Working with Arrays and Objects in Java Script

Objective:

By the end of this lab, students should be able to:

- Declare and manipulate arrays and objects in JavaScript.
- Access, add, update, and remove array and object elements.
- Use common array methods (map, filter, reduce, forEach, etc.).
- Understand how to nest and combine arrays and objects.

1. Arrays – Basics

Task 1.1: Creating and Accessing Arrays

Create an array called fruits that contains the following items: "Apple", "Banana", "Mango", "Orange", "Grapes".

```
const fruits = ["Apple", "Banana", "Mango", "Orange", "Grapes"];
console.log(fruits);
```

Try these:

- Print the first and last item in the array.
- Add a new fruit at the end of the array.
- Remove the second fruit.
- Find the length of the array.

Task 1.2: Looping Through an Array

Use both for loop and forEach() to print each fruit on a new line.

```
fruits.forEach((fruit) => {
  console.log(fruit);
});
```

Question: What's the difference between using a normal for loop and forEach()?

2. Array Methods

Task 2.1: Transforming Arrays

Use the array of numbers below:

```
const numbers = [2, 5, 8, 10, 12];
```

- Use .map() to create a new array that doubles each number.
- Use .filter() to keep only numbers greater than 6.
- Use .reduce() to find the sum of all numbers.

Task 2.2: Searching and Sorting

- Check if 8 is in the array (includes() method).
- Find the index of 10.
- Sort the array in ascending order.

3. Objects – Basics

Task 3.1: Creating and Accessing Objects

Create an object called student with the following properties: name, age, faculty, subjects.

```
const student = {
  name: "Kavindu",
  age: 21,
  faculty: "Computing",
  subjects: ["Web Development", "Database Systems",
"Programming"]
};
```

- Print the student's name and faculty.
- Add a new property called year with value 2025.
- Change the age to 22.
- Print all subjects in a loop.

4. Nested Objects and Arrays

Task 4.1: Array of Objects

```
const students = [
  {name: "Kavindu", age: 21, faculty: "Computing"},
  {name: "Nimesha", age: 22, faculty: "Engineering"},
  {name: "Dinuka", age: 23, faculty: "Business"}
];
```

- Print all student names.
- Use .filter() to find students older than 21.
- Use .map() to create an array of all faculty names.

Task 4.2: Object Containing an Array of Objects

```
const classroom = {
  className: "IT2025",
  teacher: "Mr. Perera",
  students: [
    {name: "Kavindu", age: 21},
    {name: "Nimesha", age: 22},
    {name: "Dinuka", age: 23}
  ]
};
```

- Print the teacher's name.
- Add a new student to the array.
- Print all student names in the classroom.

5. Challenge Activity

Create a script that stores a list of products (name, price, quantity) and calculates the total value of all products.

```
const products = [
  {name: "Keyboard", price: 2500, qty: 2},
  {name: "Mouse", price: 1500, qty: 3 },
  {name: "Monitor", price: 22000, qty: 1}
];
```

Hint: Use .reduce() to calculate the total value.

6. Reflection Questions

1. What is the difference between an array and an object?
2. Why are arrays and objects often used together?
3. What was the most challenging part of this lab?

7. Submission

- Submit your screenshots with the Code showing successful outputs. **Include comments in your code explaining each step.**
- Upload your code to GitHub and share the link.