TASK	PATRIK	POLICIJA	SABOR
input	standard input		
output	standard output		
time limit	0.5 seconds	3 seconds	1 second
memory limit	64 MB		
points	**100**	**100**	**100**
	300		

N people are waiting in line to enter a concert. People get bored waiting so they turn and look for someone familiar in the line.

Two persons A and B standing in line can see each other if they're standing right next to each other or if **no person between them is strictly taller** than person A **or** person B.

Write a program that determines the number of pairs of people that can see each other.

INPUT

The first line of input contains an integer N ($1 \leq N \leq 500\,000$), the number of people standing in line.

Each of the following N lines contains a single integer, the height of one person in nanometres. Everyone will be shorter than 2^{31} nanometres.

The heights are given in the order in which people are standing in line.

OUTPUT

Output the number of pairs of people that can see each other on a single line.

SAMPLE TEST DATA

input

```
7
2
4
1
2
2
5
1
```

output

```
10
```

To help capture criminals on the run, the police are introducing a new computer system. The area covered by the police contains N cities and E bidirectional roads connecting them. The cities are labelled 1 to N.

The police often want to catch criminals trying to get from one city to another. Inspectors, looking at a map, try to determine where to set up barricades and roadblocks. The new computer system should answer the following two types of queries:

1. Consider two cities A and B, and a road connecting cities G_1 and G_2. Can the criminals **get from city A to city B if that one road is blocked** and the criminals can't use it?
2. Consider three cities A, B and C. Can the criminals **get from city A to city B if the entire city C is cut off** and the criminals can't enter that city?

Write a program that implements the described system.

INPUT

The first line contains two integers N and E ($2 \leq N \leq 100000$, $1 \leq E \leq 500000$), the number of cities and roads.

Each of the following E lines contains two distinct integers between 1 and N – the labels of two cities connected by a road. There will be at most one road between any pair of cities.

The following line contains the integer Q ($1 \leq Q \leq 300000$), the number of queries the system is being tested on.

Each of the following Q lines contains either four or five integers. The first of these integers is the type of the query – 1 or 2.

If the query is of type 1, then the same line contains four more integers A, B, G_1 and G_2 as described earlier. A and B will be different. G_1 and G_2 will represent an existing road.

If the query is of type 2, then the same line contains three more integers A, B and C. A, B and C will be distinct integers.

The test data will be such that it is initially possible to get from each city to every other city.

OUTPUT

Output the answers to all Q queries, one per line. The answer to a query can be "yes" or "no".

Note: if your program correctly answers all questions of one type but not the other, it will receive 50% of the score for that case. Even then your program needs to answer all Q queries (the other queries can be answered arbitrarily).

SAMPLE TEST DATA

input

```
13 15
1 2
2 3
3 5
2 4
4 6
2 6
1 4
1 7
7 8
7 9
7 10
8 11
8 12
9 12
12 13
5
1 5 13 1 2
1 6 2 1 4
1 13 6 7 8
2 13 6 7
2 13 6 8
```

output

```
yes
yes
yes
no
yes
```

The president of the political **party in power** is holding a conference in the party headquarters. Politicians, members of the party, live in a two-dimensional grid, one member in each cell (except in cells containing obstacles). The headquarters are located in cell (0, 0). This is also where the president of the party lives.

Politicians make steps in one of the four directions (up, down, left, right), moving to one of the four adjacent cells in one step. They can't enter cells with obstacles. The conference will be attended by all party members that can reach headquarters **in S steps or less**. Each member coming to the conference will **take the shortest route** to headquarters (or any such route, if there is more than one).

The president has observed that politicians **change their party affiliation** with **each step they take**, becoming a member of the other party (there are only two parties on the political scene).

Write a program that determines how many politicians come to the conference as members of the **party in power**, and how many come as members of the **opposing party**.

INPUT

The first line contains two integers B and S ($0 \leq B \leq 10\,000$, $1 \leq S \leq 10\,000\,000$), the number of obstacles and the largest number of steps from the task description.

Each of the following B lines contains two integers, the coordinates of one obstacle. The absolute value of both coordinates will be less than 1000.

No two obstacles will be in the same cell and there will be no obstacle in cell (0, 0).

OUTPUT

Output two integers on a single line separated by a space, the number of politicians that come to the conference as members of the party in power and the opposing party, respectively.

SAMPLE TEST DATA

input
```
0 2
```
output
```
9 4
```

input
```
4 5
-1 1
0 -1
0 1
1 0
```
output
```
10 16
```

input
```
4 50000
1 1
-1 -1
1 -1
-1 1
```
output
```
2500099997 2500000000
```