.

Lesson 02 Demo 03

Balanced Array

Objective: To ascertain whether an array of even length can be divided into two halves with equal sums and unique elements in each half

Tools required: Visual Studio Code (VS Code) and JavaScript

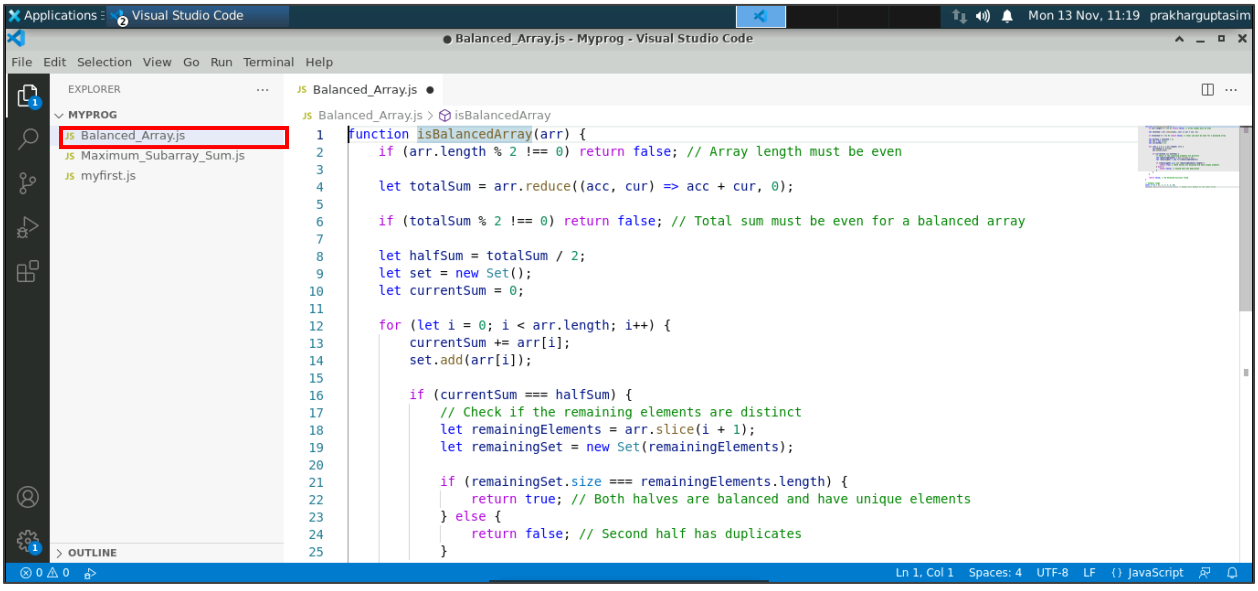
Prerequisites: Perform demo 01 of lesson 02

Steps to be followed:

