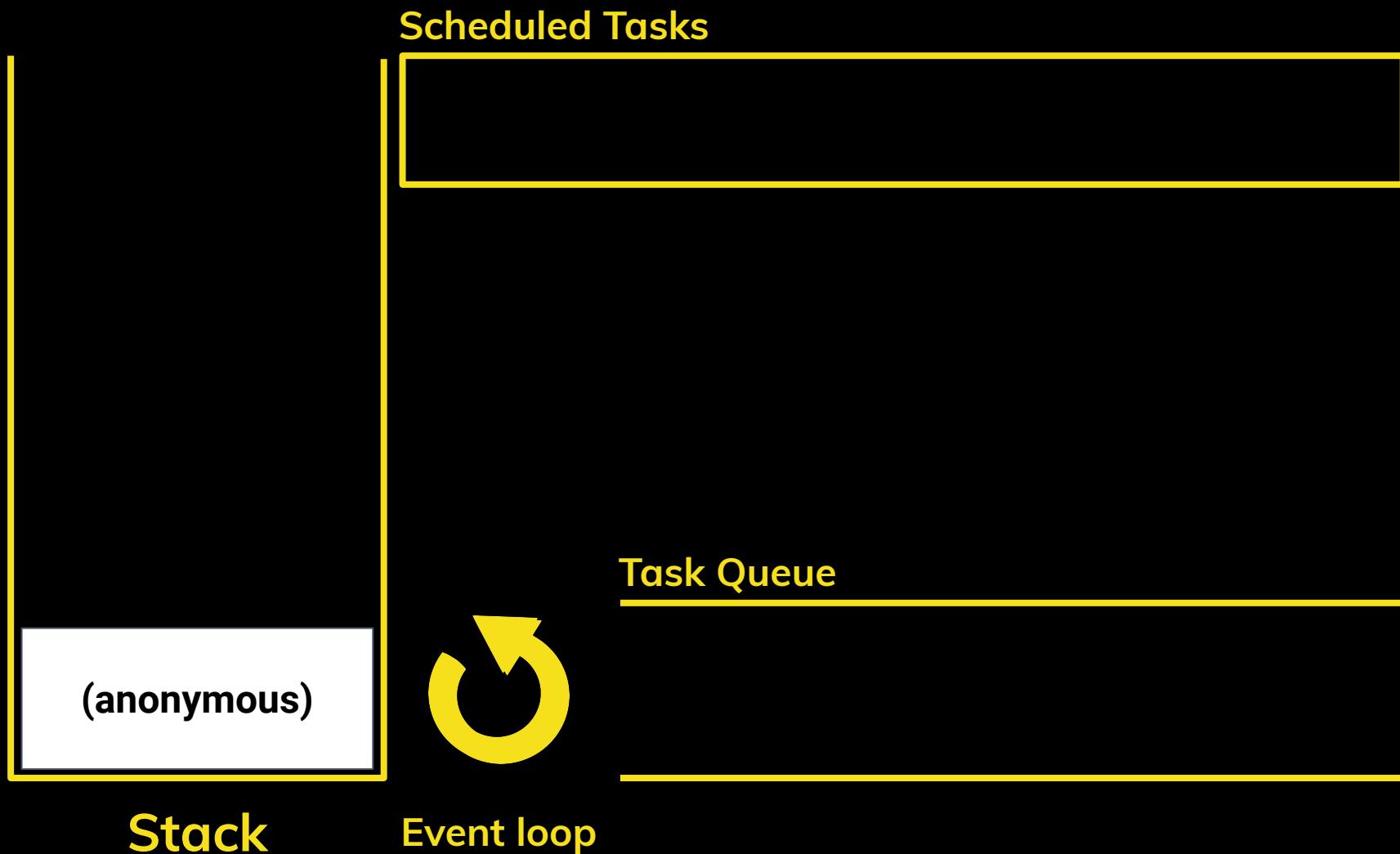
Event loop (ii)



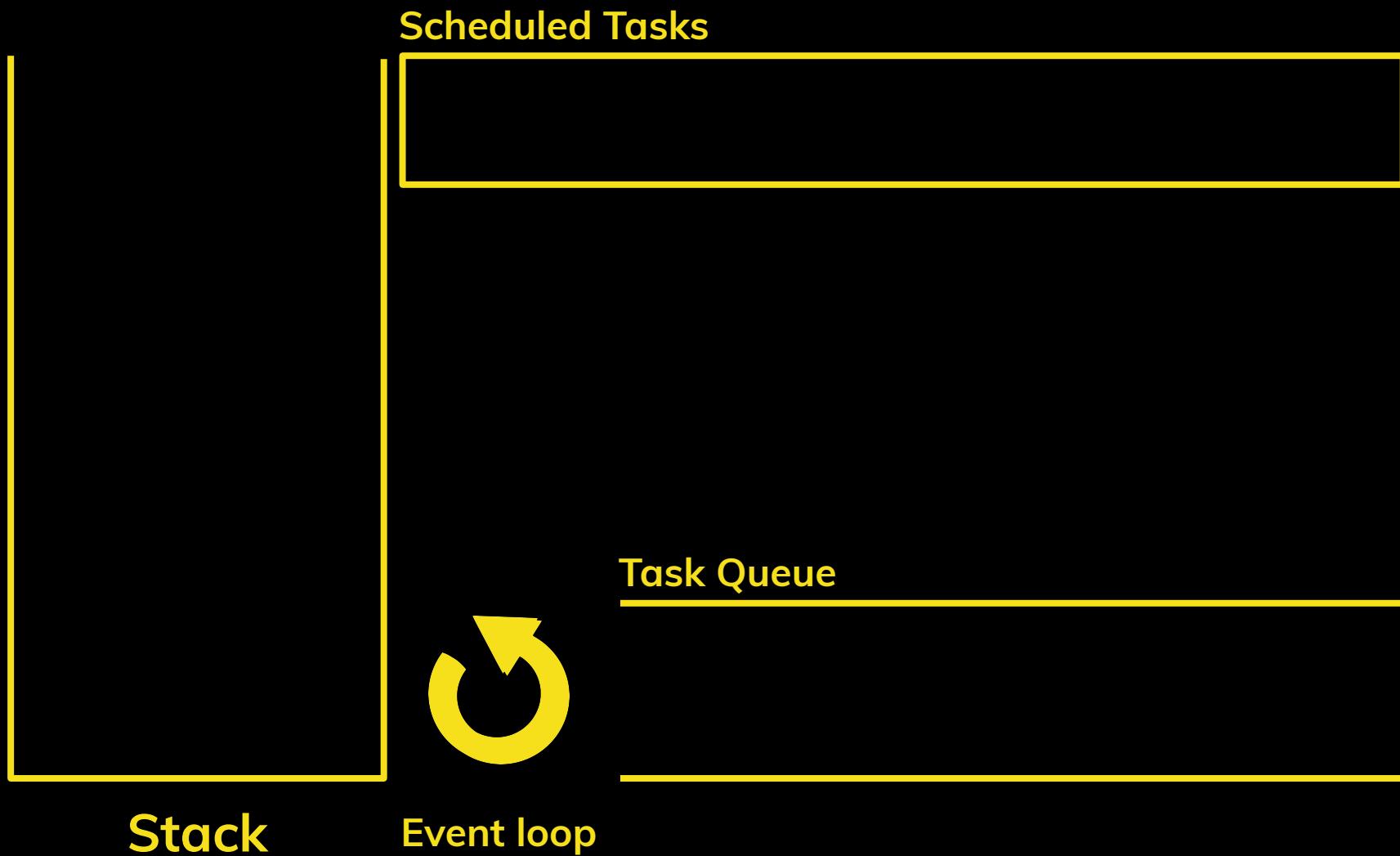
Event loop (ii)



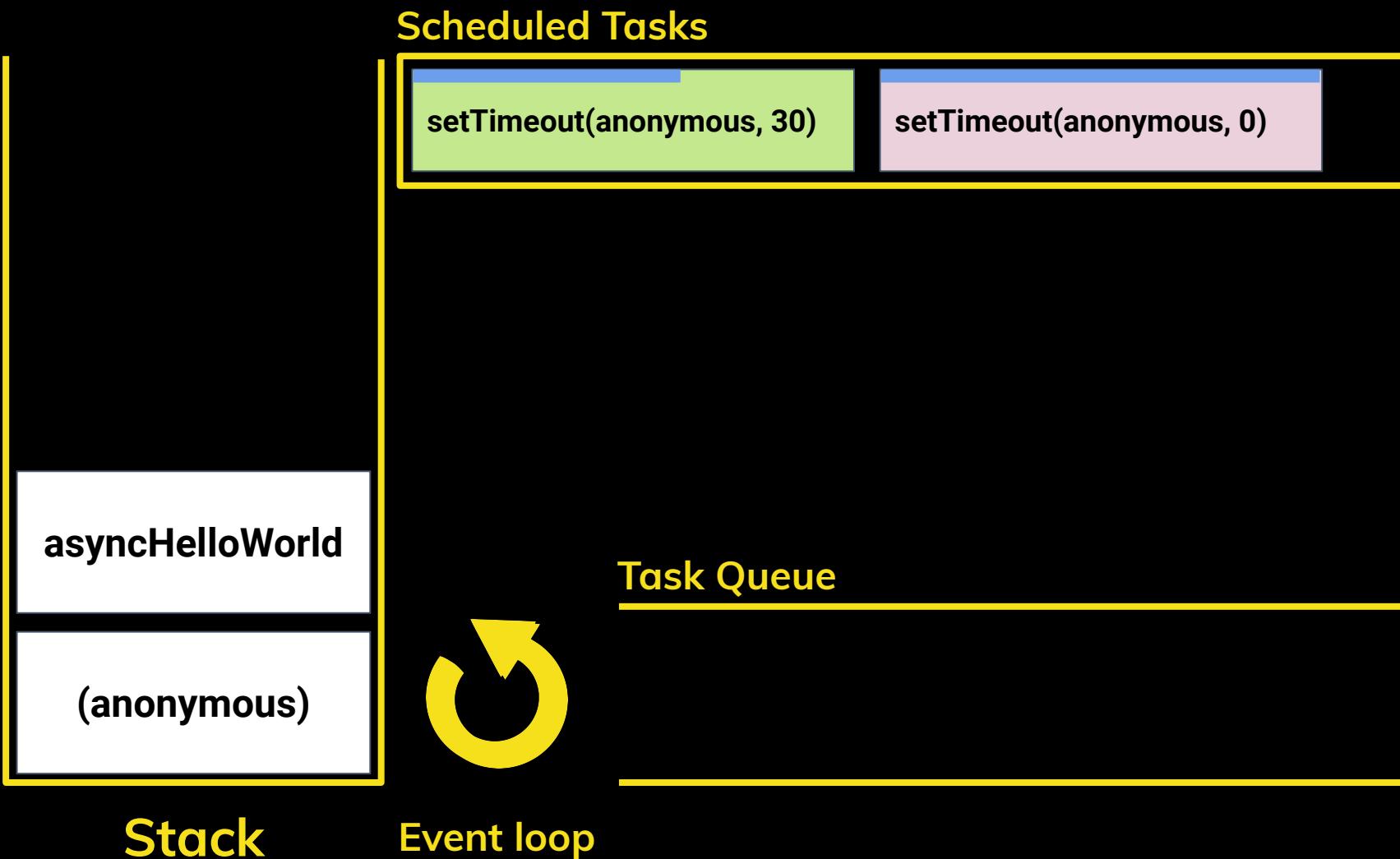
Event loop (ii)



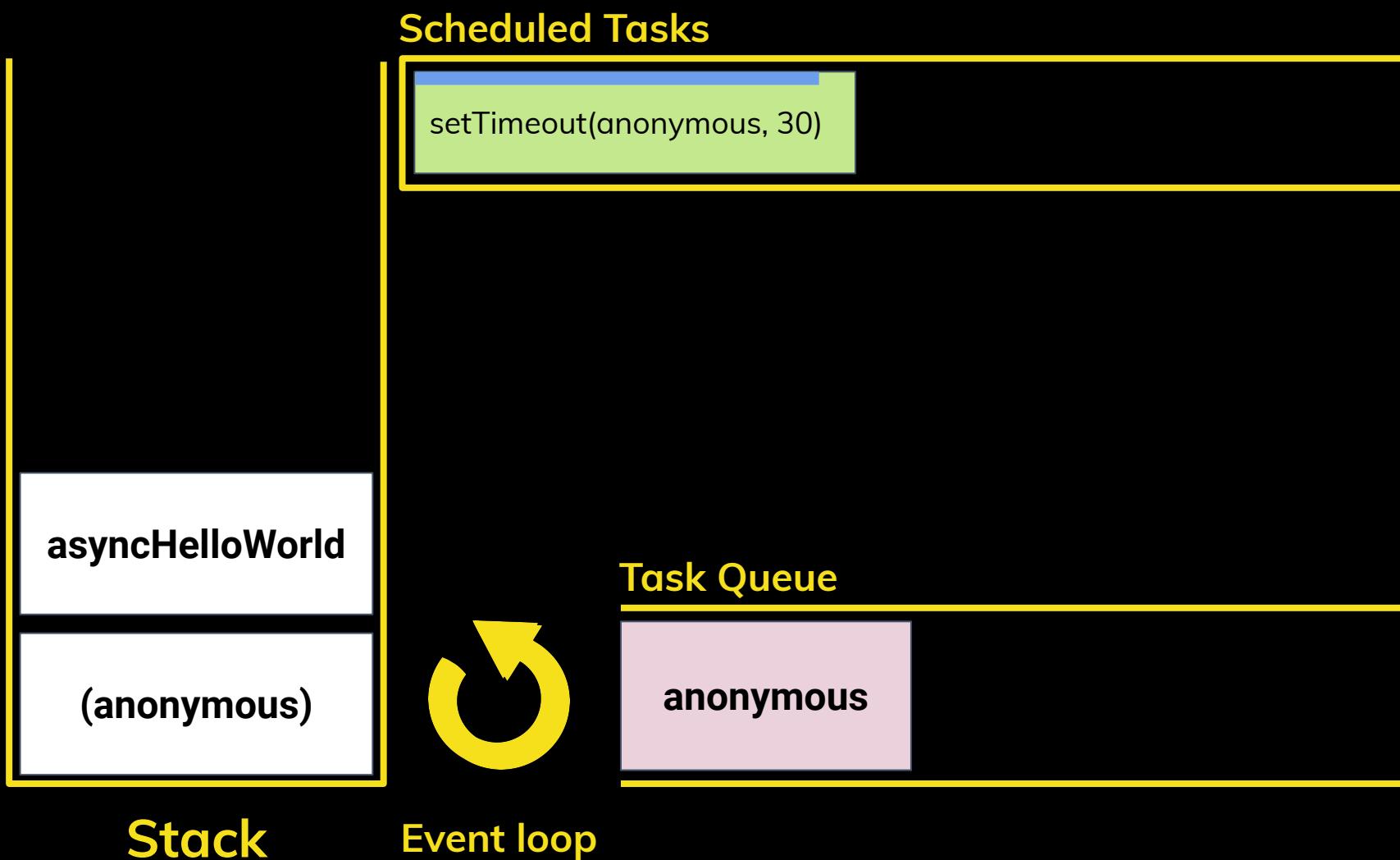
Event loop (ii)



