

[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed



 *Search Course*

(/courses/grokking-the-coding-interview/B6VypRxPolJ)

Problem Challenge 1

(/courses/grokking-the-coding-interview/N8vB7OVYo2D)

Solution Review: Problem Challenge 1

(/courses/grokking-the-coding-interview/N0o9QnPLKNv)

Problem Challenge 2

(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)

Solution Review: Problem Challenge 2

(/courses/grokking-the-coding-interview/xl2g3vvrMq3)

Problem Challenge 3

## Pair with Target Sum (easy)

We'll cover the following



- Problem Statement
- Try it yourself
- Solution
  - Code
  - Time Complexity
  - Space Complexity
- An Alternate approach
  - Time Complexity
  - Space Complexity

### Problem Statement #

Given an array of sorted numbers and a target sum, find a **pair in the array whose sum is equal to the given target**.

Write a function to return the indices of the two numbers (i.e. the pair) such that they add up to the given target.

[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed



(/courses/grokking-the-coding-interview/B6VypRxPolJ)

Problem Challenge 1

(/courses/grokking-the-coding-interview/N8vB7OVYo2D)

Solution Review: Problem Challenge 1

(/courses/grokking-the-coding-interview/N0o9QnPLKNv)

Problem Challenge 2

(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)

Solution Review: Problem Challenge 2

(/courses/grokking-the-coding-interview/xl2g3vvrMq3)

Problem Challenge 3

## Example 1:



Input: [1, 2, 3, 4, 6], target=6

Output: [1, 3]

Explanation: The numbers at index 1 and 3 add up to 6: 2+4=6

## Example 2:

Input: [2, 5, 9, 11], target=11

Output: [0, 2]

Explanation: The numbers at index 0 and 2 add up to 11: 2+9=11

## Try it yourself #

Try solving this question here:

Java

Python3

JS

C++

```
1 class PairWithTargetSum {
2
3     public static int[] search(int[] arr, int target) {
4         // TODO: Write your code here
5         int start = 0, end = arr.length-1;
6         while(start<end)
7         {
8             int sum = arr[start]+arr[end];
9             if(sum==targetSum)
10            {
11                return new int[] {start,end};
12            }
13            else if(sum>targetSum)
14            {
15                end--;
16            }
17            else{
18                start++;
19            }
20        }
21    }
22 }
```



[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed 



- [\(/courses/grokking-the-coding-interview/B6VypRxPolJ\)](#)
- [Problem Challenge 1 \(/courses/grokking-the-coding-interview/N8vB7OVYo2D\)](#)
- [Solution Review: Problem Challenge 1 \(/courses/grokking-the-coding-interview/N0o9QnPLKNv\)](#)
- [Problem Challenge 2 \(/courses/grokking-the-coding-interview/YQ8N2OZq0VM\)](#)
- [Solution Review: Problem Challenge 2 \(/courses/grokking-the-coding-interview/xl2g3vvrMq3\)](#)
- [Problem Challenge 3](#)

```
18      start++;
19      }
20      }
21      return new int[] { -1, -1 };
22      }
23      }
```

Test

Save \*

Reset

Show Results

Show Console

2 of 2 Tests Passed

Result	Input	Expected Output	Actual Output	Reason
✓	search([1, 2, 3, 4, 6], 6)	[1, 3]	[1, 3]	Succeeded
✓	search([2, 5, 9, 11], 11)	[0, 2]	[0, 2]	Succeeded

7.190s

## Solution #

Since the given array is sorted, a brute-force solution could be to iterate through the array, taking one number at a time and searching for the second number through **Binary Search**. The time complexity of this algorithm will be  $O(N * \log N)$ . Can we do better than this?

[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed

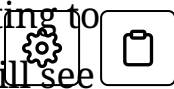


- (/courses/grokking-the-coding-interview/B6VypRxPolJ)
- Problem Challenge 1  
(/courses/grokking-the-coding-interview/N8vB7OVYo2D)
- Solution Review: Problem Challenge 1  
(/courses/grokking-the-coding-interview/N0o9QnPLKNv)
- Problem Challenge 2  
(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)
- Solution Review: Problem Challenge 2  
(/courses/grokking-the-coding-interview/xl2g3vvrMq3)
- Problem Challenge 3

We can follow the **Two Pointers** approach. We will start with one pointer pointing to the beginning of the array and another pointing at the end. At every step, we will see if the numbers pointed by the two pointers add up to the target sum. If they do, we have found our pair; otherwise, we will do one of two things:

1. If the sum of the two numbers pointed by the two pointers is greater than the target sum, this means that we need a pair with a smaller sum. So, to try more pairs, we can decrement the end-pointer.
2. If the sum of the two numbers pointed by the two pointers is smaller than the target sum, this means that we need a pair with a larger sum. So, to try more pairs, we can increment the start-pointer.

