SELISE Coding Challenge 2020

SELISE Bangladesh

https://toph.co/c/selise-coding-challenge-2020

Schedule

The contest will run for **4h0m0s**.

The standings will be frozen for the last **1h0m0s** of the contest.

Authors

The authors of this contest are aLmAHFUz, Amateur, amin21, Anubis, kawsarahmd, mamunor.rashid, oorpib, Raihanur_R, rashid46, robin_aust, sarwarIT, and subhashis_cse.

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, C11 GCC 9.2, Common Lisp SBCL 2.0, Erlang 22.3, Free Pascal 3.0, Go 1.13, Haskell 8.6, Java 1.8, Kotlin 1.1, 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, and Whitespace in this contest.

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

Notes

There are 11 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.

A. I Hate Long Description

There are **N** cities in the country AjobDesh and **M** one way roads connecting the cities.

There lives exactly one AjobPrani in each of the N cities. Every AjobPrani must visit at least one *other* AjobPrani if there is a path to visit. If possible then he should also return to his home town.

Find how many AjobPrani are unable to return to his home town.

Input

First line contains the number of test cases **T(1≤ T ≤10)**.

For each test case:

First line consists of two integers denoting **N(1≤ N ≤100000)** and **M(0≤ M ≤200000)**.

Next M lines consist of two integers A and B denoting there is a directed road from **A** to **B** (**1≤ A,B ≤N**).The graph can contain self loops.

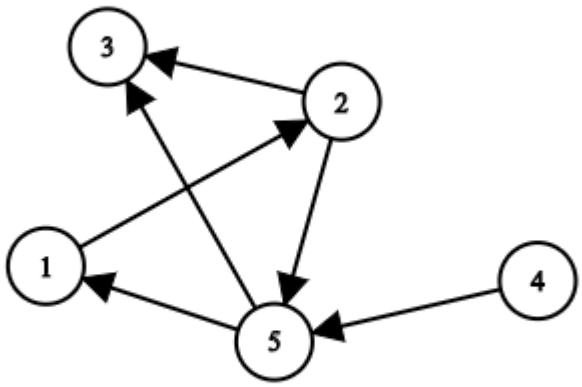
Output

For every test case, you need to print "Case T: " (where T is the test case number) followed by the number of AjobPrani who can't return.

Samples

Input	Output
1 5 6 1 2 2 3 2 5 5 3 5 1 4 5	Case 1: 1

Input	Output




```
Route for each AjobPrani:
AjobPrani 1: 1->2->5->1
AjobPrani 2: 2->5->1->2
AjobPrani 3: no way to visit any other AjobPrani
AjobPrani 4: 4->5 [can not return to 4]
AjobPrani 5: 5->1->2->5
So, only AjobPrani 4 can not return to his home town.
```

B. Bob's Dilemma

Alice and Bob have been playing a game on Android phone. It is a PVP game. They can play against each other. They are playing it for a little time, but they have learned the game's rules.

Initially, each player has only one Hero. Each hero has Certain Health Points (**H**), Attack Power (**A**), Ability Level (**L**) and Boost Attack Power (**B**).

The game is played in turns. But who will attack first?

It's decided by in game coin toss (**C**).

The hero of the toss winner (let Player1 is the toss winner) starts attacking first. So first Player1's hero deals damage equal to its attack power (**A1**). Then player2's hero deals damage equal to its attack power (**A2**) and then again the hero of player1 attacks and so on. A player wins the game if the Health Points of opponent's hero drop to 0 or less, we can say the hero died.

After completing every 5th strike, a hero immediately burst into rage and deals some extra damages equal to its Boost Attack Power. And the Boost attack Power of this hero increases by 1 i.e. if the first Boost attack deals 10 point damage (after completing its 5th strike) to the opponent, the second boost attack will deal 11 point damage (after completing its 10th strike), and so on. So we can say using Boost Attack helps them winning faster . But there's a catch.

Each hero could **activate and use** its Boost Attack Power only after having at least ability level **5**.

Now, Bob is trying to guess if he can be the winner given each player's hero's current Health Points (**H**), Attack Power (**A**), Ability Level (**L**), Boost Attack power (**B**) and the winner of the coin toss (**C**).

Can you solve it for Bob?

