14th City University Intra University Programming Contest Spring 2019

4th May, 2019

You get 13 Pages, 13 Problems and 300 minutes.

Platform Support :

Toph

Organized By:

City University Programming Club (CUPC)

A. Welcome to CUPC!	Timelimit : 1s	Memory Limit : 512 MB

City University Programming Club, **CUPC** arranges an Intra University Programming Contest for their junior contestants in this semester. All the members of CUPC are delighted and excited to arrange this contest. Some contestants are going to participate their very first onsite contest. So, they are very excited too.

So, CUPC wants to welcome their new contestants warmly by these following two lines,
"Dear New Contestants, Welcome to your very first contest! ^_^
Have a nice contest.".

Your job is all set now. Print this welcome message to the console without quotes. This makes new contestants happy!

Sample Input
No input for this problem.

Sample Output
Dear New Contestants, Welcome to your very first contest! ^_^
Have a nice contest.

Notes:
Be careful about printing a new line after this message.
Otherwise you will be penalized.

B. Counting Jeopardy	Timelimit : 1s	Memory Limit : 512 MB

Numan reads in a kindergarten school. In todays Alphabet class, he comes to know about vowels and consonants. He takes a paper and writes down the vowels and consonants separately. But he often forgets them and makes mistakes. Such as, he counts vowels as consonants and consonants as vowels, sometimes he doesn't count them at all etc etc. Numan's elder brother, Ratul, reads in class five but can mentor him strictly. Now Ratul gives him some words and makes Numan to count the letters. Ratul will give hard punishment if Numan fails.

Numan needs your help!

Input
Input contains an integer **T (1 ≤ T ≤ 10)** , denoting the total number of words Ratul gives to Numan. Then for each next **T** lines there will be two lines of input. First line contains a word that can contain uppercase and lowercase letters. Length of each word does not exceed 10. Second line contains two integers **V** and **C**, represents

Numan's vowel count and consonant count respectively.

Output

For each word, you should print a line of the following which satisfies the corresponding condition,

- **Thik gunecho Numan**, if Numan can count vowels and consonants correctly.
- **Aj kopale pituni ache**, if Numan fails to count.
- **Jak ektu rokkhe holo**, if Numan can count partially right.

Samples

Input

3
aaxyx
3 2
abc
3 0
ab
1 1

Output

Thik gunecho Numan
Aj kopale pituni ache
Jak ektu rokkhe holo

Notes:

Five of the 26 alphabet letters are vowels : A/a, E/e, I/i, O/o, and U/u. The letter Y/y is sometimes considered a sixth vowel because it can sound like other vowels.

C. A Very Hard Problem	Timelimit : 1s	Memory Limit : 512 MB

In todays C Programming class, Chintu learns about bitwise operations. Now he wants to determine the XOR of any two numbers. But he finds it hard. Can you help him?

Input

The only line contains two integers, **A** and **B** (**1 ≤ A,B ≤ 10**).

Output

Output **A XOR B**.

Samples

Input

1 1
4 2

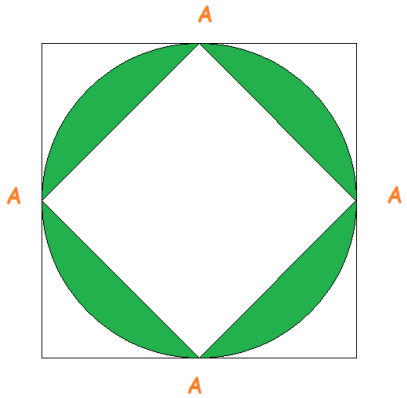
Output

0

6

D. Poltu and a Geometrical Shape	Timelimit : 1s	Memory Limit : 512 MB

Poltu and his girlfriend Pinky loves each other very much. Pinky has a elder brother. His name is “Kislu”. One day Poltu wanted to visit Kislu. So he went to Kislu’s home. Kislu was a Geometry lover. He drew a geometrical shape in his drawing room’s floor. Poltu saw that and after coming back his home he drew that shape in his handbook. And now he wants to draw this shape in his drawing room too. But after drawing that shape, it needs to color a specific portion by Green color.



