



***BUBT Intra-University
Programming Contest, Half yearly 2022
(Junior Division)***

Organized By:
Dept. of CSE, BUBT



F. String Task

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

Dipu sir gives a string to Maruf to identify whether it is palindrome or not. He gives condition-

For each position in the string, Maruf has to change the letter on this position either to the previous letter in alphabetic order or to the next one. But 'a' has no previous letter and 'z' has no next letter. Letters in every position have to be changed exactly once.

Input:

First line contains the number of test cases T. For each test case, The first line of the pair has a single integer N which is the length of the string, then take the string S.

Here, $1 \leq T \leq 50$ and $2 \leq N \leq 1000$, N is even.

Output:

Print "Yeahh!" if it's possible to make the string a palindrome by applying the changes as mentioned above to every position. Print "oops!" otherwise.

Sample Input/Output:

Sample 1:

Sample Input	Sample Output
4	Yeahh!
6	oops!
abccba	Yeahh!
2	oops!
af	
4	
adfa	
8	
abaazaba	

G. Good Math

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

Rahim has a deposit of 100 taka in BUBT Bank. The bank pays an annual profit rate of 1% compounded annually (A fraction of less than one taka is discarded).

How many years does the balance reach X taka or above for the first time?

Explanation for case 1:

The balance after one year is 101 taka.

The balance after two years is 102 taka.

The balance after three years is 103 taka.

Thus, it takes three years for the balance to reach 103 taka or above

Input:

Given an integer number X. Here $101 \leq X \leq 10^{18}$

Output:

Print the number of years it takes for Rahimi's balance to reach X taka or above for the first time.

Sample Input/Output:

Sample 1:

Sample Input	Sample Output
103	3

Sample 2:

Sample Input	Sample Output
111	11

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$$\begin{array}{r} 10 \overline{) 103} \quad (1 \\ \underline{10} \\ 3 \end{array}$$

H. Amazing Sequence

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

Suppose you are doing math tuition for a class eight student. But the student is not doing the math because he is very naughty. Today you are teaching him how to find the sum of a few numbers. But he did not listen to you. If you read the sequence "1 1 1 2 2 2" to add, but he writes 111222 and says what is the other number to add? So, you have changed your reading style. At first, you read the total occurring number then read this number. For the above sequence, you read "three one three two" but at this time, the student writes 3 1 3 2 and calculates the sum which the answer is 9 whereas the sum of your sequence is also 9 which is very amazing. So, you reward your student and ask your student to find such an **amazing sequence**.

Since you are a CSE student at BUBT and have programming skills, you decide to create a program to test whether a sequence is amazing according to your student's writing style.

Input:

The input will contain three lines, the first line contains T ($1 \leq T \leq 100$), denoting the number of test cases and the second line denotes the total number in a sequence N ($1 \leq N \leq 1000$). The next line contains the sequence separated by spaces. All numbers are positive integers and not greater than 10 in a sequence

Output:

Sum of the sequence according to student writing style and a message "amazing sequences" or "not amazing sequences".

Sample Input/Output:

Sample Input	Sample Output
2 6 1 1 1 2 2 2 7 1 2 1 1 1 1 0 1	9 amazing sequences 22 not amazing sequences

I. GCD and LCM

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 256 megabytes

Problem Statement:

You're now a senior programmer of BUBT. If we tell you to find out the GCD and LCM of two numbers, you will smile and can easily find them. We are giving you the same task but in different constraints.

Given two numbers a and b in range $[1, 10^{700000}]$ and expecting that you can also find the **GCD** and **LCM** of these numbers.

As the numbers a and b are too big which can not be fit in 64-bit integers so we are giving you the **prime factorizations** of these numbers. Also, the GCD and LCM are big so print the **output modulo $10^9 + 7$** .

Input:

First line starts with an integer N : Number of prime factors of a .

Second line has N integers $A_1, A_2, A_3, \dots, A_N$: Prime factors of a .

Next input integer is M : Number of prime factors of b .

Finally, M integers $B_1, B_2, B_3, \dots, B_M$: Prime factors of b .

Note: It is guaranteed that the given array A and B contains only prime numbers. Also input integers can be in arbitrary order.

Constraints:

$$1 \leq N, M \leq 10^5$$

$$1 \leq A_i, B_i \leq 10^7$$

Output:

For each test case print **two space separated integers** indicating **GCD(a,b)** and **LCM(a,b)**. Both integers should be **modulo $10^9 + 7$** . See the sample I/O for exact formatting.

Explanation:

1st Case: $\text{gcd}(12, 8) = 4$ and $\text{lcm}(12, 8) = 24$

2nd Case: $\text{gcd}(175, 8085) = 35$ and $\text{lcm}(175, 8085) = 40425$

Sample Input/Output:**Sample 1:**

Sample Input	Sample Output
3 2 2 3 3 2 2 2	4 24

Sample 2:

Sample Input	Sample Output
3 3 5 7 5 5 5 7 7 11	35 40425

J. Island Winner

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

CP land is a country with many islands. The islands are **divided by water**. In a few days there is going to be an election for the King of the island. D-joker and Jahin are two candidates who will fight for the throne. Since the islands are divided by water, there will be elections in all the islands separately. But the problem is to get the final result from all the islands.

