1 Count

Given an array of size n with 0s and 1s , flip at most k 0s to get the longest possible subarray of 1s.

Input Format:

First Line : n, size of array and k Second Line : n space separated numbers (0s or 1s)

Constraints:

n <= 10^5 0 <= k <= n

output format

First Line : Size of subarray Second Line : Array after flipping k 0s

sample input

10 2

1 0 0 1 0 1 0 1 0 1

sample output

5

1 0 0 1 1 1 1 1 0 1

Stock Selling

You are a trader who wants to earn profit by selling stocks. Also, you are given an array 'a' which tells you about the stock price for a particular stock for upcoming n days.

In between these n days, you can make at most 'k' transactions of buying and selling , such that no transaction overlap each other.

Input Format:

1st Line: t, number of test cases Next t lines will have, k, denoting the number of transactions n, denoting the length of array 'a' space separated values of array 'a'

Constraints:

1<= t,k,n <=100 1<= Ai <= 1000

output format

Maximum profit earned by the trader

sample input

1

1 5 23 4 5 9 20

sample output

16

Money Change

Given a big amount **N** and the array of denominations **S**. Assuming infinite supply of each of S = {S1,S2….Sm} denominations, find the number of ways to make change for **N** cents.

Input Format:

First line contains an integer **T** denoting the total number of test cases.  
For every test case, there are three lines.   
First line will contain an integer 'M' denoting the size of array.   
The second line contains M space-separated integers A1, A2, …, Am denoting the elements of the array.   
The third line contains an integer 'N' denoting the cents.

Constraints:

1 <= T <= 10 1 <= n <= 500 1 <= S[i] <= 1000 1 <= N <= 1000000

output format

Print number of possible ways to make change for N cents in a new line. Since answers can be large, print answer % (1000000000 + 7).

sample input

2

3

1 2 3

4

4

2 5 3 6

10

WILDCARD MATCHING

You are given a text and a wildcard pattern. A text contains lowercase English letters only. A wildcard pattern can contain, along with lowercase English letters, '?' and '\*' characters.

1. '?' matches any single character. For example, Text = "aaba" and Pattern = "aa?a", then they are matched.
2. ' \* ' matches any subsegment of characters(including empty sub-segment). For example, Text = "aaba" and Pattern = "a\*", then they are matched. Find out if the pattern and text matches or not.

Input Format:

First line contains the Text and the second line contains the Pattern.

Constraints:

1<= |Text|, |Pattern| <=1000

output format

Print "MATCHED", if the Text and the Pattern matches, and "NOT MATCHED" otherwise.

sample input

aaabac

\*\*ab\*?

sample output

MATCHED

Friends Pairing Problem

Given n friends, each one can remain single or can be paired up with some other friend. Each friend can be paired only once. Find out the total number of ways in which friends can remain single or can be paired up.

Input Format:

First line contains an integer t denoting the number of test cases. Next t lines contain an integer n each.

Constraints:

1<= n < 30

output format

Output t lines each line describing the answer.

sample input

1

3

sample output

4

Exchanging Coins

Tughlaq introduces a strange monetary system. He introduces copper coins and each coin has a number written on it. A coin n can be exchanged in a bank into three coins: n/2, n/3 and n/4. A coin can also be sold for gold. One can get as much grams of gold as the number written on the coin. You have one copper coin. What is the maximum weight of gold one can get from it?

Input Format:

The input file contains a single integer ***n***, the number on the coin.

Constraints:

0 <= n <= 1 000 000 000

output format

Print the maximum weight of gold you can get.

sample input

12

sample output

13

Job for Bounties

Mike’s boss gave him a string of opening and closing parenthesis asked him to find a valid parenthesis substring in it. He will get number of bounties equal to the length of substring he finds in return. What is the maximum amount of number of bounties he can get?

Input Format:

The input file has a single line which contains a single string ***str*** that Mike's boss gave to him.

Constraints:

1 <= |str| <= 100000

output format

Print, in a single line, the maximum amount of number of bounties Mike can get

sample input

(()(()()

sample output

4

Ugly Numbers

You are provided a sequence of number. All numbers of that sequence is in increasing order (including 1) and whose only prime factors are 2, 3 or 5 (except 1). You need to find the nth number of that sequence.

Input Format:

First line contains integer t which is number of test case. For each test case, it contains an integer n.

