**DP**

How many arrays consisting of integers exist?

How many arrays consisting of non-negative integers exist?

1. How many ways to partition the first positive integers to disjoint subsets, sums of whose elements are equal?
2. How many different arrays of positive integers can be constructed such that sum of the elements is equal to ?
3. The number of balanced sequences of brackets of length .
4. Given positive integers and an integer , initially 0. You can apply one of the two operations each time, described below:
   1. Choose any and multiply with .
   2. Choose any and add to
   3. Increment by 1.

What is the minimum number of operations to make equal ?

1. Terazi (knapsack)

**STL**

1. You will be provided integers, one by one. Each time an integer is provided, you are asked to calculate the median of all the integers provided before (including the new one).

(Hint: The median divides the sorted array from the middle to two sorted arrays.)

1. Given an integer array , determine whether there is a pair of different elements (not necessarily different integers) whose sum is perfectly divisible by .
2. You have a pool of strings, initially empty. There are 3 operations you are able to perform (only one at a time):
   1. Add a single instance of string to the pool.
   2. Remove a single instance of strings . If it does not exist, ignore the operation.
   3. Print the lexicographically smallest string in the pool, which contains as a prefix. If such an does not exist, print “-1”.

(Number of operations , |any string| )

**Recursion**

1. Given an integer , how many ways are there to fill all possible matrices (fill each of them independently) with the given positive integers, such that each integer is used at most once and GCD of any two integers in adjacent cells is not greater than 1?

**Prefix Sum**

1. Given an array of integers , you will be asked queries. For each query, you are supposed to find the starting and ending indices of the subarray (contiguous) with the largest sum of elements, containing the given element . If there are more than 1 such subarray, you are free to print any.