Input

The first line contains the number of test cases **T** (**1≤ T ≤ 100000**). For each test case the first line contains **C** (**C = 0 or 1**), 0 if Bob won the toss, and 1 if Alice won the toss.

The next two lines contain the description of each hero **H, A, L, B** (**1≤ H ≤ 10^10 , 1≤ A ≤ 10^10, 1≤ B ≤ 10^10, 1 ≤ L ≤ 50**), First being the description of Alice's hero, the second is the description of Bob's hero.

Output

For each test case print **'yes**' (without the quotes) if Bob can win or **'no'** (without the quotes) if he can't win in the separate line. Output is case-sensitive.

Samples

Input	Output
2 1 100 20 10 7 240 10 10 7 0 100 20 4 7 180 10 4 7	yes no

The first case, Bob's hero attacks first and Alice's hero's health decreases as follows → **90 80 70 60 43 33 23 13 3 -15** And Bob's hero's health decreases by Alice's hero as follows → **220 200 180 160 133 113 93 73 53 25 5 -15.** As Bob's hero needs less attack than Alice so, he wins.

As for Second case none of them haven't activated their Boost Attack Power so they can't use this Boost Attack . So they both need 10 attacks, but as Alice attacks first Bob can't win.

C. Lucky String

In your last programming class, you learned about octal number, string concatenation, sorting and greedy methods. That's why your teacher gives you the following task……

You are given a List of N number of octal-string (string that contains only '0' to '7'). With this List of octal strings, you can create new Lucky string by the following algorithm -

1. Pick k number of octal-string from the given List and erase them from this list. (You can not pick any erased octal-string).
2. Generate a new string by concatenating the picked octal-string.
3. Sort the character of the newly generated string in non-decreasing order. And it is the newly created Lucky string.

Example: If you pick 3 octal-string "74", "231" and "02" , then the newly generated Lucky string will be "0122347". You are allowed to create any number of new Lucky string untill the list becomes fully erased. Now you have to tell What is the minimum number of octal-string is needed to create two new lucky strings S1 and S2. If it is impossible, print -1.

Input

First line contains Lucky String S1 Second line contains Lucky String S2. Third line contains an integer N (1<=N<=26) Next N line contain N number of octal-string. In the whole input set, Maximum length of a single string will be 13 and characters will be sorted in non-decreasing order.

Output

Print a single line of the expected integer.

Samples

Input	Output
0345 456 5 035 456 7 4 6	3

In the first sample, using 1st and 4th octal string you can create first Lucky string and using 2nd octal string you can create 2nd lucky string. So, Using 3 octal-string, you can create 2 lucky string.

D. Love for Microsoft

“X”, a university student is very fond of Microsoft and its products. One day he thought of finding people who are also fond of Microsoft. But he wanted to do it secretly. So he came up with an idea.

This is his method: if the word **“microsoft”** can be made with the distinct characters of one’s user name then he or she is also fond of Microsoft and vise-versa. You are given the string that denotes the user name, please help our hero to determine whether the user is fond of Microsoft or not.

Input

The first line contains a non-empty string **(S)**, that contains only lowercase English letters — the user name. This string contains at most 100 letters **(0 < S <= 100)**.

Output

If it is possible to make the word **“microsoft”**, print “We both love Microsoft!” (without the quotes), otherwise, print “Only I love Microsoft!” (without the quotes).

Samples

Input	Output
`wjmzbmr`	`Only I love Microsoft!`

Input	Output
`microsftlver`	`We both love Microsoft!`

E. Prime factor love

Mr. Peter loves math lessons very much. Peter wants to get a good mark for math. For that , his math teacher, gave him a new task. Peter solved the task immediately. Can you?

The equation X of integer n, there X is Sum of all actual divisor from 1 to n.

```
X = SOAD(1) +SOAD(2)+.............+SOAD(n)
```

Here SOAD is defined sum of actual divisor of integer n. Actual divisor means the divisors of n without 1 and n.

```
For example, SOAD(10) = 2+5 = 7
```

Given the value of n, As X can be rather large, print sum of prime factor of **X** modulo 1000009.

Input

Input starts with an integer T (≤ 1000), denoting the number of test cases. Each case contains an integer n (0 ≤ n ≤ 2000000000000).

Output

For each case, print the case number and the result as remainder after dividing it by number 1000009.

