Problem A. Hello World!

Time limit   5000 ms
Mem limit   1048576 kB
OS   Linux

Hello Programmers!

pcIST says hello to you! Now you say hello to the world!

Input

There is no input for this problem.

Output

Output should contain one line, containing the string "Hello World!".

Problem B. Addition and Subtraction Easy

Time limit   2000 ms
Mem limit   262144 kB

Problem Statement

Joisino wants to evaluate the formula "A op B". Here, A and B are integers, and the binary operator op is either `+` or `-`. Your task is to evaluate the formula instead of her.

Constraints

- $1 \leqq A, B \leqq 10^9$
- op is either `+` or `-`.

Input

The input is given from Standard Input in the following format:

```
A op B
```

Output

Evaluate the formula and print the result.

Sample 1

Input	Output
`1 + 2`	3

Since $1 + 2 = 3$, the output should be 3.

Sample 2

Input	Output
`5 - 7`	-2

Problem C. 99 Problems

Time limit   1000 ms
Mem limit   1048576 kB
OS   Linux

Ingrid is the founder of a company that sells bicycle parts. She used to set the prices of products quite arbitrarily, but now she has decided that it would be more profitable if the prices end in 99.

You are given a positive integer N, the price of a product. Your task is to find the nearest positive integer to N which ends in 99. If there are two such numbers that are equally close, find the bigger one.

Input

The input contains one integer N ($1 \leq N \leq 10^4$), the price of a product. It is guaranteed that the number N does not end in 99.

Output

Print one integer, the closest positive integer that ends in 99. In case of a tie, print the bigger one.

Sample 1

Input	Output
10	99

Sample 2

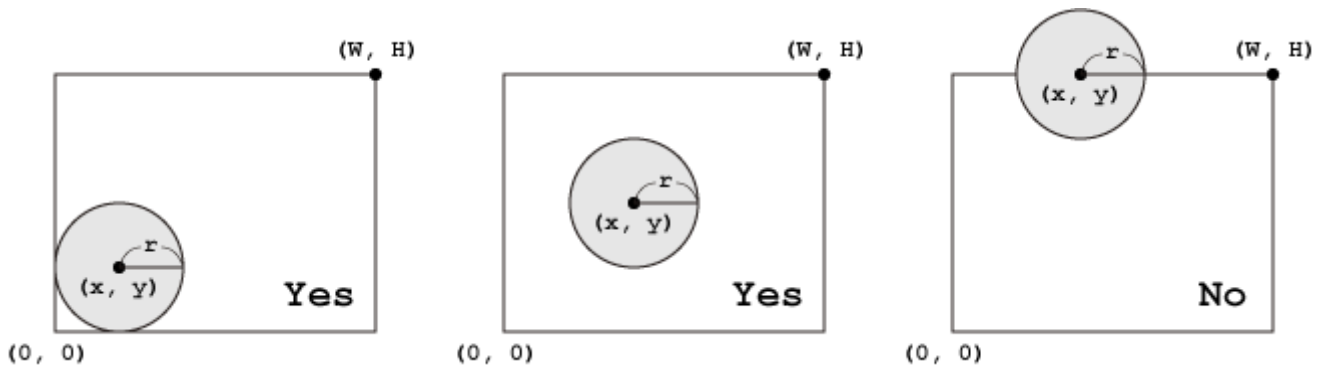| Input	Output
249	299

Sample 3

Input	Output
10000	9999

Problem D. Circle in a Rectangle

Time limit 1000 ms
Mem limit 131072 kB
OS   Linux

Write a program which reads a rectangle and a circle, and determines whether the circle is arranged inside the rectangle. As shown in the following figures, the upper right coordinate (W, H) of the rectangle and the central coordinate (x, y) and radius r of the circle are given.

Input

Five integers W, H, x, y and r separated by a single space are given in a line.

Output

Print "Yes" if the circle is placed inside the rectangle, otherwise "No" in a line.

Constraints

- $-100 \leq x, y \leq 100$
- $0 < W, H, r \leq 100$

Sample Input 1

```
5 4 2 2 1
```

Sample Output 1

```
Yes
```

Sample Input 2

```
5 4 2 4 1
```

Sample Output 2

```
No
```

Problem E. Multidimensional Hangman

Time limit	600 ms
Mem limit	1048576 kB
Statement	Statements (pt) Statements (en) Statements (es)
OS	Windows

The Multidimensional Hangman Game has very peculiar rules. In a way, it is like you are playing several games of the traditional Hangman game at the same time, with the difference that the words don't have to exist in the dictionary. If you've never played Hangman, don't worry: all the information you need is below.