So now Poltu wants to know the total area of that green portion.

Poltu’s elder brother Potla wants to help him. Potla is calculating the area. In the meantime Poltu wants someone else also to calculate that area. So that he will be able to cross check and be assure.

Input

Input will consists of one integer **T ($1 \le T \le 10^3$)** in the first line. And the following **T** lines there will be a floating point value **A ($1 \le A \le 10^3$)** which represents the outer bound length of that shape.

Output

For each line of input, the output will be the case number followed by the total area of green colored shape to 6 decimal places.

Samples

Input

2

5

7

Output
Case 1: 7.134954
Case 2: 13.984510

Notes:
Pi is considered to be arccos(−1).

E. Er Cheye Shohoj Problem Aar Hobe Nahh! ;-)	Timelimit : 1s	Memory Limit : 512 MB

Majnu likes big numbers. One day he teaches his girlfriend Laili how to find the last digit of any big number by modulo operation. Laili gets more curious and now wants to know the very first digit of a big number.

Majnu hires you for this calculation, as he is very busy in a date with Laili.

Input
The only line of Input contains a big number **N ($-10^{1000} \le N \le 10^{1000}$)**. **N** can contain one or more leading zeroes.

Output
Print the first digit of **N**.

Samples
Input
56788765688
-8
Output
5
8

F. Mr. Shishir the Miser	Timelimit : 1s	Memory Limit : 512 MB

Mr. Shishir has become dad of a little cute boy. He wants to name the boy. He proposed all of his friends and family members to choose a name and let him know. Everyone selects a name. But Shishir loves an easy name which consists of an individual character only. No matter how many times it appears in that name. To make a name easier he may needs to replace one or more characters by another characters.

Suppose someone selects a name: **"poltu"** And Mr. Shishir wants to make the name easier, he can replace **'o'**, **'l'**, **'t'**and **'u'** by **'p'** . So that the name becomes **"ppppp"**. And yes its an easy name.

Since he wanted these names from them, so he does not want to hurt them. So he wants to present some chocolates to them. He decides to present 1 chocolate for every change of character. So to change the name **"poltu"** to **"ppppp"** he needs to present **4** chocolates.

As Mr. Shishir is so much miser, he wants to gift as few as possible.

And Mr. Shishir knows that you are a good programmer and you can help him to calculate the minimum amount of gift he needs to present to make every name easier.

Input

The first line of the input contains one integer **T (1 ≤ T ≤ 1000)** which represents total amount of friends and family member of Mr. Shishir. Then in next **T** lines there will be a string **S** consists of only lowercase latin letters. Which is the given name by one of his friend or family member. Length of string **S** does not exceed **1000**.

Output

For each line of testcase, show the **minimum amount** of chocolates Mr. Shishir have to present to make a name easier.

Samples

Input

```
2
poltu
tonni
```

Output

```
4
3
```

G. Birthday Surprise	Timelimit : 1s	Memory Limit : 512 MB

Tonni, Taseen and Jamil are siblings. Tonni wants to surprise them in their birthdays. Tonni remembers the month and year of Taseen and Jamil's birthday, and they were born in the same month but maybe in different years. Unfortunately Tonni forgot these exact dates but remember that these dates were between 1st to 9th. Besides Tonni remembers a method by which she can recover these two dates.

If Tonni multiply the age of Taseen and Jamil. She will get a number. And the first digit of that number is Jamil's birth date and last non zero digit is Taseen's birth date.

Help her to recover these two birth dates.

Input
Input will consists three space separated integers **M, N and P (1 ≤ M,N < P ≤ 10^8)**. Taseen and Jamil were born in the year of **M** and **N** respectively, and the present year is **P**.

Output
Print two space separate integers **X** and **Y** in one line. **X** represents Jamil's birth date and **Y** represents Taseen's birth date.

