The Preliminary Contest for ICPC Asia Xuzhou 2019

Who is better?

限制

- 1000 ms
- 256 MB

After Asgard was destroyed, tanker brought his soldiers to earth, and at the same time took on the important task of protecting the peace of the earth. The best two solders were lb and zgx, were very capable, but they always disliked each other. However, one day they encountered a group of foreign invaders (many, but how many only tanker knew). They were all strong enough to destroy the enemy easily. But they found it too boring, so they agreed to follow some rules to deal with the invaders by taking turns, and if one of them had no enemies when it was his turn, he would later admit that the other man was better.

The rules are as follows:

- zgx takes the first turn. But he cannot destroy all the enemies at the first time;
- after that, the number of enemies that can be destroyed at a time is between 1 enemy and 2 times the number of enemies that the former has just destroyed (including 1 enemy and 2 times the number of enemies that the opponent has just destroyed).
- the winner is the one who agrees to destroy the last enemy. Both zgx and lb are smart, so they only perform actions that are best for them.

To ensure fairness, they found their leader, tanker, to judge, but tanker just wanted people to say he was great, so he didn't want them to decide easily, so he hid the number of intruders in a question:

- there are k sets of integers a and b such that $n \equiv b \pmod{a}$.
- n is the minimum positive integer solution satisfying the k groups a and b.

Input

In the first line, input k, and on lines 2 to $k+1$, input k groups a and b.

Output

If lb wins, output "`Lbnb!`", if zgx wins, output "`Zgxnb!`", if they can't solve, (n does not exist) , output "`Tankernb!`" .

Note:

$k \leq 10$, $n \leq 10^{15}$

For the sample, $n = 8$,because $8\%5 = 3$, $8\%3 = 2$ and 8 is the smallest possible integer that is fit the requirement.

Sample Input

```
2
5 3
3 2
```

Sample Output

```
Lbnb!
```

so easy

限制

- 2000 ms
- 256 MB

There are n points in an array with index from 1 to n, and there are two operations to those points.

1: 1 x marking the point x is not available

2: 2 x query for the index of the first available point after that point (including x itself) .

if such point doesn't exist, output `-1`

Input

$n \quad q$

$z_1 \quad x_1$

$\vdots$

$z_q \quad x_q$

q is the number of queries, z is the type of operations, and x is the index of operations.
$1 < x < n < 10^9, \quad 1 \leq q < 10^6$ and z is 1 or 2

Output

Output the answer for each query.

Sample Input

```
5 3
1 2
2 2
2 1
```

Sample Output

```
3
1
```

Buy Watermelon

限制

- 1000 ms
- 256 MB

The hot summer came so quickly that Xiaoming and Xiaohong decided to buy a big and sweet watermelon. But they are two very strange people. They are even-numbered enthusiasts. They want to cut the watermelon in half, and each part weighs two times as much as a kilogram .They quickly decide which melon to buy. Do you know if you want to buy this melon?

Input

Only one line contains one integer w $(1 \leq w \leq 100)$,units are kilograms.

Output

If it can meet the requirements, you will output `YES`, otherwise output `NO`.

Sample Input

```
8
```

Sample Output

```
YES
```

Carneginon

限制

- 1000 ms
- 256 MB

Carneginon was a chic bard. But when he was young, he was frivolous and had joined many gangs. Recently, Caneginon was to be crowned, because the king was shocked by his poems and decided to award him the gold medal lecturer. Therefore, Most of people in the Kingdom came to visit him.

However, as a medal lectirer, Carneginon must treat the visitors kindly, including elders and younger generations. In order to maintain order, every visitor received a license with a magic field engraved on it. And the magic field on the licence was made up of lowercase letters.

