CODEFORCES β
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acmASCIS Session 4 Wednesday groups

A. LCM

time limit per test: 0.25 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

The least common multiple of a group of integers is the smallest number that can be evenly divided by all the integers in the group. Given two integers, A and B, find the least common multiple of the two numbers.

Input
The only line contains two space-sperated integers A and B (1 <= A,B <= 1000).

Output
print a line contains a number which denotes the answer to the problem.

Sample test(s)

input
2 3
output
6

B. Palindrome

time limit per test: 0.25 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

A palindrome is a string that reads the same from left to right as it does from right to left. Given a String S contains N characters, output a palindrome that is produced by changing the minimum possible number of characters in S. Changing a character means replacing it with any single character at the same position. You are not allowed to remove or add any characters. If there are multiple answers, output the one that comes first alphabetically.

Input
The first line contains (1 <= N <= 50). The second line contains N lowercase letters ('a'-'z'), inclusive.

Output
The first line contains the minimum numbers of changes. The second line contains the palindrome that comes first alphabetically.

Sample test(s)

input
5 ameba
output
1 abeba

input
11 cigartragic
output
0 cigartragic

input
6 abcdef
output
3 abccba

C. Almost Lucky

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Everybody knows that lucky numbers are positive integers whose decimal representation contains only the lucky digits 4 and 7. For example, numbers 47, 744, 4 are lucky and 5, 17, 467 are not.

Adam calls a number almost lucky if it could be evenly divided by some lucky number. Help him find out if the given number n is almost lucky.

Input
The single line contains an integer n (1 ≤ n ≤ 1000) — the number that needs to be checked.

Output
Print "YES" (without the quotes), if number n is almost lucky. Otherwise, print "NO" (without the quotes).

Sample test(s)

input
47
output
YES

input
16
output
YES

input
78
output
NO

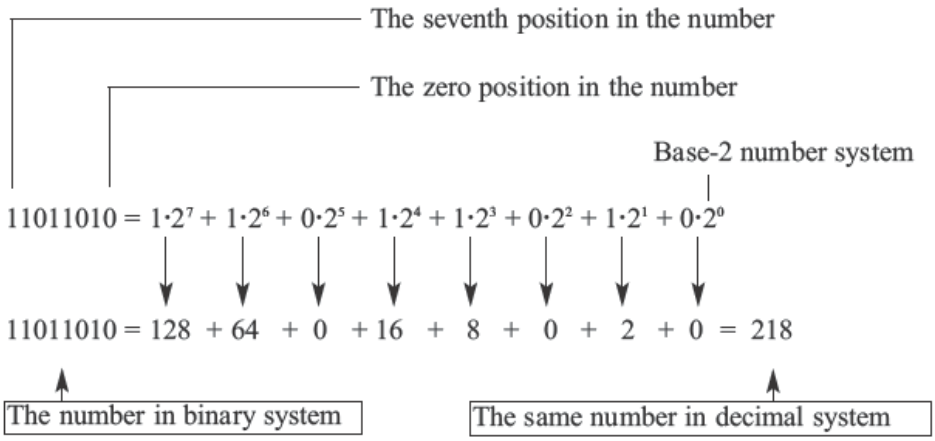
Note
Note that all lucky numbers are almost lucky as any number is evenly divisible by itself.

In the first sample 47 is a lucky number. In the second sample 16 is divisible by 4.

D. Binary Numbers

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

If you are a FCIS student of course you heard about the binary numbers, which are the base of the computer system and the only way to store its data. Sarah is anew student and she doesn't know a lot about binary numbers and her doctor asked her for a program, that the user insert a binary number and the program should output the decimal number. Sarah knows how to convert to decimal numbers but she doesn't know how to write this program. So can you help Sarah to do it, and she will gives you the steps to convert any binary number to decimal:



Input
The only line of the input data contains one binary number (from 2 bits to 8 bits maximum).

Output
Your program should prints the decimal number that represent the input binary number.

Sample test(s)

input
110100
output
52

input
1111
output
15

E. Encryption

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A student from FCIS plays with a new encryption method for numbers. These method consist of the following steps:

Steps : Example

1) Read the number N to encrypt M = 265

2) Interpret N as a decimal number X1= 265 (decimal)

3) Convert the decimal interpretation of N to its binary representation X1= 100001001 (binary)

4) Let b1 be equal to the number of 1's in this binary representation B1= 3

5) Interpret N as a Hexadecimal number X2 = 265 (hexadecimal)

6) Convert the hexadecimal interpretation of N to its binary representation X2 = 1001100101

7) Let b2 be equal to the number of 1's in the last binary representation B2 = 5

8) The encryption is the result of M xor (B1*B2) M xor (3*5) = 262

This student failed Computational Organization, that's why this student asked the judges of ACM programming Contest to ask for the numbers of 1's bits of this two representations so that he can continue playing.

Task : You have to write a program that read a Number and give as output the number B1 and B2.

