

# Recursion-3

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## Problem Statement - Return subset of an array

**Given an integer array of length  $n$ , find and return all the subsets of input array.**

**Approach:** The idea is simple, that if there are  $n$  number of elements inside an array, there are two choices for every element. Either include that element in the subset or do not include it.

Using the above idea form a recursive solution to the problem.

**Algorithm:**

1. Create a recursive function that takes the following parameters, input array, the current index, the output array or current subset, if all the subsets need to be stored then an ArrayList of arrays is needed.
2. If the current index is equal to the size of the array, then insert the output array into the ArrayList of arrays and return.
3. There are exactly two choices for every index.
4. Ignore the current element and call the recursive function with the current subset and next index, i.e.,  $i + 1$ .
5. Insert the current element in the subset and call the recursive function with the current subset and next index, i.e.,  $i + 1$ .

Refer to the solution tab for the solution.

## Problem Statement - Print subset of an array

**Given an integer array of length  $n$ , print all the subsets of the input array.**

**Approach:** The idea is similar, that if there are  $n$  number of elements inside an array, there are two choices for every element. Either include that element in the subset or do not include it.

Using the above idea form a recursive solution to the problem.

**Algorithm:**

1. Create a recursive function that takes the following parameters, input array, the current index, the output array or current subset.
2. If the current index is equal to the size of the array, then print the subset or output array.
3. There are exactly two choices for every index.
4. Ignore the current element and call the recursive function with the current subset and next index, i.e.,  $i + 1$ .
5. Insert the current element in the subset and call the recursive function with the current subset and next index, i.e.,  $i + 1$ .

Refer to the solution tab for the solution.

## Practice Problems

Here are a few similar problems for your practice.

1. Return subsets sum to K
2. Print subsets sum to K
3. Return Permutations of a String
4. Print Permutations of a String

See codezen for detailed explanation of the problem and sample inputs.

Refer to the solution tab for the solutions.