

Context for today

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Bounty

Bounty \$50

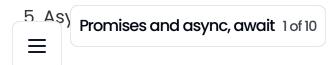
https://webdev-web3.vercel.app/web-dev

https://x.com/MaanilV/status/1822490498252337262

What we're doing today

- 1. Classes in JS
- 2. Revise callbacks
- 3. Callback hell





Assignments

Will release a video on how to solve them

https://github.com/100xdevs-cohort-3/assignments/

Classes in JS

Primitive types

- 1. number
- 2. string
- 3. boolean

Complex types

- 1. Objects
- 2. Arrays

Classes

In JavaScript, classes are a way to define blueprints for creating objects jects defined in the last section).

```
For ex
        Promises and async, await 1 of 10
     lass Rectangle {
      constructor(width, height, color) {
         this.width = width:
         this.height = height;
         this.color = color;
      area() {
        const area = this.width * this.height;
          return area:
      paint() {
           console.log(`Painting with color ${this.color}`);
    const rect = new Rectangle(2, 4)
    const area = rect.area();
    console.log(area)
```

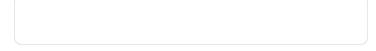
Key Concepts

1. Class Declaration:

- You declare a class using the class keyword.
- Inside a class, you define properties (variables) and methods (functions) that will belong to the objects created from this class.

2. Constructor:

- A special method inside the class that is called when you create an instance (an object) of the class.
- It's used to initialize the properties of the object.





Promises and async, await 1 of 10

d inside the class and can be used by all

4. Inheritance:

• Classes can inherit properties and methods from other classes, allowing you to create a new class based on an existing one.

5. Static Methods:

• Methods that belong to the class itself, not to instances of the class. You call them directly on the class.

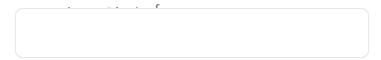
6. Getters and Setters:

 Special methods that allow you to define how properties are accessed and modified.

Inheritance in classes

Inheritance in JavaScript classes allows one class to inherit properties and methods from another class. This mechanism enables code reuse, making it easier to create new classes that are based on existing ones, without having to duplicate code.

Assignment #1 - Create a Circle class



```
Promises and async, await 1of10

area() {
    const area = this.radius * this.radius * Math.PI;
    return area;
}

paint() {
    console.log(`Painting with color ${this.color}`);
}

const circle = new Circle(2, "red")
    const area = circle.area();
    console.log(area)
```

Can you see there is code repetition here and in the Rectangle class?

Assignment #2 - Create a base shape class

Base class

```
class Shape {
  constructor(color) {
    this.color = color;
  }
  paint() {
    console.log(`Painting with color ${this.color}`);
  }
  must be implemented in the subclass');
```

```
Promises and async, await 1 of 10
getDescription() {
    return `A shape with color ${this.color}`;
}
```

Rectangle class

```
class Rectangle extends Shape {
  constructor(width, height, color) {
    super(color); // Call the parent class constructor to set the color
    this.width = width;
    this.height = height;
}

area() {
    return this.width * this.height;
}

getDescription() {
    return `A rectangle with width ${this.width}, height ${this.height}, and color
}
}
```

Circle class

```
class Circle extends Shape {
   constructor(radius, color) {
      super(color); // Call the parent class constructor to set the color
      this.radius = radius;
   }
   area() {
      return Math.PI * this.radius * this.radius;
   }
}
```

```
Promises and async, await 1 of 10

nis.radius} and color ${this.color};
```

Try playing with it

```
const circle = new Circle(20);
console.log(circle.area());
```

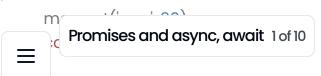
Some more classes

Date

```
const now = new Date(); // Current date and time
console.log(now.toISOString()); // Outputs the date in ISO format
```

Maps





Promise class



Calling a promise is easy, defining your own promise is where things get hard

A **Promise** in JavaScript is an object that represents the eventual completion (or failure) of an asynchronous operation and its resulting value. Promises are used to handle asynchronous operations more effectively than traditional callback functions, providing a cleaner and more manageable way to deal with code that executes asynchronously, such as API calls, file I/O, or timers.

```
Promises and async, await 1of10

e the function definition of setTimeoutPromisifed for now

function setTimeoutPromisified(ms) {
    return new Promise(resolve => setTimeout(resolve, ms));
    }

function callback() {
    console.log("3 seconds have passed");
    }

setTimeoutPromisified(3000).then(callback)
```