Input
Single line contains the number N (0<N<=9999, in decimal representation) which is the number the student wants to encrypt.

Output
You will have to output B1 and B2 in that order, separated by one space.

Sample test(s)

input
265
output
3 5

input
111
output
6 3

input
1234
output
5 5

F. Assassination

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Do you remember Ezio Auditore from the escape problem? Well, thanks to you, Ezio made it out safely. He’s now mentoring a newly recruited assassin, Omar is currently in the testing phase, he’s to assassinate a few Templars on Ezio’s watch. But Omar forgot whom he’s to assassinate and Ezio’s eagle vision is not working because he’s exhausted. So again they need your help.
The grid you’re to work on consists of '.'s and 'O's . where 'O's are the guard patrols and '.'s are the empty spots. They targets are of great importance so it is expected that they’d be heavily guarded. Templars being so neat, they always guard themselves with even number of guard patrols. So your aim is to find all the spots with even number of adjacent guard patrols. It is possible that a Templar can walk amidst a guard patrol.

Input

The input consists of one number N (1<=N<=50)

Followed by an NxN Matrix consisting of “.”s and “O”s

Output

For each grid, output the places of the hidden Templar targets in 'i's and 'j's, then output the number of targets

if there's no target, Print "No target".

Sample test(s)

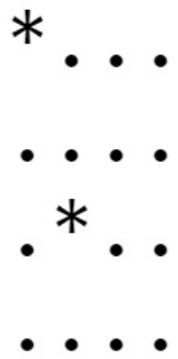
input
6 O..... .....O O..... ....O... .OO...
output
2 1 5 2 6 3 3

input
5 ....
output
No target

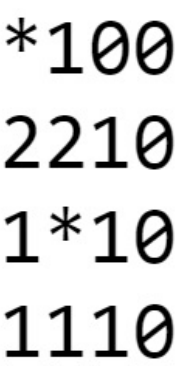
G. Minesweeper

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Have you ever played Minesweeper? It's a cute little game which comes within a certain Operating System which name we can't really remember. Well, the goal of the game is to find where are all the mines within a MxN field. To help you, the game shows a number in a square which tells you how many mines there are adjacent to that square. For instance, supose the following 4x4 field with 2 mines (which are represented by an * character):



If we would represent the same field placing the hint numbers described above, we would end up with:



As you may have already noticed, each square may have at most 8 adjacent squares.

Input

The first line of each field contains two integers n and m (0 < n,m <= 100) which stands for the number of lines and columns. The next n lines contains exactly m characters and represent the field. Each safe square is represented by an "." character (without the quotes) and each mine square is represented by an "*" character (also without the quotes).

Output

Print n lines, each line should contain the field with the "." characters replaced by the number of adjacent mines to that square.

Sample test(s)

input
4 4 *... .... .*.. ....
output
*100 2210 1*10 1110

input
3 5 **... .....

```
.*...
```

output

```
**100
33200
1*100
```

H. matrices

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Hesham is a very smart boy he likes playing with matrices , once you gave him a matrix he starts to do some operations on it to see the changes , as Hesham enjoy this he wants to show his friends how fun it is , so he asks you to make a program to convince his friends We have a matrix of size N x N. Each value of the matrix occupies an integer from [0, 9]. A few operations are going to be performed on this matrix. We would like to know how the matrix looks like after these operations are performed sequentially.

There could be five different types of operations.

row a b

In this operation, row a is interchanged with row b.

col a b

In this operation, column a is interchanged with column b.

inc

In this operation, every cell value is increased by 1 (modulo 10). That is, if after adding 1, a cell value becomes 10 we change it to 0.

dec

In this operation, every cell value is decreased by 1 (modulo 10). That is, if after subtracting 1, a cell value becomes -1 we change it to 9.

transpose

In this operation, we simply transpose the matrix. Transposing a matrix, denoted by AT, means turning all the rows of the given matrix into columns and vice-versa.

Example:

1 2 3 1 4 7

4 5 6 à after transposing à 2 5 8

7 8 9 3 6 9

Input

The input file starts with an integer T(T<50) that indicates the number of test cases. Each case starts with a positive integer N(N<10) that represents the size of the matrix. The next N lines contain N integers each. The value of each integer is in the range [0, 9]. Next there is a line with an integer M(M<50). Each of the next M lines contain an operation each. If the command is row a b or col a b, then you can assume

Output

For each case, output the case number on the first line. Then on the next N lines output the content of the final matrix. Print a blank line after each case (even after the very last one).

Sample test(s)

input
1 4 3648 9637 2157 8937 3 row 2 3 col 2 3 inc

output
Case #1 4579 3628 0478 9408

J. Simon and Antisimon

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Simon and Antisimon play a game. Initially each player receives one fixed positive integer that doesn't change throughout the game. Simon receives number a and Antisimon receives number b. They also have a heap of n stones. The players take turns to make a move and Simon starts. During a move a player should take from the heap the number of stones equal to the greatest common divisor of the fixed number he has received and the number of stones left in the heap. A player loses when he cannot take the required number of stones (i. e. the heap has strictly less stones left than one needs to take).