Constraints:

1<=t<=100 1<=n<=10000

output format

Print nth number of that sequence.

sample input

2

7

10

sample output

8

12

Farmer Frenzy

Seth ji owns a very large patch of land . Some part of his land was damaged by recent floods. He asks his servant Chotu to go find the largest sub-rectangular patch of land to do farming on for the coming crop season . Help Chotu find the value of largest such area in Seth ji's land

Input Format:

First line contains value R(rows) and C(columns) of the grid   
Input is in the format : 0(damaged) and 1(healthy) land

Constraints:

1<=R,C<=1000

output format

Area of largest possible sub-rectangle for for cultivation

sample input

2 4

0 1 1 0

1 1 1 1

sample output

4

All Ones

Given a matrix ***M*** consisiting of only 1s and 0s, you should print the side of largest square sub matrix containing all 1s.

Input Format:

First line contains two integers, ***n*** and ***m***, representing number of rows and columns of the matrix respectively followed by ***n*** lines, ***ith*** line of which contains ***m*** integers where ***jth*** integers represents ***M[i][j]***.

Constraints:

1 <= n,m <= 1000

output format

Print a single integer, the answer to the problem.

sample input

4 4

1 0 1 0

0 1 0 1

1 0 1 1

0 1 1 1

sample output

2

Mixtures

Harry Potter has n mixtures in front of him, arranged in a row. Each mixture has one of 100 different colors (colors have numbers from 0 to 99).

He wants to mix all these mixtures together. At each step, he is going to take two mixtures that stand next to each other and mix them together, and put the resulting mixture in their place.

When mixing two mixtures of colors a and b, the resulting mixture will have the color (a+b) mod 100.

Also, there will be some smoke in the process. The amount of smoke generated when mixing two mixtures of colors a and b is a\*b.

Find out what is the minimum amount of smoke that Harry can get when mixing all the mixtures together.  
You can find the original problem [here](https://online.codingblocks.com/player/21996/content/15514/www.spoj.com/problems/MIXTURES/).

Input Format:

The first line of each input file will contain n, the number of mixtures. The second line will contain n integers between 0 and 99 - the initial colors of the mixtures.

Constraints:

1 <= n <= 100

output format

Output the minimum amount of smoke.

sample input

3

40 60 20

sample output

2400

BRIDGES

The tribe soon discovers that just communication is not enough and wants to meet each other to form a joint force against the terminator. But there is a deep canyon that needs to crossed. Points have been identified on both sides on which bridge ends can be made. But before the construction could be started, a witch Chudael predicted that a bridge can only be built between corresponding end points, i.e. a bridge starting from the ith end point on one side can only end on the ith end point on the other side, where the position of end points is seen in the order in which the points were identified. If not, it would lead to the end of the tribe. The tribe just wants to make as many non-cutting bridges as possible, with the constraint in mind. Bridges "cut" if and only if they have exactly one common point that is not an end point.

Input Format:

The first line of the input contains test cases t (1<=t<=50). It is followed by 3\*t lines, 3 for each test case. The first line of input for each test case contains the number of end points identified on each side, n (1<=n<=10^3). The second line contains x-coordinates of end points identified on the first side and similiarly the third line contains the x-coordinates of corresponding end points identified on the other side. The end points are inputted in the order in which they were identified. The x-coordinates can range between -10^3 to 10^3.

Constraints:

output format

You are required to output a single line for each test case. The line contains a single integer – the maximum number of bridges possible with the constraints explained above.

sample input

3

4

2 5 8 10

6 4 1 2

3

5 3 10

6 4 1

6

1 2 3 4 5 6

3 4 5 6 1 2

sample output

2

2

4

Longest Increasing subsequence

Find the length of the longest subsequence in a given array of integers such that all elements of the subsequence are sorted in strictly ascending order.

Input Format:

The first line contains a single integer n. Next line contains n space separated numbers which are 0<a<10^5

Constraints:

0< n< 10^5

output format

Print a single line containing a single integer denoting the length of the longest increasing subsequence.

sample input

6

50 3 10 7 40 80

sample output

4

LIS Modified!

You are given a sequence of **N** integers A denoted by A[1] , A[2]…..A[N].  
Each integer in the sequence has a value associated with it W[1],W[2]…. W[N].  
You have to select a subsequence of given array A such that all the elements in A are in ***strictly increasing*** order and sum of values of elements in this selected subsequence is maximum. You have to print this maximum value.

Input Format:

The first line of input contains a single integer T. T test-cases follow. The first line of each test-case contains an integer N. The next line contains a1, a2 ,… , aN separated by a single space. The next line contains w1, w2, …, wN separated by a single space.