Callback hell

Q: Write code that

1. logs hi after 1 second

```
Promises and async, await 1 of 10 step 2
```

▼ Solution (has callback hell)

```
setTimeout(function () {
  console.log("hi");
  setTimeout(function () {
    console.log("hello");

  setTimeout(function () {
    console.log("hello there");
  }, 5000);
  }, 3000);
}, 1000);
```

▼ Alt solution (doesnt really have callback hell)

```
function step3Done() {
  console.log("hello there");
}

function step2Done() {
  console.log("hello");
  setTimeout(step3Done, 5000);
}

function step1Done() {
  console.log("hi");
  setTimeout(step2Done, 3000);
}
```

Promisified version

Now use the promisified version we saw in the last slide

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```
Promises and async, await 1 of 10 s) {

return new Promise(resolve -> setTimeout(resolve, ms));
```

▼ Solution #1 (has callback hell)

```
function setTimeoutPromisified(ms) {
  return new Promise((resolve) => setTimeout(resolve, ms));
}

setTimeoutPromisified(1000).then(function () {
  console.log("hi");
  setTimeoutPromisified(3000).then(function () {
    console.log("hello");
    setTimeoutPromisified(5000).then(function () {
     console.log("hello there");
    });
});
});
});
```

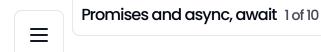
▼ Alt solution

```
setTimeoutPromisified(1000)
.then(function () {
  console.log("hi");
  return setTimeoutPromisified(3000);
})
.then(function () {
  console.log("hello");
  return setTimeoutPromisified(5000);
})
.then(function () {
  console.log("hello there");
});
```

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Async await syntax

The async and await syntax in JavaScript provides a way to write asynchronous code that looks and behaves like synchronous code, making it easier to read and maintain.

It builds on top of Promises and allows you to avoid chaining .then() and .catch() methods while still working with asynchronous operations.

async/await is essentially syntactic sugar on top of Promises.

Assignment

Write code that

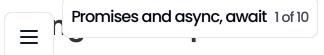
```
1. logs hi after 1 second

2. logs hello 3 seconds after step 1

3. logs hello there 5 seconds after step 2

function setTimeoutPromisified(ms) {
    return new Promise(resolve => setTimeout(resolve, ms));
    }

async function solve() {
    await setTimeoutPromisified(1000);
    console.log("hi");
    await setTimeoutPromisified(3000);
    console.log("hello");
    await setTimeoutPromisified(5000);
    console.log("hi there");
}
```



- 1. You can only call await inside a function if that function is async
- 2. You cant have a top level await

Defining your own async function

Q: Write a function that

- 1. Reads the contents of a file
- 2. Trims the extra space from the left and right
- 3. Writes it back to the file

1. Callback approach

In the callback approach, the function signature should look something like this -

```
function onDone() {
    console.log("file has been cleaned");
}
cleanFile("a.txt", onDone)
```

```
Promises and async, await 1of 10
runction cleanfile (filePath, "utf-8", function (err, data) {
    data = data.trim();
    fs.writeFile(filePath, data, function () {
        cb();
    });
    });
}

function onDone() {
    console.log("file has been cleaned");
}
cleanFile("a.txt", onDone);
```

2. Promisified approach

In the promisified approach, the function signature should look something like this -

```
async function main() {
   await cleanFile("a.txt")
   console.log("Done cleaning file");
}
main();
```

▼ Solution

```
const fs = require("fs");
function cleanFile(filePath, cb) {
    return new Promise(function (resolve) {
        fs.readFile(filePath, "utf-8", function (err, data) {
            data = data.trim();
            fs.writeFile(filePath, data, function () {
                resolve();
            });
        }
}
```

```
Promises and async, await 1 of 10

async function main() {
  await cleanFile("a.txt");
  console.log("Done cleaning file");
 }

main();
```

err first callback vs rejects in promises

Callbacks

fs.readFile function used an err first callback approach to propagate back errors

```
const fs = require("fs")
function afterDone(err, data) {
  if (err) {
    console.log("Error while reading file");
  } else {
    console.log(data)
  }
}
```

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```
Promises and async, await 1 of 10
```

Promises

Promises use the reject argument to propagate errors

```
const fs = require("fs");
function readFilePromisified(filePath) {
 return new Promise(function (resolve, reject) {
  fs.readFile(filePath, "utf-8", function (err, data) {
   if (err) {
    reject("Error while reading file");
   } else {
    resolve(data);
  });
 });
function onDone(data) {
 console.log(data);
function onError(err) {
 console.log("Error: " + err);
readFilePromisified("a.txt").then(onDone).catch(onError);
```

