**Arrays and Strings**

**Modulo**

Given two integers 'A' and 'B', A MOD B is the remainder of the operation A / B.

For example,  
  
7 MOD 3 = 1  
  
14 MOD 3 = 2  
  
27 MOD 3 = 0  
  
38 MOD 3 = 2  
  
Your program should accept 10 non-negative integers as input and output the number of distinct non-negative integers in the input, if they are considered MOD 42.

**Input**

Input contains 10 non-negative integers, each smaller than 1000, one per line.

**Output**

Output the number of distinct values when considered MOD 42.

**Sample Input:** 39 40 41 42 43 44 82 83 84 85 **Sample Output:** 6

**Carry Operation**

Children are taught to add multi-digit numbers from right-to-left one digit at a time. Many find the "carry" operation - in which 1 is carried from one digit position to be added to the next - to be a significant challenge. Your job is to count the number of carry operations for each of addition problem so that educators may assess their difficulty.

**Input Format**

Input consists of two unsigned integers less than 11 digits.

**Output Format**

Output consists of an integer that corresponds to the number of carry operations that would result from adding the two numbers.

**Sample Input 1**

123

456

**Sample Output 1**

0

**Sample Input 2**

555

555

**Sample Output 2**

3

**Sample Input 3**

123

594

**Sample Output 3**

1

**Statues**

The Princess of the Indian Royal Rajput clan loves her Royal Palace. There are **N** rooms in the palace. Every room has one or more statues. It is not necessary that every room has the same number of statues.

The Princess believes in total equality. It makes her sad to see some rooms with more statues than other rooms. Hence, she has decided to make the number of statues equal in all the rooms. Fortunately, the total number of statues in the palace, across all the rooms, is a multiple of **N**.

Your job is to figure out the minimum number of moves needed in order to equalize the number of statues in all the rooms. In one move, you may select a statue and move it to any other room. All the statues are indistinguishable.

**Input**

The input consists of 2 lines.

The first line contains a single positive integer **N**, the number of rooms.

The second line contains **N** positive integers **{ A1, A2, ..., AN }** separated by single spaces, describing the number of statues in each of the **N** rooms respectively.

**Constraints**

**1 ≤ N ≤ 50** **1 ≤ Ai ≤ 100** **Sum of all Ai's is divisible by N**

**Output**

Output consists of a single integer which corresponds to the minimum number of moves you must make to equalize the number of statues in all the rooms.

**Sample Input 1**

6 5 2 4 1 7 5

**Sample Output 1**

5

**Sample Input 2**

3 2 3 4

**Sample Output 2**

1

**Magic Number**

Alice is a very brilliant student. He considers '4' and '7' as Magic numbers. The numbers containing only magic numbers are also magical. Given a magic number N ,he wants to know what could be the next magical number greater than the given number.

**Input**

Input consists of a single integer which corresponds to a magic number **N**.

**Output**

Output the next greater magical number.

**Constraints**

4<= **N**<=100000

**Sample Input 1**

4

**Sample Output 1**

7

**Sample Input 2**

47

**Sample Output 2**

74

**Chess Puzzle**

Jake and Sully are playing around with a chessboard one night after working with their avatars all day. They decide it would be interesting to place some rooks on the chessboard in a way that no rook can threaten another rook. Since rooks move along rows and columns, this means two rooks may not be on the same row or column. Your goal is to write a program to determine whether any rooks are threatened.

Chessboards are 8x8 boards with positions between (1,1) and (8,8).

**Input Format:**

Input consists of 2n+1 integers. The first integer corresponds to the number of rooks. The second and third integer corresponds to the column and row of the first rook, the fourth and fifth integer corresponds to the column and row of the second rook and so on.

**Output Format:**

Your program should output the words ”SAFE” or ”NOT SAFE” on a single line.

**Sample Input 1:**

3 1 1 2 6 8 8

**Sample Output 1:**

SAFE

**Sample Input 2:**

2 2 3 1 3

**Sample Output 2:**

NOT SAFE

**Cheer Leader Pattern**

In the IPL season’s valedictory function the organizers have organized for a dance program. Well the dance has to be performed with men only along the points of the diagonals of the square of side ‘n’ and the females only along points of the borders. The remaining positions are to filled by children. Can you please help them determine their respective positions by writing a C program……???