Constraints:

1 <= T <= 5 1 <= N <= 200000 1 <= a[i] <= 10^9, where i ∈ [1..N] 1 <= w[i] <= 10^9, where i ∈ [1..N]

output format

For each test-case output a single integer: The maximum sum of values of increasing subsequences of the given sequence.

sample input

2

4

1 2 3 4

100 200 300 400

3

4 2 3

100 30 20

sample output

1000

100

Print LCS

A subsequence is a sequence that can be derived from another sequence by deleting some elements without changing the order of the remaining elements. For example, the sequence {A,B,D} is a subsequence of {A,B,C,D,E,F}, obtained after removal of elements C, E and F.

Given two strings A and B of size n and m respectively, you have to print the Longest Common Subsequence(LCS) of strings A and B, where LCS is the longest sequence present in both A and B.

Note: It is gauranteed that there is only one unique longest common subsequence

Input Format:

Two strings A and B.

Constraints:

1 <= n,m <= 10^3

output format

Output the LCS of A and B.

sample input

abc

acd

sample output

ac

K-Ordered LCS

Any programmer worth his salt would be familiar with the famous Longest Common Subsequence problem. Mancunian was asked to solve the same by an incompetent programmer. As expected, he solved it in a flash. To complicate matters, a twist was introduced in the problem.

In addition to the two sequences, an additional parameter **k** was introduced. A k-ordered LCS is defined to be the LCS of two sequences if you are allowed to change **atmost** k elements in the first sequence to any value you wish to. Can you help Mancunian solve this version of the classical problem?

Input Format:

The first line contains three integers N, M and k, denoting the lengths of the first and second sequences and the value of the provided parameter respectively. The second line contains N integers denoting the elements of the first sequence. The third line contains M integers denoting the elements of the second sequence.

Constraints:

1 <= N, M <= 2000 1 <= k <= 5 1 <= element in any sequence <= 109

output format

Print the answer in a new line.

sample input

5 5 1

1 2 3 4 5

5 3 1 4 2

sample output

3

Brackets All Over

You are given a string containing only opening and closing brackets "(" and ")" of size m. You have to append 2 strings a and b in the order a+s+b and make them valid string of size n with the following properties,

1. At any index, number of opening brackets should be greater than closing brackets
2. No. of opening and closing brackets should be equal. You have to tell number of combinations of string a and b if its possible, otherwise print "0" Print the asnwer with modulo 10^9 + 7.

Input Format:

1st Line: n m 2nd Line: string s

Constraints:

1<= m <= n <= 10^5 n-m <= 1200

output format

The number of combinations of a and b. Otherwise -1

sample input

4 2

((

sample output

1

The Subset Sum To Target

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

Input Format:

1st Line: n sum 2nd Line: a1 a2……an (Array Values)

Constraints:

1<= n <= 5000 1<= sum <= 10^7 1<= Ai <=10^5

output format

Yes, if sum exist No, it sum does not exist

sample input

5 10

1 2 3 4 5

sample output

Yes

0-1 Knapsack

You are packing for a vacation on the sea side and you are going to carry only one bag with capacity S (1 <= S <= 1000). You also have N (1<= N <= 1000) items that you might want to take with you to the sea side. Unfortunately you can not fit all of them in the knapsack so you will have to choose. For each item you are given its size and its value. You want to maximize the total value of all the items you are going to bring. What is this maximum total value?

Input Format:

On the first line you are given N and S. Next line contains N space separated integer which is the size of things and next line contains the corresponding value of things.

Constraints:

1 <= S,N <= 1000

output format

You should output a single integer on one like - the total maximum value from the best choice of items for your trip.

sample input

5 4

1 2 3 2 2

8 4 0 5 3

sample output

13

0-N Knapsack

You've heard of 0-1 knapsack. Below is the problem statement for the same.  
  
Given weights and values of n items, put these items in a knapsack of capacity ***cap*** to get the maximum total value in the knapsack. In other words, given two integer arrays ***val[0..n-1]*** and ***wt[0..n-1]*** which represent values and weights associated with n items respectively. Also given an integer ***cap*** which represents knapsack capacity, find out the maximum value subset of ***val[]*** such that sum of the weights of this subset is smaller than or equal to ***cap***. You cannot break an item, either pick the complete item, or don’t pick it (0-1 property).  
There is a little twist for 0-N knapsack. You can pick an element more than once. Now you have to find maximum value multi subset of ***val[]*** such that sum of the weights of this subset is smaller than or equal to ***cap***.

Note: Maximum value subset means the sunset with maximum sum of all the values in subset.

Input Format:

The first line contains two integers, representing ***n***(size of ***val[]***) and ***cap*** respectively. The subsequent line contains ***n*** integers representing the ***wt[]*** array. The next line, again, contains ***n*** integers representing the ***val[]*** array.