Here is the visual representation of this algorithm for Example-1:



[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed



(/courses/grokking-the-coding-interview/B6VypRxPolJ)

Problem Challenge 1

(/courses/grokking-the-coding-interview/N8vB7OVYo2D)

Solution Review: Problem Challenge 1

(/courses/grokking-the-coding-interview/N0o9QnPLKNv)

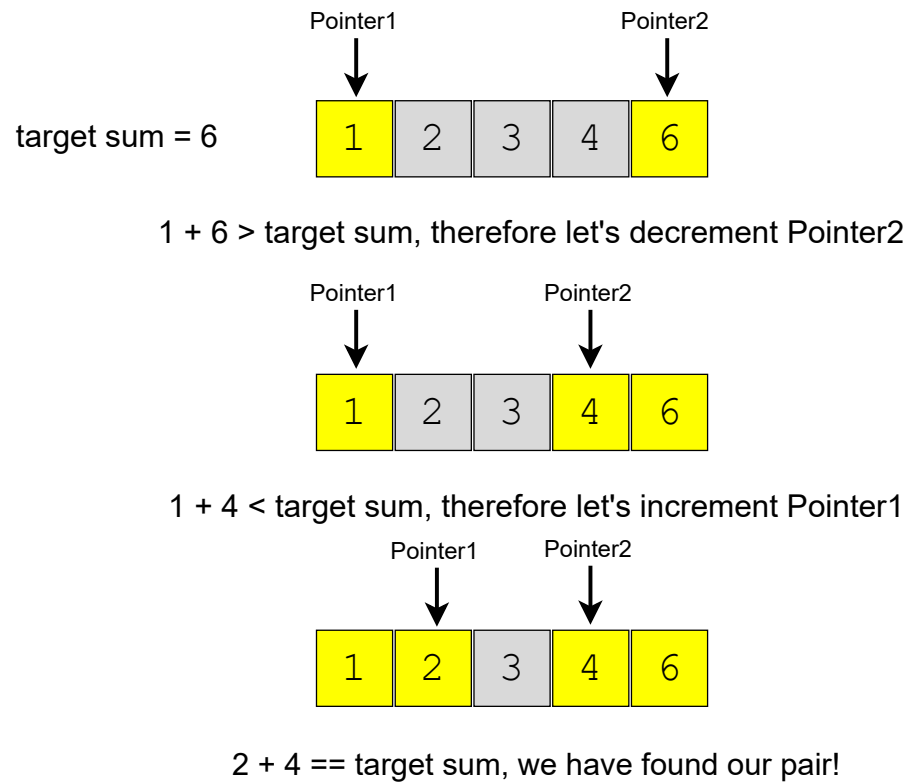
Problem Challenge 2

(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)

Solution Review: Problem Challenge 2

(/courses/grokking-the-coding-interview/xl2g3vxrMq3)

Problem Challenge 3



## Code #

Here is what our algorithm will look like:

Java

Python3

C++

JS

```
1 class PairWithTargetSum {
2
3     public static int[] search(int[] arr, int target) {
4         int left = 0, right = arr.length - 1;
5         while (left < right) {
6             int currentSum = arr[left] + arr[right];
7             if (currentSum == target)
8                 return new int[] { left, right }; // found
9
10            if (targetSum > currentSum)
```



[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed



(/courses/grokking-the-coding-interview/B6VypRxPolJ)

Problem Challenge 1

(/courses/grokking-the-coding-interview/N8vB7OVYo2D)

Solution Review: Problem Challenge 1

(/courses/grokking-the-coding-interview/N0o9QnPLKNv)

Problem Challenge 2

(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)

Solution Review: Problem Challenge 2

(/courses/grokking-the-coding-interview/xl2g3vvrMq3)

Problem Challenge 3

```
11     left++; // we need a pair with a bigger sum
12     else
13         right--; // we need a pair with a smaller sum
14     }
15     return new int[] { -1, -1 };
16 }
17
18 public static void main(String[] args) {
19     int[] result = PairWithTargetSum.search(new int[] { 1, 2, 3, 4, 5 });
20     System.out.println("Pair with target sum: [" + result[0] + ", " + result[1] + "]");
21     result = PairWithTargetSum.search(new int[] { 1, 2, 3, 4, 5 });
22     System.out.println("Pair with target sum: [" + result[0] + ", " + result[1] + "]");
23 }
24 }
```



Run

Save

Reset



## Time Complexity #

The time complexity of the above algorithm will be  $O(N)$ , where 'N' is the total number of elements in the given array.

