AUST ACM Lab 02 Selection Contest 2 (Fall 21)

https://toph.co/c/m9fxxx7

Toph

Schedule

The contest will run for **3h0m0s**.

Authors

The authors of this contest are edge555, hasibhossain, pz1971, rithyy, and Tash52.

Rules

This contest is formatted as per the official rules of ICPC Regional Programming Contests.

You can use Bash 5.0, Brainf*ck, C# Mono 6.0, C++11 GCC 7.4, C++14 GCC 8.3, C++17 GCC 9.2, C++20 GCC 12.1, C11 GCC 12.1, C11 GCC 9.2, Common Lisp SBCL 2.0, Erlang 22.3, Free Pascal 3.0, Go 1.18, Haskell 8.6, Java 1.8, Kotlin 1.1, Lua 5.4, Node.js 10.16, Perl 5.30, PHP 7.2, PyPy 7.1 (2.7), PyPy 7.1 (3.6), Python 2.7, Python 3.7, Ruby 2.6, Rust 1.57, Swift 5.3, and Whitespace in this contest.

Be fair, be honest. Plagiarism will result in disqualification. Judges' decisions will be final.

Notes

There are 7 challenges in this contest.

Please make sure this booklet contains all of the pages.

If you find any discrepencies between the printed copy and the problem statements in Toph Arena, please rely on the later.

Disclaimer

The contents of this contest have not been reviewed by Toph and do not necessarily represent Toph's views.

A. Shooting apples

Tashfiq love apples. One day he was standing near an apple tree with a large knapsack and started shooting at apples.

But he has to return home quickly. As a result, he cannot collect all apples and just returns with the apples that fell directly on his knapsack.

Can you find how many mangoes fell directly on top of his knapsack?

You are given a 2D grid corresponding to the situation of **R rows** and **C columns**.

Apples are labeled as ‘O’,

The tree is labeled as ‘t’. For simplicity, you can assume the mangos can fall through trees.

Leaves are labeled as ‘g’. You can assume that mangoes can fall through leaves.

The knapsack is represented by **one straight horizontal strip of** ‘=’. You can assume it has infinite capacity.

The ground is labeled as ‘a’. Mangoes cannot pass through the ground.

You can assume the knapsack does not go through the tree's stem.

Input

First line contains two positive integers, R and C — the number of rows and columns respectively.

(1 ≤ R,C ≤ 500)
Each of the next R lines will contain C characters describing the grid.

Output

Print one integer, the number of apples that fell directly on top of his knapsack.

Samples

Input	Output
8 16 ....t..O...t.t.. .O.tt.....t..O.. .....t..t..... ...O...t..... .....t..... .....t...====. aaaaaaaaaaaaaaa	1
It can be clearly seen that there is one mango over the knapsack.	

Input	Output
33 55 ....g...g.................... ....g....g....g........g................. ....g..........g............................. ....g...........................g............... ....g.........................O.....g............. ....g.......O.......t.....t............g........... ......g.....O...........t....t......................... .....g...................t.t.................g......... ...g........t............tt....t.......t............... ....g........t......t....t..t......t........gg......... ....g.........t....t.........t....tttt................. ....g.....O....t.t............t...t.......O............ ....g...........t............t.tt.O.................... .....g..........t...........tt..............g.......... ......g.....tttttt..........t........O................. ....g....t....tt.......t.....O.........g........... ....g.........tt....t............................ ....g.g......tt..t.............g............... ....g......ttt.....g..g..g.g................ ....g....ttt..g........................... ....g.gtttg............................. ....ttt.............................. ....ttt.............................. ....ttt.............................. ....ttt.............................. ....ttt......=========............... aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	4

The knapsack can be anywhere, and it will not move.

B. Bro Hate Queries

Whenever a query related problem comes, Bro always fails to solve it. Here is a query related problem again, help bro to solve this!

Given an array containing N elements and Q queries. For each query given two integers X and Y, you have to print how many elements in the given array are greater than or equals to X but less than or equals to Y.