Carneginon had a unique licence, which could judge whether others are his older or younger. Now, we assume that the sequence on Carneginon's licence is T and the sequence on visitors' licence is S. For each visitor,

- If the length of T is longer than the length of S, it's obviously that the visitor is younger. And if S is a substring of T, Carneginon would call the visitor `my child!`. Otherwise, Carneginon would call the visitor `oh, child!`.
- If the length of T is less than the length of S, it's obviously that the visitor is elder. And if T is a substring of S, Carneginon would call the visitor `my teacher!`. Otherwise, Carneginon would call the visitor `senior!`.
- Of course, if the length of T is equal to the length of S, the visitor is Carneginon's peer. And if T is equal to S, it shows that the visitor entered through an improper way and Carneginon would shout `jntm!`. Otherwise, Carneginon would call the visitor `friend!`.

Now, you know the T (Carneginon's licence), q (the number of visitors) and each visitor's licence(S_i). Can you judge what Caneginon needs to say when he sees every visitor?

Input

The first line is a string T, representing Carneginon's license.

The second line is and integer q, which means the number of visitors.

Then m lines, for each line, there is a string S, denoting the visitor's license.

$1 \leq |T| \leq 10^5, 1 \leq |S| \leq 10^5, 1 \leq q \leq 1000$

It is guaranteed that $q \times (|S| + |T|) \leq 10^7$.

Output

There are q lines.

For each S, output what Carneginon should say correctly.

Sample Input

```
abcde
6
abcde
aaaaa
abcd
aaaa
abcdef
abccdefg
```

Sample Output

```
jntm!
friend!
my child!
oh, child!
my teacher!
senior!
```

XKC's basketball team

限制

- 1000 ms
- 256 MB

XKC , the captain of the basketball team , is directing a train of n team members. He makes all members stand in a row , and numbers them $1 \cdots n$ from left to right.

The ability of the i-th person is w_i , and if there is a guy whose ability is not less than $w_i + m$ stands on his right , he will become angry. It means that the j-th person will make the i-th person angry if $j > i$ and $w_j \geq w_i + m$.

We define the anger of the i-th person as the number of people between him and the person , who makes him angry and the distance from him is the longest in those people. If there is no one who makes him angry , his anger is -1 .

Please calculate the anger of every team member .

Input

The first line contains two integers n and $m(2 \leq n \leq 5 * 10^5, 0 \leq m \leq 10^9)$.

The following n lines contain n integers $w_1..w_n(0 \leq w_i \leq 10^9)$.

Output

A row of n integers separated by spaces , representing the anger of every member .

Sample Input

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

Sample Output

```
4 3 2 1 0 -1
```

Little M's attack plan

限制

- 2000 ms
- 256 MB

There are N cities in the fantasy ACM world. There are several undirected roads between the cities and the length of each road is 1 kilometer. Because ACM world is fantastic, there is one and only one path between any two cities. Little M from Mars decides to lead his army to attack these cities. Little M will get p_i RP when city i is occupied. Little M is a considerate general and he doesn't want his troops to lose too much, so he decided to attack the cities near his troops. Little M has made q plans to attack the cities less than or equal to k kilometers from city v. For each plan, he wants to know how many RP he will get after all the cities in the plan are occupied.

Input

The first line of the input is a single integer $n(1 \leq n \leq 1000000)$ which is the number of cities.

It is then followed by a single line of n integers $p_1, p_2, \cdots, p_n (0 \leq p_i \leq 2^{31})$, denoting the RP little M will get when the city i is occupied.

The following $n-1$ lines describe the ACM world. Each line will contain two integers u_i and v_i, representing that there is a undirected road between city u_i and $v_i (1 \leq u_i, v_i \leq n)$.

The next line is a single integer $q(1 \leq q \leq 5000)$, denoting the number of plans.

The following q lines each contains two integers $v_i (1 \leq v_i \leq n)$ and $k_i (0 \leq k_i \leq 100)$ and their meanings are shown in problem description.

Output

Output q lines, for every plan print a number: the RP little M will get.

