**JavaScript Looping through Arrays and Objects Bootcamp: Agenda and Practice Questions**

**Agenda:**

1. **Introduction to Looping in JavaScript**
   * Importance of mastering loops for data manipulation.
2. **Looping through Arrays**
   * Detailed explanations of various methods for looping through arrays.
   * Practice questions focusing on array iterations.
3. **Looping through Objects**
   * Techniques for iterating over object properties.
   * Practice questions emphasizing object iterations.
4. **Combining Loops for Complex Structures**
   * Techniques for handling nested structures (arrays of objects, etc.).
   * Practice questions combining loops for deeper logic.
5. **Wrap-up**
   * Review of challenges and areas of improvement.

**Looping through Arrays: Key Explanations**

1. **for loop** – A traditional loop for iterating through an array by index.

javascript

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const arr = [1, 2, 3];

for (let i = 0; i < arr.length; i++) {

console.log(arr[i]);

}

1. **for...of loop** – Iterates over iterable objects (like arrays) and returns the value of each element.

javascript

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for (const num of arr) {

console.log(num);

}

1. **forEach()** – Executes a provided function once for each array element.

javascript

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arr.forEach(num => {

console.log(num);

});

1. **map()** – Creates a new array populated with the results of calling a provided function on every element.

javascript

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const doubled = arr.map(num => num \* 2);

1. **filter()** – Creates a new array with all elements that pass the test implemented by the provided function.

javascript

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const evens = arr.filter(num => num % 2 === 0);

**Looping through Objects: Key Explanations**

1. **for...in loop** – Iterates over the keys of an object.

javascript

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const obj = { a: 1, b: 2 };

for (const key in obj) {

console.log(key, obj[key]);

}

1. **Object.keys()** – Returns an array of an object's property names, allowing use of array methods to iterate.

javascript

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Object.keys(obj).forEach(key => {

console.log(key, obj[key]);

});

1. **Object.values()** – Returns an array of an object's values, enabling iteration over values directly.

javascript

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Object.values(obj).forEach(value => {

console.log(value);

});

1. **Object.entries()** – Returns an array of an object's key-value pairs, allowing both keys and values to be accessed.

javascript

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Object.entries(obj).forEach(([key, value]) => {

console.log(key, value);

});

**Practice Questions**

**Looping through Arrays:**

1. Write a for loop that prints each element of an array of colors.
2. Create a function that uses for...of to log each number in an array of scores, adding 10 to each score.
3. Use forEach() to create a new array that contains only the lengths of strings in an array of names.
4. Use map() to create an array of strings that state the square of each number in an array of integers.
5. Filter an array of mixed numbers (positive and negative) to return only the positive numbers using filter().

**Looping through Objects:**

1. Create an object representing a book with properties like title, author, and year. Use a for...in loop to log each property and its value.
2. Write a function that takes an object representing a student and uses Object.keys() to log all property names.
3. Given an object of user settings, use Object.values() to log all settings values.
4. Create an object with multiple nested properties and use Object.entries() to print both keys and values.

**Combining Loops for Complex Structures:**

1. Given an array of objects representing students (with properties name and grades), use a nested loop to print each student's name and their grades.
2. Write a function that accepts an array of objects and returns a new array containing the names of all students who scored above 75.
3. Use a for...of loop to iterate through an array of objects and a for...in loop to iterate through each object's properties, logging both keys and values.
4. Create an array of objects representing products (with properties name and price), and write a function that calculates the total price of all products using nested loops.