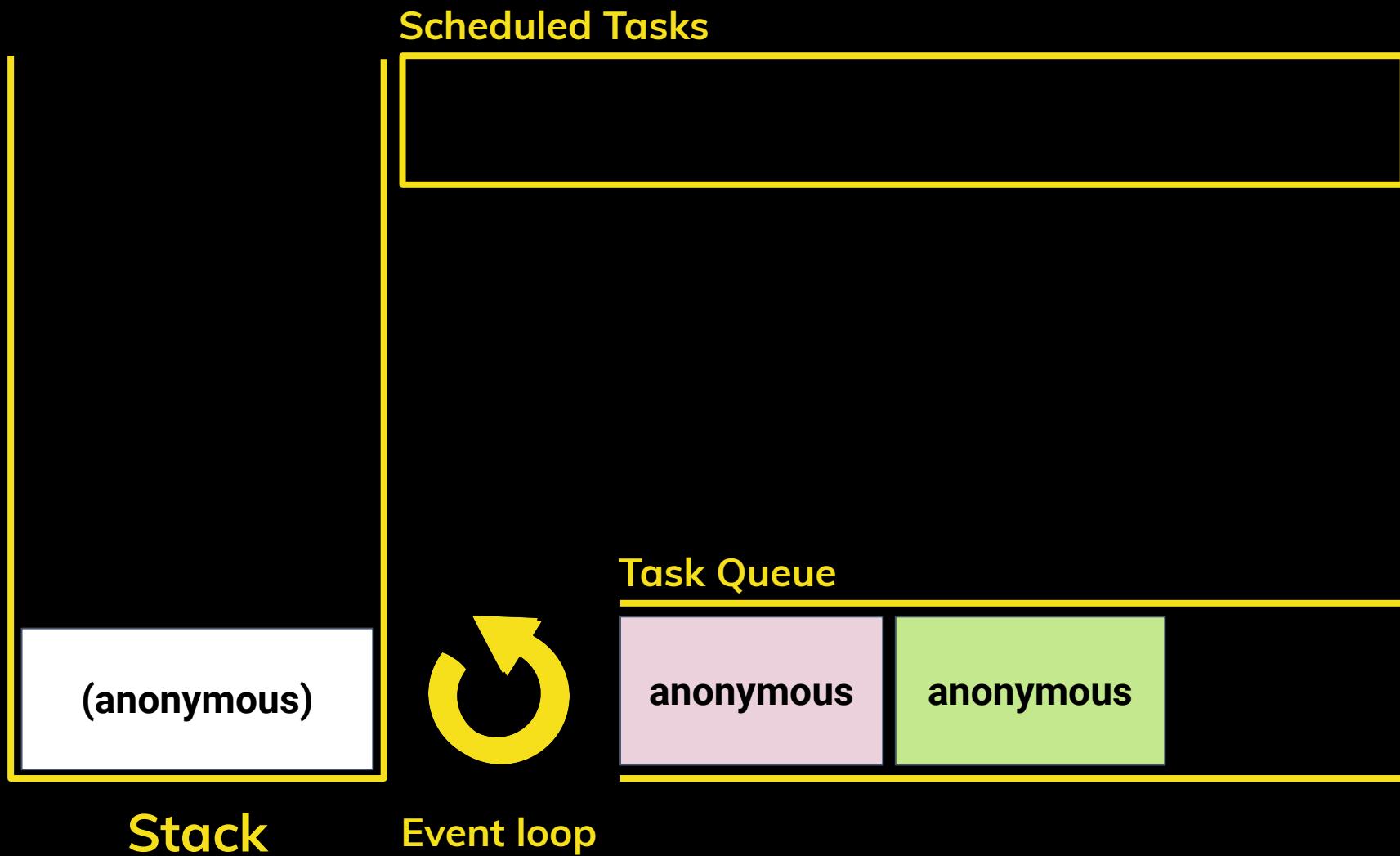
Event loop (iii)



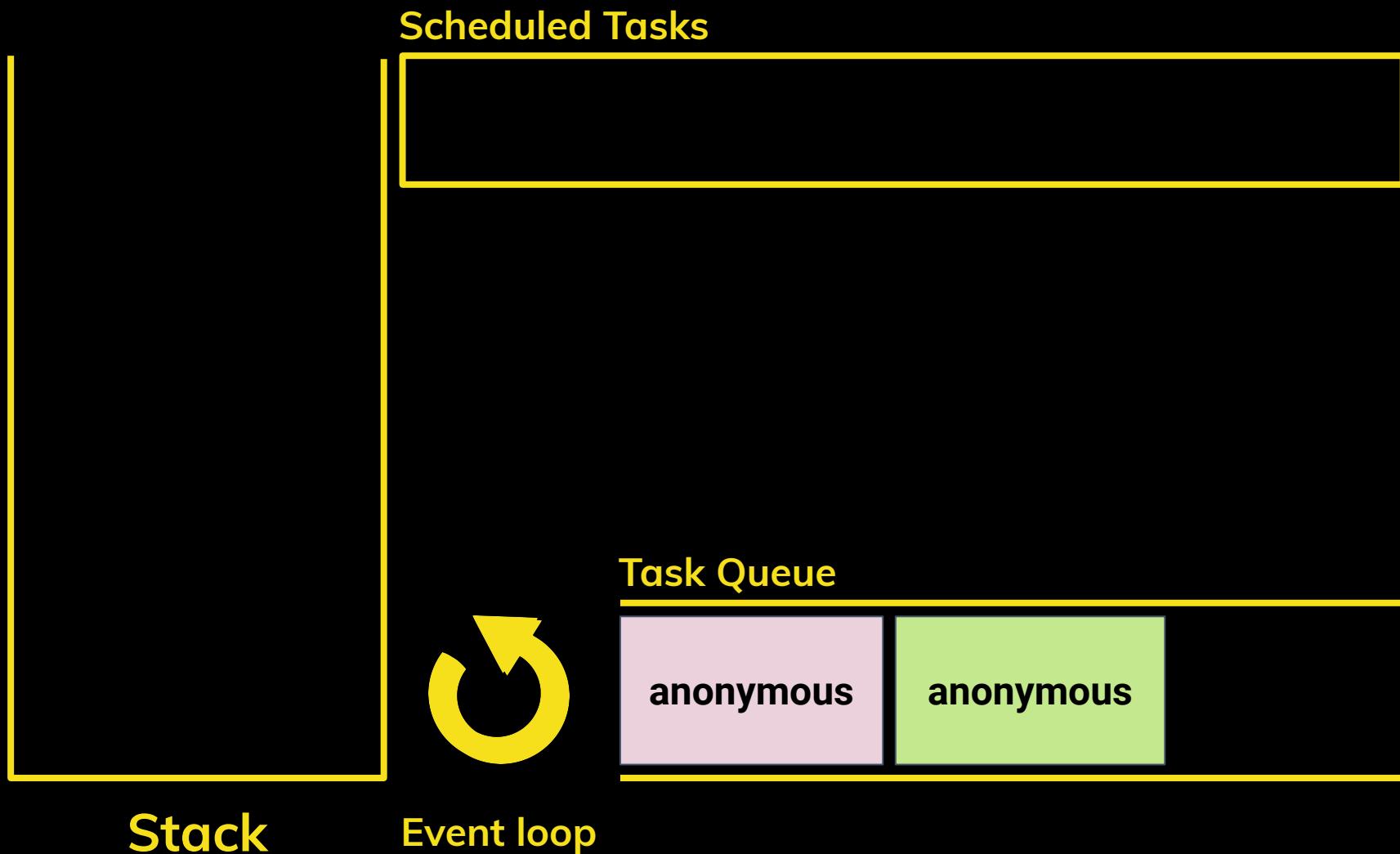
Event loop (iii)



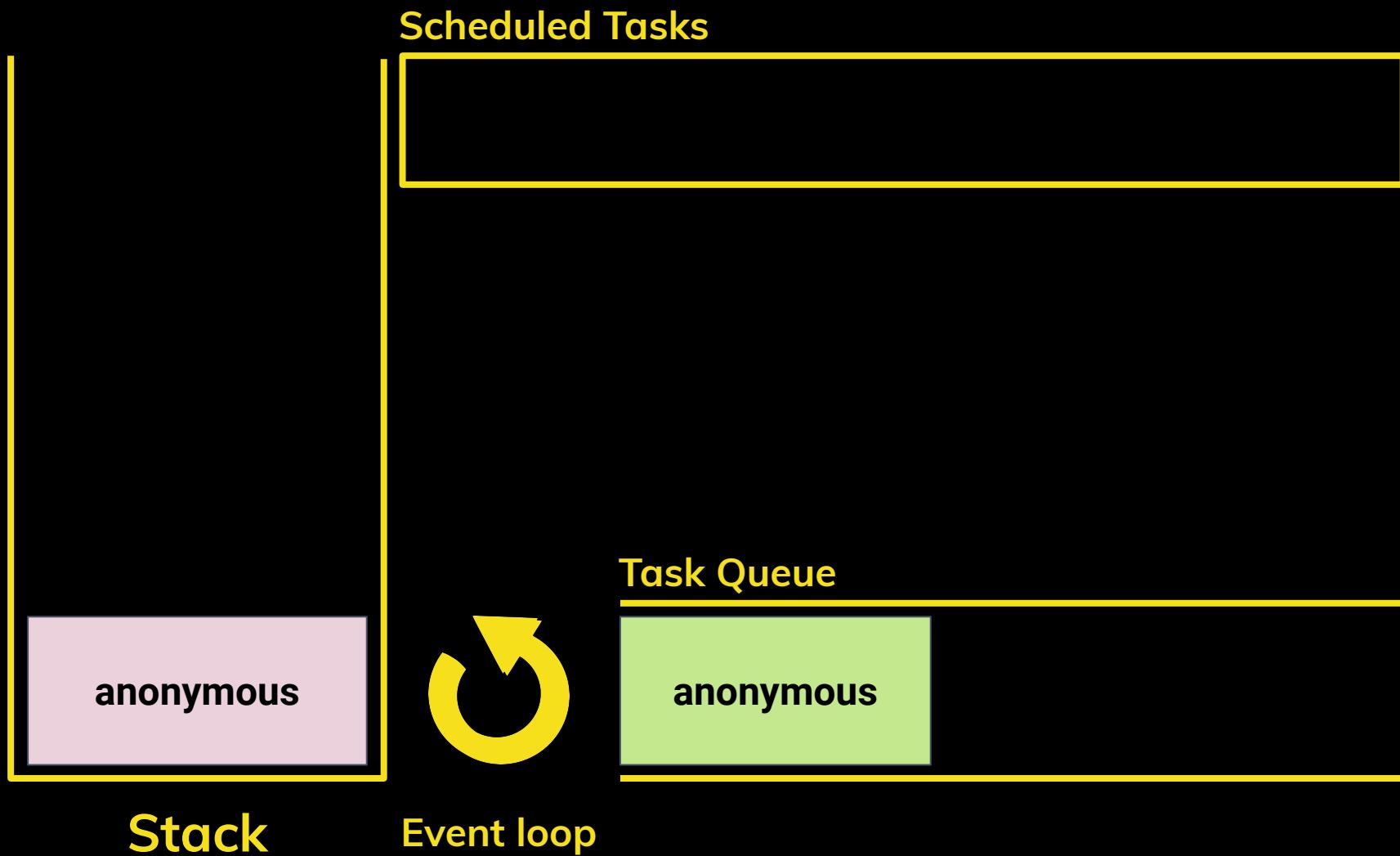
Event loop (iii)



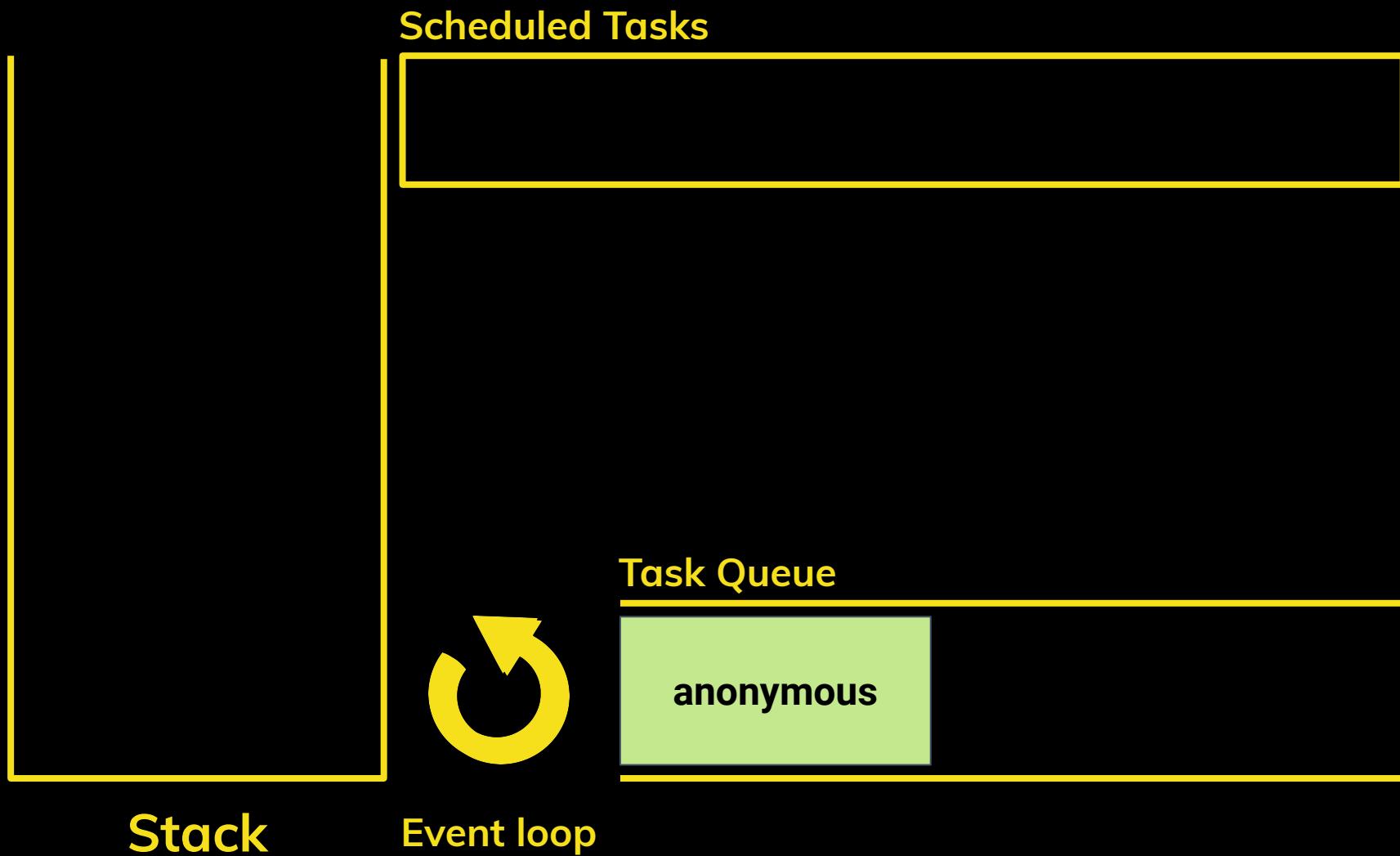
Event loop (iii)



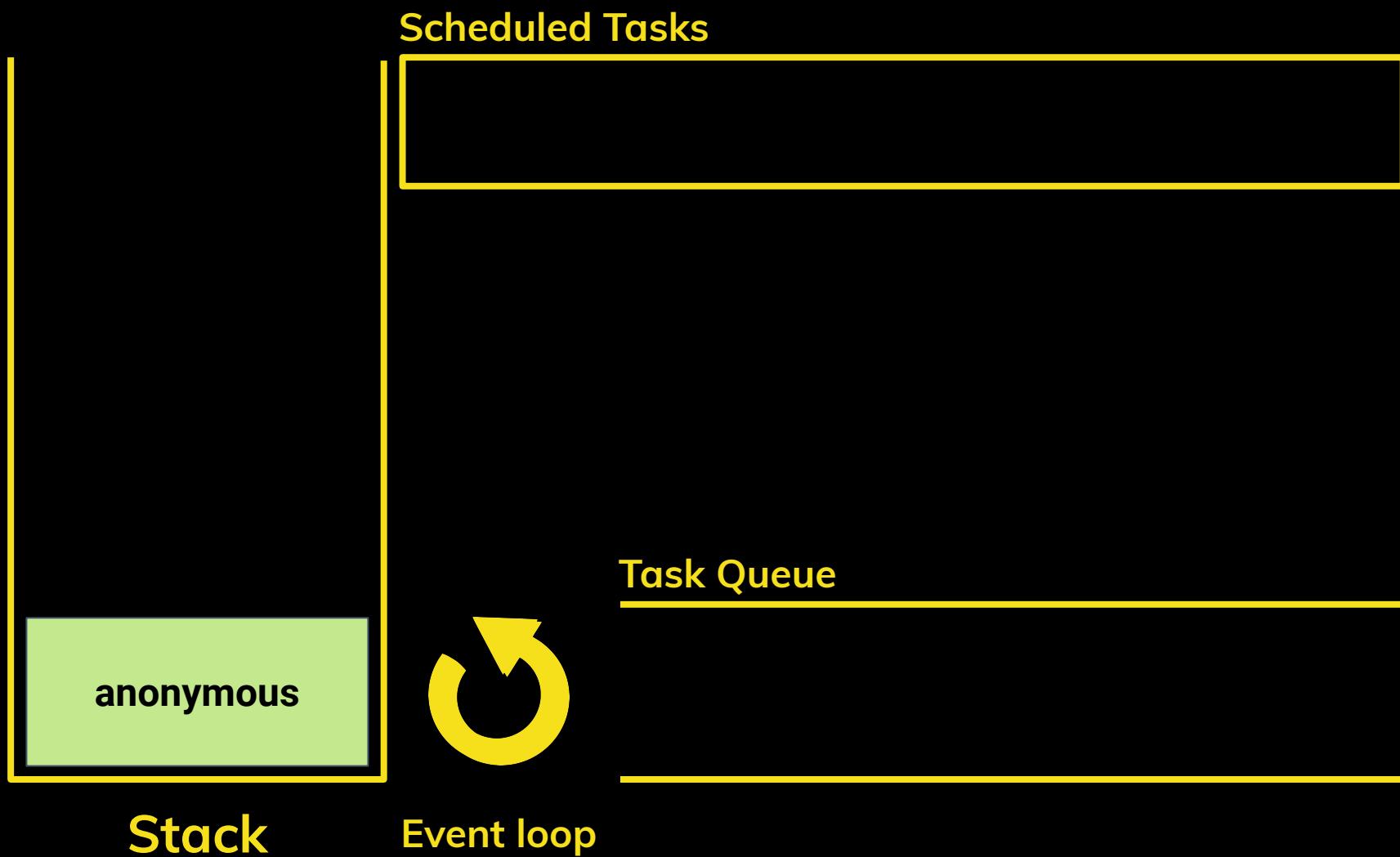
Event loop (iii)