In the multidimensional version of the game, there are several words on a board, initially unknown, all of the same length. At each turn in the game, you discover some characters from certain word positions (how these characters were discovered is not important for this problem). At a certain point, when only one unknown character remains in each word on the board, the game goes into the <u>all or nothing</u> phase. At this point, you must choose a word that maximizes the number of compatibilities with the words on the board. For a choosen word P, we say it is compatible with a word T on the board if all known letters in T occur in exactly the same positions in P.

Given the known information about the words on the board, you must determine which word to choose for <u>all or nothing</u> phase, which maximizes the number of compatibilities. If there is more than one solution, print the lexicographically smallest. We say that a word P is lexicographically smaller than a word Q if $P_i < Q_i$ where P_i is the i-th character of P, Q_i is the i-th character of Q and i is the smallest index such that $P_i \neq Q_i$.

Input

The first line of the input contains two integers N and C satisfying $1 \leq N \leq 10^4$ and $1 \leq C \leq 12$, indicating the number of words on the board and the length of the words it contains. Each of the next N lines contains a word of length C composed only of characters from `'a'` to `'z'` except for one of its positions, which will contain a character `'*'` , indicating that the character at that position is still unknown.

Output

Print a single line, containing, in order, a word T, of length C, and an integer M, such that M is the greatest number of compatibilities a word might have with the input words and T is the lexicographically smallest amongst the words with compatibility M.

Sample 1

Input	Output
5 4 rat* ru*d rot* r*ta r*ta	rata 3

Sample 2

Input	Output
5 4 bon* fon* n*no *eto *ano	nano 2

Problem F. Catch the Thief

Time limit	1000 ms
Code length Limit	50000 B
OS	Linux

Read problems statements in [Hindi](#), [Mandarin Chinese](#), [Russian](#), [Vietnamese](#), and [Bengali](#) as well.

A policeman wants to catch a thief. Both the policeman and the thief can only move on a line on integer coordinates between 0 and N (inclusive).

Initially, the policeman is at a coordinate x and the thief is at a coordinate y. During each second, each of them must move to the left or right (not necessarily both in the same direction) by distance **exactly** equal to K. No one may go to the left of the coordinate 0 or to the right of N. Both the policeman and the thief move simultaneously and they cannot meet while moving, only at the end of each second.

Will the policeman be able to catch the thief if they both move optimally? The thief is caught as soon as the policeman and thief meet at the same position at the same time.

Input

- The first line of the input contains a single integer T denoting the number of test cases. The description of T test cases follows.
- The first and only line of each test case contains four space-separated integers x, y, K and N.

Output

For each test case, print a single line containing the string `"Yes"` if the thief can be caught or `"No"` if the thief cannot be caught (without quotes).

Constraints

- $1 \leq T \leq 1,000$
- $1 \leq N \leq 10^9$
- $1 \leq K \leq N$
- $0 \leq x, y \leq N$
- $x \neq y$

Sample 1

Input	Output
5 0 1 1 1 1 4 1 5 4 2 1 7 3 7 2 10 8 2 3 15	No No Yes Yes Yes

Example case 1: The policeman is at 0 and the thief is at 1. After the 1-st second, the policeman is at 1 and the thief is at 0. After the next second, the policeman is again at 0 and the thief at 1. They cannot end up at the same coordinate.

Problem G. Polo the Penguin and the XOR

Time limit	1000 ms
Code length Limit	50000 B
OS	Linux

Read problems statements in Russian [here](#)

Polo, the Penguin, likes the XOR operation. Please read **NOTE** if you are not familiar with XOR operation.

XOR-sum of a list of numbers is the result of XOR-ing all of them. XOR-sum of (**A[1]** XOR **A[2]** XOR ... XOR **A[N]**) is defined as **A[1]** XOR (**A[2]** XOR (**A[3]** XOR (... XOR **A[N]**))).

