Practical XI

Objects and Classes

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OVERVIEW & PURPOSE

- Understand and Implement classes and object’s concepts

Content

CHALLENGE

TODO: Coding Challenge #1

1. a) Create a ***Circle*** class to simulate a Circle. Within the class, you should have:

    i) One property, ***radius***.

    ii) A method ***getArea()*** which returns the circle's area. You should use the constant ***PI*** from the ***Math*** library.

    iii) A method ***enlargeCircle()*** such that the circle’s radius will be tripled.

    iv) A method ***shrinkCircle()*** such that the circle’s radius will be halved.

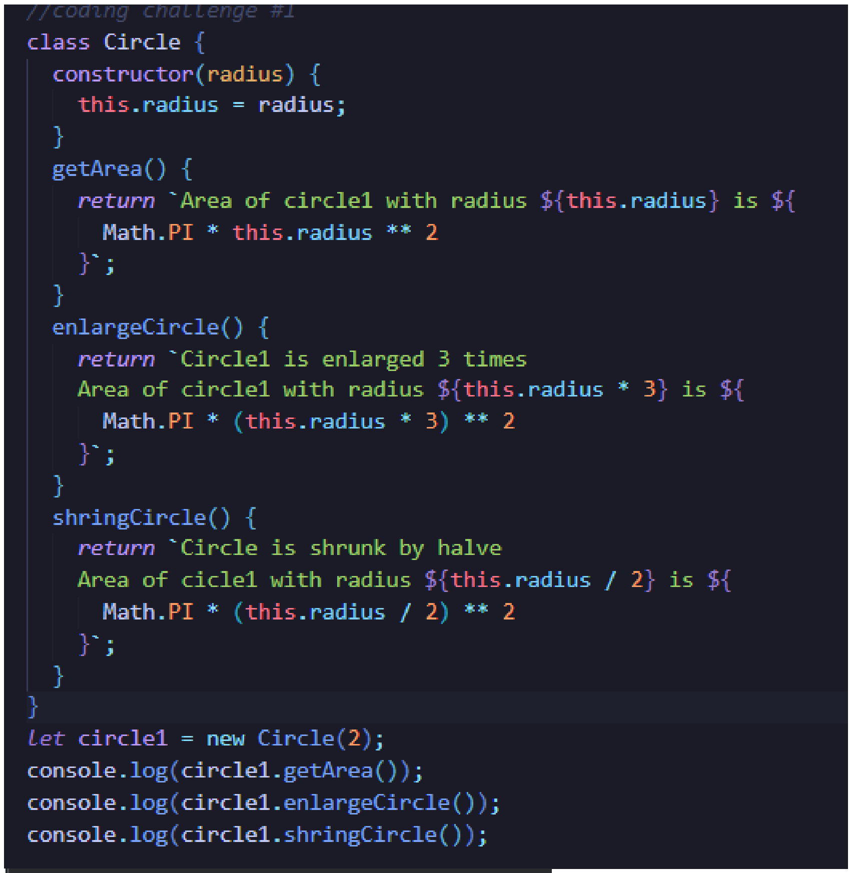
   b) In the main program,

    i) Create an instance of Circle named ***circle1*** with ***radius*** of 2.

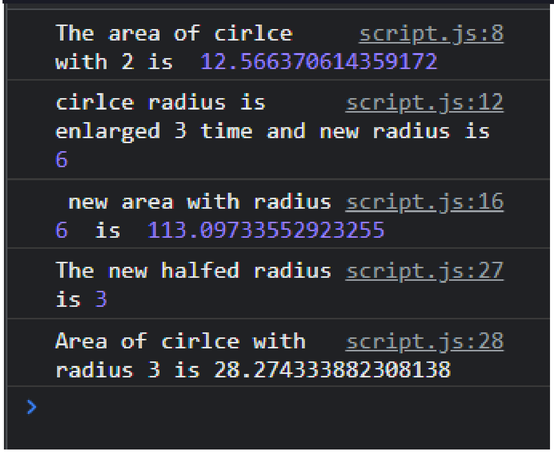
    ii) Display the area of ***circle1*** as shown in the program output.

    iii) Enlarge the radius of ***circle1*** by 3 times and display the area of ***circle1*** as shown in the program output.