Event loop (iii)



Event loop (iii)





Promesas

```
function moreAsync () {  
    console.log("Start");  
    setTimeout(() => console.log("setTimeout"), 0);  
    Promise.resolve("Promise 1").then(msg => console.log(msg))  
    Promise.resolve("Promise 2").then(msg => console.log(msg))  
    console.log("End")  
}  
  
moreAsync();
```

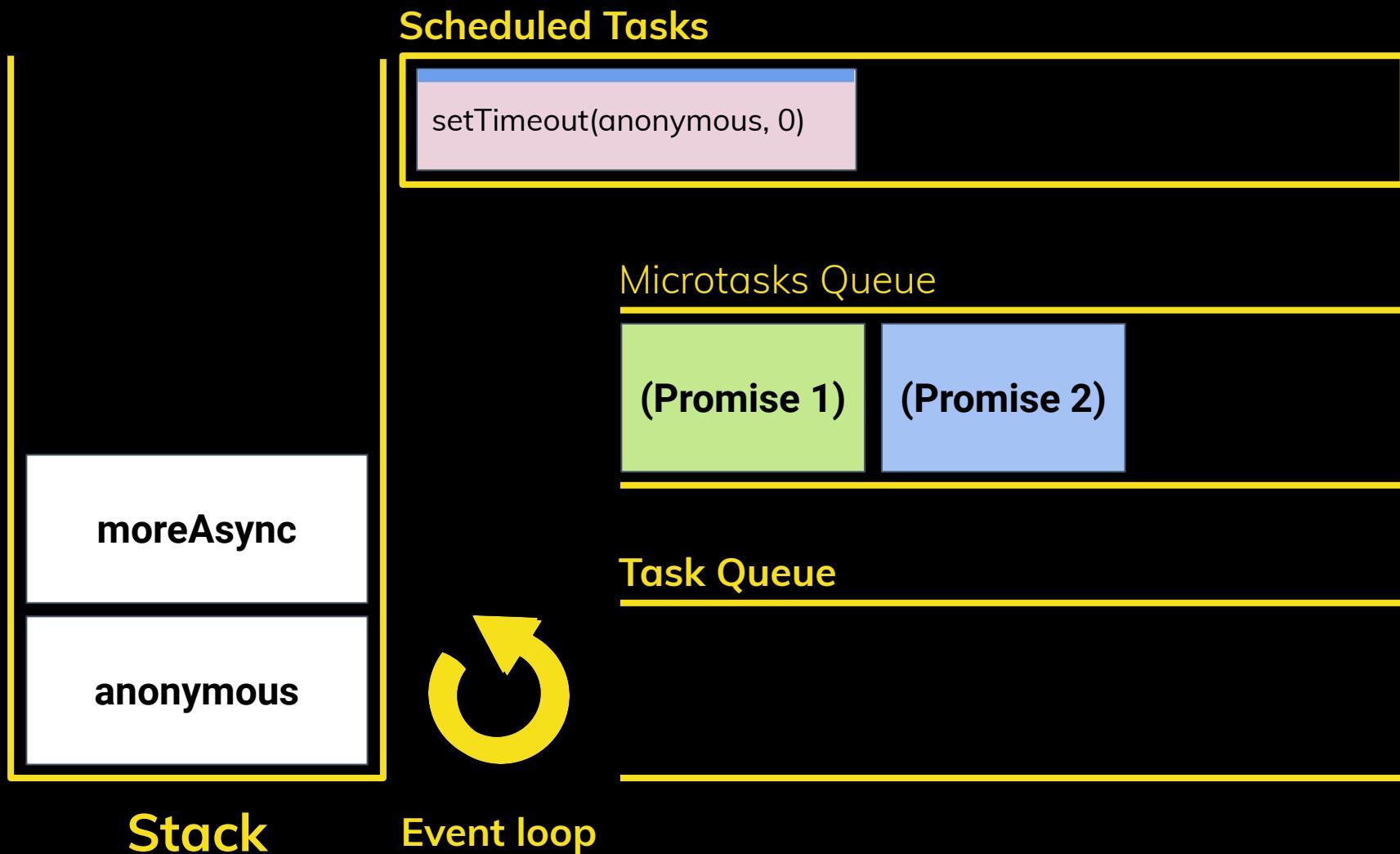
Promesas

```
function moreAsync () {  
    console.log("Start");  
    setTimeout(() => console.log("setTimeout"), 0);  
    Promise.resolve("Promise 1").then(msg => console.log(msg))  
    Promise.resolve("Promise 2").then(msg => console.log(msg))  
    console.log("End")  
}  
  
moreAsync();
```

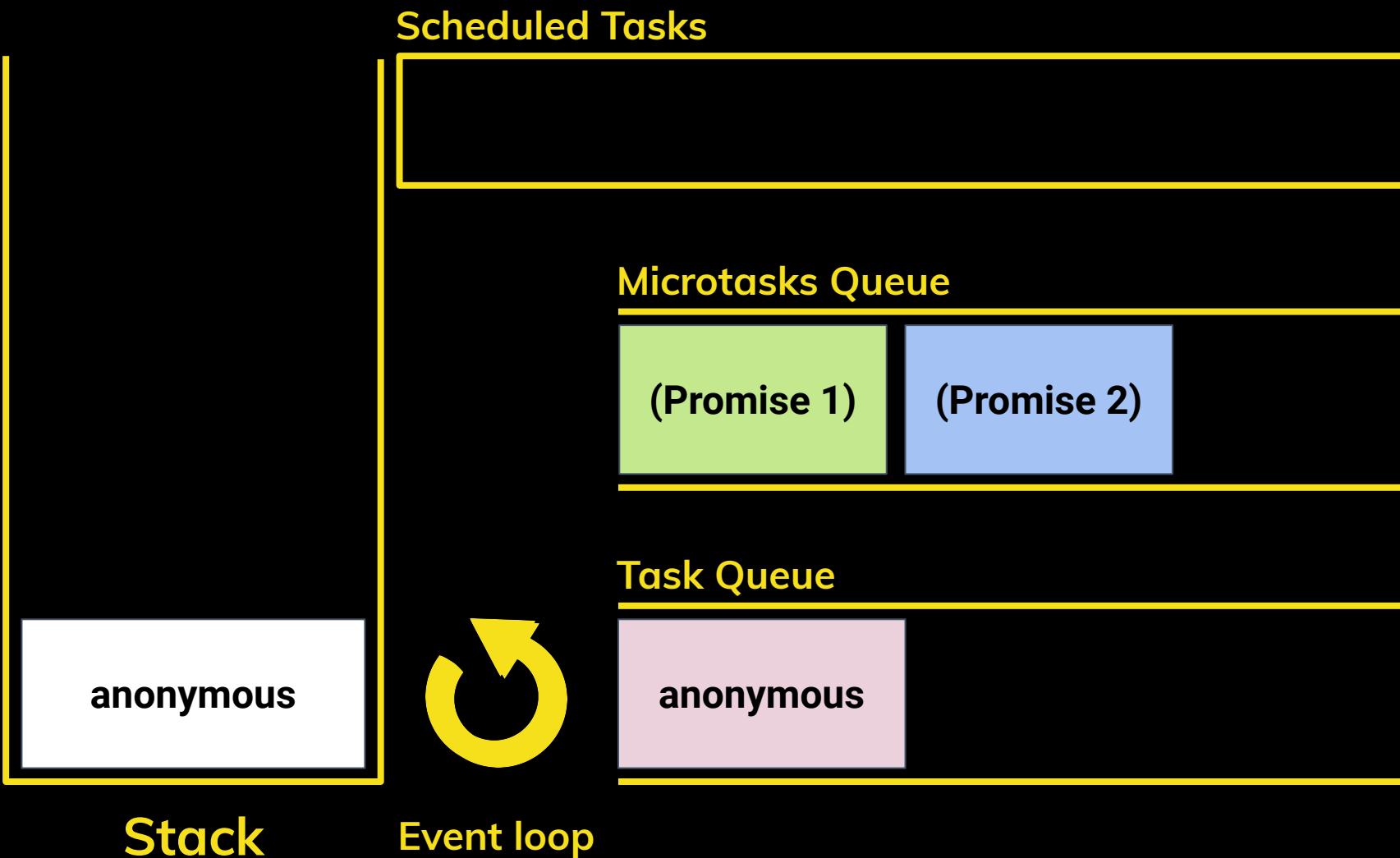
Output:

```
> Start  
> End  
> Promise 1  
> Promise 2  
> setTimeout
```

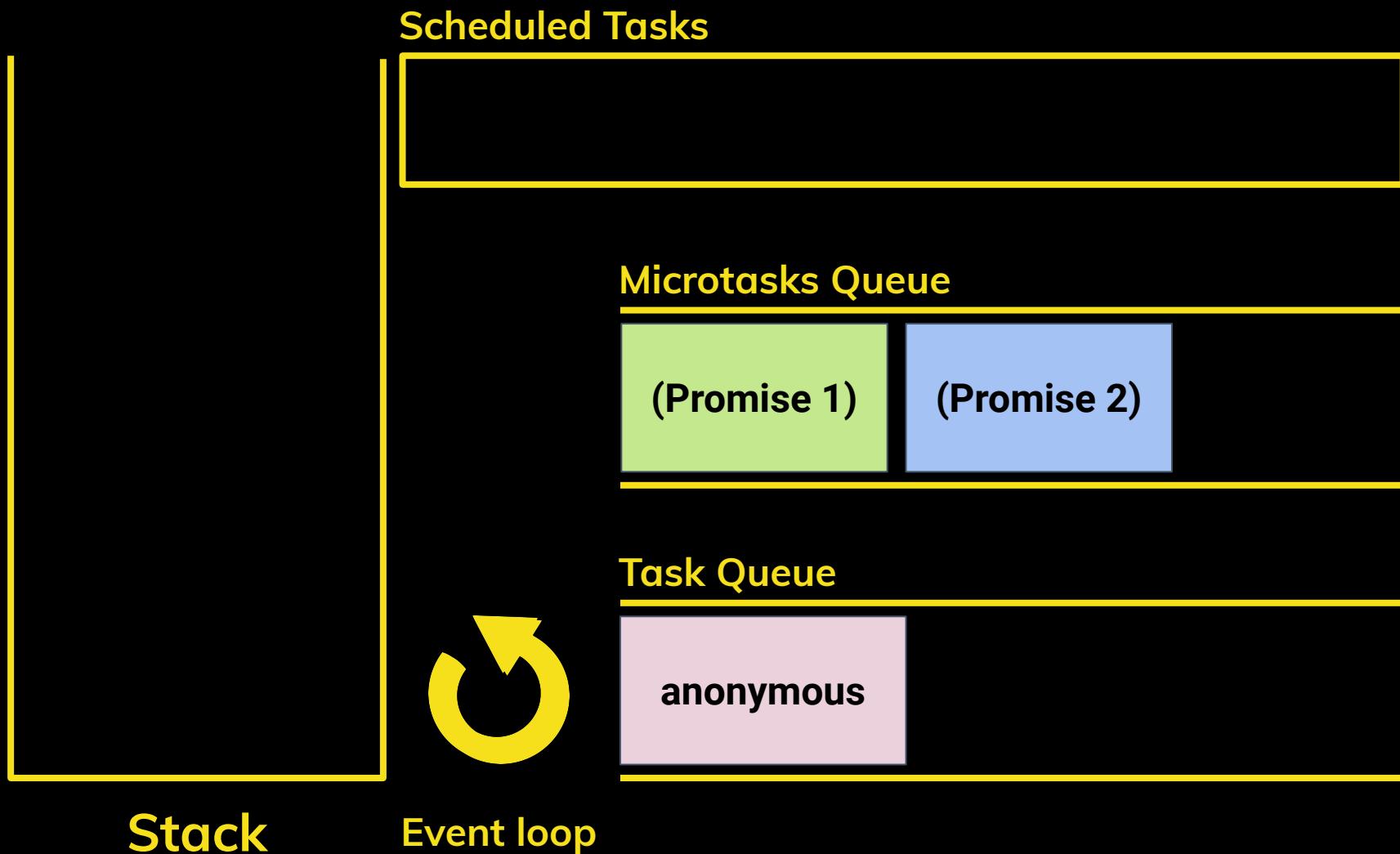
Event loop (iv)



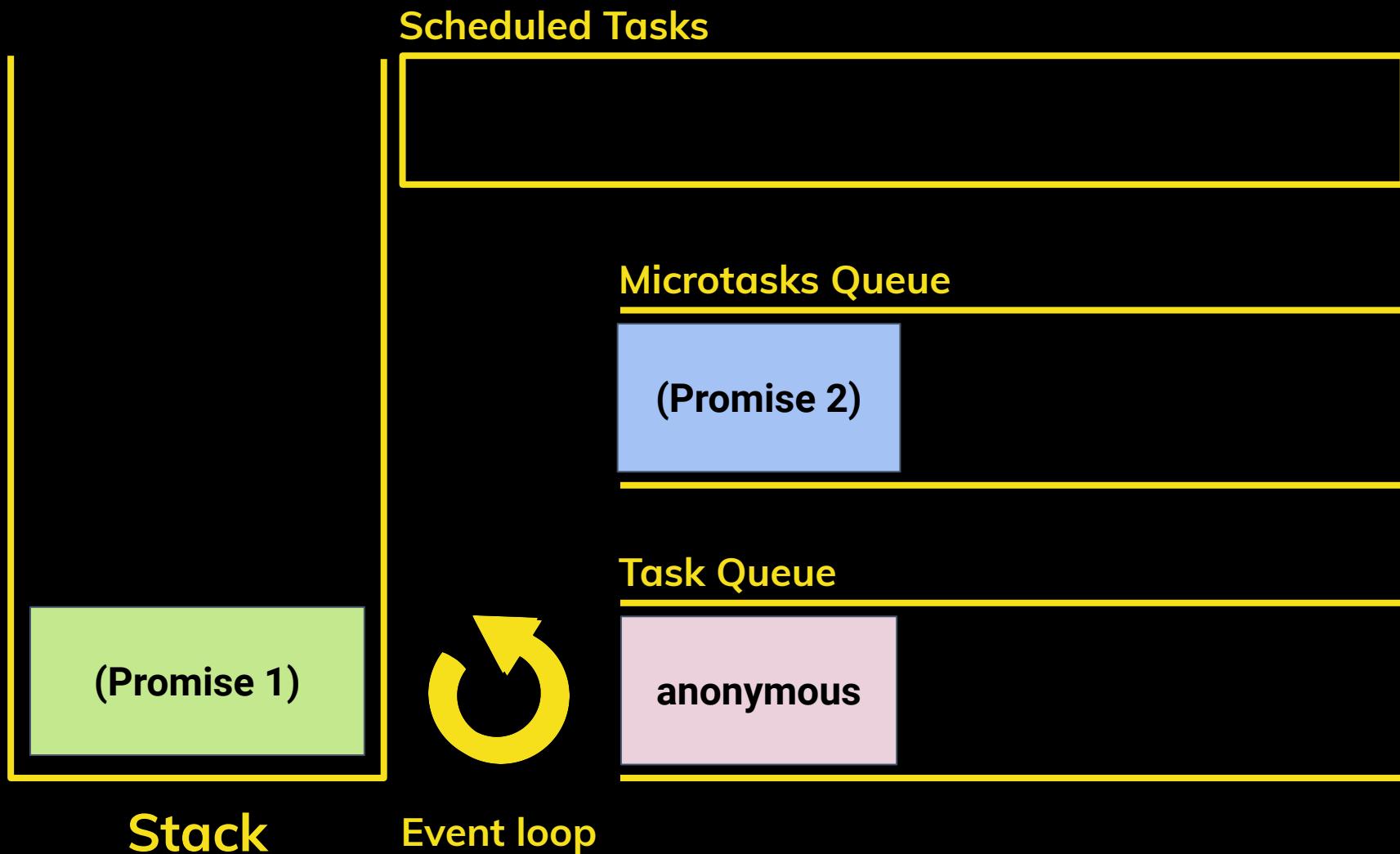
Event loop (iv)