Samples

Input	Output
3 10 50 100	Case 1: 23 Case 2: 20 Case 3: 25

Explanation

- 1 = 1=0
- 2 = 1 ,2 =0
- 3 = 1,3 =0
- 4 = 1,2 ,4 = 2= 2
- 5 = 1,5 = 0
- 6 = 1,2,3,6= 2+3 = 5

- 7 = 1, 7 = 0
- 8 = 1,2,4,8 = 2+4 = 6
- 9 = 1,3,9 = 3 =3
- 10 = 1,2,5,10 = 2+5 = 7
- SOAD = (0+0+0+2+0+ 5+0 + 6 +3 + 7) = (23%1000009)=23
- Sum of prime factor of 23 = (23%1000009)=23

F. Jan or Jami

Jan and Jami are playing a game. Initially they have a string (***S***) consisting of only **uppercase** letters with **fixed length 3**. For example, AAH or KSZ or KJH.

Jan and Jami make alternating moves: Jan makes the first move, Jami makes the second move, Jan makes the third one, and so on. During each move, the current player must choose **a letter** from the string (***S***) and replace it with any of the **next three letters from the alphabet**. For example, if at a certain move, ***S*** = AMS, (Reminder: the next three letters of **A** are **B**, **C** and **D**) then the current player can make it BMS or APS or AMT (Here total nine different changes are possible).

If a player fails to move, he loses. Both players play **optimally**. You have to determine the winner of the game.

Input

The first line of the input contains a single integer **Q** (1<=**Q**<=10000) - the number of the query. Each of the next **Q** lines contain a string S consisting of only **uppercase** letters with **fixed length 3**.

Output

For each query, if Jan wins the game, print “Jan” otherwise print “Jami” (without quotes).

Samples

Input	Output
4 ZZW ZZZ YYZ XYZ	Jan Jami Jami Jan

For the last sample: XYZ. In the first move, Jan makes YYZ (ZYZ or XZZ isn’t optimal). In the second move, Jami makes YZZ or ZYZ. In the third one, Jan makes ZZZ. Finally, Jami fails to move. So, Jan wins the game.

G. Alphabets Puzzle

Wassi and Tahseen are two young brothers who are just learning the English alphabets, still the uppercase letters only. Their teacher wanted to test how much they have learned so far. As a result, she prepared a string of capital letters where some of the letters are missing.

The teacher wanted to see if her students can find out the total numbers of letters are missing. Now, since Wassi and Tahseen are too young to write a program, our teacher can not ask them to write one.

So can you help out our teacher here by writing a small program that will help her to determine if her two little students got the count of missing letters right.

Input

The input will contain a string S (0 <|S|<=1000).

Output

Just print the answer in a single line.

Samples

Input	Output
ABCD	22

Input	Output
AAAA	25

Input will be only english uppercase letter.

H. Sudden Tour!

Suppose waking up tomorrow morning you heard that there is no corona and your varsity is opened! At this wonderful news your friends planned a sudden tour to the highest peak of Bangladesh. Do you know the name? It's Tazing dong(aka bijay).

As they are very excited they couldn't decide what to take with them and what not to as their bag has a limited capacity of C. As you are the best programmer among your friends they asked for your help.In this problem you will be given a list of N items where the ith item takes a space of Si and a fun value of the ith item Fi set by your friends. They want to maximize the total fun value they can gain in this tour without overflowing their bag's total capacity. They will be very disappointed at you if you don't help them.

Input

On the first line you will be given the number of test cases T(T<11) on each test case you will be given the number of items N(0<=100) and the total capacity of the bag C (0<=100000). Each of the Next N lines will contain two positive integers Si and Fi not greater than 10000. You just have to print the desired answer in a single line.

Output

For each case print the case number and the maximum fun value In a single line.

Samples

Input	Output
2 3 10 9 2 5 8 2 3 2 15 9 8 8 9	Case 1: 11 Case 2: 9

I. ICPC World Final

ICPC (International Collegiate Programming Contest) World final is one of the most prestigious contest in the world. Every year lots of team participate in this contest. Teams from Bangladesh are also participating in this contest since 1997. From Bangladesh every year lots of contestants also try to participate in this World Final. But only few are qualified to participate in this contest.

