St. Francis Institute of Technology Borivli (West), Mumbai-400103

(Autonomous Institute)

Department of Information Technology

Sub: Internet Programming

Experiment – 4: JavaScript Arrow function, Class and Inheritance

Aim: To write a menu driven program in JavaScript to demonstrate the use of arrow function, class, and inheritance.

2. **Objective:** To understand the basic concepts of JavaScript arrow functions, classes and inheritance.

3. **Lab Outcome:** Students will be able to **use** JavaScript to develop interactive web pages (PO3, PO5, PSO3, PSO4)

4. **Prerequisite:** JavaScript

5. **Requirements:** The following are the requirements –
   - PC/Laptop, Visual Studio Code, Browser

6. Pre-Experiment Theory:

JavaScript is the programming language of the Web. JavaScript tis used to program the behaviour of web pages.

In JavaScript we have the following **conditional statements:**

- Use if to specify a block of code to be executed, if a specified condition is true
- Use else to specify a block of code to be executed, if the same condition is false
- Use else if to specify a new condition to test, if the first condition is false
- Use switch to specify many alternative blocks of code to be executed

JavaScript supports different kinds of **loops**:

- for - loops through a block of code a number of times
- for/in - loops through the properties of an object
- for/of - loops through the values of an iterable object
- while - loops through a block of code while a specified condition is true
- do/while - also loops through a block of code while a specified condition is true

JavaScript arrow functions are a **concise syntax** for writing function expressions. Arrow function should not be used as method or as constructor.

Syntax of arrow function when function body has a **single statement:**

```
let myFunction = (arg1, arg2, ...argN) => expression
```

Syntax of arrow function when function body has a **multiple statement:**

```
let myFunction = (arg1, arg2, ...argN) => {
    statement(s)
}
```

Example script using arrow function to display Hello World.

```
<script>
let hello = "";
hello = () => {
  return "Hello World!";
}
document.getElementById("demo").innerHTML = hello();
</script>
```

Example script using arrow function for decision making.

```
const greater = (a) => (a > 15? a: 15);
console.log(greater (25));
```

JavaScript classes are templates for JavaScript objects. A JavaScript class is not an object. It is a template for JavaScript objects. Use the keyword class to create a class. Always add a method named **constructor**().

For example,

```
class ClassName {
        constructor() { ... }
}
```

When you have a class, you can use the class to create objects.

7. Laboratory Exercise:

A. Procedure

- Open Visual Studio Code
- Select File, New, to create a new file, and save it as .html file
- Write html code in html file.
- Write JavaScript either in the html file or
- Write JavaScript in the external .js file and link it into html file.
- To view the output, right-click on the file and select Open With option. Then choose any web browser that is available or check output on console.
- Check the output.

B. Program Code

1. Write a Menu driven program in JavaScript to carry out the following to demonstrate the use of control structures and **arrow functions**-
    1) To take username as input and display Hello Username!
    2) To calculate area of a triangle.
    3) To display whether number given by user is even or odd.
    4) To find greatest number from array of seven numbers.
    5) Find Factorial of a number given by user.

2. Write a Menu driven program in JavaScript to carry out the following to demonstrate the use of classes and inheritance -
    1) Create a class ‘accholder’ with following attribute as ‘accnum’, ‘name’, ‘age’, and ‘balance’ and print details of two employees using display function.
    2) Create a parent class “Calculator” with attributes length, width. Create one derived class named “rectArea” from “calculator” with attribute radius and method to display area of a rectangle. Use super keyword to call parent’s constructor. Then create

derived class “circleArea” from “rectArea” and include method to calculate and display area of a circle.

8. Post Experimental Exercise-

1. Write JavaScript arrow function to display a table of number.
2. Write JavaScript arrow function to print Fibonacci series up to 7 numbers.
3. Write JavaScript arrow function to find if the given year is a leap year or not.
4. Write JavaScript arrow function to find the entered number is a perfect number or not.
5. Create two objects **Dog** and **Cat** using **Animal** prototype function. Declare any two properties and one method of your choice for the Animal prototype. Also write a code to implement any one type of inheritance of your choice.

9. Results/Observations/Program output:

- Present the program code and output.

10. Conclusion:

- Write what was performed in the experiment.
- Write which all features of JavaScript you used to perform the experiment.