Constraints:

1 <= n,cap <= 1000 1 <= wt[i] <= cap 1 <= val[i] <= 100000

output format

Print a single integer, the answer to the problem.

sample input

5 11

3 2 4 5 1

4 3 5 6 1

sample output

16

Colorful Knapsack

You are given ***N*** stones, labeled from 1 to ***N***. The i-th stone has the weight ***W[i]***. There are ***M*** colors, labeled by integers from 1 to ***M***. The i-th stone has the color ***C[i]*** (of course, an integer between 1 to ***M***, inclusive). You want to fill a Knapsack with these stones. The Knapsack can hold a total weight of ***X***. You want to select exactly ***M*** stones; one of each color. The sum of the weights of the stones must not exceed ***X***. Since you paid a premium for a Knapsack with capacity ***X*** (as opposed to a Knapsack with a lower capacity), you want to fill the Knapsack as much as possible. Write a program that takes all the above values as input and calculates the best way to fill the Knapsack - that is, the way that minimizes the unused capacity. Output this unused capacity. See the explanation of the sample test cases for clarity.

Input Format:

The first line contains three integers, N, M and X, separated by single space. The next line contains N integers, W[1], W[2], W[3] … W[N], separated by single space. The next line contains N integers C[1], C[2], C[3] … C[N], separated by single space.

Constraints:

1 ≤ M ≤ 100 M ≤ N ≤ 100 1 ≤ W[i] ≤ 100 1 ≤ C[i] ≤ M 1 ≤ X ≤ 10000

output format

An optimal way of filling the Knapsack minimizes unused capacity. There may be several optimal ways of filling the Knapsack. Output the unused capacity of the Knapsack (a single integer on a line by itself) for an optimal way. If there is no way to fill the Knapsack, output -1.

sample input

9 3 10

1 3 5 1 3 5 1 3 5

1 1 1 2 2 2 3 3 3

sample output

1

Diwali Puzzle

Its Diwali time and everyone is busy decorating there homes using light bulbs. The light bulbs are arranged in a row. Little bob is bored of participating in contests so he decided to write 1 for every bulb which is on and 0 for every bulb which is off and creates an array of size equal to number of light bulbs. Since he is a bright kid he looks at his array and calculates the sum of all the adjacent pairwise products and wonders how many such combinations exist. More formally you are given an array of size n (consisting of 0 and 1 only) and k = a1*a2 + a2*a3 + a3*a4 + … an-1*an. You have to find out how many combinations of these light bulbs of size n (on and off) will give the sum of products equal to given value k. You have to calculate this value modulo 10^6+3.

Input Format:

The first line consists of number of test cases. The second line consists of two values n and k.

Constraints:

test cases <= 100 n <= 100 k <= 100

output format

The number of combinations modulo 10^6+3.

sample input

6

5 3

10 9

99 87

23 34

66 23

23 12

sample output

2

1

185141

0

375215

84498

Vivek and Party

Vivek has just finished college and decided to go out with friends. Vivek has some strange habits and thus he decided to celebrate this important moment of his life drinking a lot. He will start drinking beverages with low alcohol content, like beer, and then will move to a beverage that contains more alcohol, like wine, until there are no more available beverages. Once Vivek starts to drink wine he will not drink beer again, so the alcohol content of the beverages never decreases with the time.

You should help Vivek by indicating an order in which he can drink the beverages in the way he wishes.

Input Format:

Each test case starts with 1 <= N <= 100, the number of available beverage. Then will follow N lines, informing the name of each beverage, a name has less than 51 characters and has no white space .

Then next M (less than 200) lines contains two Strings B1 and B2, names of the beverages which states that the B2 contains more alcohol than B1 , and Vivek has to drink B1 before B2.

There is a blank line after each test case .In the case there is no relation between two beverages Dilbert should start drinking the one that appears first in the input. The input is terminated by end of line (EOF).

Constraints:

1 <= N <= 100 1 <= M <= 200 1 <= length of Bi <= 60

output format

For each test case you must print the message: 'Case #C: Vivek should drink beverages in this order: B1 B2 …… Bn.'

where C is the number of the test case, starting from 1, and B1 B2…Bn is a list of the beverages such that the alcohol content of beverage B(i+1) should not less than B(i).After each test case you must print a blank line.

sample input

8

a

b

c

d

e

f

s

t

6

a e

a b

c d

e f

s t

a t

8

s

a

b

e

f

c

d

t

6

a e

a b

c d

e f

s t

a t

sample output

Case #1: Vivek should drink beverages in this order: a b c d e f s t.

Case #2: Vivek should drink beverages in this order: s a b e f c d t.