Sample Input

```
7
1 1 1 1 1 1 1
1 2
1 3
2 4
2 5
3 6
3 7
5
1 100
1 0
2 1
4 100
4 2
```

Sample Output

```
7
1
4
7
4
```

Colorful String

限制

- 1000 ms
- 256 MB

The value of a string s is equal to the number of different letters which appear in this string.

Your task is to calculate the total value of all the palindrome substring.

Input

The input consists of a single string $|s|(1 \leq |s| \leq 3 \times 10^5)$.

The string s only contains lowercase letters.

Output

Output an integer that denotes the answer.

Sample Input

```
abac
```

Sample Output

```
6
```

function

限制

- 1000 ms
- 256 MB

For $n = p_1^{k_1} p_2^{k_2} \cdots p_m^{k_m}$, define $f(n) = k_1 + k_2 + \cdots + k_m$, please calculate $\sum_{i=1}^{n} f(i!) \% 998244353$

Input

There is a single integer $n (1 \leq n \leq 10^{10})$.

Output

Print a single line containing an integer, denoting the ans.

Sample Input

```
10
```

Sample Output

```
66
```

query

限制

- 2000 ms
- 256 MB

Given a permutation p of length n, you are asked to answer m queries, each query can be represented as a pair (l, r), you need to find the number of pair(i, j) such that

$l \leq i \leq j \leq r$ and $\min(p_i, p_j) = \gcd(p_i, p_j)$.

Input

There is two integers $n(1 \leq n \leq 10^5)$, $m(1 \leq m \leq 10^5)$ in the first line, denoting the length of p and the number of queries.

In the second line, there is a permutation of length n, denoting the given permutation p. It is guaranteed that p is a permutation of length n.

For the next m lines, each line contains two integer l_i and $r_i(1 \leq l_i \leq r_i \leq n)$, denoting each query.

Output

For each query, print a single line containing only one integer which denotes the number of pair(i, j).

Sample Input

```
3 2
1 2 3
1 3
2 3
```

Sample Output

```
2
0
```

Random Access Iterator

限制

- 4000 ms
- 256 MB

Recently Kumiko learns to use containers in C++ standard template library.

She likes to use the **std::vector** very much. It is very convenient for her to do operations like an ordinary array. However, she is concerned about the random-access iterator use in the **std::vector**. She misunderstanding its meaning as that a vector will return an element with equal probability in this container when she access some element in it.

As a result, she failed to solve the following problem. Can you help her?

You are given a tree consisting of n vertices, and 1 is the root of this tree. You are asked to calculate the height of it.

The height of a tree is defined as the maximum number of vertices on a path from the root to a leaf.

Kumiko's code is like the following pseudo code.

```
1: function DFS(u, d)
2:     depth[u] ← d
3:     k ← the number of sons of u
4:     for i = 1 → k do
5:         v ← select a son of u with equal with equal probability
6:         DFS(v, d + 1)
7:     end for
8: end function
```

She calls this function **dfs(1, 1)**, and outputs the maximum value of depth array.

Obviously, her answer is not necessarily correct. Now, she hopes you analyze the result of her code.

Specifically, you need to tell Kumiko the probability that her code outputs the correct result.

To avoid precision problem, you need to output the answer modulo $10^9 + 7$.

Input

The first line contains an integer n - the number of vertices in the tree $(2 \leq n \leq 10^6)$.

Each of the next $n - 1$ lines describes an edge of the tree. Edge i is denoted by two integers u_i and v_i, the indices of vertices it connects $(1 \leq u_i, v_i \leq n, u_i \neq v_i)$.

It is guaranteed that the given edges form a tree.

Output

Print one integer denotes the answer.

Sample Input

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

Sample Output

```
750000006
```

样例解释

Kumiko's code has $\frac{3}{4}$ probability to output the correct answer.

Center

限制

- 2000 ms
- 256 MB

You are given a point set with n points on the 2D-plane, your task is to find the smallest number of points you need to add to the point set, so that all the points in the set are center symmetric.

