

Advanced Programming Lab

WEEK - 0

1.) Write a program to print the Pascal's Triangle

WEEK - 1

1.) A permutation of an array of integers is an arrangement of its members into a sequence or linear order.

- For example, for arr = [1,2,3], the following are considered permutations of arr: [1,2,3], [1,3,2], [3,1,2], [2,3,1].

The next permutation of an array of integers is the next lexicographically greater permutation of its integer. More formally, if all the permutations of the array are sorted in one container according to their lexicographical order, then the next permutation of that array is the permutation that follows it in the sorted container. If such an arrangement is not possible, the array must be rearranged as the lowest possible order (i.e., sorted in ascending order).

- For example, the next permutation of arr = [1,2,3] is [1,3,2].
- Similarly, the next permutation of arr = [2,3,1] is [3,1,2].
- While the next permutation of arr = [3,2,1] is [1,2,3] because [3,2,1] does not have a lexicographical larger rearrangement.

Given an array of integers nums, find the next permutation of nums.

The replacement must be in place and use only constant extra memory.

WEEK - 2

1.) Given an input string s and a pattern p, implement regular expression matching with support for '.' and '*' where:

- '.' Matches any single character.
- '*' Matches zero or more of the preceding element.

The matching should cover the entire input string (not partial).

WEEK - 3

1.) Given a set of non-negative integers, and a value sum, determine if there is a subset of the given set with sum equal to given sum.

Example:

Input: set[] = {3, 34, 4, 12, 5, 2}, sum = 9

Output: True

There is a subset (4, 5) with sum 9.

Input: set[] = {3, 34, 4, 12, 5, 2}, sum = 30

Output: False

There is no subset that add up to 30.

WEEK - 4

1.) Given a rod of length n inches and an array of prices that includes prices of all pieces of size smaller than n. Determine the maximum value obtainable by cutting up the rod and selling the pieces. For example, if the length of the rod is 8 and the values of different pieces are given as the following, then the maximum obtainable value is 22 (by cutting in two pieces of lengths 2 and 6)

length		1	2	3	4	5	6	7	8
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price		1	5	8	9	10	17	17	20
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And if the prices are as following, then the maximum obtainable value is 24 (by cutting in eight pieces of length 1)

length		1	2	3	4	5	6	7	8
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price		3	5	8	9	10	17	17	20
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WEEK - 5

1.) Divide and Conquer Strategy :

Find the minimum and maximum element in the array using divide and conquer with recursion.

WEEK - 6

1.) Write a python program to find the repetitive substrings in the given string.

WEEK - 7

1.) Given an array of strings, group of anagrams together. You can return the answer in any order. An Anagram is a word or phrase formed by rearranging the letters of a different word or phrase, typically using all the original letters exactly once.

WEEK - 8

1.) Given an $m \times n$ matrix, return all elements of the matrix in spiral order.

WEEK - 9

1.) Given a sorted array of distinct integers and a target value, return the index if the target is found. If not, return the index where it would be if it were inserted in order. You must write an algorithm with $O(\log n)$ runtime complexity.