Input

Input starts with the integers N $(1 <= N <= 10^5)$and Q $(1 <= Q <= 10^5)$.

The following line contains N elements which denotes the array.

The next Q lines contains two integers X and Y $< X <= Y <= 10^7)$

You may assume the array elements are greater than 0 and less than or equals to 10^7 .

Output

For each query print the number of elements in the array which are greater than or equals to X but less than or equals to Y .

Samples

Input	Output
10 3 10 20 30 40 100 200 300 400 50 60 1000 2000 25 50 90 290	0 3 2

C. Dumb AI Robot

A group of talented students from AUST CSE have built an AI robot as part an assignment. They named it “Rithy”. They fed the robot numerous amount of data to make it able to predict the sum of an arithmetic sequence. An arithmetic sequence is a sequence of integers where the difference of any two consecutive numbers are same.

In the testing phase, they found out that Rithy is so dumb that it can only predict the sum of a sequence if it is in the form of **1,2,3,…N**.

You have to modify the source code put on Rithy’s brain so that it can output the sum of a sequence in the form **1,2,3,…N** with some missing integers. For example: if 3 is missing in the sequence: 1, 2, 3, 4, 5 ; output will be 1 + 2 + 4 + 5 = 12.

Input

The first line contains an integer **N** (1 ≤ N ≤ 100), the length of the arithmetic sequence. The next line will contain an integer **M** (1 ≤ M ≤ N), the number of integers that are missing in the sequence. The following M lines will have M integers $M_i (1 \leq M_i \leq N)$, the numbers that are missing in the sequence. Each of these M numbers will be unique.

Output

Output a single integer denoting the **sum** of the sequence with missing integers.

Samples

Input	Output
3 1 3	3

Input	Output
3 2 1 2	3

D. Search It

You are given a string S of length N written on a whiteboard. You are given some queries Q.

In each query, you are given a string B and a duster. You have to tell after removing some (possibly zero) characters from the black board, you can obtain the string B or not.

after every query the string S appears again.

Input

The first line contains an integer `N` (`1 <= N <= 10^5`), the size of string `S`. The second line contains a string `S`, only lowercase letter ('a'-'z') and the third line contains an integer `Q` (`1 <= Q <= 10^5`), the number of queries.

Each of the next lines contains a string `B` (`1 <= |B| <= 100`).

Output

For each query, print "`YES`" if `B` can be obtained or print "`NO`". (Without the inverted comma)

Samples

Input	Output
16 helloonetwothree 5 hello one hren heeoe oneho	YES YES NO YES NO

E. Find the Coefficients

We all know about “Binomial coefficients”.

(1+a)^2 = a^2 + 2a + 1, here the coefficients are 1,2,1

(a+b)^4 = a^4 + 4a^3 + 6a^2 + 4a + 1, here the coefficients are 1,4,6,4,1

Given the power 'N' you need to find all the coefficients.

Input

First line of input will contain an integer 'T', the number of test cases. Next 'T' lines will contain an integer 'N' each.

Constraints:
1<=T<=50
1<=N<=50

Output

Given the power N of (1+x) you need to find all the coefficients and print them in order of the power of their term with a single space between them.
Be carefull about trailing spaces and be sure to print a new line after every test case.

Samples

Input	Output
2 2 3	1 2 1 1 3 3 1

F. Maximum Stop

A bus goes from place A to B and returns from B to A. Now there are N stops in its route. N_i people enter the bus and OUT_i people went out from the bus in ith stop.

Your task is to find out the maximum number of stops ride by a person, excluding the stop where he/she got off from the bus. There is no specific ID for a person or someway to indicate who is in or who is out. Anyone can stay on the bus or leave. The followings are assumed to be true in this problem.

- You can surely assume that always number of man in the bus ≥ 0.
- At first people will get out from the bus, then other people will enter the bus.
- After the last stop, total number of IN and OUT are equal.

Input

First line of input has an integer **T** $(1 \leq T \leq 5)$ which denotes the number of test cases. Each case starts with a line containing one integer **N** $(2 \leq N \leq 10)$. N is the stop number of the bus. Next N line contain two integers (0 ≤ N_i and OUT_i ≤ 50 for ith stop).