He has an array **A** consisting of **N** integers. Index in the array are numbered from **1** to **N**, inclusive. Let us denote by **F(L, R)**, the XOR-sum of all integers in the array **A** whose indices lie from **L** to **R**, inclusive, i.e. **F(L, R) = A[L]** XOR **A[L+1]** XOR ... XOR **A[R]**. Your task is to find the total sum of XOR-sums **F(L, R)** over all **L** and **R** such that **1 ≤ L ≤ R ≤ N**.

Input

The first line of the input contains an integer **T** denoting the number of test cases. The description of **T** test cases follows. The first line of each test case contains a single integer **N** denoting the size of **A**. The second line contains **N** space-separated integers **A[1], A[2], ..., A[N]**.

Output

For each test case, output a single line containing the total sum to the corresponding test case.

Constraints

- **1 ≤ T ≤ 100,000**
- **1 ≤ N ≤ 100,000**
- **0 ≤ A[i] ≤ 1,000,000,000 (10^9)**
- The total sum of all **N** over all test cases will not exceed **100,000**.

Example

Input:
```
1
2
1 2
```

Output:

6

Explanation

Example case 1. F(1, 1) = A[1] = 1, F(2, 2) = A[2] = 2 and F(1, 2) = A[1] XOR A[2] = 1 XOR 2 = 3. Hence the answer is **1 + 2 + 3 = 6**.

NOTE

[XOR operation](#) is a bitwise "Exclusive OR" operation performed on two integers in binary representation. First, the shorter number is prepended with leading zeroes until the numbers have equal size in binary. Then the resulting number (also in binary) contains **0** in all positions where the corresponding bits coincide, and **1** on the rest of the positions.

For example, 3 XOR $5 = 011_2$ XOR $101_2 = 110_2 = 6$.

Problem H. Popatlal ki shaadi

Time limit	1000 ms
Mem limit	1572864 kB
Code length Limit	50000 B
OS	Linux

Popatlal from Gokuldham Society is still not married. He approaches a marriage bureau and ask them to hurry the process. The bureau checks the list of eligible girls (n) and hands it over to Popatlal. Popatlal being conscious about his marriage, determined to find a girl with maximum connections so that he can gather more information about her.

Accordingly, he looks to figure out the maximum number of girls (from list) who know each other to achieve above purpose. In order to finalise the girl, he needs to find the Kth prime. Where k = largest group of girls who know each other.

Considering Popat's poor knowledge in Maths, he seeks for Jethalal's help for the answer. Now you, being fan of Jethalal, take this prestigious opportunity to solve Popat's marriage issue.

In case number of connections are zero, print "-1".

Note: Suppose girl "a" knows girl "b" and girl "b" knows girl "c", then girl "a" also knows girl "c" – transitivity holds.

Consider 1 to be a composite number.

Input

First line of the input contains t, the number of test cases.

Each line of the test case contains a number n specifying the number of girls and m specifying number of connections.

Each 'm' lines contain u and v denoting that girl u and v know each other.

Output

Each new line of the output contains Kth prime number, or -1 if there are no connections.

Constraints

1 <= t <= 100

1 <= n <= 100000

0 <= m <= n

1 <= u, v <= n

Example

Input:

```
1
10  6
1 2
2 3
3 4
4 5
6 7
9 10
```

Output:

```
11
```

Contributed by: Paras Jain

Problem I. Company Layoffs

Time limit   1000 ms
Mem limit   262144 kB
OS   Windows

The tech company, Weta, has announced that it will continue to make layoffs once a week for the next M weeks.

For the layoffs, Weta has established that it will fire all employees who have a score greater than Q_i. Q_i is different every week, and obviously the current week score must be lower than the previous one.

Fortunately, the employees know about this in advance. That is why everyone who would be affected by the week's layoff must make their score equal to Q_i.

Weta will not notice this, since Weta does not care about the number of employees fired, but the sum of the employees score.

You, as the representative of the employees, must give Weta the sum of the scores once they have all adjusted their scores to avoid being fired.

Note that only employees with a score greater than Q_i can change their score.

Input

The first line of input contains two integer N, M ($1 \leq M < N \leq 10^5$), the number of employees in Weta and the number of layoffs.

The next line contains N integers S_i ($1 \leq S_i \leq 10^9$)

The following M lines describe the layoffs. The i-th of them contains Q_i, the score for the layoff of the $i - th$ week. ($1 \leq Q_i \leq 10^9$)

Output

Print M lines with the sum of employees' scores.

Sample 1

Input	Output
5 3 2 3 5 5 10 8 7 1	23 22 5