**Q:-1**

**AlphaCode-Question**

Send Feedback

Alice and Bob need to send secret messages to each other and are discussing ways to encode their messages:

Alice: “Let’s just use a very simple code: We’ll assign ‘A’ the code word 1, ‘B’ will be 2, and so on down to ‘Z’ being assigned 26.”

Bob: “That’s a stupid code, Alice. Suppose I send you the word ‘BEAN’ encoded as 25114. You could decode that in many different ways!”

Alice: “Sure you could, but what words would you get? Other than ‘BEAN’, you’d get ‘BEAAD’, ‘YAAD’, ‘YAN’, ‘YKD’ and ‘BEKD’. I think you would be able to figure out the correct decoding. And why would you send me the word ‘BEAN’ anyway?”

Bob: “OK, maybe that’s a bad example, but I bet you that if you got a string of length 5000 there would be tons of different decodings and with that many you would find at least two different ones that would make sense.”

Alice: “How many different decodings?”

Bob: “Jillions!”

For some reason, Alice is still unconvinced by Bob’s argument, so she requires a program that will determine how many decodings there can be for a given string using her code.

Input

Input will consist of multiple input sets. Each set will consist of a single line of at most 5000 digits representing a valid encryption (for example, no line will begin with a 0). There will be no spaces between the digits. An input line of ‘0’ will terminate the input and should not be processed.

Output

For each input set, output the number of possible decodings for the input string. Print your answer taking modulo "10^9+7"

Sample Input:

25114

1111111111

3333333333

0

Sample Output:

6

89

1

**Q:-2**

**Largest Bitonic Subarray**

Send Feedback

#### You are given an array of positive integers as input. Write a code to return the length of the largest such sub-array in which the values are arranged first in strictly ascending order and then in strictly descending order.

#### Such a sub-array is known as bitonic sub-array. A purely increasing or purely decreasing subsequence will also be considered as a bitonic sequence with the other part empty.

##### Note that the elements in bitonic sub-array need not be consecutive in the given array but the order should remain same.

##### Input Format:

Line 1 : A positive Integer N, i.e., the size of array

Line 2 : N space-separated integers as elements of the array

##### Output Format:

Length of Largest Bitonic Sub-Array

##### Input Constraints:

1<= N <= 10^5

##### Sample Input 1:

6

15 20 20 6 4 2

##### Sample Output 1:

5

##### Sample Output 1 Explanation:

Here, longest Bitonic sub-array is {15, 20, 6, 4, 2} which has length = 5.

##### Sample Input 2:

2

1 5

##### Sample Output 2:

2

##### Sample Input 3:

2

5 1

##### Sample Output 3:

2

**Q:-3**

**StairCase Problem**

Send Feedback

#### A child is running up a staircase with n steps and can hop either 1 step, 2 steps or 3 steps at a time. Implement a method to count how many possible ways the child can run up to the stairs. You need to return all possible number of ways.

#### Time complexity of your code should be O(n).

##### Input format :

Integer n (No. of steps)

##### Constraints :

n <= 70

##### Sample Input 1:

4

###### Sample Output 1:

7

**Q:-4**

**Coin Change Problem**

Send Feedback

#### You are given an infinite supply of coins of each of denominations D = {D0, D1, D2, D3, ...... Dn-1}. You need to figure out the total number of ways W, in which you can make change for Value V using coins of denominations D.

#### Note : Return 0, if change isn't possible.

##### Input Format

Line 1 : Integer n i.e. total number of denominations

Line 2 : N integers i.e. n denomination values

Line 3 : Value V

##### Output Format

Line 1 : Number of ways i.e. W

#### Constraints :

1<=n<=10

1<=V<=1000

##### Sample Input 1 :

3

1 2 3

4

##### Sample Output

4

##### Sample Output Explanation :

#### Number of ways are - 4 total i.e. (1,1,1,1), (1,1, 2), (1, 3) and (2, 2).

**Q:-5**

**Magic Grid Problem**

Send Feedback

You are given a magrid S ( a magic grid ) having R rows and C columns. Each cell in this magrid has either a Hungarian horntail dragon that our intrepid hero has to defeat, or a flask of magic potion that his teacher Snape has left for him. A dragon at a cell (i,j) takes away |S[i][j]| strength points from him, and a potion at a cell (i,j) increases Harry's strength by S[i][j]. If his strength drops to 0 or less at any point during his journey, Harry dies, and no magical stone can revive him.

Harry starts from the top-left corner cell (1,1) and the Sorcerer's Stone is in the bottom-right corner cell (R,C). From a cell (i,j), Harry can only move either one cell down or right i.e., to cell (i+1,j) or cell (i,j+1) and he can not move outside the magrid. Harry has used magic before starting his journey to determine which cell contains what, but lacks the basic simple mathematical skill to determine what minimum strength he needs to start with to collect the Sorcerer's Stone. Please help him once again.

