Task	PARKING	SEMAFORI	GRANICA	GEORGE	PRINCEZA	CESTARINE
Input	standard input (keyboard)					
Output	standard output (screen)					
Memory limit (heap+stack)	32 MB					
Time limit (per test)	1 second					
Number of tests	5	5	10	6	10	10
Points per test	4	6	5	10	6	8
Total points	**20**	**30**	**50**	**60**	**60**	**80**
	300					

Note: The evaluation system has two Intel Pentium 4 3.0 GHz processors and is running the Linux operating system. The following compile options are used for different languages:

- C: –O2 –s –static –std=c99 –lm
- C++: –O2 –s –static –lm
- Pascal: –O1 –XS

1. PARKING

Having dropped out of school because of chemistry, Luka got a job driving trucks. One evening he parked his three trucks in a rest area which charges for parking in an unusual way – they give a discount on quantity.

When only one truck is parked, the driver pays A kuna per minute. When two trucks are parked, the drivers each pay B kuna per minute. When three trucks are parked, the drivers each pay C kuna per minute.

Given the numbers A, B and C, as well as the intervals in which Luka's three trucks are parked, determines how much Luka needs to pay the owner of the rest area.

Input

The first line contains three integers A, B and C ($1 \leq C \leq B \leq A \leq 100$), the prices of parking as defined above.

Each of the following three lines contains two integers each. These are the arrival and departure times (in minutes) of one of Luka's trucks. The arrival time will always be earlier than the departure time. All time indexes will be between 1 and 100.

Output

Output the overall cost of Luka's parking his three trucks.

Sample test data

input

```
5 3 1
1 6
3 5
2 8
```

output

```
33
```

input

```
10 8 6
15 30
25 50
70 80
```

output

```
480
```

2. SEMAFORI

Luka is driving his truck along a long straight road with many traffic lights. For each traffic light he knows how long the red and green lights will be on (the cycle repeating endlessly).

When Luka starts his journey, all traffic lights are red and just started their cycle. Luka moves one distance unit per second. When a traffic light is red, he stops and waits until it turns green.

Write a program that determines how much time Luka needs to reach the end of the road. The start of the road is at distance zero, the end at distance L.

Input

The first line contains two integers N and L ($1 \leq N \leq 100$, $1 \leq L \leq 1000$), the number of traffic lights on the road and the length of the road.

Each of the next N lines contains three integers D, R and G, describing one traffic light ($1 \leq D < L$, $1 \leq R \leq 100$, $1 \leq G \leq 100$). D is the distance of the traffic light from the start of the road. R and G denote how long the red and green lights are on, respectively.

The traffic lights will be ordered in increasing order of D. No two traffic lights will share the same position.

Output

Output the time (in seconds) Luka needs to reach the end of the road.

Sample test data

input

```
2 10
3 5 5
5 2 2
```

output

```
12
```

input

```
4 30
7 13 5
14 4 4
15 3 10
25 1 1
```

output

```
36
```

In the first example, Luka will wait 2 seconds at the first traffic light. After that he will reach the second traffic light while it is green and be able to pass through immediately.

3. GRANICA

Luka started driving international routes with his truck. His biggest problem is the border with Slovenia. The border is a point of entrance into the European Union, so every truck is thoroughly examined. Because of this, Luka always has to wait several hours there. To kill the time, he comes up with various logic and math games.

In one of them, Luka first reads the numbers off of N license plates and writes them down on a piece of paper. Then he tries to find an integer M greater than 1 such that all integers on the paper give the same remainder when divided by M. Luka tries to find as many such integers M as possible.

Write a program that, given Luka's N integers, determines all such integers M.

Input

The first line contains the integer N ($2 \leq N \leq 100$), the number of integers on paper.

Each of the following N lines contains one integer between 1 and 1 000 000 000 (one billion). All these integers will be distinct.

The input data will guarantee that at least one integer M will always exist.

Output

Output all integers M separated by spaces, in any order.

Scoring

In test cases worth 60% points, each of the N numbers will be at most 10000.

Sample test data

input

```
3
6
34
38
```

output

```
2 4
```

input

```
5
5
17
23
14
83
```

output

```
3
```

In the first example, all integers give a remainder of 0 when divided by 2 and the remainder 2 when divided by 4.

4. GEORGE

Last week Mister George visited Croatia. Since Mister George is a very important person, while he was in a street, the police **disallowed entry** to that street, but vehicles that entered the street before Mister George could continue driving.

While Mister George was visiting, Luka drove his truck around town. But because of some of the streets being closed off, he couldn't make his delivery in time and almost lost his job. Although it is late now, he is wondering how he could have planned his delivery better i.e. what would have been the least time needed to make his delivery while Mister George was visiting. He knows the route mister George took.

The city is modeled with intersections and two-way streets connecting them. For each street, Luka knows how much time he needs to traverse it (mister George needs the same amount of time).

For example, if Mister George starts traversing a street during minute 10 and needs 5 minutes to exit it, this street will be blocked during minutes 10, 11, 12, 13 and 14. Luka can enter the street during minutes 9 and earlier, or 15 and later.