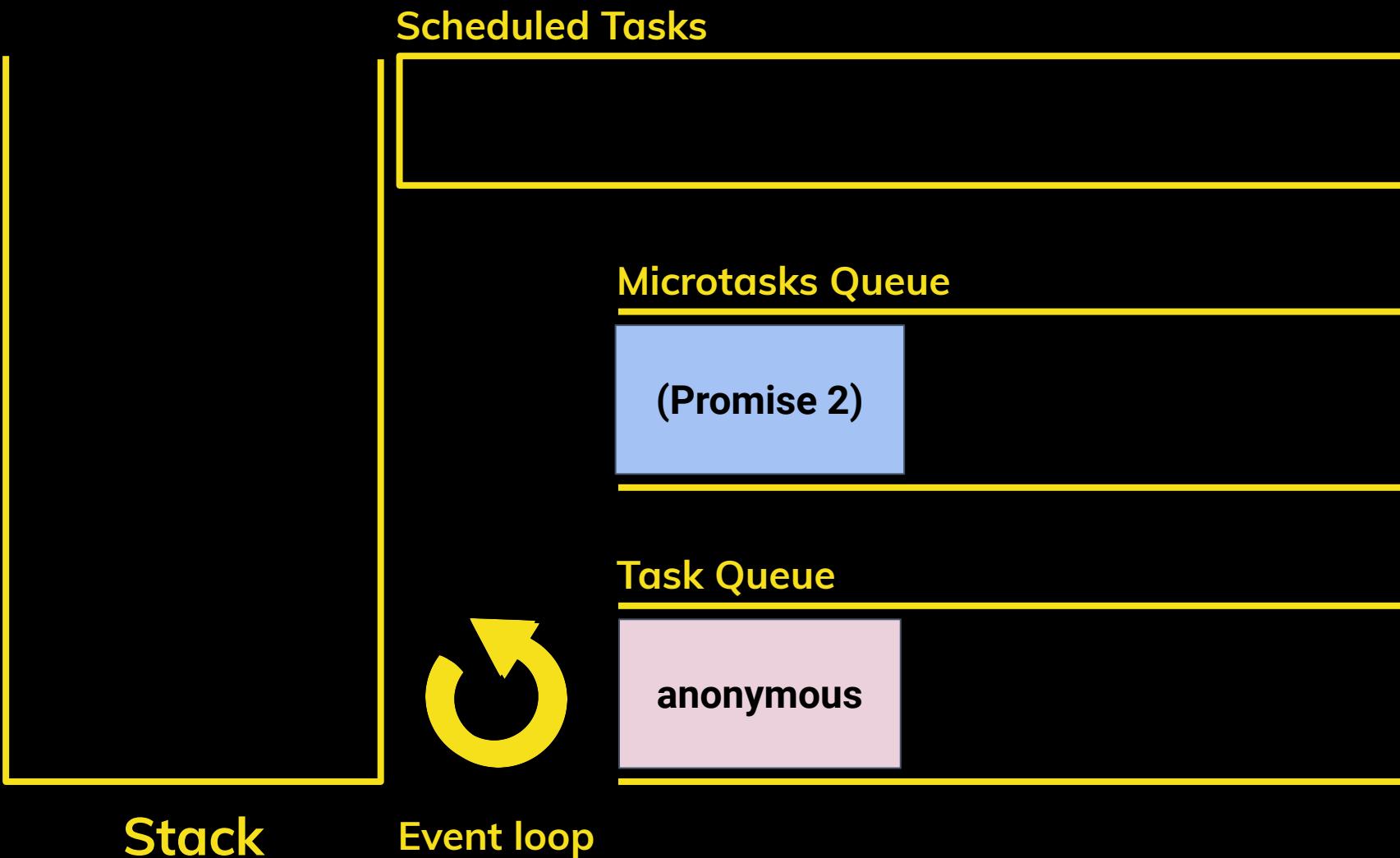
Event loop (iv)



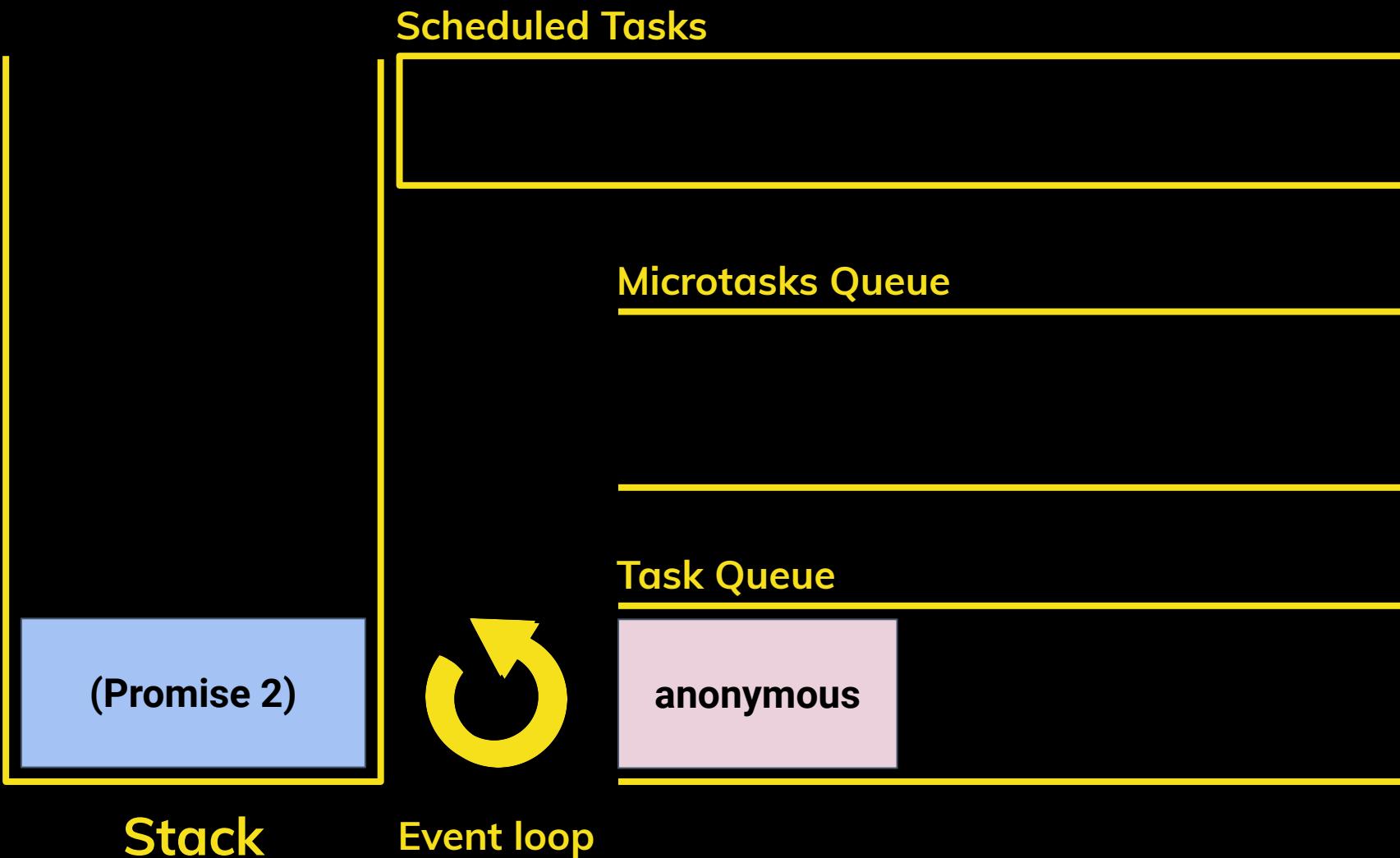
Event loop (iv)



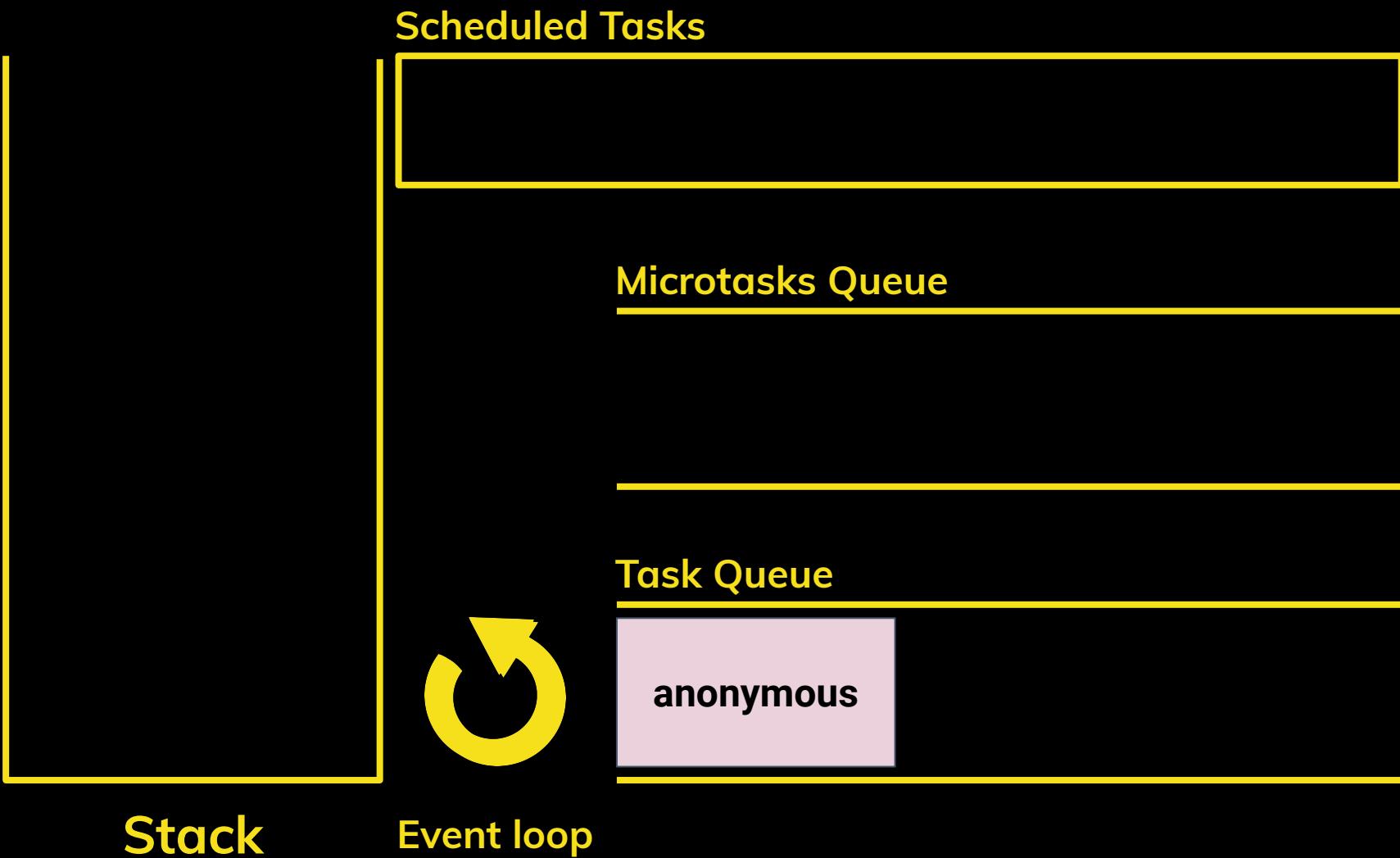
Event loop (iv)



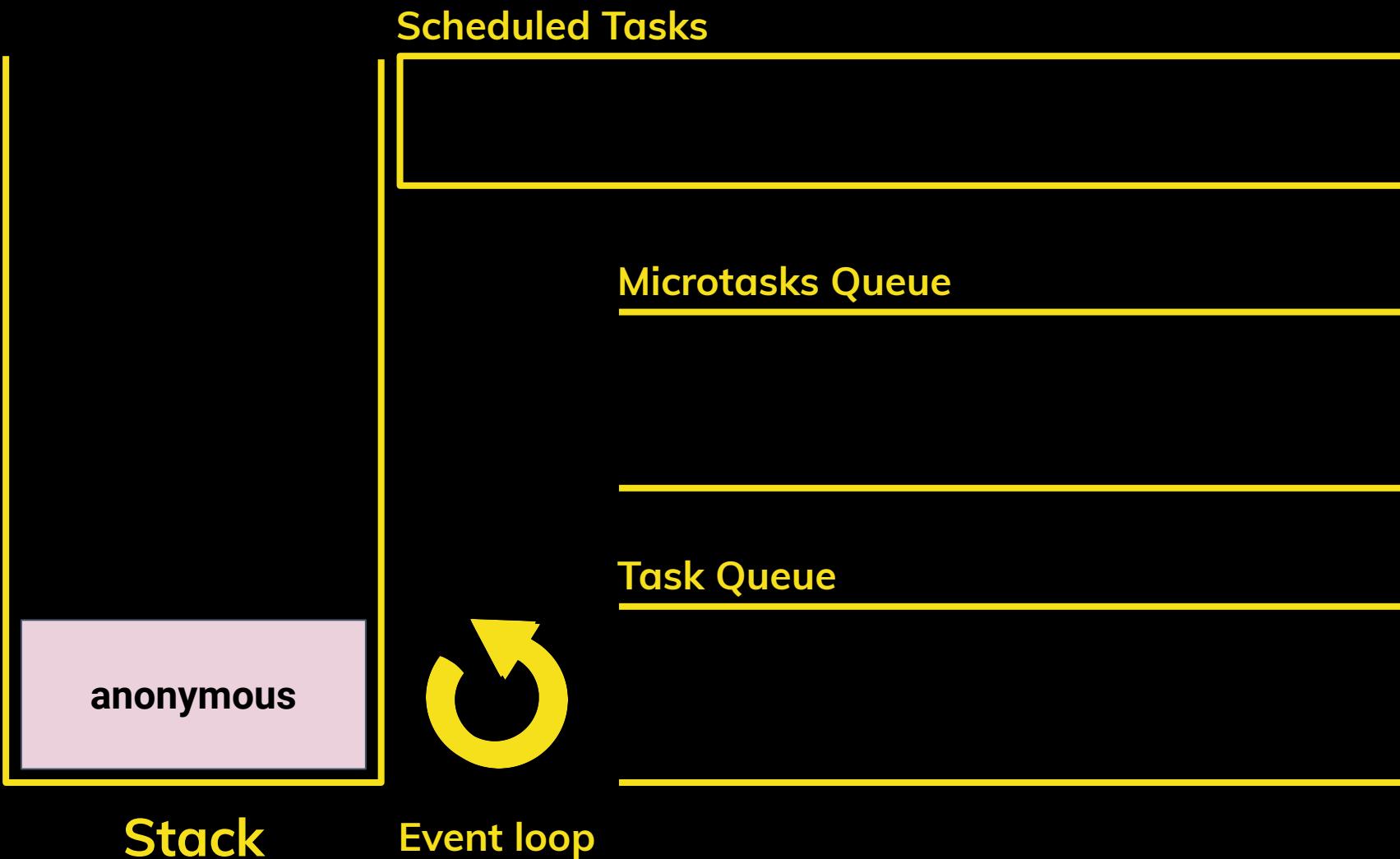
Event loop (iv)