## Space Complexity #

The algorithm runs in constant space  $O(1)$ .

## An Alternate approach #

Instead of using a two-pointer or a binary search approach, we can utilize a **HashTable** to search for the required pair. We can iterate through the array one number at a time. Let's say during our iteration we are at number 'X', so we need to

[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed



(/courses/grokking-the-coding-interview/B6VypRxPolJ)

Problem Challenge 1

(/courses/grokking-the-coding-interview/N8vB7OVYo2D)

Solution Review: Problem Challenge 1

(/courses/grokking-the-coding-interview/N0o9QnPLKNv)

Problem Challenge 2

(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)

Solution Review: Problem Challenge 2

(/courses/grokking-the-coding-interview/xl2g3vxrMq3)

Problem Challenge 3

find 'Y' such that " $X + Y == Target$ ". We will do two things here:



1. Search for 'Y' (which is equivalent to " $Target - X$ ") in the **HashTable**. If it is there, we have found the required pair.
2. Otherwise, insert "X" in the **HashTable**, so that we can search it for the later numbers.

Here is what our algorithm will look like:



Java



Python3



C++



JS

```
import java.util.HashMap;

class PairWithTargetSum {

    public static int[] search(int[] arr, int targetSum) {
        HashMap<Integer, Integer> nums = new HashMap<>(); // to store numbers and their indices
        for (int i = 0; i < arr.length; i++) {
            if (nums.containsKey(targetSum - arr[i]))
                return new int[] { nums.get(targetSum - arr[i]), i };
            else
                nums.put(arr[i], i); // put the number and its index in the map
        }
        return new int[] { -1, -1 }; // pair not found
    }

    public static void main(String[] args) {
        int[] result = PairWithTargetSum.search(new int[] { 1, 2, 3, 4, 6 }, 6);
        System.out.println("Pair with target sum: [" + result[0] + ", " + result[1] + "]");
        result = PairWithTargetSum.search(new int[] { 2, 5, 9, 11 }, 11);
        System.out.println("Pair with target sum: [" + result[0] + ", " + result[1] + "]");
    }
}
```



Run

Save

Reset









[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed 



-  (/courses/grokking-the-coding-interview/B6VypRxPolJ)
-  Problem Challenge 1 (/courses/grokking-the-coding-interview/N8vB7OVYo2D)
-  Solution Review: Problem Challenge 1 (/courses/grokking-the-coding-interview/N0o9QnPLKNv)
-  Problem Challenge 2 (/courses/grokking-the-coding-interview/YQ8N2OZq0VM)
-  Solution Review: Problem Challenge 2 (/courses/grokking-the-coding-interview/xl2g3vvrMq3)
-  Problem Challenge 3

## Time Complexity #

The time complexity of the above algorithm will be  $O(N)$ , where ‘N’ is the total number of elements in the given array.

## Space Complexity #

The space complexity will also be  $O(N)$ , as, in the worst case, we will be pushing ‘N’ numbers in the **HashTable**.

[← Back](#)

Introduction



[Next →](#)

[Remove Duplicates \(easy\)](#)

☒ **Mark as Completed**

6% completed, meet the [criteria](#) and claim your course certificate!

[Claim Certificate](#)

-  Report an Issue
-  Ask a Question  
([https://discuss.educative.io/tag/pair-with-target-sum-easy\\_\\_pattern-two-pointers\\_\\_grokking-the-coding-interview-patterns-for-coding-questions](https://discuss.educative.io/tag/pair-with-target-sum-easy__pattern-two-pointers__grokking-the-coding-interview-patterns-for-coding-questions))



[← Back To Course Home](#)

# Grokking the Coding Interview: Patterns for Coding Questions

6% completed



 *Search Course*

(/courses/grokking-the-coding-interview/B6VypRxPolJ)

Problem Challenge 1

(/courses/grokking-the-coding-interview/N8vB7OVYo2D)

Solution Review: Problem Challenge 1

(/courses/grokking-the-coding-interview/N0o9QnPLKNv)

Problem Challenge 2

(/courses/grokking-the-coding-interview/YQ8N2OZq0VM)

Solution Review: Problem Challenge 2

(/courses/grokking-the-coding-interview/xl2g3vvrMq3)

Problem Challenge 3