11. References:

- HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery) 2Ed., DT Editorial Services
- https://www.w3schools.com/js/default.asp
- https://www.tutorialspoint.com/javascript/index.htm
- https://www.youtube.com/watch?v=W6NZfCO5SIk
- https://www.youtube.com/watch?v=PkZNo7MFNFg

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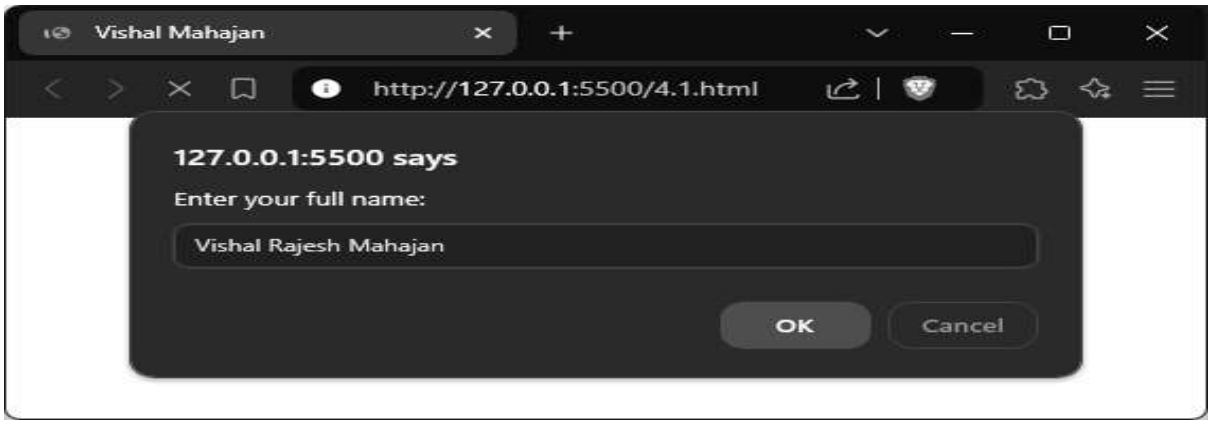
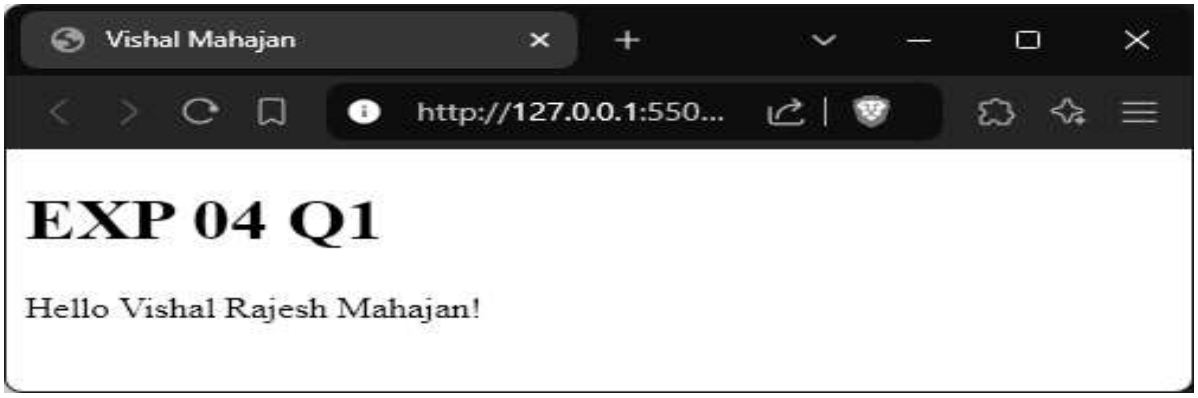
1. Write a Menu driven program in JavaScript to carry out the following to demonstrate the use of control structures and arrow functions

1. To take username as input and display Hello Username!

```
<body>
    <h1>EXP 04 Q1</h1>
    <p id="display"></p>
    <script>
        let x = prompt("Enter your full name:");
        const name = (a) => {
            document.getElementById("display").innerHTML = "Hello " + a + "!";
        }
        name(x);
    </script>
</body>
```