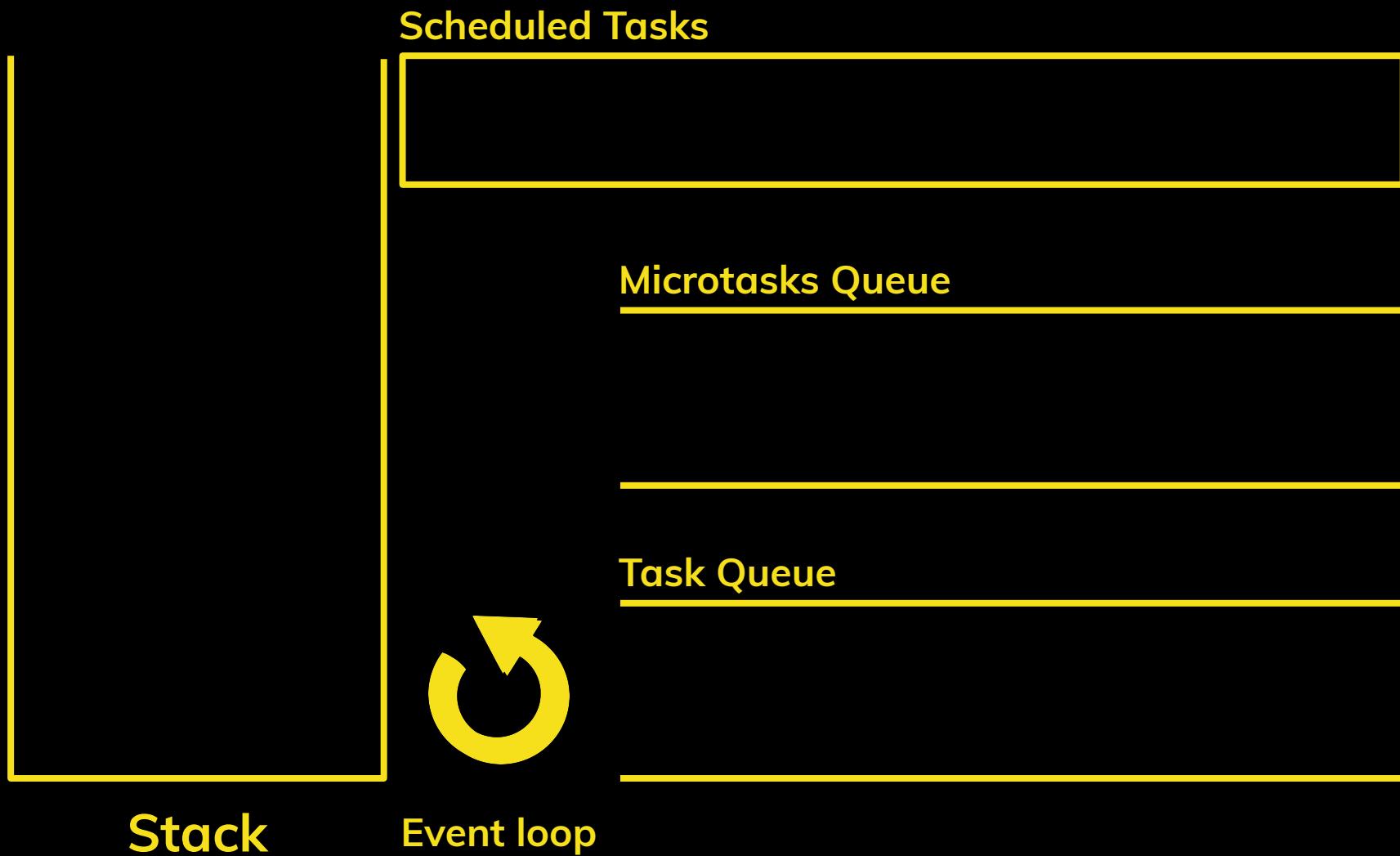
Event loop (iv)



Event loop (iv)



Event loop (iv)



El **event loop** es lo que
hace que JavaScript
parezca ser multihilo

Patrones de Diseño - Introducción

Qué es un
patrón de diseño

Una solución para
un problema dentro
de un contexto.





Una solución para un problema dentro de un **contexto**.

- El contexto es la situación donde el patrón aplica.
- Esta situación debe ser recurrente.
- **Ejemplo:** Muchos objetos están interesados en el estado de otro objeto.



Una solución para un **problema** dentro de un contexto.

- Se refiere a la meta que estás tratando de alcanzar dentro del contexto.
- El problema incluye todas las limitaciones que existen dentro de este contexto.
- **Ejemplo:** Estos objetos quieren recibir notificaciones cuando cambie el estado, sin tener que solicitar la información.



Una **solución** para un problema dentro de un contexto.

- Un diseño genérico que alcanza la meta dentro del contexto.
- Ejemplo: Crear una clase donde cualquier objeto se puede suscribir y desuscribir a cambios en el estado.

Una **solución** para un problema dentro de un contexto.

- Un diseño genérico que alcanza la meta dentro del contexto.
- Ejemplo: Crear una clase donde cualquier objeto se puede suscribir y desuscribir a cambios en el estado.



Observer Pattern

Ejemplos

Every Layout

¿Cómo acomodar elementos?



RUDIMENTS

Boxes

Composition

Units

Global and local styling

Modular scale

Axioms

LAYOUTS

every-layout.dev/layouts/stack

Contexto

The Stack

Nombre

TABLE OF CONTENTS

- The problem
- The solution
- Use cases
- The generator
- The component

Problema

Patrón de diseño

Ejemplos

The problem

Flow elements require space (sometimes referred to as *white space*) to physically and conceptually separate them from the elements that come before and after them. This is the purpose of the margin property.

Media Queries

¿Cómo acomodar la información para diferentes tamaños de pantalla?

Media
Queries

Medium



This screenshot shows the Medium homepage on a desktop browser. The top navigation bar includes links for 'HOME', 'THE NEW NEWS', 'CULTURE', 'TECH', 'ENTERTAINMENT', 'SELF', 'POLITICS', 'GESSA', 'HEALTH', 'POPULAR', and 'ECON'. A search bar and user account options ('Become a member', 'Sign in', 'Log out') are also present. The main content area features several articles with thumbnail images and titles like 'The Truth About DNA Fitness Tests' and 'Paradise Lost'. Below the articles is a large 'Welcome to Medium, where words matter.' section with a call-to-action button 'Get started'. At the bottom, there are sections for 'Featured for members' and 'Popular on Medium'.

This screenshot shows the Medium homepage on a tablet device. The layout is similar to the desktop version but is adapted for a smaller screen. The main content area displays the same articles and the 'Welcome to Medium' section. The 'Popular on Medium' section at the bottom is also visible.

This screenshot shows the Medium homepage on a mobile device. The layout is significantly simplified due to the smaller screen. The main content area shows a few articles and the 'Welcome to Medium' section. The 'Popular on Medium' section at the bottom is also visible.

Patrones de React

[React Patterns on GitHub](#)

Contents

- Function component
- Destructuring props
- JSX spread attributes
- Merge destructured props with other values
- Conditional rendering
- Children types
- Array as children
- Function as children
- Render prop
- Children pass-through
- Proxy component
- Style component
- Event switch
- Layout component
- Container component
- Higher-order component
- State hoisting
- Controlled input

Function component

[Function components](#) are the simplest way to declare reusable components.

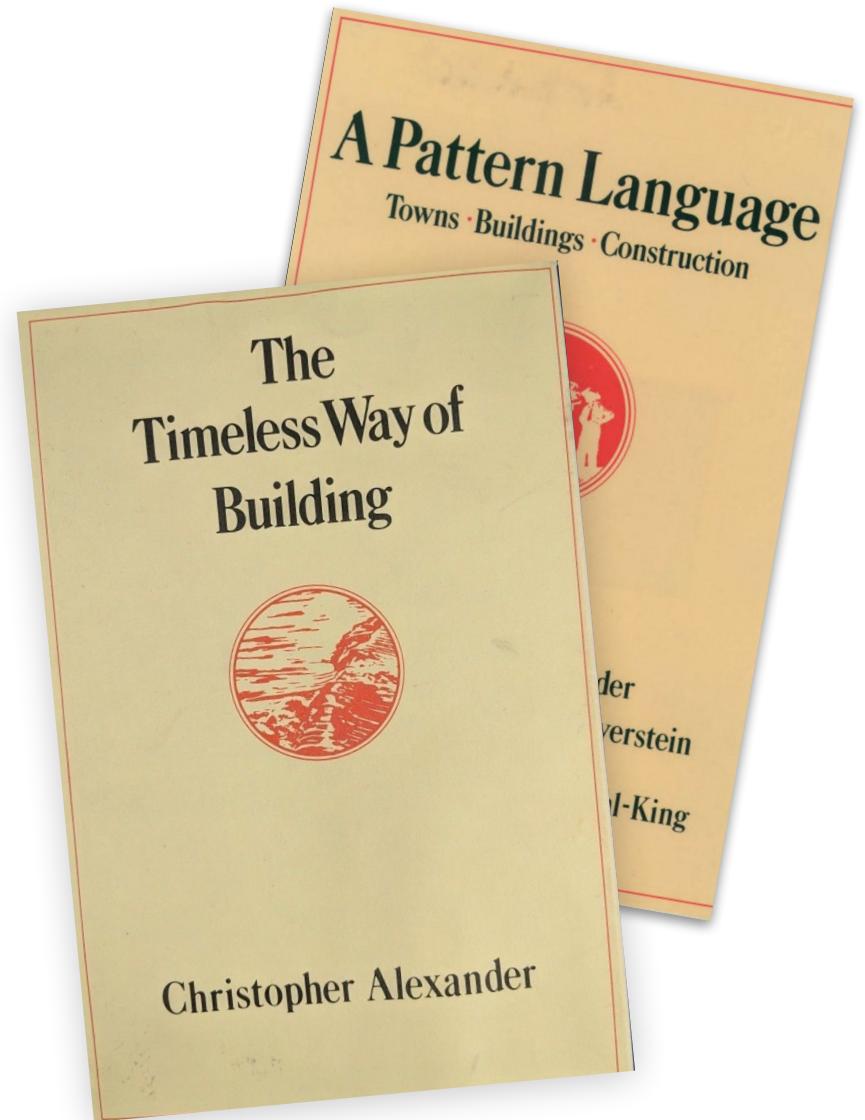
They're just functions.

```
function Greeting() {  
  return <div>Hi there!</div>;
```

Un poco de historia

La idea de los patrones comienza en la arquitectura con **Christopher Alexander**.

Sus libros describen patrones para construir arquitectura dinámica, como casas, pueblos y ciudades.

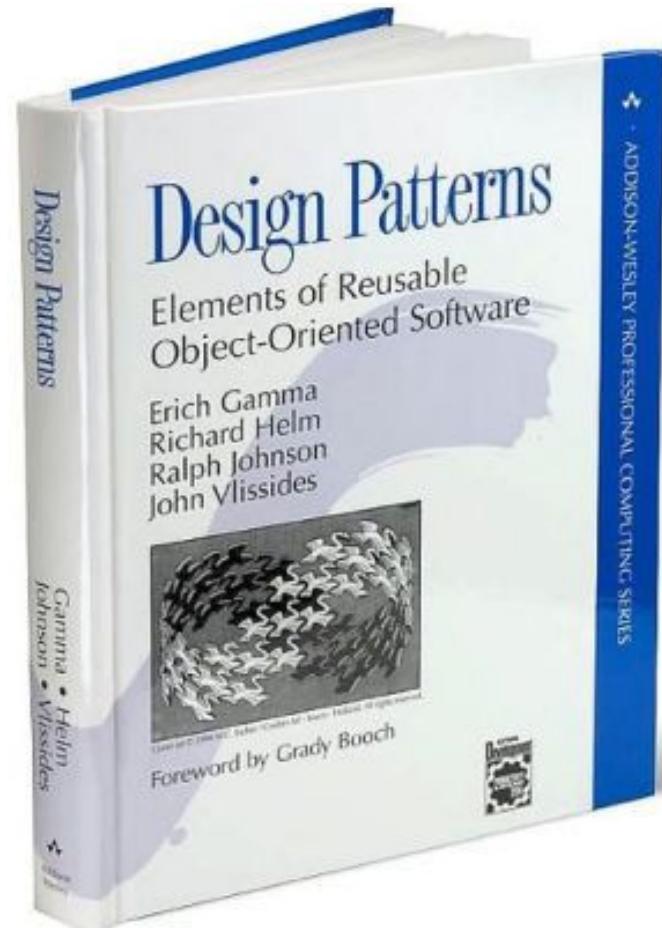


Un poco de historia

El libro que comenzó el campo de patrones de diseño de software.

Publicado en 1995.

Describe los patrones fundamentales.





Beneficios

- Los patrones de diseño son una caja de herramientas de soluciones bien probadas a problemas comunes en diseño de software.
- Te proveen un lenguaje común que permite comunicarse de forma específica y eficiente.



Crítica

- Los patrones de diseño son una forma de complejidad.
- Son soluciones a las limitaciones de un lenguaje de programación. Ejemplo: Java o C# no tienen funciones de alto nivel.
- “Cuando lo que tienes es un martillo, todo te parece un clavo.”

“

Patterns, like all forms of complexity, should be avoided until they are absolutely necessary

”

Jeff Atwood

blog.codinghorror.com/head-first-design-patterns



Conclusión

- Siempre busca pensar en términos de diseño, no de patrones.
- Usa un patrón cuando hay una necesidad natural para usarlos.
- Si existe una alternativa más simple, prefierela.

Patrones de Diseño -
Introducción

Categorías de
patrones de diseño

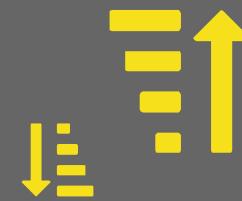
Categorías



Patrones
creacionales



Patrones
estructurales



Patrones de
comportamiento

Patrones creacionales

Proveen diferentes mecanismos
para crear objetos.



Patrones creacionales

- Abstract Factory
- Builder
- Factory Method
- Prototype
- Singleton

Builder

(Constructor)

Es usado para permitir la creación de una variedad de objetos complejos desde un objeto fuente.

Separa la creación de un objeto complejo de su estructura, de tal forma que el mismo proceso de construcción puede servir para crear representaciones diferentes.

Builder

(Constructor)

Es usado para permitir la creación de una variedad de objetos complejos desde un objeto fuente.

Separa la creación de un objeto complejo de su estructura, de tal forma que el mismo proceso de construcción puede servir para crear representaciones diferentes.

// Cómo jQuery usa el Builder

```
$('<h1 class="super-big">My favorite Pokemons</h1>');

$('<button class="btn">Llama Ya</button>').click(() => {
  console.log("Llamando...");
});

$( "<input />" )
  .attr({ "type": "email", "id": "email" })
  .appendTo( "#login-form" );
```

Patrones estructurales

Describen formas de componer
objetos para formar nuevas
estructuras flexibles y eficientes.



Patrones estructurales

- Adapter
- Bridge
- Composite
- Decorator
- Façade
- Flyweight
- Proxy

// Cómo jQuery usa el Adapter

```
// IE <=11+  
  
let inputEl = document.createElement("input")  
inputEl.value = "priority-shipping";  
inputEl.type = "radio";  
console.log(inputEl.value) // undefined
```

```
// Con jQuery  
  
let $input = $("<input />");  
$input.val("priority-shipping");  
$input.attr({ type: "radio" });  
console.log($input.val()) // priority-shipping
```

Patrones de comportamiento

Gestionan algoritmos y
responsabilidades entre objetos.

Patrones de comportamiento

- Chain of Responsibility
- Command
- Interpreter
- Iterator
- Mediator
- Memento
- Observer
- State
- Strategy
- Template Method
- Visitor

// Cómo jQuery usa el Composite

// Un solo elemento

```
$("#submit-button").addClass("big-text");  
$("#hero-heading").addClass("big-text");
```

// Muchos elementos

```
 $("button").addClass("big-text");  
 $(".title").addClass("big-text");  
 $("h1").addClass("big-text");
```

Patrones de Diseño - Singleton

Descripción y Caso de Uso

Singleton

(Creacional)

Es un patrón que te asegura que una clase solo tiene una instancia.

Esta única instancia puede ser consumida por cualquier otro objeto.