Write a program that calculates the least amount of time Luka needs to make his delivery, if he starts driving K minutes after the arrival of Mister George.

Input

The first line contains two integers N and M ($2 \leq N \leq 1000$, $2 \leq M \leq 10\,000$), the number of intersections and the number of streets. The intersections are numbered 1 to N.

The second line contains four integers A, B, K and G ($1 \leq A, B \leq N$, $0 \leq K \leq 1000$, $0 \leq G \leq 1000$). These are, in order:

- The intersection where Luka starts;
- The intersection Luka must get to;
- The difference in starting times between mister George and Luka (Luka starts at intersection A exactly K minutes after mister George starts his route);
- The number of intersections on Mister George's route.

The third line contains G integers, the labels of intersections mister George will visit. Every pair of adjacent integers denotes a street he will traverse. That street will exist and Mister George will traverse every street at most once.

Each of the following M lines contains three integers A, B and L, meaning that there is a street between intersection A and B, and it takes L minutes to traverse. L will be between 1 and 1000.

Output

Output the least amount of time (in minutes) Luka needs to make his delivery.

Sample test data

input

```
6 5
1 6 20 4
5 3 2 4
1 2 2
2 3 8
2 4 3
3 6 10
3 5 15
```

output

```
21
```

input

```
8 9
1 5 5 5
1 2 3 4 5
1 2 8
2 7 4
2 3 10
6 7 40
3 6 5
6 8 3
4 8 4
4 5 5
3 4 23
```

output

```
40
```

5. PRINCEZA

Luka parked his truck near the lake. The lake is inhabited by the frog Barica, who jumps across N plants floating on the lake's surface. Knowing a fair number of folk tales, Luka knows that if he kisses Barica, she will turn into a beautiful princess. However, he needs to catch her first!

Assuming an aerial view, the position of a plant on the lake's surface can be defined with a pair of coordinates. From plant (x, y) Barica can jump:

- To plant (x+P, y+P), for any positive integer P. Call this direction A.
- To plant (x+P, y−P), for any positive integer P. Call this direction B.
- To plant (x−P, y+P), for any positive integer P. Call this direction C.
- To plant (x−P, y−P), for any positive integer P. Call this direction D.

Barica selects one of the four directions and jumps onto the first plant in the chosen direction. If there is no plant in the selected direction, Barica stays where she is. After Barica jumps, **the plant she jumped from sinks** and disappears.

Knowing the locations of the plants and the sequence of directions Barica chooses, Luka wants to determine coordinates of the plant Barica will end up on. Luka will wait for her at that plant, ambush her and kiss her.

Write a program that solves Luka's problem and helps him turn Barica into a beautiful princess.

Input

The first line contains two integers N and K ($1 \leq N, K \leq 100\,000$), the number of plants and the number of attempted jump.

The second line contains K letters each of which is 'A', 'B', 'C' or 'D'. These letters represent in order the directions in which Barica attempts to jump.

Each of the following N lines contains two integers X and Y ($0 \leq X \leq 1\,000\,000\,000$, $0 \leq Y \leq 1\,000\,000\,000$), the coordinates of one plant. Barica is initially located on the first plant.

Output

Output Barica's final coordinates.

Sample test data

input

```
7 5
ACDBB
5 6
8 9
4 13
1 10
7 4
10 9
3 7
```

output

```
7 4
```

input

```
6 12
AAAAAABCCCDD
1 1
2 2
3 3
4 4
5 3
6 2
```

output

```
5 3
```

6. CESTARINE

In a single day, N of Luka's trucks travel a specific highway. The highway has a number of exits and entrances. An exit with a particular number is in the same location as the entrance with that number.

Upon entering the highway, a truck driver receives a ticket which indicates the entrance he used. When exiting, the driver pays a toll equal to the absolute difference of the entrance and exit numbers. For example, if a ticket says he used entrance 30, then exiting at exit 12 will cost him 18.

Luka has figured out a way to save toll money that his company daily spends. Any two drivers can meet on the highway and exchange tickets, even if their routes don't overlap. Tickets can be exchanged an arbitrary number of times.

However, **a driver cannot use an exit if his ticket says he used the same entrance**, since that would be suspicious.

Write a program that calculates the least total amount of tolls that the drivers can achieve by exchanging tickets.

Input

The first line contains the integer N ($1 \leq N \leq 100000$), the number of trucks.

Each of the following N lines contains two distinct integers between 1 and 1000000. These are in order the entrance and exit numbers of one truck.

No two trucks will use the same highway entrance or the same exit.

Output

Output the least total amount of tolls Luka's company must pay.

Note: use 64-bit integer types (long long in C/C++, int64 in Pascal).

Sample test data

input

```
3
3 65
45 10
60 25
```

output

```
32
```

input

```
3
5 5
6 7
8 8
```

output

```
5
```

In the first example, the first and third drivers will exchange tickets. After this, the second and third drivers exchange tickets. After this, the drivers will have the tickets 60, 3, 45, respectively. The total amount in tolls is $|65-60| + |10-3| + |25-45| = 32$.