

# Lab Exercise: Introduction to JavaScript Object and Events.

## Background

Welcome to this lab exercise on JavaScript object literals, function constructors, closures, and events. In this exercise, you will have the opportunity to work on 15 different problems, each designed to help you gain a deeper understanding of these important concepts.

Throughout the exercise, you will be tasked with creating and manipulating JavaScript objects using object literals and function constructors. You will also have the opportunity to explore the power of closures and how they can be used to encapsulate data and functionality.

Finally, you will learn about events in JavaScript and how they can be used to add interactivity to your web pages.

Each problem in this exercise is designed to be simple and straightforward but will still challenge you to think creatively and apply what you have learned. We encourage you to work through each problem carefully and take your time to understand the concepts being presented fully.

We hope you find this exercise to be both fun and educational and that it helps you build a strong foundation in JavaScript programming. Good luck!

## Objectives

In this lab exercise, you will learn how to:

- To give students a practical understanding of JavaScript object literals and function constructors.
- To teach students how to use closures to encapsulate data and functionality in JavaScript.
- To give students hands-on experience with creating and using events in JavaScript.
- To challenge students to think creatively and apply what they have learned to solve various programming problems.
- To help students build a strong foundation in JavaScript programming, which will be helpful in future web development projects.

By completing this lab exercise, students should feel confident in their ability to create and manipulate JavaScript objects, work with closures, and add interactivity to their web pages using events.

## Lab Exercise 1: Object Literals and Properties

Objective: To create and manipulate JavaScript object literals by adding and modifying properties.

### Problem Descriptions:

1. Create a user object with properties for name, age, and email.

2. Add a property to the user object for their favourite book.
3. Change the email property of the user object to a new email address.
4. Create a car object with properties for make, model, and year.
5. Add a property to the car object for the number of doors.
6. Change the year property of the car object to a new car year.

### **Lab Exercise 2: Object Literals and Methods**

Objective: To create and manipulate JavaScript object literals by adding and invoking methods.

#### **Problem Descriptions:**

1. Create a calculator object with properties for num1 and num2.
2. Add a method to the calculator object that returns the product of num1 and num2.
3. Create a shoppingCart object with properties for items and totalPrice.
4. Add a method to the shoppingCart object that adds an item to the cart.
5. Add a method to the shoppingCart object that removes an item from the cart.

### **Lab Exercise 3: Creating Objects with Function Constructors**

Objective: To create objects using JavaScript function constructors.

#### **Problem Descriptions:**

1. Create a Student constructor function with name, age, and grade level properties.
2. Create an instance of the Student constructor function with the name "Jane", age 17, and grade level 11.
3. Create a Teacher constructor function with properties for name, subject, and years of experience.
4. Create an instance of the Teacher constructor function with the name "Mr. Smith," subject, "Math", and 5 years of experience.
5. Create a Book constructor function with properties for title, author, and pages.
6. Create an instance of the Book constructor function with the title "JavaScript Basics," author "Harper Lee," and 281 pages.

### **Lab Exercise 4: Using Function Constructors with Methods**

Objective: To create objects using JavaScript function constructors and add methods to them.

#### **Problem Descriptions:**

1. Create a BankAccount constructor function with properties for account number and balance.

2. Add a method to the BankAccount constructor function that allows a deposit to be made into the account.
3. Add a method to the BankAccount constructor function that allows a withdrawal to be made from the account.
4. Create an instance of the BankAccount constructor function with an account number of 123456 and a balance of \$1000.
5. Make a deposit of \$500 into the account using the deposit method.
6. Make a withdrawal of \$200 from the account using the withdrawal method.

### **Lab Exercise 5: Basic Closures**

Objective: To create and manipulate basic JavaScript closures.

#### **Problem Descriptions:**

1. Create a function that takes a parameter and returns a function that adds the parameter to a number.
2. Create a closure that stores a number and has a method for adding to that number.
3. Create a closure that stores an array of numbers and has a method for adding a number to the array.
4. Create a closure that stores an array of numbers and has a method for calculating the average of the numbers in the array.
5. Create a closure that generates a message that is displayed after a specified number of seconds.

### **Lab Exercise 6: JavaScript Events with addEventListener and onEvent**

Objective: To practice creating and handling JavaScript events using addEventListener and onEvent.

#### **Problem Description:**

1. Create an HTML document with a button element and a div element.
2. Attach a click event listener to the button element using addEventListener.
3. When the button is clicked, change the text of the div element to "Hello, world!" using addEventListener.
4. Attach a mouseover event listener to the div element using onmouseover.
5. When the mouse is over the div element, change the text of the div element to "Mouse over!" using onmouseover.
6. Attach a mouseout event listener to the div element using onmouseout.
7. When the mouse leaves the div element, change the text of the div element to "Mouse out!" using onmouseout.

### **Lab Exercise 7: JavaScript Events with addEventListener and onEvent**

Objective: To create a JavaScript function that accesses HTML form elements using addEventListener.

#### **Problem Description:**

1. Create an HTML document with a form element that contains input fields for name, email, and message.
2. Attach a submit event listener to the form element using addEventListener.
3. When the form is submitted, prevent the default form subbehaviour behavior.
4. Use the document.getElementById or document.querySelector method to get references to the input fields in the form.
5. Use the values of the input fields to create a message that includes the name, email, and message.
6. Use the alert method to display the message to the user.

### **Lab Exercise 8:**

Objective: To create a JavaScript function that validates an HTML form using addEventListener before submission.

#### **Problem Description:**

1. Create an HTML document with a form element that contains input fields for name, email, and message.
2. Attach a submit event listener to the form element using addEventListener.
3. When the form is submitted, prevent the default form submission behavior.
4. Use the document.getElementById or document.querySelector method to get references to the input fields in the form.
5. validate the input fields to make sure they are not empty.
6. If any of the input fields are invalid, display an error message to the user.
7. If all of the input fields are valid, submit the form.