Problem A
A

Time limit: ? seconds
Memory limit: 1024 megabytes

Problem Description

Input Format

Output Format

Technical Specification

Sample Input 1

```
-1 1
```

Sample Output 1

```
0
```

Sample Input 2

```
-999 1000
```

Sample Output 2

```
1000
```

Problem B
Best Substring

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

You are given a string $s = s_1 s_2 s_3 ... s_n$. Let $f(s, i)$ denotes the starting position of the best length-i substring. For two equal-length substring a and b, the one has smaller lexicographically order is better. If the two substring are the same, the one has smaller starting position is better.

Let $h(s) = \sum_{i=1}^{n} i \times f(s, i)$. Your task is to find $h(s)$.

Input Format

First line contains the number of testcases T. Each testcase is a line containing a string s.

Output Format

For each testcase, output $h(s)$ in one line.

Technical Specification

- $1 \leq T \leq 10^5$
- $1 \leq |s| \leq 2 \times 10^5$
- the total length of strings is at most 2×10^6

Sample Input 1

```
2  2
```

Sample Output 1

```
2
```

Sample Input 2

```
2  1
```

Sample Output 2

```
0
```

Problem C
Camp

Time limit: 1 second
Memory limit: 1024 megabytes

Problem Description

In Gakuentoshi, everyone has their own unique skill. Uiharu and Shirai are holding a learning event to let their friends to teach each other their skills and make new friends. Uiharu and her friends are red team. Shirai and her friends are white team.

Each one in red team will pick one of white team's members as student. And each one in white team will pick one of red team's members as students. Everyone will pick a student and can only be one person' s student. First, red team will teach their students their own skill. And white team will teach their students their own skill. Everyone learn one new skill now. Then red team will teach their students the new skill they just learned and so does white team. This won't stop until they cannot learn new skill.

Both red team and white team have N people. M people already choose a student. Uiharu wonders how many possibilities are left so everyone could learn all the skill the attendee has. Can you help her?

Two possibility are considered different if anyone choose a different student.

Input Format

First line contains one integer T. There are T test data followed by. In each test, the first line contains two numbers N and M separated by blanks. There are N people in each team. M people have chosen their students. Then M lines follows. The i-th of following lines contains one letter and two number C_i, u_i, and v_i. C_i could be `R` or `W`. `R` means that the u_i-th member of red team chooses the v_i-th member of white team. `W` means that the u_i-th member of white team chooses the v_i-th red team. Everyone will at most choose one student.

Output Format

For each test data, output the number of possibilities that everyone could learn all the skills the attendees have.

Technical Specification

- $1 \leq T \leq 100$
- $1 \leq N \leq 7$
- $0 \leq M \leq 2N$
- C_i is either `R` or `W`.
- $1 \leq u_i \leq N$
- $1 \leq v_i \leq N$

Sample Input 1

```
2
1 1
R 1 1
3 2
R 3 1
W 2 2
```

Sample Output 1

```
1
1
```

Problem D
Discovering Secrets in Islands

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

Two villages are connected together by a two-way road. In an environment, there are many villages. A traveler starts from a village (source) and moves to a predefined village (destination). To do so, the traveler moves along the roads to visit villages until the traveler reaches the destination. The traveler can find some moon stones at a village. Each road has a travel cost. Determine a path for the traveler so that the traveler takes the lowest cost. If there are two paths with the same cost, the one with the highest amount of moon stones is selected. The total influence cost of a village, v, is the sum of the cost of all the villages in the k-neighborhood of village v. The k-neighborhood of village v does not include the village v itself. For two different villages u and v, village u is a member of the k-neighborhood of village v **iff** there are at most k roads that are visited for moving from village v to village u.

The travel cost from one village v_s to an adjacent village v_a via road r is computed as:

$$\text{Travel cost} = c_t(v_s) + c_r$$

where road r connects villages v_s and v_a, $c_t(v_s)$ is the total influence cost of v_s, and c_r is the cost of the road.

The villages have unique names. A name is formed by four letters in lowercase.

Input Format

The first line contains three numbers, N, M, and k, where N is the total number of villages, M is the total number of roads, and k is the value used for defining the neighborhood of villages. The second line contains the source village name and the destination village name. Then there are N set of village records. Each village record contains: the village name, the number of moon stones of the village, and the influence cost. Then there are M road records. Each road record contains two village names and the road cost.

Output Format

For each problem instance, output the lowest cost and the maximum moon stones.