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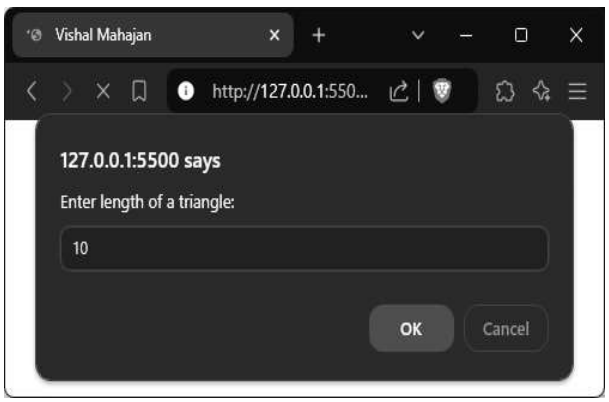
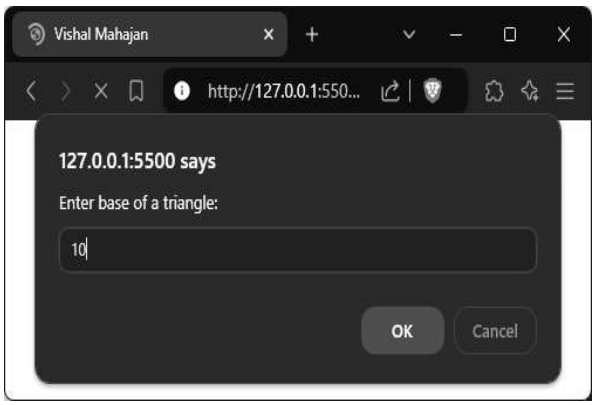
2. To calculate area of a triangle.

```
<body>
    <h1>EXP 04 Q2</h1>
    <h2 id="display"></h2>
    <script>
        let len = prompt("Enter length of a triangle:");
        let base = prompt("Enter base of a triangle:");
        const area = (len,base) => {
            document.getElementById("display").innerHTML = "Area of triangle is "
+ (0.5 * len * base);
        }
        area(len,base);
    </script>
</body>
```





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3. To display whether number given by user is even or odd.

```
<body>
    <h1>EXP 04 Q3 odd or even</h1>
    <h2 id="display"></h2>
    <script>
        (() => {
            let number = prompt("Enter a number:");
            document.getElementById("display").innerHTML = `${number} is ${number
% 2 === 0 ? "even" : "odd"}`;
        })();
    </script>
</body>
```

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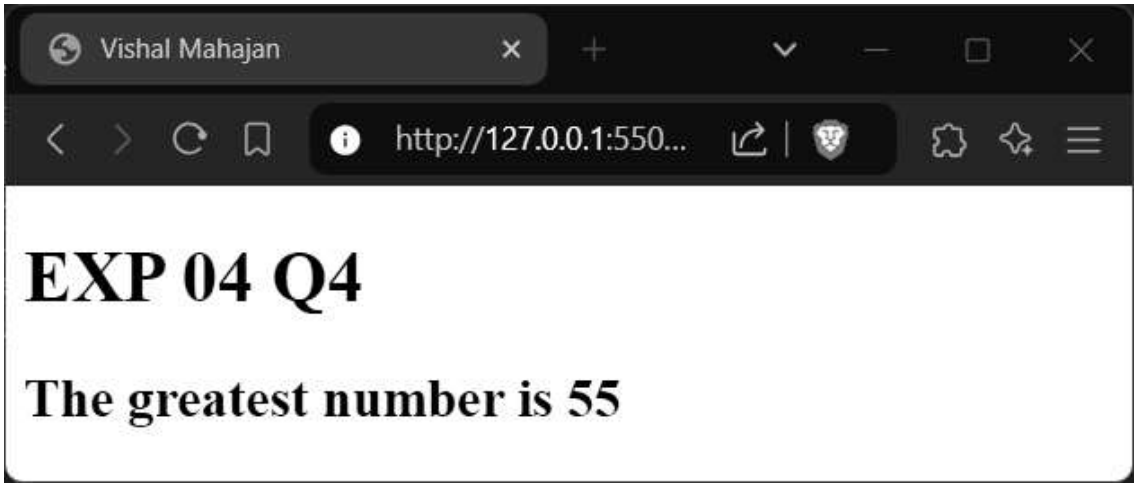
4. To find greatest number from array of seven numbers.

```
<body>
    <h1>EXP 04 Q4</h1>
    <h2 id="display"></h2>
    <script>
        let numbers = [];
        for (let i = 0; i < 7; i++) {
            let num = parseFloat(prompt(`Enter number ${i + 1}:`));
            numbers.push(num);
        }
        const findGreatestNumber = (nums) => Math.max(...nums);
        const greatestNumber = findGreatestNumber(numbers);

        document.getElementById('display').innerText = `The greatest number is
${greatestNumber}`;
    </script>
</body>
```

Inputted Array is 22,33,55,11,23,44,8
Output is ;



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5. Find Factorial of a number given by user.

```
<body>
    <h1>EXP 04 Q5 factorial</h1>
    <h2 id="display"></h2>
    <script>
        let number = parseFloat(prompt("Enter a number:"));
        const factorial = (num) => {
            if (num === 0) {
                return 1;
            }
            return num * factorial(num - 1);
        }
        const fact = factorial(number);
        document.getElementById("display").innerText = `Factorial of ${number} is
${fact}`;
    </script>
</body>
```

2. Write a Menu driven program in JavaScript to carry out the following to demonstrate the use of classes and inheritance -

1) Create a class 'accholder' with following attribute as 'accnum', 'name', 'age', and 'balance' and print details of two employees using display function.