Estructura

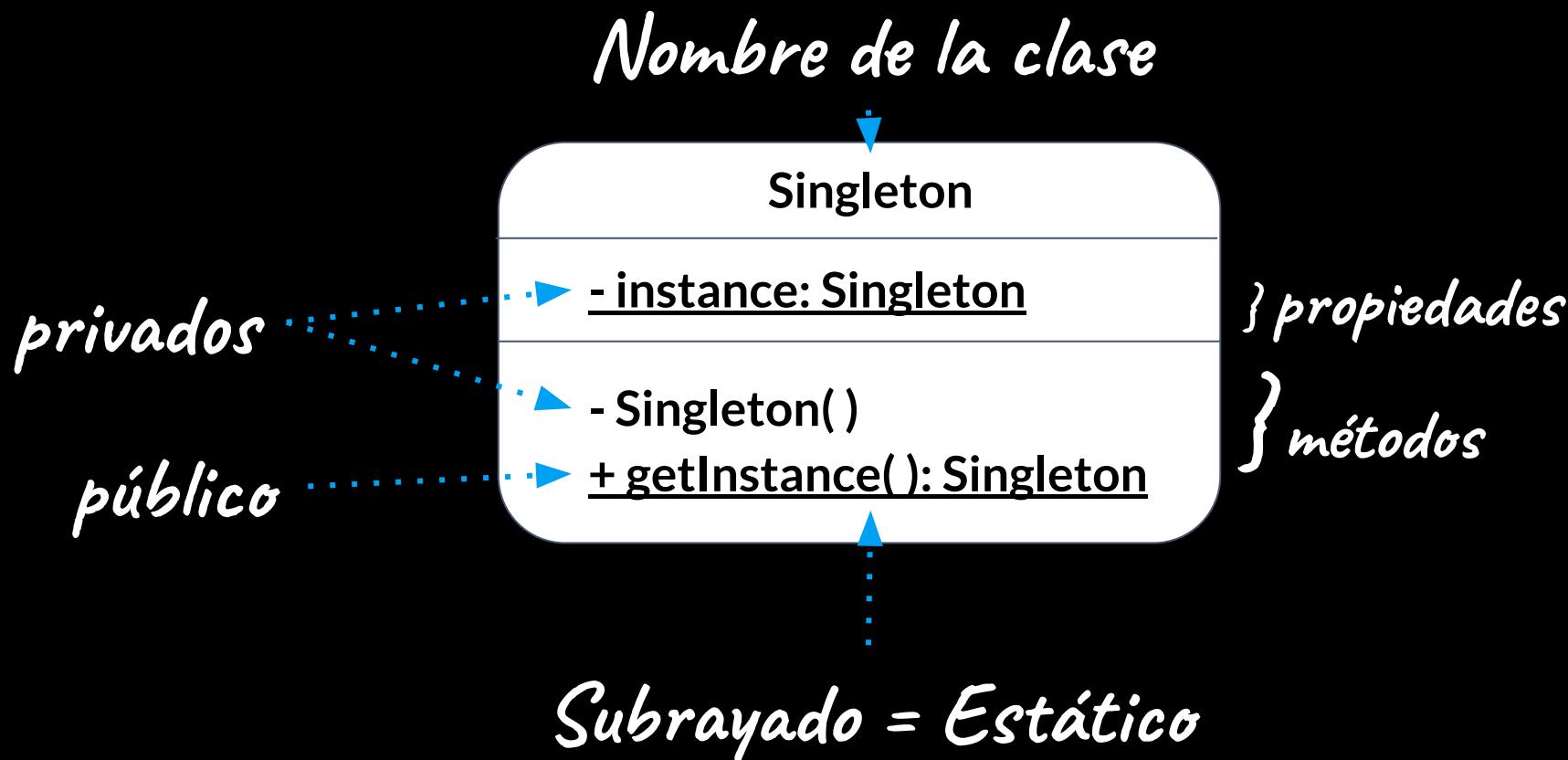
Singleton

- instance: Singleton

- Singleton()

+ getInstance(): Singleton

Estructura



Implementación (TypeScript)

```
class Database {  
    private static instance: Database;  
  
    private constructor() {  
        // init  
    }  
  
    public static getInstance(): Database {  
        if (!Database.instance) {  
            Database.instance = new Database();  
        }  
  
        return Database.instance;  
    }  
  
    public connect(url: string) {  
        // Implementation code  
    }  
}
```

Implementación (Node.js)

```
class Database {  
  constructor() {...}  
  public connect(url) {  
    // Implementation code  
  }  
}  
  
export default new Database();
```

| Una analogía

El gobierno de tú país.

Podrán haber varios partidos,
pero un solo gobierno.

Por ejemplo, el “Gobierno de Alpha Centauri”
es un punto de acceso global que identifica
un grupo de personas a cargo.

Mongoose

(Caso de uso)

Mongoose es una librería que te ayuda a interactuar con una base de datos de MongoDB.

Te provee con una interfaz simple para buscar, escribir y validar datos.

En este tipo de librería solo quieres tener una instancia.

```
// Mongoose
// https://github.com/Automattic/mongoose/blob/master/lib/index.js

'use strict';

function Mongoose() {...}

Mongoose.prototype.connect = function() {...};
Mongoose.prototype.disconnect = function() {...};
Mongoose.prototype.Model = function Model () {...};
Mongoose.prototype.Schema = function Schema () {...};

module.exports = new Mongoose();
```



Otros casos de uso

Solo quieres tener un FileSystem.

Solo quieres tener un WindowManager

Patrones de Diseño -
Observer

Descripción

| Imagine que...

Jaime te marca y te pregunta si tienes fiesta este sábado

> *Umm. No. ¿Por qué tendría una fiesta?*

Margarita te marca y te pregunta si tienes fiesta el miércoles

> *Obvio no. El jueves se trabaja.*

| Finalmente sí tienes una fiesta

Deja llamo a Gabriel a avisarle...

> *Dale dale. Yo le caigo.*

Deja llamo a Angela a avisarle...

> *Amor. Pero si vivimos juntos. Obvio no
me tenías que decir.*

Deja llamo a Manuel a avisarle...

> *Dude. Yo estoy en España. Cómo crees
que voy a poder ir.*

¿Qué pasó?

Tus amigos, para asegurarse que no se pierden ni una fiesta, te marcan para preguntarte si hay una pronto. Imaginate que todo el día, todos los días, suene el celular.



¿Qué pasó?

Cuando finalmente sí tienes una fiesta, empiezas a marcarle a TODO el mundo en tu lista de contactos.

Esto se siente un poco como spam. Ugh.



Search mail

Compose

Inbox

9001

Snoozed

Sent

Drafts

All Mail

Categories

Newsletters

994

More

Important and unread

Angela .. A

Daniel .. m

Camila Ba

Richard K

Starred

Contact D

Everything else

Ana de P

AT&T

Aliada DF

Un problema de software

Tienes que hacer un tablero de Bitcoin:

- Tienes que desplegar el último precio de venta.
- Tienes que desplegar el último precio en el <title> de la página.

```
class BitcoinPriceTracker {  
  constructor() {  
    setInterval(this.notify, 1000);  
  }  
  
  private getPrice(): string {  
    /* ... */  
  }  
  
  notify = async () => {  
    let price = await this.getPrice();  
    document.title = price;  
    document.querySelector("#btc-price").innerText = price;  
  };  
}
```



“Hola buen dev. Si mire.
Me gustaría añadir una gráfica
que muestre el precio del
bitcoin en tiempo. Tu sabes.
Igual que le hacen los otros sites.”



```
class BitcoinPriceTracker {  
  notify = async () => {  
    let price = await this.getPrice();  
    document.title = price;  
    document.querySelector("#btc-price").innerText = price;  
  };  
}
```



*Hay que conocer la
implementación de cada objeto
que quiere enterarse.*

“

Programa a una
interfaz, no a una
implementación

”

Principio de diseño de software

Patrones de Diseño -
Observer

Estructura

Observer

(Comportamiento)

Un objeto tiene alguna información/estado interesante.

Otros objetos están interesados y quieren enterarse de cambios de este estado.

Observer (Comportamiento)

Subject / Publisher

Un objeto tiene alguna información/estado interesante.

Otros objetos están interesados y quieren enterarse de cambios de este estado.

Observer / Subscriber

Observer (Comportamiento)

Este patrón sugiere que creemos un objeto (el Subject) con mecanismos de suscripción.

Los objetos interesados (Observer) se pueden suscribir para recibir actualizaciones de un estado.

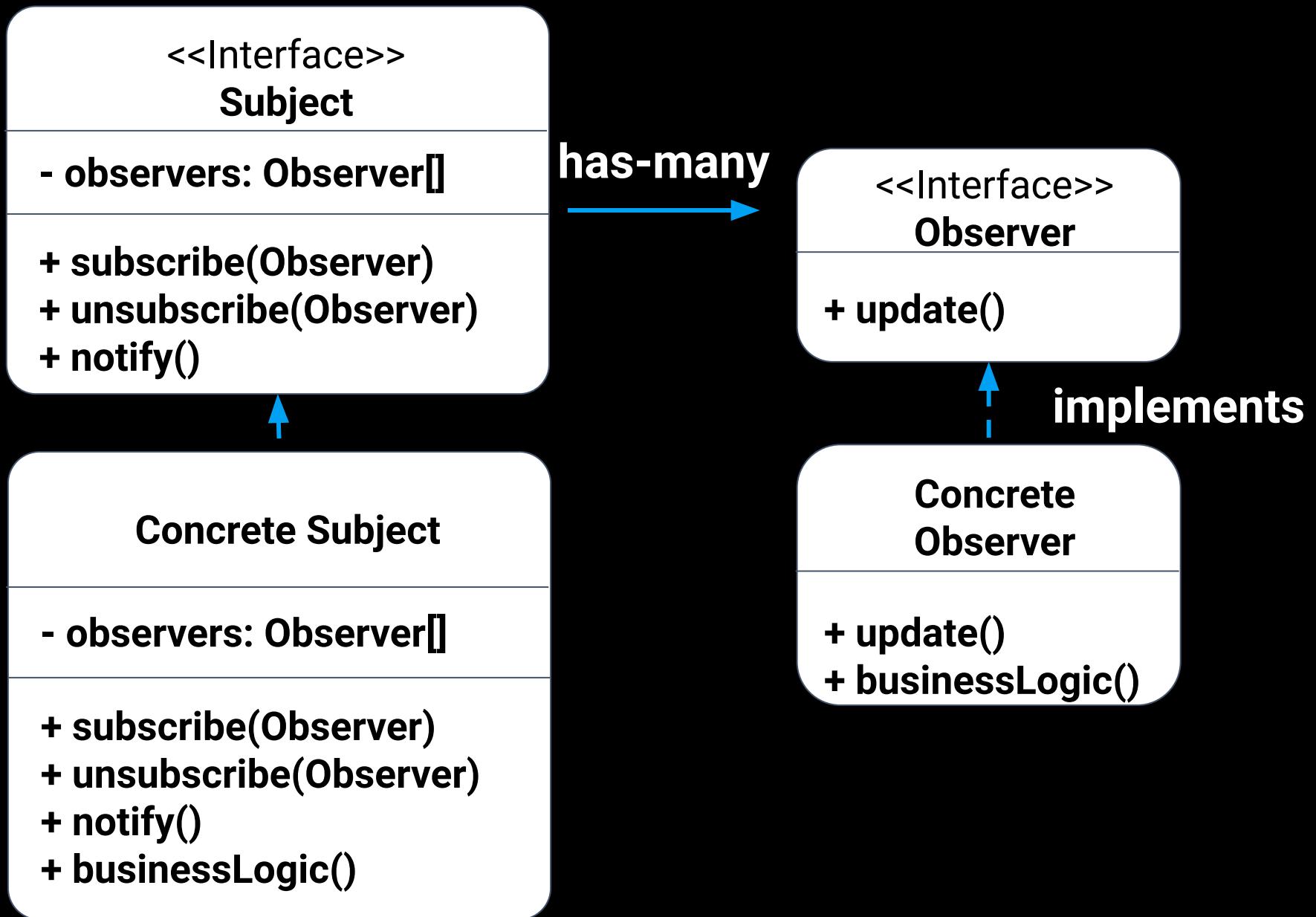
Observer (Comportamiento)

Cuando el estado cambia, el Subject le notifica a todos los Observers.

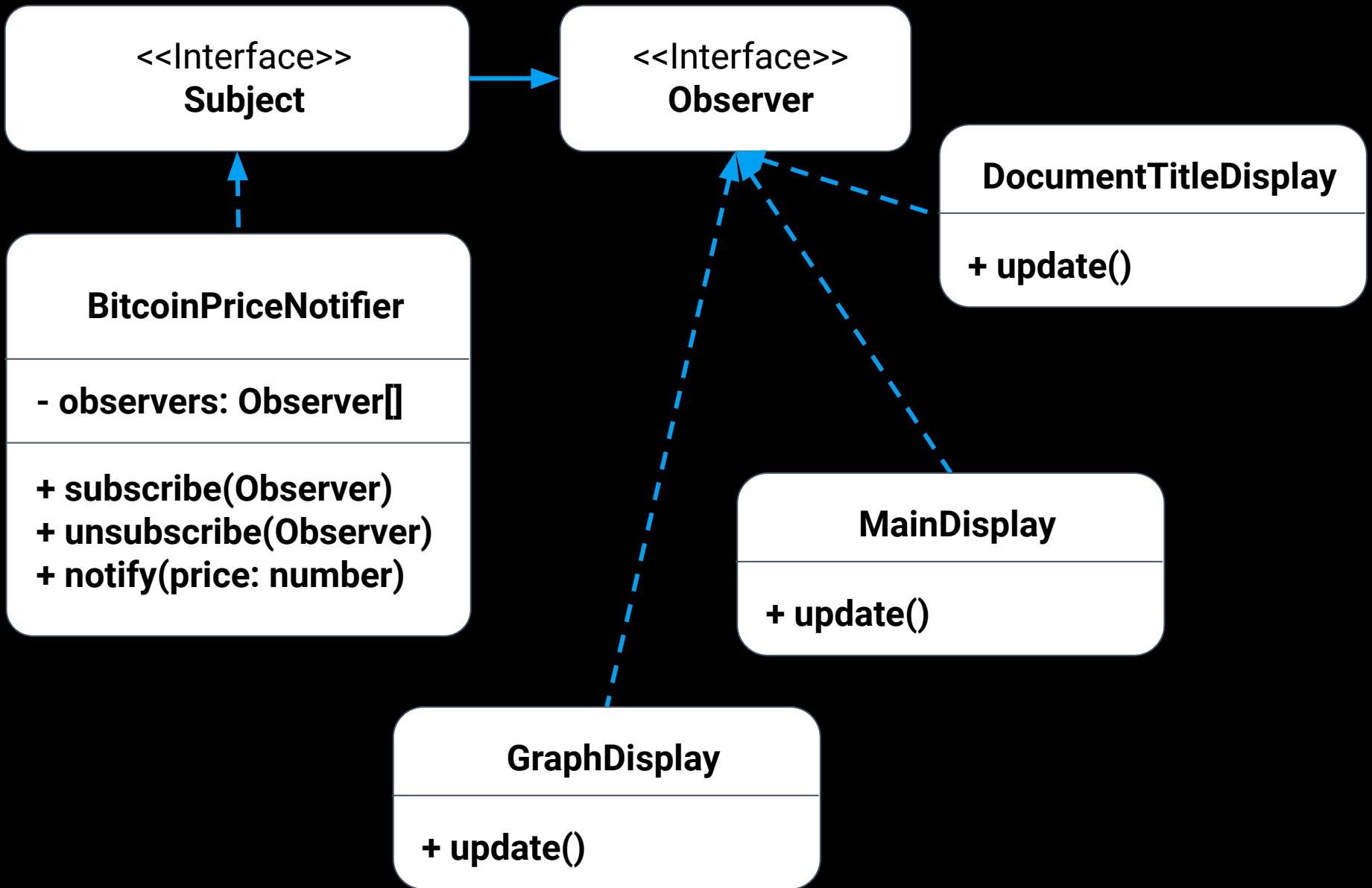
Si un Observer ya no le interesa recibir notificaciones, se puede desuscribir.

Esto suena a un newsletter

Estructura



Estructura



Patrones de Diseño - Observer

Casos de uso



Redux

- Una librería de manejo de estado.
- Inicializas un *store* con un estado y un reducer.
- Despachas acciones que modifican el estado.
- El *store* notifica que el estado cambió.



Redux

- Una librería de manejo de estado.
- Inicializas un *store* con un estado y un reducer.
- Despachas acciones que modifican el estado.
- El *store* **notifica** que el estado cambió.

```
// Redux - API  
import { createStore } from 'redux';  
  
const store = createStore( ... );  
  
store.subscribe(function() {...});  
store.dispatch({ type: 'INCREMENT' });  
store.getState();
```

```
183 function dispatch(action) {
184     if (!isPlainObject(action)) {
185         throw new Error(
186             'Actions must be plain objects. ' +
187             'Use custom middleware for async actions.'
188         )
189     }
190
191     if (typeof action.type === 'undefined') {
192         throw new Error(
193             'Actions may not have an undefined "type" property. ' +
194             'Have you misspelled a constant?'
195         )
196     }
197
198     if (isDispatching) {
199         throw new Error('Reducers may not dispatch actions.')
200     }
201
202     try {
203         isDispatching = true
204         currentState = currentReducer(currentState, action)
205     } finally {
206         isDispatching = false
207     }
208
209     const listeners = (currentListeners = nextListeners)
210     for (let i = 0; i < listeners.length; i++) {
211         const listener = listeners[i]
212         listener()
213     }
214
215     return action
216 }
```

el estado

los observers

Modifica el estado...