Technical Specification

- $1 \leq N \leq 10000$
- $1 \leq M \leq 10000$
- $0 \leq k \leq 5$
- $1 \leq c \leq 99$, where c is the cost of a road
- $1 \leq m \leq 8$, where m is the number of moonstones at a village
- $1 \leq f \leq 5$, where f is the influence cost of a village

Sample Input 1

```
6 4 0
nagi nage
nagi 5 1
nagf 7 2
nagh 2 2
nagd 6 5
nagg 5 2
nage 2 5
nagh nagd 96
nagi nagh 25
nagh nagg 49
nagd nage 3
```

Sample Output 1

```
124 15
```

Sample Input 2

```
4 2 1
akko akkm
akko 2 5
akkp 8 2
akkn 1 1
akkm 6 3
akkn akkm 20
akko akkn 3
```

Sample Output 2

```
32 9
```

Sample Input 3

```
6 5 2
gaam gaak
gaak 2 1
gaan 2 3
gaaj 1 2
gaao 5 5
gaal 1 2
gaam 1 3
gaan gaaj 96
gaao gaal 25
gaak gaao 95
gaan gaal 37
gaaj gaam 89
```

Sample Output 3

```
384 12
```

Problem E
Emulation of Numbers

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

X is a positive number and P is a set of potrysitive numbers. Compute the total number of combinations of the P's elements such that the sum of the elements of each combination is equal to X. The elements of P can be reused.

The followings are three examples. Example One: $X = 6, P = \{2, 3, 7\}$. The number of combinations is 2. The combinations are: 1) $\{2, 2, 2\}$; and 2) $\{3, 3\}$.

Example Two: $X = 7, P = \{2, 7, 3\}$. The number of combinations is 2. The combinations are: 1) $\{2, 3, 2\}$; and 2) $\{7\}$.

Example Three: $X = 9, P = \{2, 3, 7, 3\}$. The number of combinations is 3. The combinations are: 1) $\{2, 7\}$; 2) $\{2, 2, 2, 3\}$; and 3) $\{3, 3, 3\}$.

Input Format

The first line contains the positive number X. The second line is the number of elements of P, N. The third lines contain N positive numbers which are the elements of P.

Output Format

Print the number of all possible combinations. If there is no combination, print `0`.

Technical Specification

$1 \leq X \leq 1000000$, $2 \leq N \leq 9$, and $[X/1000] + 2 \leq p \leq 2 * [X/1000] + 7$, where p is an element of P, and $[X/1000]$ is the largest integer that is smaller than or equal to $X/1000$. The elements of P are not unique. The maximum number of combinations is smaller than 10^{16}.

Sample Input 1

```
6
3
2 7 3
```

Sample Output 1

```
2
```

Sample Input 2

```
7
3
2 7 3
```

Sample Output 2

```
2
```

Sample Input 3

```
9
4
```

Sample Output 3

```
3
```

```
2 3 7 3
```

Problem F
Fast and Hairy

Time limit: 5 seconds
Memory limit: 1024 megabytes

Problem Description

Uiharu and Misaka are running a barbershop. There are N customers every day. Everyone wants a different hair style so the work load w_i would be different. Uiharu and Misaka have different skills to speed up their work. Uiharu could program the hair clipper to work faster. She can finish U unit of work per second. Misaka could control the electricity and operate the hair clipper without hands. She can finish M unit of work per second. Each customer can only be serviced by one barber. Uiharu and Misaka want to getting off work together. They'll go home after the last customer leave. They need to distribute the work load evenly. Right now, they are busy on preparing their equipment. Can you help them find out what is the least time to finish today's work? If the last customer leaves in the middle of a second, we say the work finishes at the end of the second.

Input Format

First line contains one integer T. There are T test data followed by. In each test, the first line contains three numbers N, U, and M separated by blanks. The second line contains N numbers $w_1, w_2, \ldots, w_N$.

Output Format

For each test data, output one number representing the least time to finish today's work.

Technical Specification

- $1 \leq T \leq 100$
- $1 \leq N \leq 10000$
- $1 \leq U \leq 10000$
- $1 \leq M \leq 10000$
- $1 \leq w_i \leq 100$ for $i \in \{1, 2, \ldots, N\}$.

Sample Input 1

```
1
5 2 3
2 7 3 6 6
```

Sample Output 1

```
5
```

Problem G
Garden

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

There is a grassland in front of Alice's house with some beautiful flowers. Alice wants to fence up all of the flowers to be her garden.

The grassland is a 2D plane, and there are m flowers on the grassland. The j-th flower is on the integer position (x_j, y_j). There are also n wood piles on the grassland. The i-th flower is on the integer position (x_i, y_i); She wants her gardan is a **convex polygon**, that means if she wants to move from one place to another place in her garden, she can go in a straight line without going out of her garden. The garden should have a positive area and all of the vertex should be a wood pile on the grassland. All of the flowers should be **strictly** inside the garden, that means the flower can not be outside the garden or on the border of the garden. She needs some fences to fence up her garden so she wants to minimize the total length of the fences. If she wants to put the fences between the ath wood pile and the $b$the wood pile, she needs $\sqrt{(x_a - x_b)^2 + (y_a - y_b)^2}$ length of fences.

She is curious if she wants to use the i-th wood piles as one of the vertices in her garden. What is the minimal length of fences she needs? Can you help her?

