

Data Structures Algorithms Interview Preparation Topic-wise Practice C++ Java Python Competitive Programming Machi

# Generating subarrays using recursion

Difficulty Level : Medium • Last Updated : 18 Nov, 2021

Given an array, generate all the possible subarrays of the given array using recursion.

#### **Examples:**

```
Input : [1, 2, 3]
Output : [1], [1, 2], [2], [1, 2, 3], [2, 3], [3]
Input : [1, 2]
Output : [1], [1, 2], [2]
```

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

We have discussed iterative program to generate all subarrays. In this post, recursive is discussed.



**Approach:** We use two pointers **start** and **end** to maintain the starting and ending point of the array and follow the steps given below:

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Below is the implementation of the above approach.

#### C++

```
// C++ code to print all possible subarrays
// for given array using recursion
#include <iostream>
# include <vector>
using namespace std;
// Recursive function to print all possible subarrays
// for given array
void printSubArrays(vector<int> arr, int start, int end)
    // Stop if we have reached the end of the array
    if (end == arr.size())
        return;
    // Increment the end point and start from 0
    else if (start > end)
        printSubArrays(arr, 0, end + 1);
   // Print the subarray and increment the starting point
    else
        cout << "[";
        for (int i = start; i < end; i++){</pre>
```

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```
return;
}
int main()
{
    vector<int> arr = {1, 2, 3};
    printSubArrays(arr, 0, 0);
    return 0;
}
```

#### Java

```
// Java code to print all possible subarrays
// for given array using recursion

class solution
{

// Recursive function to print all possible subarrays
// for given array
static void printSubArrays(int []arr, int start, int end)
{

    // Stop if we have reached the end of the array
    if (end == arr.length)
        return;
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```
System.out.print("[");
        for (int i = start; i < end; i++){</pre>
            System.out.print(arr[i]+", ");
        System.out.println(arr[end]+"]");
        printSubArrays(arr, start + 1, end);
    return;
public static void main(String args[])
int []arr = {1, 2, 3};
printSubArrays(arr, 0, 0);
```

## Python3



```
# Python3 code to print all possible subarrays
# for given array using recursion
```

# Recursive function to print all possible subarrays

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```
# Increment the end point and start from 0
    elif start > end:
        return printSubArrays(arr, 0, end + 1)
    # Print the subarray and increment the starting
    # point
    else:
        print(arr[start:end + 1])
        return printSubArrays(arr, start + 1, end)
# Driver code
arr = [1, 2, 3]
printSubArrays(arr, 0, 0)
C#
// C# code to print all possible subarrays
// for given array using recursion
using System;
class GFG
    // Recursive function to print all
    // possible subarrays for given array
    static void printSubArrays(int []arr,
```

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```
// Increment the end point
    // and start from 0
    else if (start > end)
        printSubArrays(arr, 0, end + 1);
    // Print the subarray and
    // increment the starting point
    else
        Console.Write("[");
        for (int i = start; i < end; i++)</pre>
            Console.Write(arr[i]+", ");
        Console.WriteLine(arr[end]+"]");
        printSubArrays(arr, start + 1, end);
    return;
// Driver code
public static void Main(String []args)
    int []arr = {1, 2, 3};
    printSubArrays(arr, 0, 0);
```

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```
<?php
// PHP code to print all possible
// subarrays for given array using recursion
// Recursive function to print all
// possible subarrays for given array
function printSubArrays($arr, $start, $end)
    // Stop if we have reached
   // the end of the array
   if ($end == count($arr))
        return;
    // Increment the end point
   // and start from 0
    else if ($start > $end)
        return printSubArrays($arr, 0,
                              $end + 1);
    // Print the subarray and increment
    // the starting point
    else
    echo "[";
    for($i = $start; $i < $end + 1; $i++)</pre>
        echo $arr[$i];
        if($i != $end)
```

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```
}
// Driver code
$arr = array(1, 2, 3);
printSubArrays($arr, 0, 0);
// This code is contributed by mits
?>
```

### **Javascript**

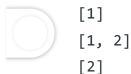
```
<script>
// Javascript code to print all possible
// subarrays for given array using recursion
// Recursive function to print all
// possible subarrays for given array
function printSubArrays(arr, start, end)
{
    // Stop if we have reached the end
    // of the array
    if (end == arr.length)
        return;
    // Increment the end point and start
```

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```
else
        document.write("[");
        for(var i = start; i < end; i++)</pre>
            document.write( arr[i] + ", ");
        }
        document.write(arr[end] + "]<br>");
        printSubArrays(arr, start + 1, end);
    return;
}
// Driver code
var arr = [ 1, 2, 3 ];
printSubArrays(arr, 0, 0);
// This code is contributed by rutvik_56
</script>
```

#### **Output:**



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Time Complexity:  $\bigcirc_{O(n^2)}$ 

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Improved By: Mithun Kumar, rituraj\_jain, SURENDRA\_GANGWAR, Rajput-Ji, rutvik\_56, sankarsingh,

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