Input (STDIN)

The first line contains the number of test cases T. T cases follow. Each test case consists of R C in the first line followed by the description of the grid in R lines, each containing C integers. Rows are numbered 1 to R from top to bottom and columns are numbered 1 to C from left to right. Cells with S[i][j] < 0 contain dragons, others contain magic potions.

Output (STDOUT):

Output T lines, one for each case containing the minimum strength Harry should start with from the cell (1,1) to have a positive strength throughout his journey to the cell (R,C).

Constraints:

1 ≤ T ≤ 5

2 ≤ R, C ≤ 500

-10^3 ≤ S[i][j] ≤ 10^3

S[1][1] = S[R][C] = 0

Sample Input

3

2 3

0 1 -3

1 -2 0

2 2

0 1

2 0

3 4

0 -2 -3 1

-1 4 0 -2

1 -2 -3 0

Sample Output

2

1

2

**Q:-6**

**Maximum Sum Rectangle**

Send Feedback

Given a 2D array, find the maximum sum rectangle in it. In other words find maximum sum over all rectangles in the matrix.

Input

First line contains 2 numbers n and m denoting number of rows and number of columns. Next n lines contain m space separated integers denoting elements of matrix nxm.

Output

Output a single integer, maximum sum rectangle.

Constraints

1<=n,m<=100

Sample Input

4 5

1 2 -1 -4 -20

-8 -3 4 2 1

3 8 10 1 3

-4 -1 1 7 -6

Sample Output

29

**Q:-7**

**Loot Houses**

Send Feedback

#### A thief wants to loot houses. He knows the amount of money in each house. He cannot loot two consecutive houses. Find the maximum amount of money he can loot.

##### Input Format

Line 1 : An integer N

Line 2 : N spaced integers denoting money in each house

##### Output Format

Line 1 : Maximum amount of money looted

##### Input Constraints

1 <= n <= 10^4

1 <= A[i] < 10^4

##### Sample Input :

6

5 5 10 100 10 5

##### Sample Output 1 :

110

**Q:-8**

**Maximum Square Matrix With All Zeros**

Send Feedback

#### Given a n\*m matrix which contains only 0s and 1s, find out the size of maximum square sub-matrix with all 0s. You need to return the size of square with all 0s.

##### Input format :

Line 1 : n and m (space separated positive integers)

Next n lines : m elements of each row (separated by space).

##### Output Format:

Line 1 : Size of maximum square sub-matrix

##### Sample Input :

3 3

1 1 0

1 1 1

1 1 1

##### Sample Output :

1

**Q:-9**

**Count BSTs**

Send Feedback

#### Given an integer N, find and return the count of unique Binary search trees (BSTs) are possible with nodes valued from 1 to N.

#### Output count can be very large, so return the count modulo 10^9+7.

##### Input Format :

Integer n

##### Output Format :

Count of BSTs

##### Contraints :

#### 1<= N <=1000

##### Sample Input 1:

8

##### Sample Output 1:

1430

##### Sample Input 2:

3

##### Sample Output 2:

5

**Q:-10**

**Boredom**

Send Feedback

#### Gary is bored and wants to play an interesting but tough game . So he figured out a new board game called "destroy the neighbours" . In this game there are N integers on a board. In one move, he can pick any integer x from the board and then all the integers with value x+1 or x-1 gets destroyed .This move will give him x points.

#### He plays the game until the board becomes empty . But as he want show this game to his friend Steven, he wants to learn techniques to maximise the points to show off . Can you help Gary in finding out the maximum points he receive grab from the game ?

##### Input Format :

Line 1 : Integer N

Line 2 : A list of N integers

##### Output Format :

Maximum points Gary can recieve from the Game setup

##### Constraints :

#### 1<=N<=10^5

#### 1<=A[i]<=1000

##### Sample Input :

2

1 2

##### Sample Output :

2

**Q:-11**

**Minimum Number of Chocolates**

Send Feedback

#### Noor is a teacher. She wants to give some chocolates to the students in her class. All the students sit in a line and each of them has a score according to performance. Noor wants to give at least 1 chocolate to each student. She distributes chocolates to them such that If two students sit next to each other then the one with the higher score must get more chocolates. Noor wants to save money, so she wants to minimise the total number of chocolates.

#### Note that when two students have equal score they are allowed to have different number of chocolates.

##### Input Format:

First Line: Integer N, the number of students in Noor’s class.

Second Line: Each of the student's score separated by spaces.

##### Output Format:

Output a single line containing the minimum number of chocolates Noor must give.

##### Input Constraints

1 <= N <= 100000

1 <= score <= 100000

##### Sample Input:

4

1 4 4 6

##### sample Output:

6

##### Sample Input:

3

8 7 5

##### sample Output:

6