Samples
Input
2016 2013 2019
2000 2010 2020
Output
1 8
2 2

H. Largest Fibo	Timelimit : 2s	Memory Limit : 512 MB

Have you ever heard about fibonacci series? It is a gradually increasing series in which the i^{th} term is the sum of $(i-1)^{th}$ and $(i-2)^{th}$ terms.

Generally,
fibo(1) = 0
fibo(2) = 1 and
fibo(i) = fib(i-1) + fib(i-2) for any i ≥ 3.

First few fibos are 0, 1, 1, 2, 3 and so on.

You will be given some random numbers and you have to find out the absolute value of the largest fibo among them.

Input
Input starts with the total number of testcases, **T (T ≤ 1000)**. Then in each next **T** lines there will be some random numbers. The value of each number should be in this range, **[-10^{18} , 10^{18}]**.

It is assumed that the total number of the random numbers per testcase does not exceed 1000.

Output
For each testcase, print out the case number followed by the expected output stated above. If such output is not found, simply **print -1**.

Samples
Input
3
0
0 1 1 2 3 5 8 200 13
10 1000 10000

Output
Case 1: 0
Case 2: 13
Case 3: -1

Notes:
Dataset is huge. Use faster I/O methods.

I. Back to High School Algebra	Timelimit : 1s	Memory Limit : 512 MB

Tarik is an intelligent little boy. He reads in class 9. Now he is very busy for his term-final. Tarik opened his math book and starts to solve some interesting math problems. Suddenly he thought about Union and Intersection operations of Set Theory. And he exclaimed, "Alas! If I could implement these operations by writing some lines of code, it would be more precious and enjoyable to me."

Given three sets A, B and C, can you determine **(A ∪ B) ∩ C**?

Input
There are four lines of input.
First lines contains three integers **N**, **M** and **P**; denoting the length of Set A, Set B and Set C respectively.
Second line contains **N** space separated integers, the elements of Set A.
Third lines contains **M** space separated integers, the elements of Set B.
Fourth line contains **P** space separated integers, the elements of Set C.

$0 \le N,M,O \le 10^5$
$-10^9 \le$ elements $\le 10^9$

Output
Print the size of the resultant set **(A ∪ B) ∩ C** followed by all the elements of this set. If such set is not found, simple print **Null Set**.

Samples

Input

5 3 4
1 2 3 4 5
1 2 3
1 2 3 4

5 5 1
1 2 3 4 5
6 7 8 9 10
100

Output

4
1 2 3 4

Null Set

J. Jinia the Chocolate Lover	Timelimit : 1s	Memory Limit : 512 MB

Jinia is a talented cute baby girl. She loves chocolate very much as well as her friends too. She has **N** distinct types of chocolates. She arranged her all chocolates in a row and named every chocolate by **N** distinct positive integer number. Jinia has a friend, named **"Fool"**. Fool can't read but can count hardly. When Fool wants a chocolate, he counts all the chocolates and asked for $\mathbf{K^{th}}$ chocolate from Jinia (Sometimes he counts in a wrong way). Jinia always wants to give the chocolate if the $\mathbf{K^{th}}$ chocolate is available in her collection as she loves her friends too. If not available then she says, **"You fool! I don't have that one"**.

If $\mathbf{K^{th}}$ chocolate is available in her collection then she must give it to her friend Fool. Now after giving the chocolate, she wants to know all the remaining chocolate's name in **increasing order**. As you are a good programmer, you can help her.

Input

The first line of input contains two integers **N** and **K** $\mathbf{(1 \le N,K \le 10^5)}$ — **N** is the number of chocolates Jinia has and the $\mathbf{K^{th}}$ chocolate which her friend Fool wants. Then next line contains **N** space separated distinct integer $\mathbf{(1 \le Name[i] \le 10^6)}$ which represents **N** chocolates name which has been given by Jinia.

