

# Binary Search In JavaScript

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Binary Search is searching technique used to find an element in a sorted array.

Custom Search

user approach. It used to search any

As compared to linear, binary search is much faster with Time Complexity of  $O(\log N)$  whereas linear search algorithm works in  $O(N)$  time complexity.

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In this article, implement of Binary Search in Javascript using both iterative and recursive ways are discussed.



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Given a sorted array of numbers. The task is to search a given element  $x$  in the array using Binary search.

### Examples:

Input : arr[] = {1, 3, 5, 7, 8, 9}

x = 5

Output : Element found!

Input : arr[] = {1, 3, 5, 7, 8, 9}

x = 6

Output : Element not found!

**Note:** Assuming the array is sorted.

**Recommended:** Please try your approach on *{IDE}* first, before moving on to the solution.

**Recursive Approach :**

4. If greater, call the same function with ending index = middle-1 and repeat step 1.
5. If smaller, call the same function with starting index = middle+1 and repeat step 1.

Below is the implementation of Binary Search(Recursive Approach) in JavaScript:

```
<script>
let recursiveFunction = function (arr, x, start, end) {

    // Base Condition
    if (start > end) return false;

    // Find the middle index
    let mid=Math.floor((start + end)/2);

    // Compare mid with given key x
    if (arr[mid]===x) return true;

    // If element at mid is greater than x,
    // search in the left half of mid
    if(arr[mid] > x)
        return recursiveFunction(arr, x, start, mid-1);
    else

        // If element at mid is smaller than x,
        // search in the right half of mid
        return recursiveFunction(arr, x, mid+1, end);
}

// Driver code
let arr = [1, 3, 5, 7, 8, 9];
let x = 5;

if (recursiveFunction(arr, x, 0, arr.length-1))
    document.write("Element found!<br>");
else document.write("Element not found!<br>");

x = 6;

if (recursiveFunction(arr, x, 0, arr.length-1))
    document.write("Element found!<br>");
else document.write("Element not found!<br>");
</script>
```

### Output:

Element found!  
Element not found!

**Time Complexity:**  $O(\log N)$ .

Below is the implementation of Binary Search(Iterative Approach) in JavaScript:

```
<script>
// Iterative function to implement Binary Search
let iterativeFunction = function (arr, x) {

    let start=0, end=arr.length-1;

    // Iterate while start not meets end
    while (start<=end){

        // Find the mid index
        let mid=Math.floor((start + end)/2);

        // If element is present at mid, return True
        if (arr[mid]===x) return true;

        // Else look in left or right half accordingly
        else if (arr[mid] < x)
            start = mid + 1;
        else
            end = mid - 1;
    }

    return false;
}

// Driver code
let arr = [1, 3, 5, 7, 8, 9];
let x = 5;

if (iterativeFunction(arr, x, 0, arr.length-1))
    document.write("Element found!<br>");
else document.write("Element not found!<br>");

x = 6;

if (iterativeFunction(arr, x, 0, arr.length-1))
    document.write("Element found!<br>");
else document.write("Element not found!<br>");
</script>
```

### Output:

Element found!

Element not found!

**Time Complexity:**  $O(\log N)$ .



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