**Input Format:**

Input consists of a single integer n representing the matrix (n\*n).

**Output format:**

Output consists of the n\*n character matrix.

[Refer sample input and output for further formatting specifications]

**Sample input and output 1:**

**[All text in bold corresponds to input and the rest to output]**

Enter the size of matrix:

**4**

M F F M

F M M F

F M M F

M F F M

**Sample input and output 2:**

Enter the size of matrix:

**7**

M F F F F F M

F M C C C M F

F C M C M C F

F C C M C C F

F C M C M C F

F M C C C M F

M F F F F F M

**Counting Stars**

Galileo's latest project involves determining the density of stars in certain regions of the sky. For this purpose he started looking for datasets online, and discovered a dataset on Newton's blog. Newton had decomposed the night sky into a Voronoi tessellation with the generators arranged in a grid. He has stored the number of stars in a Voronoi cell at a position in a matrix that corresponds to the position of the generator in the grid.

This dataset does not directly help Galileo, because he needs to be able to query the number of stars in a rectangular portion of the sky. Galileo tried to write a program that does this on his own, but it turned out to be too slow. Can you help him?

**Input Format**

The first line contains two integers n and m that denote the height and width of the matrix respectively. This is followed by n lines each containing m integers each.

The line following this would contain a single integer t, the number of queries to be run. Each query line consists of 4 integers px, py, qx, qy. The first two integers denote the row and column numbers of the upper left corner of the rectangular region, and the second pair of numbers correspond to the lower right corner.

**Output Format**

For each query output a single line containing the number of stars in that rectangular region.

**Sample Input**

3 3

10 10 10

10 10 10

10 10 10

4

1 1 1 1

1 1 3 3

2 1 3 3

3 1 3 3

**Sample Output**

10

90

60

30

**String Encryption**

A simple string contains a large repetition of letters within it. This problem is related to string handling and manipulation. An original message is sent from planet Earth to planet Cybertron in the form of a string. However, the letter position and string size is not important. The number of time each letter has occurred in the string is important. So the original string which is sent to Cybertron is encrypted in the new string which comprises of the letters followed by the number of times it has occurred in the original string. Eg- original message is- abcdabf. Then the encrypted string is- a2b2c1d1f1

**Input**

The input consists of a single line string that consists of only lower case alphabets. Assume that the maximum length of the string is 50.

**Output**

It will consist of in the encrypted string which comprises the letters followed by each time it has occurred in the original string in order.

**Sample Input:** information **Sample Output:** i2n2f1o2r1m1a1t1

**DISTORTED MESSAGE**

**Description:**

The terrorist leader has just sent an urgent message to the his team, but the message has

been distorted by subspace interference. All of the strings “th” have been replaced with “iiing”.

Your job is to unscramble the message

**Input:**

Input consists of a string that corresponds to the distorted text. Assume that the maximum number of characters in the string is 300.

**Output:**

Output consists of a string that corresponds to the original text.

**Sample Input:**

Dariiing Bane restructured iiinge cult, so iiingat iiingere could only be two - no more, no less - a master, and an apprentice. Bane adopted cunning, subterfuge, and stealiiing as iiinge fundamental tenets of iiinge Siiiing order.

**Sample Output:**

Darth Bane restructured the cult, so that there could only be two - no more, no less - a master, and an apprentice. Bane adopted cunning, subterfuge, and stealth as the fundamental tenets of the Sith order.

**YODA**

Description: As a young jedi you must learn to converse with Yoda. You have found a simple rule that helps change a “normal” sentence into “Yoda talk”. Take the first two words in the sentence and place them at the end. Write a program that uses this rule to change normal sentence into “Yoda talk”.

**Input:**

Input consists of a string that you must change into “Yoda talk”.

Assume that the maximum length of the string is 100;

**Output:**

Print the corresponding sentence in Yoda talk.

**Sample Input:**

I will go now to find the Wookiee

**Sample Output:**

go now to find the Wookiee I will