    iv) Halve the radius of ***circle1*** and display the area of ***circle1*** as shown in the program output.



```
//coding challenge #1
class Circle {
  constructor(radius) {
    this.radius = radius;
  }
  getArea() {
    return `Area of circle1 with radius ${this.radius} is ${
      Math.PI * this.radius ** 2
    }`;
  }
  enlargeCircle() {
    return `Circle1 is enlarged 3 times
    Area of circle1 with radius ${this.radius * 3} is ${
      Math.PI * (this.radius * 3) ** 2
    }`;
  }
  shringCircle() {
    return `Circle is shrunk by halve
    Area of cicle1 with radius ${this.radius / 2} is ${
      Math.PI * (this.radius / 2) ** 2
    }`;
  }
}
let circle1 = new Circle(2);
console.log(circle1.getArea());
console.log(circle1.enlargeCircle());
console.log(circle1.shringCircle());
```



```
The area of cirlce        script.js:8
with 2 is  12.566370614359172

cirlce radius is         script.js:12
enlarged 3 time and new radius is
6

 new area with radius    script.js:16
6  is  113.09733552923255

The new halfed radius    script.js:27
is 3

Area of cirlce with      script.js:28
radius 3 is 28.274333882308138

>
```

Program output:

```
Area of circle1 with radius 2.0 is 12.566370614359172

Circle is enlarged 3 times
Area of circle1 with radius 6.0 is 113.09733552923255

Circle is shrunk by halve
Area of circle1 with radius 3.0 is 28.274333882308138
```

2. a) Write ***BankAccount*** class that will be used to create bank accounts for all users of the bank. The class consists of the following:

i) Two properties, ***name*** (String type) and ***savings*** (float type).

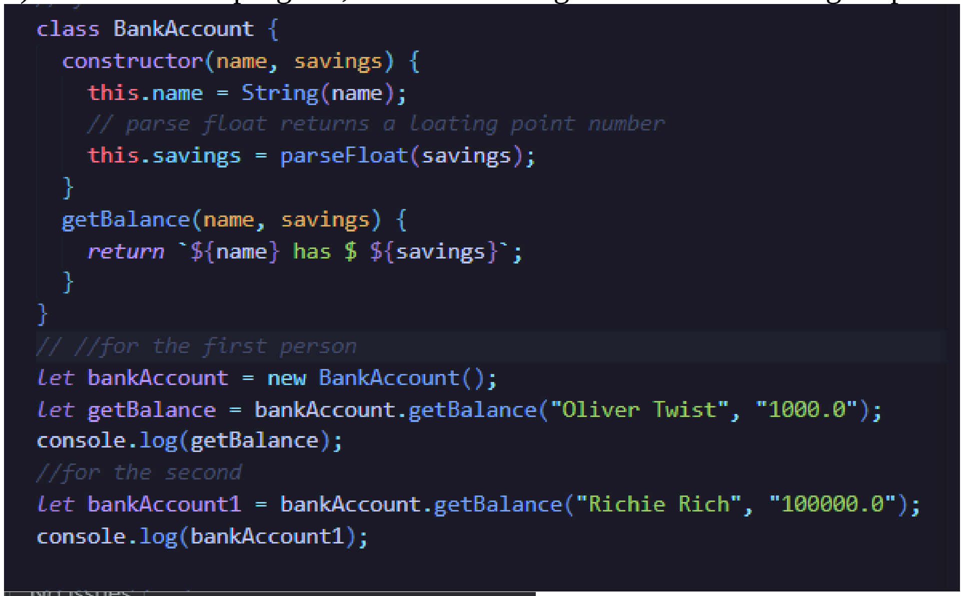
ii) Write the method ***getBalance()*** that returns a String value in the following format:

<name> + "has $"+ <savings>

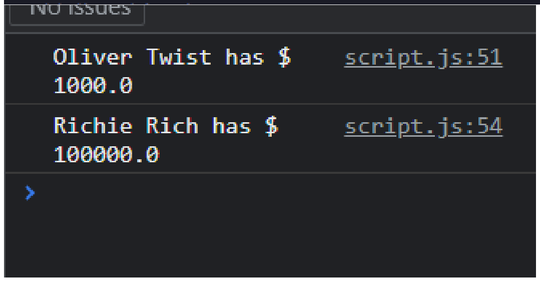
For example,

Tom has $1234.0

b) In the main program, write codes to generate the following output:



```
class BankAccount {
  constructor(name, savings) {
    this.name = String(name);
    // parse float returns a loating point number
    this.savings = parseFloat(savings);
  }
  getBalance(name, savings) {
    return `${name} has $ ${savings}`;
  }
}
// //for the first person
let bankAccount = new BankAccount();
let getBalance = bankAccount.getBalance("Oliver Twist", "1000.0");
console.log(getBalance);
//for the second
let bankAccount1 = bankAccount.getBalance("Richie Rich", "100000.0");
console.log(bankAccount1);
```



```
No Issues

Oliver Twist has $      script.js:51
1000.0
Richie Rich has $       script.js:54
100000.0
>
```

Program output:

```
Oliver Twist has $1000.0
Richie Rich has $100000.0
```

3. Write a class named ***Fan*** to model fans. The properties of the ***Fan*** class are ***speed*** and ***on*** of ***integer*** type and ***boolean*** type respectively.

