

1. You are building a basic calculator application in JavaScript. Write a JavaScript function called `calculate` that takes three parameters: two numbers and an operator. The function should perform the specified operation on the two numbers and return the result. The supported operations are: Addition (+), Subtraction (-), Multiplication (\*), Division (/). If an invalid operator is provided, the function should return "Invalid operator.". Write the `calculate` function. Example:  
`console.log(calculate(5, 3, '+'))`; should output: 8.  
`console.log(calculate(10, 4, '-'))`; should output: 6.  
`console.log(calculate(6, 2, '*'))`; should output: 12.  
`console.log(calculate(15, 3, '/'))`; should output: 5.  
`console.log(calculate(8, 2, '%'))`; should output: Invalid operator.

Your code should handle all the supported operation and provide the correct result.

2. You are developing a program to check if a give string is a palindrome. A palindrome is a word, phrase, number, or other sequence of characters that reads the same forward and backward (ignoring spaces, punctuation, and capitalization). Write a JavaScript function called `isPalindrome` that takes a string as input and returns `true` if the string is a palindrome, and `false` otherwise. Your function should ignore spaces, punctuation, and capitalization while checking for palindromes. Example:  
`Console.log(isPlaindrome("A man, a plan, a canal, Panama"))`; // should output: true.  
`Console.log(isPlaindrome("racecar"))`; // should output: true.  
`Console.log(isPlaindrome("hello"))`; // should output: false.  
Write the `isPlaindrome` function and test it with the provided examples.

3. You are tasked with implementation of a function to find the financial of a given positive integer using recursion. The factorial of a non-negative integer  $n$  is denoted by  $n!$  and is the product of all positive integers less than or equal to  $n$ . Write a JavaScript function called `factorial` that takes an integer  $n$  as input and returns its factorial. Example:  
`console.log(factorial(5))`; // should output: 120 ( $5! = 5 * 4 * 3 * 2 * 1 = 120$ )  
`console.log(factorial(0))`; // should output: 1 ( $0!$  is defined as 1)  
`console.log(factorial(8))`; // should output: 40320 ( $8! = 8 * 7 * 6 * 5 * 4 * 3 * 2 * 1 = 40320$ )  
Write the `factorial` function and test it with the provided examples.

4. You are creating a simple web page that displays a quote and its author. You want to dynamically update the content of a `<div>` element with the quote and author using JavaScript.

Write a JavaScript function called `displayQuote` that takes two parameters: a quote text and an author name. The function should update the content of a `<div>` element with the ID “quote-container” to display the provided quote and author.

Assume the following HTML structure:

```
<!DOCTYPE html>
<html>
<head>
  <title> Quote Display </title>
</head>
<body>
  <div id = “quote-container”>
    <!-- The content will be updated dynamically using JavaScript -->
  </div>
  <button onclick=”displayQuote(‘Be yourself: everyone else is already taken.’,
‘Oscar Wild’)”> Show Quote </button>

  <script>
    // Your JavaScript Code here
  </script>
</body>
</html>
```

5. You are building a simple quiz application. You have an array of questions and their corresponding options. Write a JavaScript function called `displayQuestion` that takes a question object as a parameter and displays the question and its options in a `<div>` element on the web page.

Assume the following HTML structure:

```
<!DOCTYPE html>
<html>
<head>
  <title> Quiz App </title>
</head>
<body>
  <div id = “question-container”>
    <!-- The Question and options will be displayed here-->
  </div>
  <button onclick=”displayQuestion(question)”> Next Question </button>

  <script>
    // Your JavaScript Code here
  </script>
</body>
</html>
```

6. You are building a simple to-do list application. User can add tasks to their to-do list. Write a JavaScript function called `addTask` that takes a task description as a parameter and adds the task to a `<ul>` element on the web page.

Assume the following HTML structure:

```
<!DOCTYPE html>
<html>
<head>
  <title> To-Do List </title>
</head>
<body>
  <input type="text" id="taskInput" placeholder="Enter task description">
  <button onclick="addTask()">Add Task</button>

  <ul id="taskList">
    <-- The task will be added here -->
  </ul>
  <script>
    // Your JavaScript code here
  </script>
</body>
</html>
```

Write the `addTask` function and add the necessary JavaScript code to add a task to the list when the button is clicked.

7. Three integers need to be sorted, therefore create a JavaScript conditional expression. To show the outcomes, display an alert box. Typical values are 0, -1, 4. 4, 0, -1 as a result.

8. Write a JavaScript program that computes the average marks of the following students. Then, this average is used to determine the corresponding grade. The grades are computed as follows:

Student Name	Marks
David	80
Vinoth	77
Divya	88
Ishita	95
Thomas	68

Range	Grade
<60	F
<70	D
<80	C
<90	B
<100	A

9. You are creating a simple interactive web page. Write a JavaScript function called `changeBackgroundColor` that changes the background color of an HTML element when the mouse enters it. The function should take two parameters: the ID of the element and the new background color.
10. You are developing a web form that requires users to fill in certain fields before submitting. Write a JavaScript program that implements form validation to display an error message if a required field is left empty when submitting the form. Assume you have the following HTML structure for the form:

```
<!DOCTYPE html>
<html>
<head>
  <title> Form Validation </title>
</head>
<body>
  <form id="myForm">
    <label for="name"> Name: </label>
    <input type="text" id="name" name="name" required>
    <br>
    <label for="email"> Email: </label>
    <input type="text" id="email" name="email" required>
    <br>
    <button type="submit"> Submit </button>
  </form>

  <p id="errorMessage" style="color: red"></p>
  <script>
    // your JavaScript code here
  </script>
</body>
</html>
```

Write the JavaScript program to implement form validation and display an error message if a required field is left empty when submitting the form.

11. You are tasked with creating a JavaScript program that models people's information. Write a JavaScript program that defines a class called `Person`. The `Person` class should have properties for name, age, and country. Additionally, include a method named `displayDetails` that displays the person's information. Create two instances of the `Person` class with different values and call the `displayDetails` method for each instance to show their details.