Output

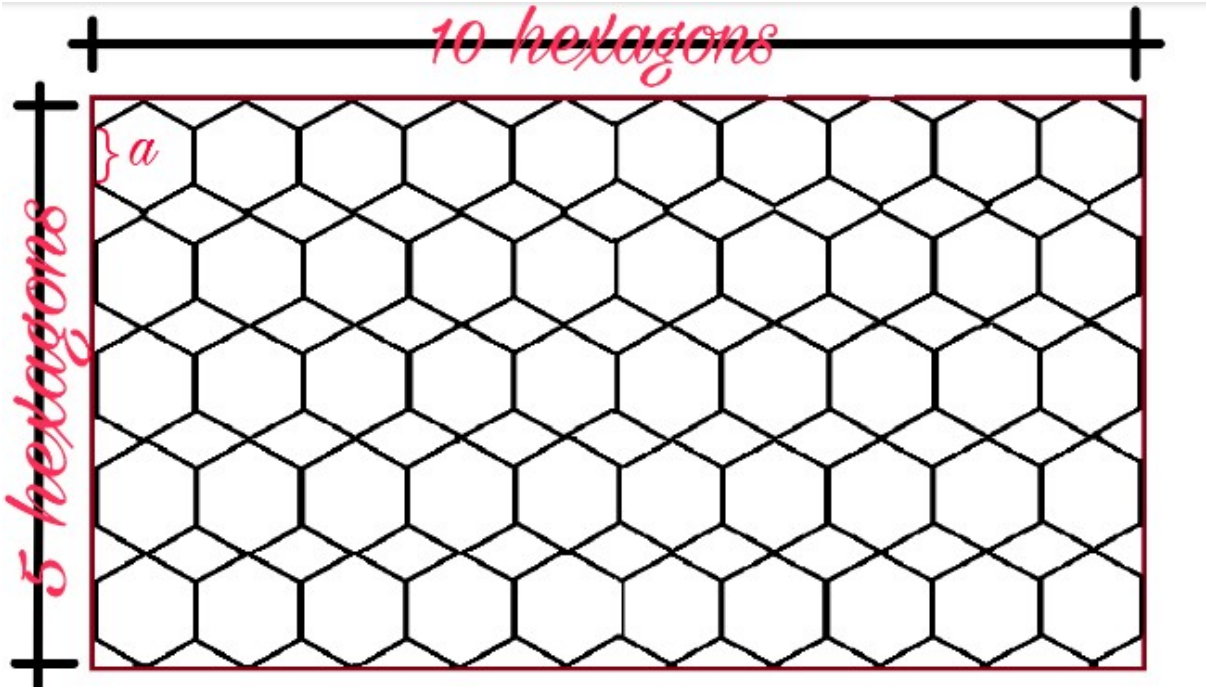
At first print test case number just like sample output “Case X: ”, X is the test case number. Then print the maximum number of stops ride by a person.

Samples

Input	Output
2 2 1 0 0 1 4 2 0 2 2 3 0 0 5	Case 1: 1 Case 2: 2

G. Honeycomb

Parvez was looking for a plank for a group of bees to live on. While searching, he found a wooden plank. But the problem is that any other group of bees lived on that plank in their own made house just like the picture below. They left the house but now the house is attached to the plank. (I don't know what kind of bee makes house like that!)



Parvez needs a plank of area **X**. Now if the area of that plank is equal to or greater than **X**, then Parvez will destroy the housing of that plank and take away the board. Otherwise, it won't destroy the housing.

Input

The bees house in the picture is made up of many hexagons. So you will be given the value of one arm of the hexagon and the value of **X** as input. For which you can use float or double data type.

Output

Would Parvez take the plank or not? If the answer is yes then print `Yes`. Otherwise, print `No`. **[You can assign the area into a *double* type variable]**

Samples

Input	Output
5 6000	No

Input	Output
10 27320.509	No

Input	Output
23.19 14690.99	Yes