1. Create the algorithm and run it

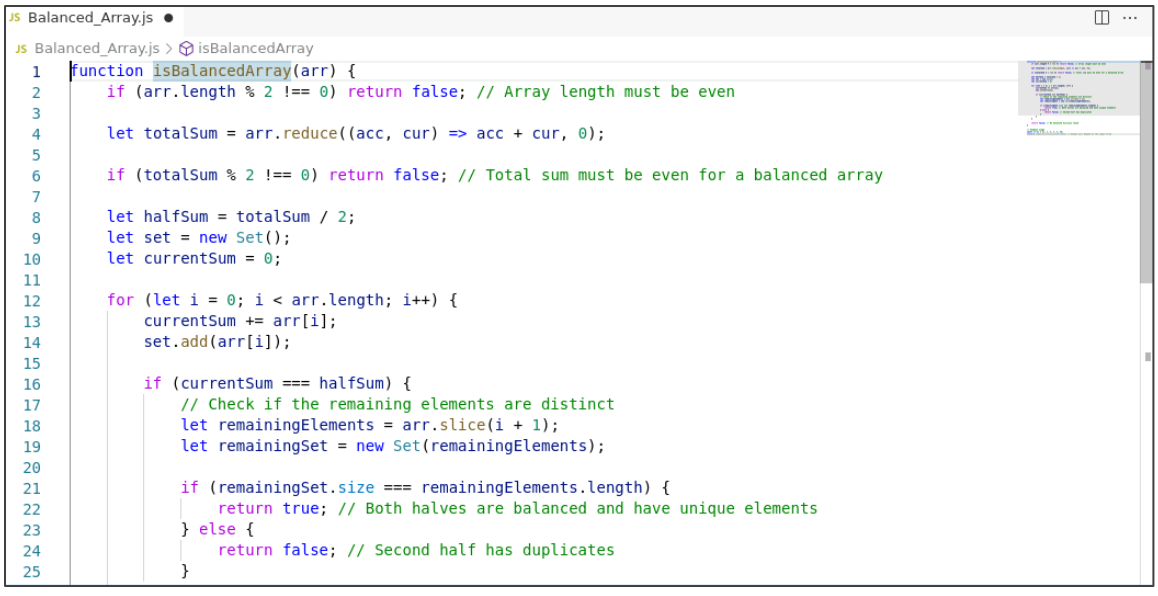
Step 1: Create the algorithm and run it

1.1 Create a JavaScript file named **Balanced_Array.js** shown below:



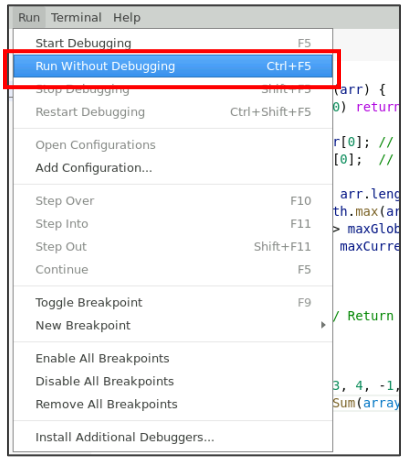
1.2 Paste the code in the file created in step 1.1 as shown below:

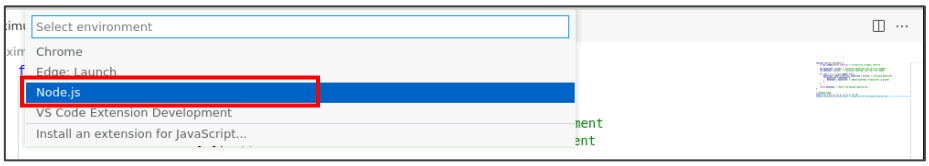
```
function isBalancedArray(arr) {
if (arr.length % 2 !== 0) return false; // Array length must be even
let totalSum = arr.reduce((acc, cur) => acc + cur, 0);
if (totalSum % 2 !== 0) return false; // Total sum must be even for a balanced array
let halfSum = totalSum / 2;
let set = new Set();
let currentSum = 0;
for (let i = 0; i < arr.length; i++) {
currentSum += arr[i];
set.add(arr[i]);
if (currentSum === halfSum) {
// Check if the remaining elements are distinct
let remainingElements = arr.slice(i + 1);
let remainingSet = new Set(remainingElements);
if (remainingSet.size === remainingElements.length) {
   return true; // Both halves are balanced and have unique elements
 } else {
   return false; // Second half has duplicates
}
}
}
return false; // No balanced division found
}
// Example usage
const array = [1, 2, 3, 4, 5, 6];
console.log(isBalancedArray(array)); // Output will depend on the input array
```



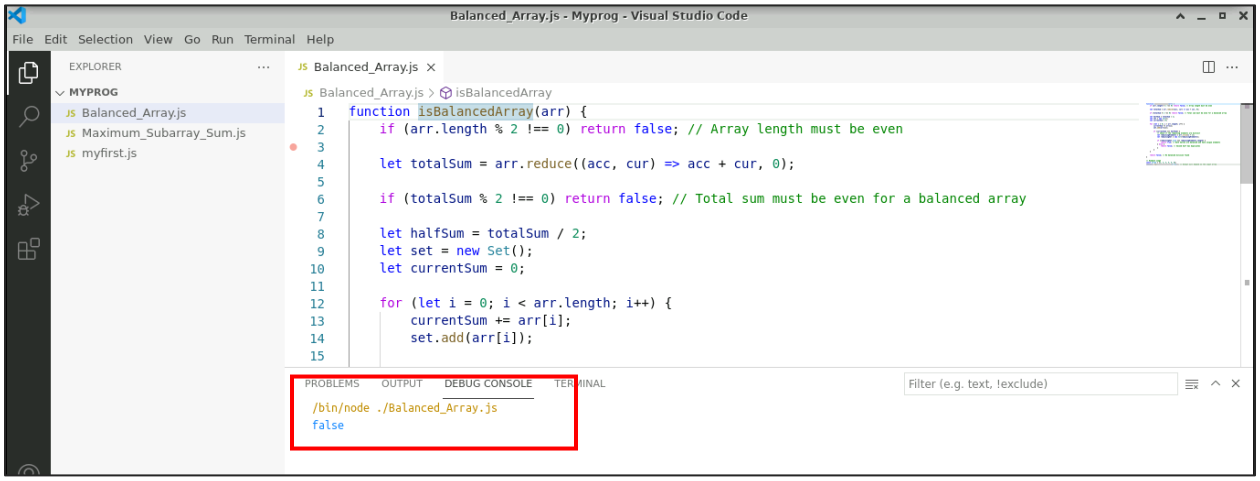
.

1.3 Now save the code and click on **Run->Run Without Debugging->Node.js** to check the output in the debug console





- Now you can see the output in the debug console as shown below:



Explanation:

1. First, we check if the total sum of the array is even and the length of the array is even.
2. We calculate the half sum, which is what each half should sum up to for the array to be balanced.
3. As we iterate through the array, we keep adding elements to a set and summing up their values.
4. If, at any point, the current sum equals the half sum, we check the remaining elements in the array. If these remaining elements are all unique (checked by comparing the size of a set constructed from these elements with the length of these elements), then the array can split into two balanced halves. Otherwise, it cannot.

Conclusion:

By following the above step, you have successfully checked whether the given array is balanced or not.