The values of ***speed***: ***1***, ***2*** and ***3*** denote the speed of the fan as slow, medium and fast respectively.

The value of ***on***: ***true*** denotes the fan is on and ***false*** denotes the fan is off.

Code a method ***getState()*** that returns the state of the fan object as shown.

For example if ***speed*** is ***2*** and ***on*** is ***true***, invoking ***showState()*** will return:

```
    on at medium speed
```

For example if ***on*** is ***false***, invoking ***showState()*** will display:

```
    off
```

In the main program,

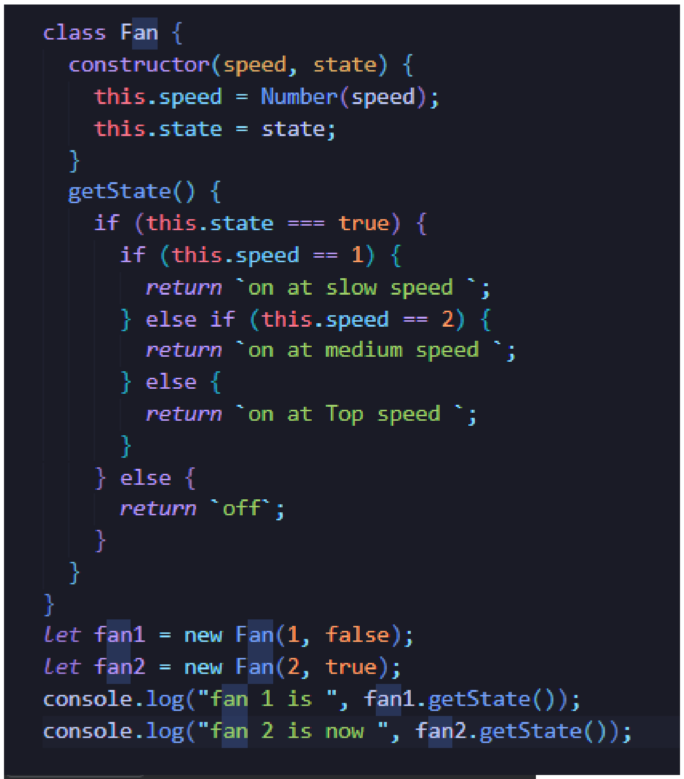
(i) Instantiate 2 Fan objects. The first fan has ***on*** status with ***low*** speed, and the second fan also has ***on*** status with ***fast*** speed.

(ii) Invoke ***getState()*** method to display the state of both fans.

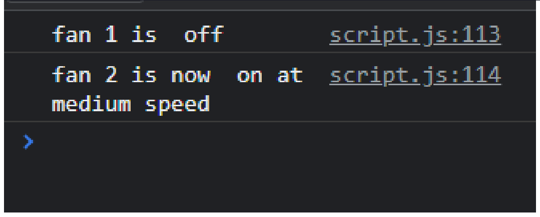
(iii) Switch off the first fan and set the speed of the second fan to medium.

(iv) Invoke ***getState()*** again to display the state of both fans.

Program output:



```
class Fan {
  constructor(speed, state) {
    this.speed = Number(speed);
    this.state = state;
  }
  getState() {
    if (this.state === true) {
      if (this.speed == 1) {
        return `on at slow speed `;
      } else if (this.speed == 2) {
        return `on at medium speed `;
      } else {
        return `on at Top speed `;
      }
    } else {
      return `off`;
    }
  }
}
let fan1 = new Fan(1, false);
let fan2 = new Fan(2, true);
console.log("fan 1 is ", fan1.getState());
console.log("fan 2 is now ", fan2.getState());
```



```
fan 1 is  off              script.js:113
fan 2 is now  on at        script.js:114
medium speed
>
```

```
Fan 1 is on at low speed
Fan 2 is on at fast speed

Fan 1 is now off
Fan 2 is now on at medium speed
```

GOOD LUCK 😊

~ End of Practical ~