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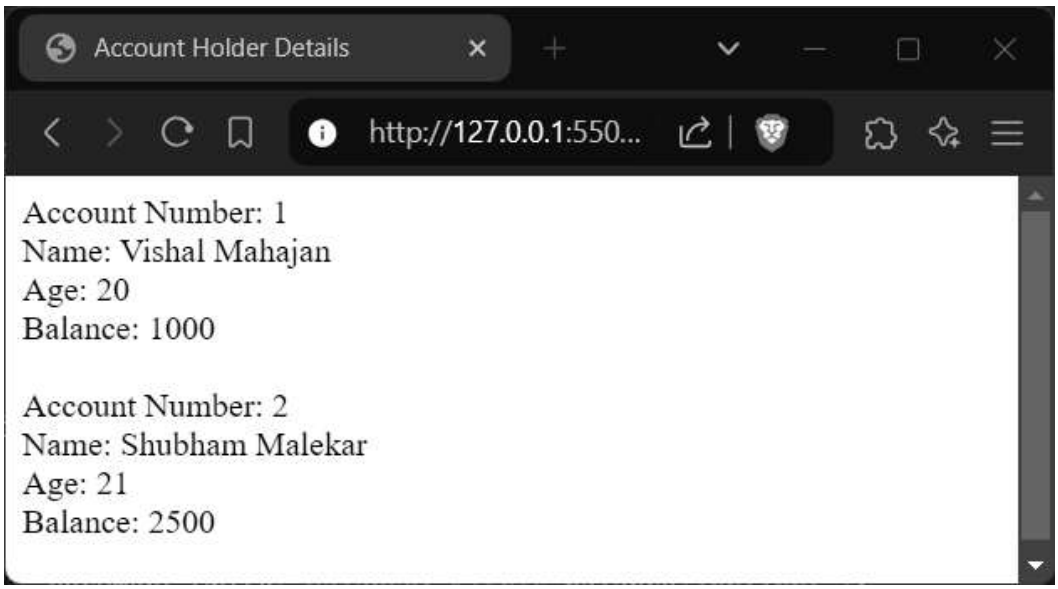
```
<body>
    <script>
        class AccHolder {
            constructor(accnum, name, age, balance) {
                this.accnum = accnum;
                this.name = name;
                this.age = age;
                this.balance = balance;
            }
            display() {
                document.write(`Account Number: ${this.accnum}<br>`);
                document.write(`Name: ${this.name}<br>`);
                document.write(`Age: ${this.age}<br>`);
                document.write(`Balance: ${this.balance}<br><br>`);
            }
        }
        let accHolder1 = new AccHolder("1", "Vishal Mahajan", 20, 1000.0);
        let accHolder2 = new AccHolder("2", "Shubham Malekar", 21, 2500.0);

        accHolder1.display();
        accHolder2.display();
    </script>
</body>
```



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2. Create a parent class "Calculator" with attributes length, width. Create one derived class named "rectArea" from "calculator" with attribute radius and method to display area of a rectangle. Use super keyword to call parent's constructor. Then create derived class "circleArea" from "rectArea" and include method to calculate and display area of a circle.

```
<body>
    <h2 id="display"></h2>
    <script>
        class Calculator {
            constructor(length, width) {
                this.length = length;
                this.width = width;
            }
        }

        class RectArea extends Calculator {
            constructor(length, width) {
                super(length, width);
            }

            displayRectArea() {
                const area = this.length * this.width;
                document.getElementById("display").innerHTML += `Rectangle Area:
${area}<br>`;
            }
        }

        class CircleArea extends RectArea {
            constructor(length, width, radius) {
                super(length, width);
                this.radius = radius;
            }

            displayCircleArea() {
                const area = Math.PI * Math.pow(this.radius, 2);
```

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```
                document.getElementById("display").innerHTML += `Circle Area:
${area.toFixed(2)}<br>`;
            }
        }


        let length = parseFloat(prompt("Enter the length of the rectangle:"));
        let width = parseFloat(prompt("Enter the width of the rectangle:"));
        let rect = new RectArea(length, width);
        rect.displayRectArea();

        let radius = parseFloat(prompt("Enter the radius of the circle:"));
        let circle = new CircleArea(0, 0, radius);
        circle.displayCircleArea();
    </script>
</body>
```