...y notifica a los interesados

```
116 * @param {Function} listener A callback to be invoked on every dispatch.  
117 * @returns {Function} A function to remove this change listener.  
118 */  
119 function subscribe(listener) ← un observer  
120   if (typeof listener !== 'function') {  
121     throw new Error('Expected the listener to be a function.')  
122   }  
123  
124   if (isDispatching) {  
125     throw new Error(  
126       'You may not call store.subscribe() while the reducer is executing. ' +  
127       'If you would like to be notified after the store has been updated, subscribe from a ' +  
128       'component and invoke store.getState() in the callback to access the latest state. ' +  
129       'See https://redux.js.org/api-reference/store#subscribe\(listener\) for more details.'  
130     )  
131   }  
132  
133   let isSubscribed = true  
134  
135   ensureCanMutateNextListeners()  
136   nextListeners.push(listener)  
137  
138   return function unsubscribe() { ← unsubscribe  
139     if (!isSubscribed) {  
140       return  
141     }  
142  
143     if (isDispatching) {  
144       throw new Error(  
145         'You may not unsubscribe from a store listener while the reducer is executing. ' +  
146         'See https://redux.js.org/api-reference/store#subscribe\(listener\) for more details.'  
147       )  
148     }  
149   }  
150 }
```

EventEmitter (Node.js)

Node.js

About these Docs

Usage & Example

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Buffer

C++ Addons

C/C++ Addons - N-API

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Cluster

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Domain

ECMAScript Modules

Errors

Events

File System

Class: EventEmitter

Added in: v0.1.26

The `EventEmitter` class is defined and exposed by the `events` module:

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

All `EventEmitters` emit the event `'newListener'` when new listeners are added and `'removeListener'` when existing listeners are removed.

Event: 'newListener'

Added in: v0.1.26

- `eventName <string> | <symbol>` The name of the event being listened for
- `listener <Function>` The event handler function

The `EventEmitter` instance will emit its own `'newListener'` event *before* a listener is added to its internal array of listeners.

Listeners registered for the `'newListener'` event will be passed the event name and a reference to the listener being added.

The fact that the event is triggered before adding the listener has a subtle but important side effect: any *additional* listeners registered to the same `name` *within* the `'newListener'` callback will be inserted *before* the listener that is in the process of being added.

```
const myEmitter = new MyEmitter();
// Only do this once so we don't loop forever
myEmitter.once('newListener', (event, listener) => {
  if (event === 'event') {
    // Insert a new listener in front
    myEmitter.on('event', () => {
      console.log('B');
    });
  }
});
```

EventEmitter (Node.js)

emitter.on = subscribe
emitter.off = unsubscribe
emitter.emit = notify

- Class: EventEmitter
 - Event: 'newListener'
 - Event: 'removeListener'
 - EventEmitter.listenerCount(emitter, eventName)
 - EventEmitter.defaultMaxListeners
 - emitter.addListener(eventName, listener)
 - emitter.emit(eventName[, ...args])
 - emitter.eventNames()
 - emitter.getMaxListeners()
 - emitter.listenerCount(eventName)
 - emitter.listeners(eventName)
 - emitter.off(eventName, listener)
 - emitter.on(eventName, listener)
 - emitter.once(eventName, listener)
 - emitter.prependListener(eventName, listener)
 - emitter.prependOnceListener(eventName, listener)
 - emitter.removeAllListeners([eventName])
 - emitter.removeListener(eventName, listener)
 - emitter.setMaxListeners(n)
 - emitter.rawListeners(eventName)

ECMAScript Observable

Hay una propuesta para añadir
Observables al standard library de
ECMAScript.

Aun está en Stage 1.

Patrones de Diseño - Decorator

Descripción y Casos de Uso

Imaginate que...

Entras a apple.com para comprar una computadora, pero en lugar de encontrar “una Macbook Pro de 13” y otra de 15”, encuentras...

MacBook Pro

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15-inch MacBook Pro



New

Touch Bar and Touch ID
2.6GHz 6-Core
Processor with Turbo
Boost up to 4.5GHz
256GB Storage

2.6GHz 6-core 9th-generation
Intel Core i7 processor

Turbo Boost up to 4.5GHz

Radeon Pro 555X with 4GB of GDDR5
memory

16GB 2400MHz DDR4 memory

256GB SSD storage¹

Retina display with True Tone

Touch Bar and Touch ID

Four Thunderbolt 3 ports

\$2,399.00

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New

Touch Bar and Touch ID
2.3GHz 8-Core
Processor with Turbo
Boost up to 4.8GHz
512GB Storage

2.3GHz 8-core 9th-generation
Intel Core i9 processor

Turbo Boost up to 4.8GHz

Radeon Pro 560X with 4GB of GDDR5
memory

16GB 2400MHz DDR4 memory

512GB SSD storage¹

Retina display with True Tone

Touch Bar and Touch ID

Four Thunderbolt 3 ports

\$2,799.00

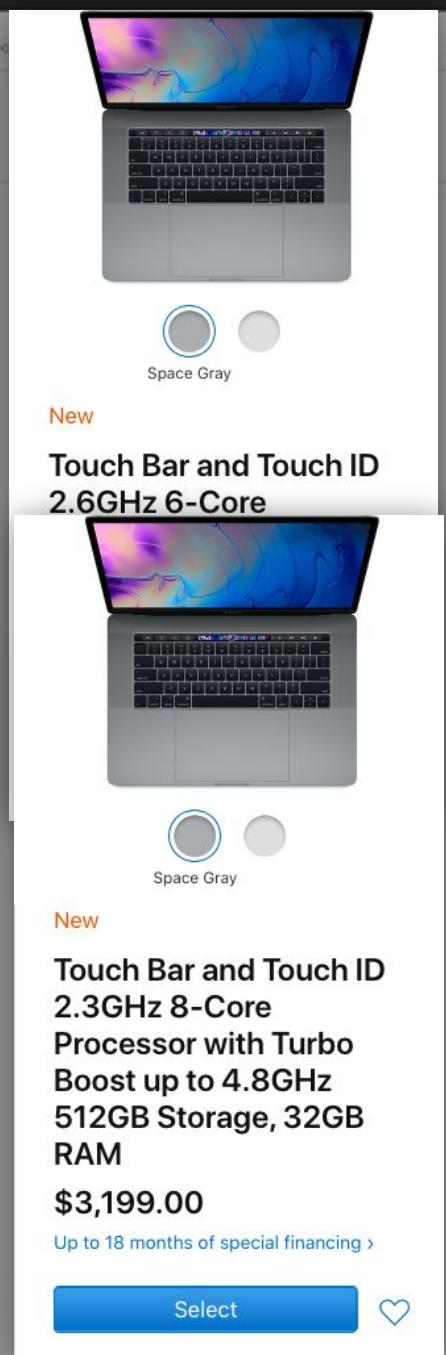
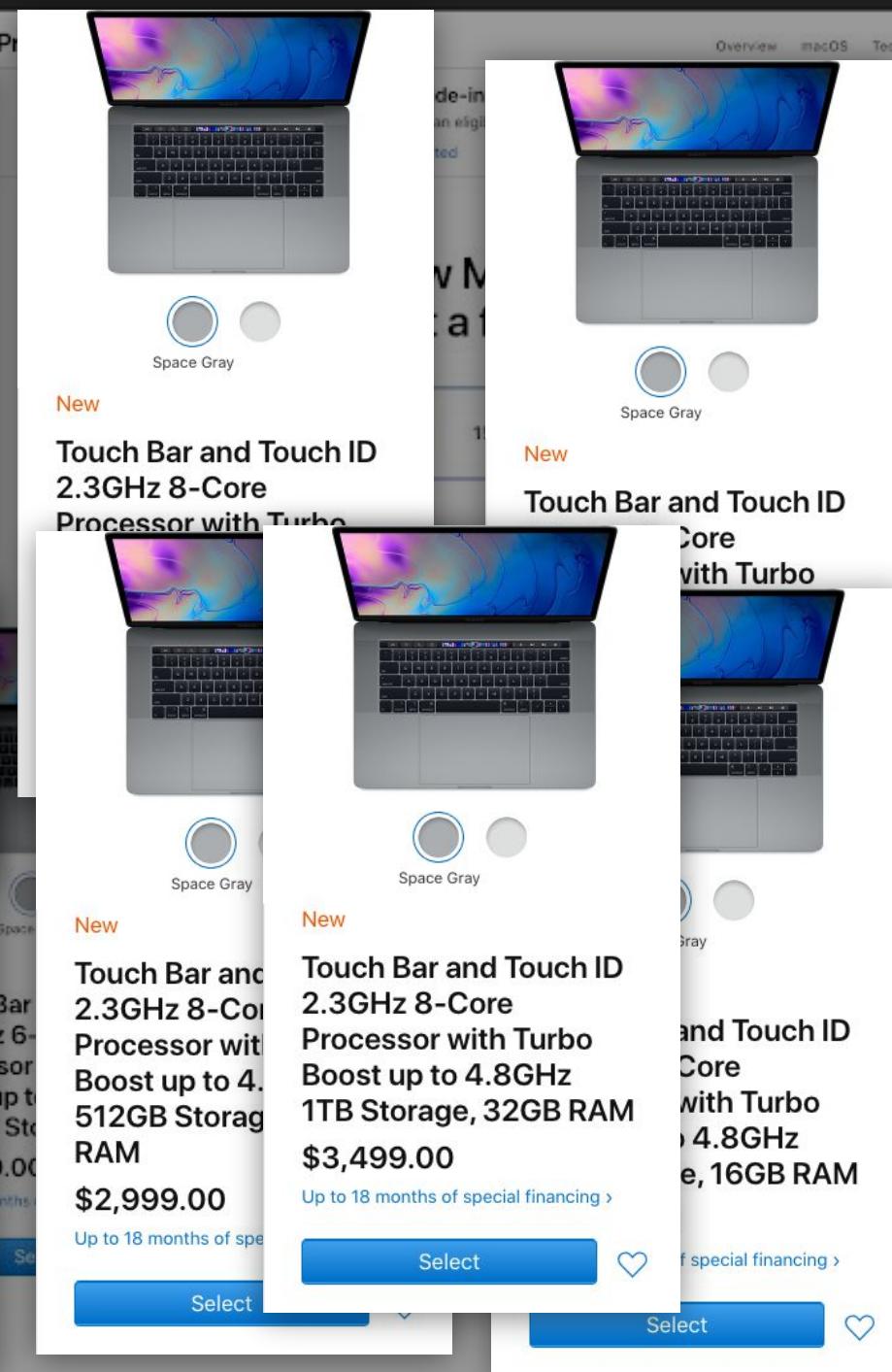
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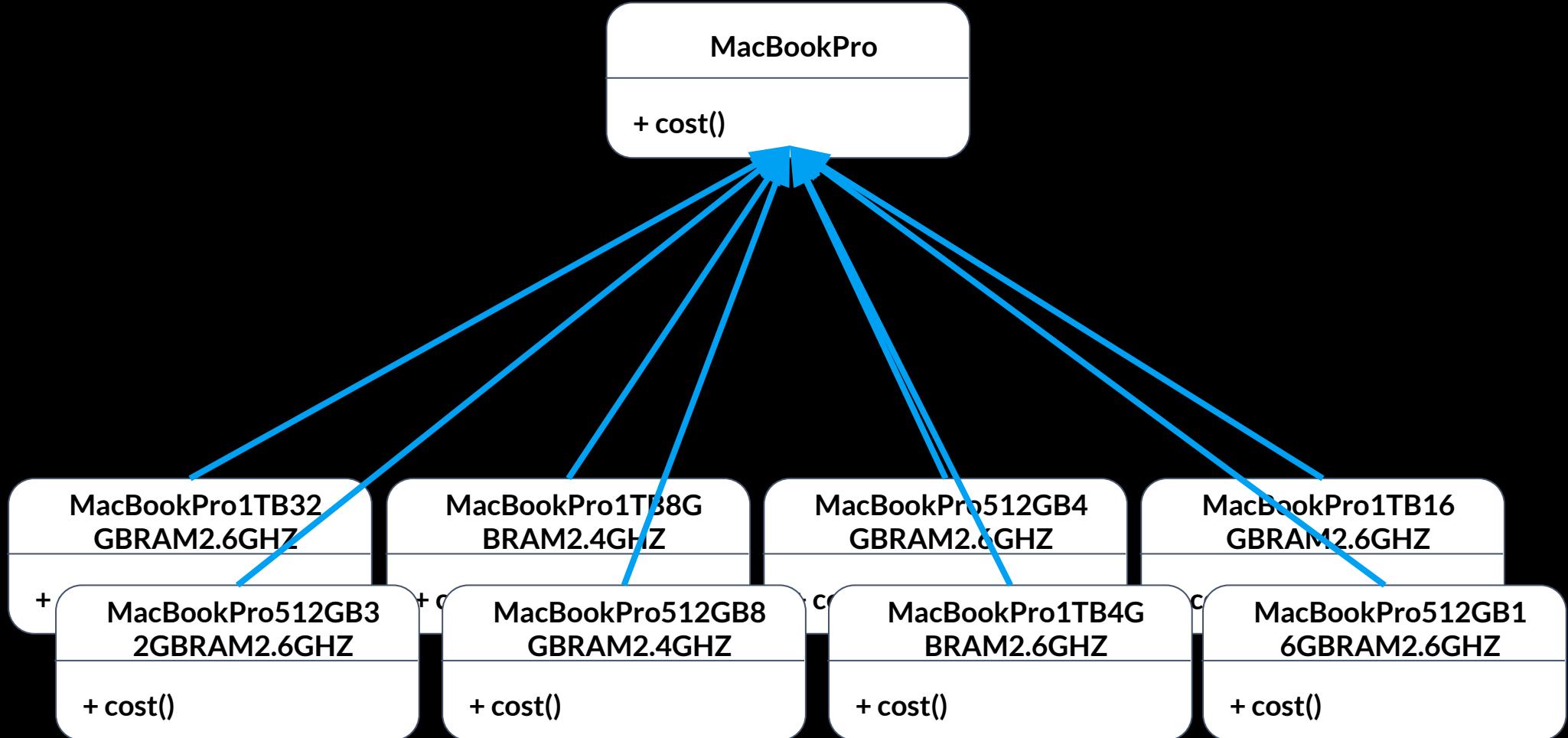
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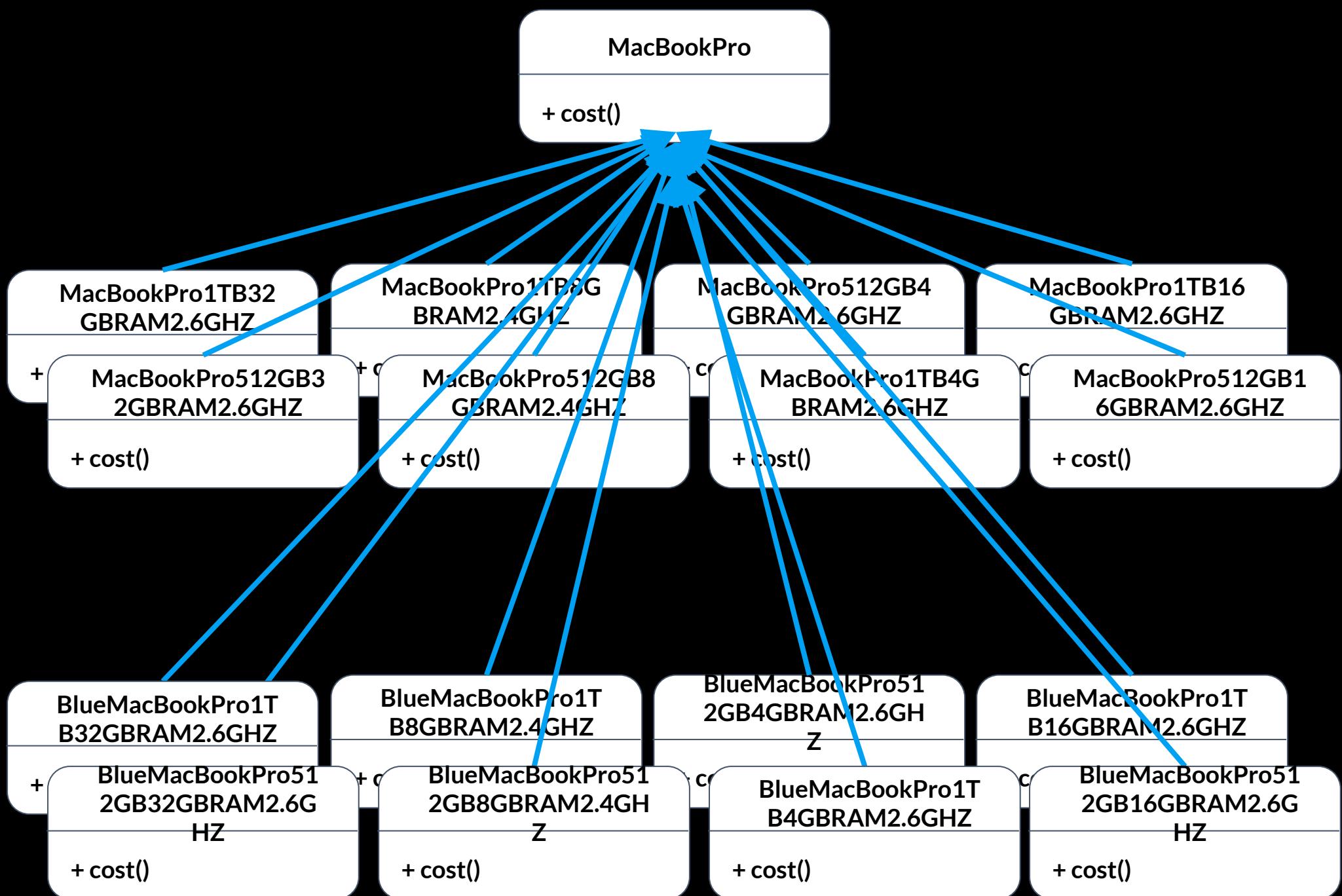




A photograph of a person in a large, white and black panda costume standing at a bus stop. They are holding a small device, possibly a smartphone, up towards the camera. The background shows a bus stop with a sign that says "Bell Aliant" and a payphone. The scene is set at night or in low light.