Luckily they have you to write a programme that immediately announces the results.

You are given the map of CP land as a 2D grid of $N \times M$ size . Consisting of following characters:

'D' meaning this part of island has a vote for D-joker

'J' meaning this part of island has a vote for Jahin

'#' indicating water

'=' meaning it is part of the island but contains no vote.

Two cells of the grid are part of the same island if none of them is water and they have a common edge. Each cell has four edges.

A candidate wins over an island if he has more votes than the other candidate in that island. A king is that one candidate who has won more islands than the other one.

If both of them have the same votes on an island, no one conquers it, it's a draw. If both win over the same number of islands, None of them are King, 'Jonogon' is.

Input:

The first line gives an integer T ($1 \leq T \leq 500$), denoting the number of test cases.

First line of each test case has two integers, N ($1 \leq N \leq 10^2$) and M ($1 \leq M \leq 10^2$).

Next N lines contains a string of length M , consisting of only 'D', 'J', '=' and '#', as mentioned above.

The dataset is large, Use faterIO.

Output:

Announce the name of the king, "Jahin", "D-joker" or "Jonogon", without the quotes.

Sample Input/Output:

Sample Input	Sample Output
2	Jonogon D-joker
3 3 D=J =J# ##D	
5 5 #D### ##D## ##-## #J### #J###	

K. Catch The Array

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

You are given a sequence of positive integers of length N , $A = A_1, A_2, \dots, A_N$, and an integer K . How many contiguous subsequences of A satisfy the following condition-

The sum of the elements in the contiguous subsequence is at least K

We consider two contiguous subsequences different, if they start from different positions in A , even if they are the same in content.

Note that the answer may not fit into a 32-bit integer type.

Input:

The first line contains two integers N ($1 \leq N \leq 10^5$) length of the array and an integer K ($1 \leq K \leq 10^{10}$).

The Second line contains N integers A_1, A_2, \dots, A_N ($1 \leq A_i \leq 10^5$) where A_i is the i -th element of the array A .

Output:

Print the **number of contiguous** subsequences of A that satisfy the condition.

Sample Input/Output:

Sample 1:

Sample Input	Sample Output
4 10 6 1 2 7	2

Sample 2:

Sample Input	Sample Output
3 5 3 3 3	3

Sample 3:

Sample Input	Sample Output
10 53462 103 35322 232 342 21099 90000 18843 9010 35221 19352	36

L. World's Longest Marine Drive

Input: Standard Input, **Output:** Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

Cox's Bazar–Teknaf Marine Drive is an 80-kilometer-long road from Cox's Bazar to Teknaf along the Bay of Bengal and it is the world's longest marine drive.

Mr x is planning for a solo trip to Cox bazar. He will stay N days and want to ride a bike as much as he can on each day. He has W TK for this purpose. Bike rental costs 100 TK per hour and an additional 50 Tk service charge without fuel. He has to refill fuel. 1 liter of fuel costs 100 Tk and the bike can cover 50 km in one liter of fuel. If the max speed of the bike is 50 km/h, what is the maximum number of minimum kilometers he can ride each day?

Let's say he wants to ride 75 km on the 1st day. He has to rent a bike for 2 hours and needs 2 liters of fuel. Total Cost will be 450Tk. 200 Tk rental fees and 200 Tk fuel fees and 50 Tk service fees.

Note : Each day he has to rent a bike independently and initially the fuel tank will be empty. Rental hours and fuel amount will be integer.

Input:

The first line contains one integer T ($1 \leq T \leq 2 \cdot 10^5$) – the number of test cases.

Each line contains two integers N and W where ($1 \leq N \leq 2 \cdot 10^5$, $1 \leq W \leq 10^{18}$) – the number of days he will stay in Cox's bazar and the amount of money.

Output:

Output one number – maximum of minimum amount kilometers he can ride each day.

Sample Input/Output:

Sample Input	Sample Output
2	100
3 1500	0
4 990	

M. Nomino's pizza sauce

Input: Standard Input, Output: Standard Output

Time Limit: 1 second(s)

Memory Limit: 512 megabytes

Problem Statement:

Nomino made a pizza of D diameter and cut it into N equal slices. He went to bring a bottle of tomato ketchup for the pizza. When he came back, he found that one of the slices was gone !! It must be ratatouille ! He uses W grams of ketchup per unit area of a pizza, he wants to know how much sauce he needs now to cover the left pizza.

So Nomino called you to calculate the amount of sauce he needs now.

Input:

The first line gives an integer T , denoting the number of test cases.

For each test case you are given three integers D , N and W , where D is the diameter of the pizza, N is the number of slices that were made initially, W is the amount of sauce domino uses per unit area of the pizza.

Constrains:

$$1 \leq T \leq 10^5$$

$$1 \leq D, N, W \leq 10^3$$

Output:

For each test case, print the amount of sauce Nomino needs in grams. Print the amount rounded upto 6 decimal points.

Sample Input/Output:

Sample Input	Sample Output
2	294.524311
5 4 20	336.599213
5 7 20	