All the points are center symmetric means that you can find a center point (X_c, Y_c)(not necessarily in the point set), so that for every point (X_i, Y_i) in the set, there exists a point (X_j, Y_j) (i can be equal to j) in the set satisfying $X_c = (X_i + X_j)/2$ and $Y_c = (Y_i + Y_j)/2$.

Input

The first line contains an integer $n(1 \leq n \leq 1000)$.

The next n lines contain n pair of integers (X_i, Y_i) $(-10^6 \leq X_i, Y_i \leq 10^6)$ -- the points in the set

Output

Output a single integer -- the minimal number of points you need to add.

Sample Input

```
3
2 0
-3 1
0 -2
```

Sample Output

```
1
```

样例解释

For sample 1, add point $(5, -3)$ into the set, the center point can be $(1, -1)$.

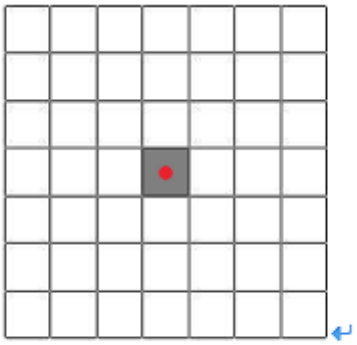
Dice

限制

- 1000 ms
- 256 MB

Mr. World Tree likes to play with dice. The dice is a standard cube-shaped six-sided object with each side containing a number from 1 to 6, where number on each side is distinct.

One day, he comes up with the following game. He draws an infinite grid map. Each cell in map is as big as the bottom of the dice.



Top view for initial case (part)

Initially the dice is placed in the cell $(0, 0)$, with the number $'1'$ facing up. By flipping the dice once, the dice can be moved into an adjacent cell while the number facing up is also changed. Obviously, when flipping in different direction, there are four situations for the number facing up.

For the initial dice, in one flip, it can be moved to $(0, 1)$ or $(1, 0)$ or $(0, -1)$ or $(-1, 0)$ and the number facing up is changed to the number on adjacent side of the number $'1'$ side.

However, Mr. World Tree only likes the situation where the number $'1'$ is facing up. He calls it “good situation”. To express his love, he picks out some cells to visit by flipping the dice. For cell (x, y), when the dice is in (x, y) and in “good situation”, we think that we visit it. Now you need to find the minimum flips to visit all cells given by Mr. World Tree.

All cells can be moved into at any number of times. We think we have visited $(0, 0)$ initially with 0 flip.

Input

The first line of the input contains an integer T, denoting the number of test cases. In each test case, there is one integer n in the first line, denoting the number of cells. For the next n lines, each line contains two integers x_i, y_i , denoting each coordinate.

- $1 \leq T \leq 5$
- $1 \leq N \leq 16$
- $-1000 \leq X_i, Y_i \leq 1000$

Output

For each test case, print a single line containing an integer, denoting the minimum flips.

Sample Input

```
2
3
1 1
2 2
3 3
2
-2 -2
1 1
```

Sample Output

```
14
10
```

样例解释

For the first test case, a possible route is $(0,0)$ -> $(2,2)$ -> $(1,1)$ -> $(3,3)$ with 14 flips.

For the second test case, $(0,0)$ -> $(-2,-2)$ -> $(1,1)$ with 10 flips .

Longest subsequence

限制

- 1000 ms
- 128 MB

String is a very useful thing and a subsequence of the same string is equally important.

Now you have a string s with length n and a string t with length m. Find out the largest subsequence in the string s so that the lexicographical order of this subsequence is strictly larger than t.

Input

two integers m, n in the first line

The second line is a string s

The third line is a string t

- $1 \leq n, m \leq 10^6$

Output

Output an integer representing the longest length, otherwise output `-1`.

Sample Input 1

```
9 3
aaabbbccc
abc
```

Sample Output 1

```
6
```

Sample Input 2

```
9 3
aaabbbccc
zzz
```

Sample Output 2

```
-1
```