**“Hola buen dev. Si mire.
Me gustaría añadir un
nuevo modelo color azul.”**

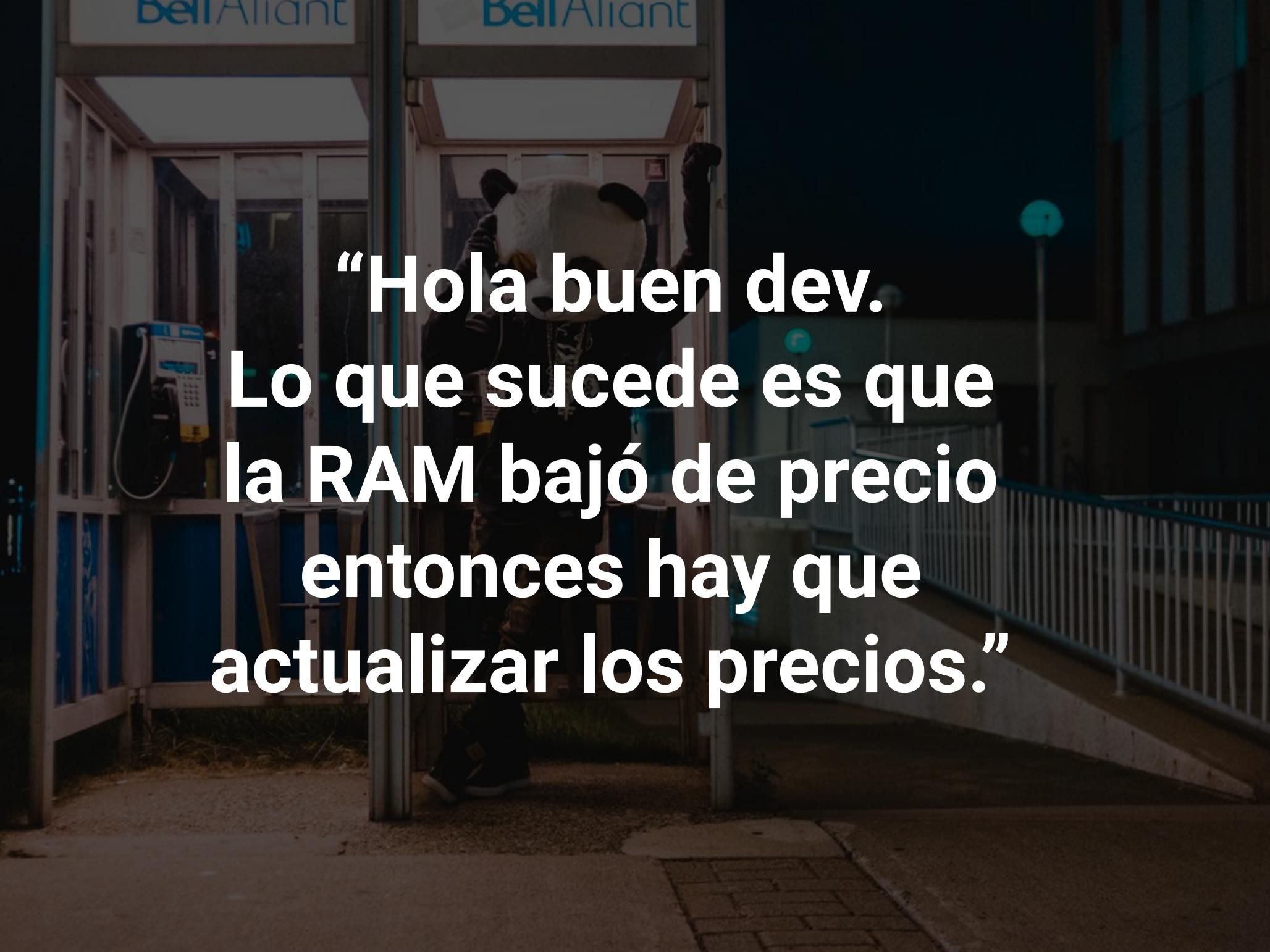






```
class MacBookPro1TB32GBRAM26GHZ {  
    constructor(){ ... }  
  
    cost() {  
        return 3199;  
    }  
}
```

```
class MacBookPro1TB16GBRAM26GHZ {  
    constructor(){ ... }  
  
    cost() {  
        return 2999;  
    }  
}
```



**“Hola buen dev.
Lo que sucede es que
la RAM bajó de precio
entonces hay que
actualizar los precios.”**

“

**Una entidad de software
(clase, módulo, función, etc.)
debe quedar abierta para su
extensión, pero cerrada
para su modificación**

”

*Principio de abierto/cerrado de diseño de software
(Open Closed Principle)*

Patrones de Diseño -
Decorator

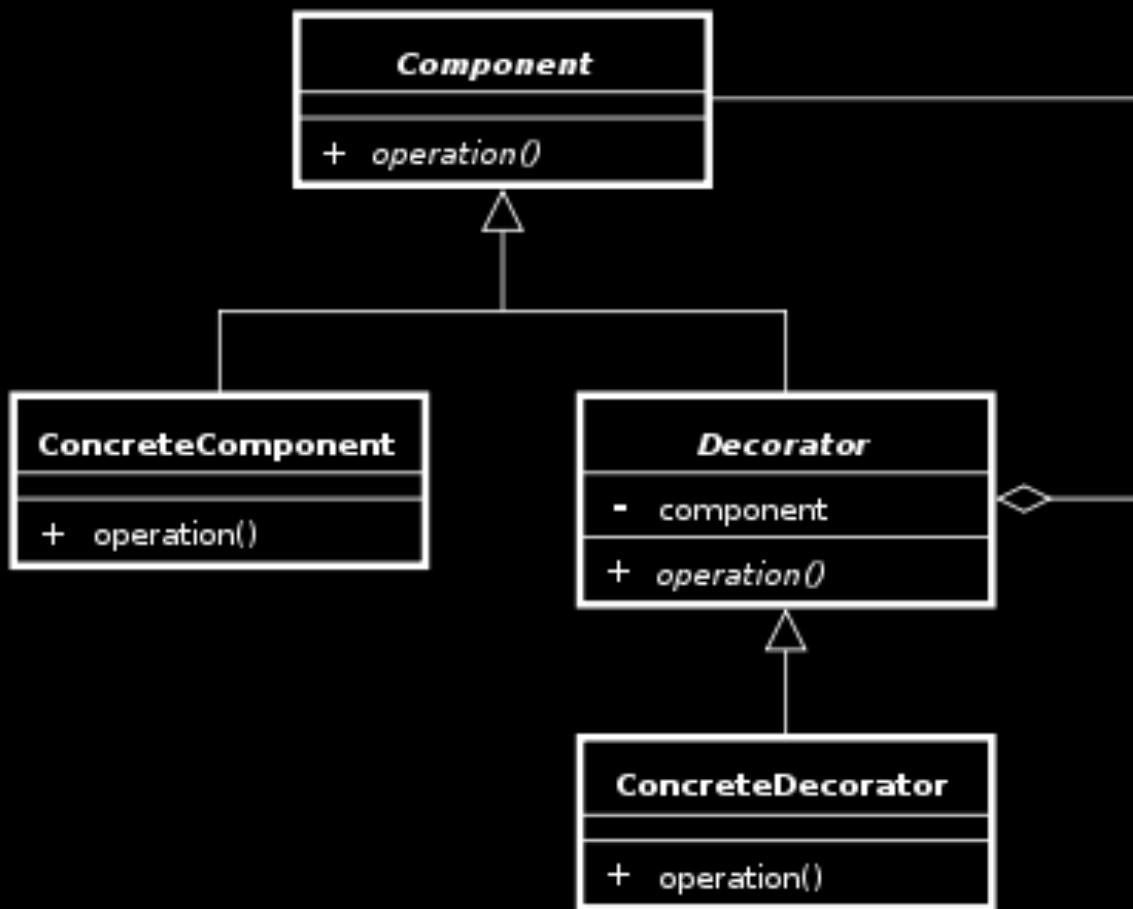
Estructura

Decorator

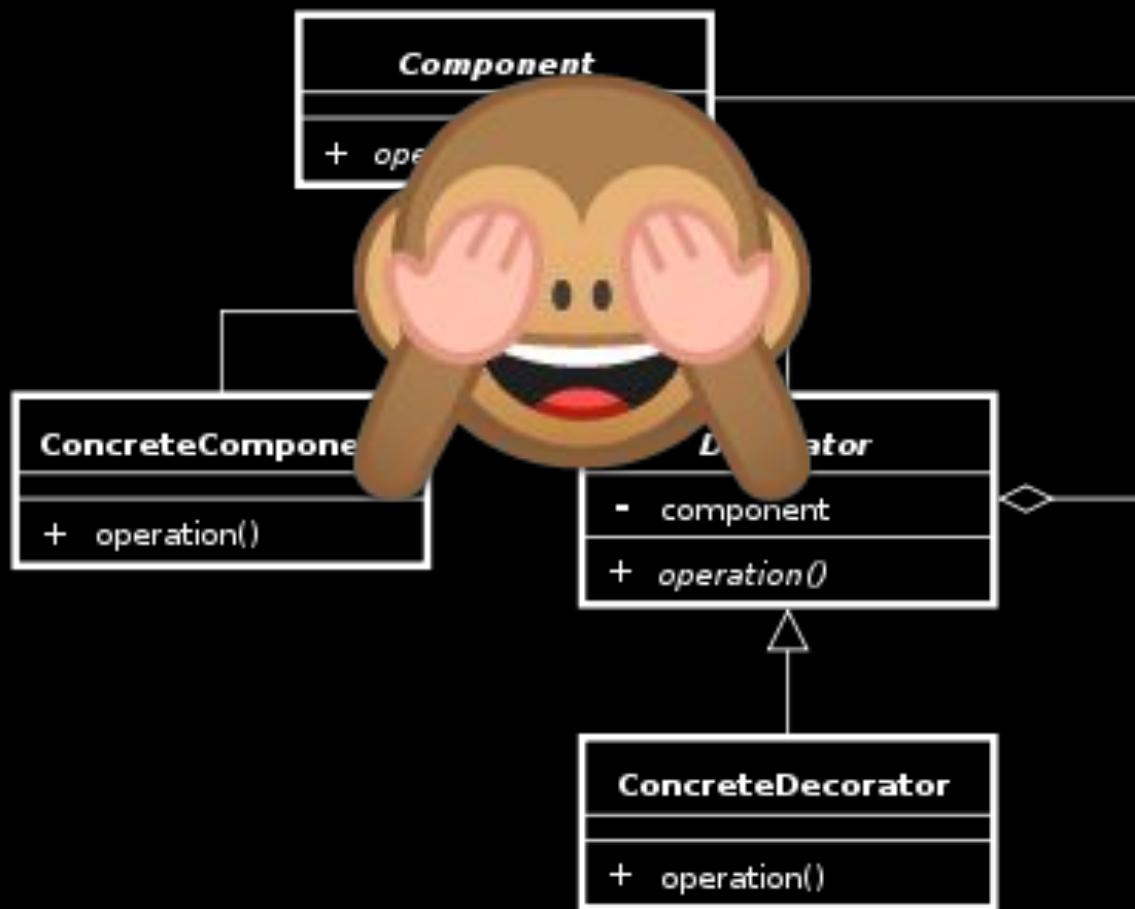
(Estructural)

- Añade nuevas responsabilidades a un objeto de forma dinámica.
- Nos permiten extender funcionalidad sin tener que usar subclases.

Decorator (Estructural)



Decorator (Estructural)



The JavaScript Way

(Monkey patching)

```
class MacbookPro {  
  constructor() { this.memory = 8; }  
  cost() { return 2399; }  
}  
  
function withMemory(amount, computer) {  
  let cost = computer.cost();  
  computer.cost = function () {  
    let memoryCost = Math.max((amount - 8) * 25, 0);  
    return cost + memoryCost;  
  };  
}
```

The JavaScript Way

(Monkey patching)

```
let macbook = new MacbookPro()  
withMemory(32, macbook)  
  
console.log(macbook.cost())  
// 2999
```



The JavaScript Way

Closures

Herencia prototípica

Middleware

ECMAScript Decorators (*Stage 2*)

Patrones de Diseño -
Decorator

Casos de uso

Lodash.memoize



A screenshot of a web browser window showing the source code for Lodash's memoize function. The browser is running on macOS, indicated by the OS X interface elements. The URL in the address bar is <https://github.com/lodash/lodash/blob/4.17.10/lodash.js#L10532>. The code is color-coded for syntax highlighting.

```
10534     * // => ['a', 'b']
10535     *
10536     * // Replace `_.memoize.Cache`.
10537     * _.memoize.Cache = WeakMap;
10538     */
10539     function memoize(func, resolver) {
10540       if (typeof func != 'function' || (resolver != null && typeof resolver != 'function')) {
10541         throw new TypeError(FUNC_ERROR_TEXT);
10542       }
10543       var memoized = function() {
10544         var args = arguments,
10545             key = resolver ? resolver.apply(this, args) : args[0],
10546             cache = memoized.cache;
10547
10548         if (cache.has(key)) {
10549           return cache.get(key);
10550         }
10551         var result = func.apply(this, args);
10552         memoized.cache = cache.set(key, result) || cache;
10553         return result;
10554       };
10555       memoized.cache = new (memoize.Cache || MapCache);
10556       return memoized;
10557     }
10558
10559     // Expose `MapCache`.
10560     memoize.Cache = MapCache;
10561
10562     /**
10563      * Creates a function that negates the result of the predicate `func`. The
10564      * `func` predicate is invoked with the `this` binding and arguments of the
```

Lodash.memoize

The screenshot shows a browser developer tools code editor with the file `lodash/lodash.js at 4.17.10 · lodash`. The code is annotated with handwritten-style text and curly braces:

- A blue curly brace on the left side of the code, spanning from line 10534 to 10558, is labeled **Nueva funcionalidad**.
- A blue arrow points to the word `resolver` in line 10539, which is part of the function signature `memoize(func, resolver)`. Above this, the text **función decorada** is written.
- A large blue curly brace on the right side of the code, spanning from line 10539 to 10564, is labeled **Decorator**.

```
* // => ['a', 'b']
*
* // Replace `_.memoize.Cache`.
* _.memoize.Cache = WeakMap;
*/
function memoize(func, resolver) {
  if (typeof func != 'function' || (resolver != null && typeof resolver != 'function')) {
    throw new TypeError(FUNC_ERROR_TEXT);
  }
  var memoized = function() {
    var args = arguments,
      key = resolver ? resolver.apply(this, args) : args[0],
      cache = memoized.cache;

    if (cache.has(key)) {
      return cache.get(key);
    }
    var result = func.apply(this, args);
    memoized.cache = cache.set(key, result) || cache;
    return result;
  };
  memoized.cache = new (memoize.Cache || MapCache);
  return memoized;
}

// Expose `MapCache`.
memoize.Cache = MapCache;

/** 
 * Creates a function that negates the result of the predicate `func`. The
 * `func` predicate is invoked with the `this` binding and arguments of the
```

```
function measure(fn) {  
  let start = Date.now();  
  fn();  
  console.log(`Time: ${Date.now() - start}ms`);  
}  
  
function fibonacci(num) {...}  
  
let fastFibonacci = lodash.memoize(fibonacci);  
  
measure(() => fastFibonacci(100000)); // "Time: 625ms"  
measure(() => fastFibonacci(100000)); // "Time: 0ms"
```