Input Format

The first line contains one integer n indicating the number of wood piles. Following contains n lines. The ith line contains two integers x_i, y_i separated with one space indicating the position of ith wood piles. Next line contains one integer m indicating the number of flowers. Following contains m lines. The jth line contains two integer x_j, y_j separated with one space indicating the position of jth flowers. Guarantee no three wood piles are collinear and all the positions of flowers and wood piles are distinct.

Output Format

print n floating number, the ith number indicates the minimal length of fences if Alice wants to use the ith wood pile as one of the vertices in her garden. If it is impossible to fence up her garden with the i-th wood pile, please print -1. The answer is considered as correct if its absolute or relative error doesn't exceed 10^{-6}. Namely, if your answer is a, and the jury's answer is b, then your answer is accepted, if $\frac{|a-b|}{max(1,|b|)} \leq 10^{-6}$

Technical Specification

- $1 \leq n \leq 100$
- $-10^9 \leq x_i, y_i \leq 10^9$
- $1 \leq m \leq 10^5$

- $-10^9 \leq x_j, y_j \leq 10^9$

Sample Input 1

```
5
0 0
2 2
-2 -2
2 -2
-2 2
4
1 1
-1 -1
1 -1
-1 1
```

Sample Output 1

```
-1 16 16 16 16
```

Problem H
H

Time limit: ? seconds
Memory limit: 1024 megabytes

Problem Description

Input Format

Output Format

Technical Specification

Sample Input 1

```
4
helloworldhelloworld
helloworldhelloworld
helloworldhelloworld
helloworldhelloworld
```

Sample Output 1

```
20
```

Problem I
I

Time limit: ? seconds
Memory limit: 1024 megabytes

Problem Description

Input Format

Output Format

Technical Specification

Sample Input 1

```
2
0 0
0 1
1 0
1 1
```

Sample Output 1

```
2
```

Problem J
J

Time limit: ? seconds
Memory limit: 1024 megabytes

Problem Description

Input Format

Output Format

Technical Specification

Sample Input 1

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

Sample Output 1

```
NO
```

Sample Input 2

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

Sample Output 2

```
YES
101
```

Problem K
KOVID-21

Time limit: 2 seconds
Memory limit: 1024 megabytes

Problem Description

There is an epidemic of KOVID-21 spreading around the world. People's lives are severely affected by the KOVID-21. Especially the people like to travel around the world.

Fortunately, the vaccine, Hoderna, is coming. Hoderna is so powerful that the person who has been vaccinated with Horderna will not be infected with KOVID-21 at all. But Hoderna is hard to preserve. For convenience, the government wants to find **exactly one** place to be a vaccination station. Finding the place of the vaccination station is a hard problem. If the place of the vaccination station is too far for some person. They will be annoyed with the government.

The country is a 2D plane, there are n residents. The ith resident lives on the (x_i, y_i) of the 2D plane. Guarantee the residents live in the integer position, which means x_i, y_i are integers. In one unit, the person in the position (x, y) can go to one of the eight position $(x-1, y-1), (x-1, y), (x-1, y+1), (x, y-1), (x, y+1), (x+1, y-1), (x+1, y), (x+1, y+1)$. The annoy value of a resident is the number of time units that he needs to spend to go to the vaccination station from their home. Please help the government to **minimize** the **sum** of annoyance with all residents.

Input Format

The first line contains one integer n indicating the number of residents. Following contains n lines. The ith line contains two integer x_i, y_i separated with one space indicating the position of ith resident.

Output Format

print a single integer indicating the minimum sum of annoyance value with all residents.

Technical Specification

- $1 \leq n \leq 10^6$
- $-10^9 \leq x_i, y_i \leq 10^9$

Sample Input 1

```
1
1 1
```

Sample Output 1

```
0
```

Sample Input 2

```
2
0 0
```

Sample Output 2

```
2
```

```
2 2
```

Problem L
Luansheng Divisor

Time limit: 3 seconds
Memory limit: 1024 megabytes

Problem Description

A Luansheng divisor of n is an positive integer x that both x and $x+1$ are divisor of n. For example 6 is a Luansheng divisor of 84 because both 6 and 7 are divisor of 84.

You are given a positive integer n. Your task is to find all Luansheng divisors of n.

Input Format

First line contains the number of testcases T. Each testcase is a line containing a positive integer n.

Output Format

For each testcase, output a line containing all Luansheng divisor of n in increasing order. If n doesn't have any Luansheng divisor, output -1.

Technical Specification

- $1 \leq T \leq 100$
- $1 \leq n \leq 10^{18}$

Sample Input 1	Sample Output 1
`1 1000000000`	`14570502158`

Sample Input 2	Sample Output 2
`1 5`	`7`

Problem M

Mobile Communication in Flatland

Time limit: 1 second

Memory limit: 1024 megabytes

Problem Description

Input Format

Output Format

Technical Specification

Sample Input 1

```
3
```

Sample Output 1

```
0 0
1 1
2 0
```