Output

Print remaining chocolates name in **increasing order** if Jinia can give the chocolate, otherwise print **"You fool! I don't have that one"** (without qoutes).

Samples

Input

4 3
5 3 1 9

4 5
8 3 1 9

Output

3 5 9

You fool! I don't have that one

Notes

Fool is not a programmer so he starts counting from 1 always.

K. Can You Find the LSS?	Timelimit : 1s	Memory Limit : 512 MB

Given a string S, a substring P is called **LSS (Longest Sorted Substring)** of string S, if and only if, P can be found as the longest sorted substring in ascending or descending order from S.
You have to find the length of LSS from a given string.

Input

The first line of input starts with an integer **T (1 ≤ T ≤ 100)** denoting the total number of testcases. Then in next **T**lines there will be a string **S** consists of only lowercase latin letters. Length of string **S** does not exceed 1000.

Output

For each line of testcase, give the output in that format, **Case X: Y**.
Where **X** is the case number and **Y** is the desired result.

Samples

Input

4
aaavvb
abcdfe
a
oba

Output

Case 1: 5

Case 2: 5
Case 3: 1
Case 4: 3

L. Poltu and the Gabbar Singh's String	Timelimit : 2s	Memory Limit : 512 MB

Poltu and his girlfriend Pinky loves each other. But their enemy the Gabbar Singh is a wicked fellow and does not like that. One day he proposed Pinky to go and have a date with him. Pinky rejected him straighly. The Gabbar Singh became very angry and he kidnapped Pinky. Poltu rushed to rescue his love. But evil the Gabbar Singh threw a condition to Poltu.

I will give you a string. Can you find the biggest number from it which is the sum of two different Prime Numbers?

Poltu is a brave lover. He can even sacrifice his life for her girlfriend. But he has no idea about prime numbers. Can you help him?

It is assured that a solution exists.

Input
Input starts with an integer denoting the total number of testcases, **N($1 \leq N \leq 10^6$)**. Each next **N** lines contains a string **S**. **S** contains only digits **'0-9'**. Length of string **S** does not exceed 20.

Input string can contain different type of sums. But it is assured that, in the output for any prime A and B, always A,B < 10^4 where A+B equals a valid sum.

Output
For each line of input, the output will be the case number followed by the biggest number from **S** which is the sum of two different prime numbers.

Samples
Input
3
10
107
1005

Output
Case 1: 10
Case 2: 10

Case 3: 100

Notes:
10 = 3 + 7
100 = 3 + 97
All of them are primes.

M. Programming Contest	Timelimit : 1s	Memory Limit : 512 MB

Alice and Bob are studying in CSE Department of City University. They often participate in various online and onsite programming competitions. **City University Programming Club, CUPC** arranges an **Intra University Programming Contest** on 4th May 2019. But unfortunately in the same date **Codeforces** also arranges a contest named **Codeforces Round #557 (Div. 1 & 2)**. Alice loves to participate in onsite contest but Bob loves online most. So in 4th May 2019, Alice decides to participate in Intra University Programming Contest and Bob decides to participate in Codeforces Round #557 (Div. 2).

Intra University Programming Contest and Codeforces will be consist of N & M problems respectively.

Naturally Alice and Bob each will be happy if one can solve more problems than another. They both will be sad if they solve same number of problems.
Now Alice and Bob wants to know in how many ways any one of them would be happy after these contests.

As you are a good programmer, help them to calculate.

Input
You will be given two space separated integer **N & M ($1 \leq N,M \leq 10^8$)** represents the number of total problems of **Intra University Programming Contest** and **Codeforces Round #557 (Div. 2)** respectively.

Output
Print the number of ways in one line, in how many ways any one of them would be happy after these contests.

Samples
Input
1 2

Output
4

Notes

Any of them would be happy if solved problems amount of Alice and Bob will be {0,1} or {0,2} or {1,0} or {1,2} that means total 4 ways, when the number of problems of Alice's contest is N = 1 and Bob's contest M = 2.