Your task is to determine by the given a, b and n who wins the game.

Input
The only string contains space-separated integers a, b and n (1 ≤ a, b, n ≤ 100) — the fixed numbers Simon and Antisimon have received correspondingly and the initial number of stones in the pile.

Output
If Simon wins, print "0" (without the quotes), otherwise print "1" (without the quotes).

Sample test(s)

input
3 5 9
output
0

input
1 1 100
output
1

Note
The greatest common divisor of two non-negative integers a and b is such maximum positive integer k, that a is divisible by k without remainder and similarly, b is divisible by k without remainder. Let gcd(a, b) represent the operation of calculating the greatest common divisor of numbers a and b. Specifically, gcd(x, 0) = gcd(0, x) = x.

In the first sample the game will go like that:

Simon should take gcd(3, 9) = 3 stones from the heap. After his move the heap has 6 stones left.

Antisimon should take gcd(5, 6) = 1 stone from the heap. After his move the heap has 5 stones left.

Simon should take gcd(3, 5) = 1 stone from the heap. After his move the heap has 4 stones left.

Antisimon should take gcd(5, 4) = 1 stone from the heap. After his move the heap has 3 stones left.

Simon should take gcd(3, 3) = 3 stones from the heap. After his move the heap has 0 stones left.

Antisimon should take gcd(5, 0) = 5 stones from the heap. As 0 < 5, it is impossible and Antisimon loses.

In the second sample each player during each move takes one stone from the heap. As n is even, Antisimon takes the last stone and Simon can't make a move after that.

K. Riddle Me This

time limit per test: 0.25 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Batman, The world greatest detective, is hunting down one of his foes, Edward Nigma AKA The Riddler, who has kidnapped his sidekick Red Robin. Edward Nigma is a very cocky character, he thinks too high of himself and always belittles his foes' wits. He made a deal with batman, he's to give him one number and it's output. And he has to figure the rest out.He left batman the riddle statement "Riddle me this: The "Square" is "Perfect" and the Earth orbits the Sun, the answer to your salvation is basically Forty-One". If he could solve it, he can have his sidekick back, if not, Robin dies. Can you help batman rescuing his sidekick?

Input
The input consists of one line, a single number N (1<=N<=10^9)that is to be operated on

Output
For every case, output the solution of the riddle concerning the number you have.

Sample test(s)

input
1
output
43

input
1000000000
output
1000000001000000041

L. X_O game

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Certainly, everyone is familiar with X_O game. The rules are very simple indeed. Two players take turns marking the cells in a 3 × 3 grid (one player always draws crosses, the other — noughts). The player who succeeds first in placing three of his marks in a horizontal, vertical or diagonal line wins, and the game is finished. The player who draws crosses goes first. If the grid is filled, but neither Xs, nor Os form the required line, a draw is announced.

You are given a 3 × 3 grid, each grid cell is empty, or occupied by a cross or a nought. You have to find the player (first or second), whose turn is next, or print one of the verdicts below:

illegal — if the given board layout can't appear during a valid game.

the first player won — if in the given board layout the first player has just won.

the second player won — if in the given board layout the second player has just won.

draw — if the given board layout has just let to a draw.

Input
The input consists of three lines, each of the lines contains characters ".", "X" or "O" (a period, a capital letter X, a capital letter O).

Output
Print one of the six verdicts: first, second, illegal, the first player won, the second player won or draw.

Sample test(s)

input
XOX .O. .X.
output
second

M. Find the interesting number

time limit per test: 3 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

Farah loves all sorts of odd properties of numbers. For instance, mathematics consider 945 to be an interesting number, since it is the first odd number for which the sum of its divisors is larger than the number itself. To help Farah search for interesting numbers, you are to write a program that scans a range of numbers and determines the number that has the largest number of divisors in the range. Unfortunately, the size of the numbers, and the size of the range is such that a too simple-minded approach may take too much time to run. So make sure that your algorithm is clever enough to cope with the largest possible range in just a few seconds.

Input

The first line of input specifies the number N of ranges, and each of the N following lines contains a range, consisting of a lower bound L and an upper bound U, where L and U are included in the range. L and U are chosen such that $1 \le L \le U \le 1000000000$ and $0 \le U-L \le 10000$

Output

For each range, find the number P which has the largest number of divisors (if several numbers tie for first place, select the lowest), and the number of positive divisors D of P (where P is included as a divisor). Print the text 'Between L and U, P has a maximum of D divisors.', where L, U, P, and D are the numbers as defined above.

Sample test(s)

input
2 1 10 1000 2000
output
Between 1 and 10, 6 has a maximum of 4 divisors. Between 1000 and 2000, 1680 has a maximum of 40 divisors.

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