Amin,from Bangladesh, wanted to participate in this World Final to represent his country and university also. He solved a lot of problems and participated in a lots of online & onsite contests too. After working his heart out finally he participated in the ICPC World Final. Now here I will give you an array of integers which will indicate the number of solved problems by Amin on each day. And you have to find the **non decreasing sub-sequence** of length Y and output the minimum possible maximum number.

Input

The first line contains one integers t (1<=t<=100) — the number of test cases. Description of the test cases follows.

The first line of each test case contains a single integer n (1<=n<=10^6) the number of days.

The second line of each test case contains n integers a1,a2,a3…..an (1<=ai<=10^6)-the elements of array. Here ai will indicate the solved problems of ith day by Amin.

Next line contains length of the non decreasing sub-sequence i.e Y. (1<=Y<=n)

It is guaranteed that the sum of n for all test cases does not exceed 10^6 (∑n<=10^6).

Output

You have to find the non decreasing sub-sequence of length Y and output the minimum possible maximum number & if not possible output “-1”.

Samples

Input	Output
2 7 3 5 2 4 7 1 9 3 5 4 3 2 1 2 3	Case 1: 7 Case 2: -1

In the first case,possible non-decreasing sub-sequences of length Y=3 are [3,5,7], [3,5,9], [3,4,7], [3,4,9], [3,7,9], [5,7,9], [2,4,7], [2,7,9], [2,4,9], [4,7,9] and the minimum possible maxium number is 7 for the sub-sequence [2,4,7].Hence the answer is 7.

For the second case,there are no possible non-decreasing sub-sequence of length 3 so that the answer is -1.

J. The Wonder Equation 2

Today we will tell you the story of a Prince, Charles, Prince of the Herroku island. He was trained to be an unconquerable warrior. When Charles was a child his mother Queen Victoria always told him the story of a God. Actually, an evil god named Mazdean known as the god of war and destruction. One day Charles heard from a spy of his island that there is a war going on in a country called Atlanta and Mazdean the god of WAR is the reason for that war. After hearing this, Charles decided to go to Atlanta and kill Mazdean. Being true to his thoughts he arms himself with the "Legbiter" sword and leaves the island and reaches the place where war is happening. Charles was shocked when he went to Atlanta. Because of people In there, they are not normal!. Whatever you ask them, They will not answer your question at first, rather they will give you a Math equation to solve, and then they may answer your question. Strange people !!
When did Charles ask them "where is Mazdean?" **People there give him this equation $A^2 + B^2 + C^2 + 2\times A\times B + 2\times B\times C + 2\times C\times A = N$ to solve and also they will give the value of N**. Now, you have to find the number of combinations of (A, B, C) Triplet. Since Charles is a Herrokuan warrior, he is good at Combat field but not good at math. That's why Charles is asking for your help. After all, you are a world-famous mathematician, who also knows coding. Now Help Charles to solve this equation so that he can find Mazdean and be able to kill him.

Input

Input begins with an integer T($0 < T \leq 10^3$) for the number of cases to follow. Next T lines each contain a single integer N ($0 < N \leq 10^{18}$).

Output

Print the Number of Combination of (A, B, C) Triplet and here A, B, C >= 1.

Samples

Input	Output
2 81 1000000000000000000	28 499999998500000001

K. Easy Queries

This task is very simple. You are given a binary string (i.e. a string consisting of digits ‘0’ and ‘1’) of length n. The digits are numbered from the left to the right starting with 1. Now you have to execute m queries of two types on this string of the following form:

• **toggle l r**: “toggle” digits (i.e. replace them with their opposite) at all positions with indexes from l to r ($1 \le l \le r \le n$), inclusive : each digit 0 is replaced with 1 and each digit 1 is replaced with 0.

• **print** : find and print the length of the longest non-decreasing subsequence of string s.

Subsequence of string s is a string that can be obtained from s by removing zero or more of its elements. A string is called non-decreasing if each successive digit is not less than the previous one.

Input

The first line contains two integers **n** and **m** (**$1 \le n \le 1000000$, $1 \le m \le 300000$**) — the length of the string s and number of queries correspondingly. The second line contains the binary string s. Next m lines contain queries in the form described in the statement.

Output

For each query **print** output an answer on a single line.

Samples

Input	Output
3 5 101 print toggle 1 1 print toggle 1 3 print	2 3 2