Total Problems: Nine

You have to solve all the problems

Problem A

Given a list of integer numbers, you have to write a program to find the Maximum absolute difference between two consecutive elements.

Input

The first line of input contains N, which represent the size of integer array. Next line contains N space separated integers.

$1 < N < 100$

Output

Print the maximum difference of any two consecutive integers.

Sample Input	Sample Output
7 2 3 10 6 4 8 1	7
6 7 9 5 6 3 2	4

Problem B

Write a program that will read a string and print Capitalize string, Capitalize string is a string in which first character of each word is in Uppercase (Capital) and other alphabets (characters) are in Lowercase (Small). A word is a combination of any consecutive alphabets.

Input

Input consists of 1 line with a sentence. The sentence will consist of only alphabets and white spaces. Length of the sentence will be no more than 10000.

Output

Print the capitalize string of the input sentence. See sample for clarification.

Sample Input	Sample Output
I am a programmer	I Am A Programmer
BANGLADESH IS INDEPENDENT	Bangladesh Is Independent

Problem C

Write a program that will read a number *n*, where the number $n = 2^a$. You need to print the value of *a*.

Input

Input consists of one line with an integer *n*. Length of the *n* will be no more than 19.

Output

Print the value of a. See sample for clarification.

Sample Input	Sample Output
16	4
1152921504606846976	60

Problem D

You have to find all the roots of the given quadratic equation.

$$ax^2+bx+c=0$$

You must consider all the cases. Roots should be printed in ascending order. If both the roots are equal, print the root just once. In case of complex root, print as$(r - ci)$, (r+ci)respectively.

Input

Input consists of 1 line with three integers a, b and c.

$$-100000 \leq a,b,c \leq 100000, a \neq 0$$

Output

Print the roots upto 2 decimal points as instructed. Multiple solutions will be separated by space. See sample for clarification.

10 15 5	-1.00 -0.50
1 2 3	-1.00-1.41i -1.00+1.41i
1 -4 4	2.00

Problem E

Given a matrix A, you have to calculate the mean vector of this matrix. You can calculate the mean vector by taking the average of each columns of matrix A.

Input

The first line of input contains two integers R and C which represent the size of the matrix. Next R lines contains the matrix entries.

$$1 < \mathrm{R,C} < 1000, -100 < \mathrm{A_{nm}} \leq 100$$

Output

Print the elements of the mean vector separated by space and two places after decimal point.

Sample Input	Sample Output
2 3 1 4 3 5 3 4	3 3.50 3.50
3 5 1 4 3 4 5 5 3 4 1 6 3 4 9 6 7	3.00 3.67 5.33 3.67 6.00

Problem F

You will be given a sentence. You have to make the run-length encoding of the sentence. Run-length encoding is the representation of the same consecutive characters as the character with its count.

For example, the run-length encoding of the sentence ‘aaaaabbaaacccbb’ is ‘a5b2a3c3b2’.

Input

Input consists of 1 line with a sentence. The sentence will consists only alphabets (Both smaller and capital). Length of the sentence will be no more than 1000000.

Output

Print the encoding in the given sentence. See sample for clarification.

aaaaabbaaacccbb	a5b2a3c3b2
Bangladeshisindependent	B1a1n1g1l1a1d1e1s1h1i1s1i1n1d1e1p1e1n1d1e1n1t1

Problem G

In this problem, you have to simulate a list of commands in a board game with a RXC sized board. Each cell of this board consists of '.' and '#', which represent empty and block spot receptively. Now, you are given a list of commands and the initial position of a player P. Based on these commands, you have to change the position of the player in the board and determine the final position of the player after executing the full list of commands.

Moreover, during the execution of the commands if the player lands on a invalid position(either lands on a block spot or lands outside of the board), then you have to print “Invalid Command” (without quotes).

Commands	Meaning
S	Start Execution of Commands
L	Left
R	Right
U	Up
D	Down
E	End Execution of Commands

Please note that the (1,1) and (R,C) position represent top right and bottom left cell of the board. Moreover, it is not necessary that the initial position of the player will be a valid cell.

Input

First line of the input contains the list of commands. Second line contains two integers X and Y represent the initial position of the player. Third line will contain the size of the board (R and C). Subsequently, next R line contains the board.

Output

Based on the execution of the commands either print the final position(print the row and column number separated by space) of the player of “Invalid Command”.

SDDLRRRE 3 2 5 5 ..##. .#..# #..#. #.#.# ....#	5 4
SDDDLRRRE 3 2 5 5 ..##. .#..# #..#. #.#.# ....#	Invalid Command

Problem H

You will be given an 8x8 chessboard. Some cells in the chessboard will be empty, other will hold some pieces. There will be two types of pieces, Queens and Pawns. Given the chessboard and the position of the pieces, you will have to figure out, whether the two Queens can attack each other. Two Queens can attack each other if they are in the same row or column of diagonal and there are no other pieces in the path of attack.

Input

Input will contain a 8x8 chessboard as 8 lines of string, each with 8 characters. A '.' will mean an empty cell. 'Q' means a Queen and 'P' means a pawn. There will be exactly two Queens in the board.

Output

Output "Yes" if the Queens attack each other, "No" otherwise.

Q....... .... P......P .... P......Q	Yes
Q....... ....P.... ....Q	No
Q....Q.. ....P..... ....P..... ....P	Yes
Q...PQ.P ....P..... ....P..... ....P	No

Problem I

Given two integer numbers A and B, find the remainder of A/B.

Input

Input will contain two numbers A and B. Length of A can be as most 1000. B will be between 1 and 100.

Output

Print the value of the remainder.

2000 400	0
2100 400	100
1996 4	0
1987 4	3
10000000000000000000000000000000000001 4	1