A. Cottage Village

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

A new cottage village called «Flatville» is being built in Flatland. By now they have already built in «Flatville» n square houses with the centres on the Ox-axis. The houses' sides are parallel to the coordinate axes. It's known that no two houses overlap, but they can touch each other.

The architect bureau, where Peter works, was commissioned to build a new house in «Flatville». The customer wants his future house to be on the Ox-axis, to be square in shape, have a side t, and touch at least one of the already built houses. For sure, its sides should be parallel to the coordinate axes, its centre should be on the Ox-axis and it shouldn't overlap any of the houses in the village.

Peter was given a list of all the houses in «Flatville». Would you help him find the amount of possible positions of the new house?

Input

The first line of the input data contains numbers n and t ($1 \le n, t \le 1000$). Then there follow n lines, each of them contains two space-separated integer numbers: x_i a_i, where x_i — x-coordinate of the centre of the i-th house, and a_i — length of its side ($-1000 \le x_i \le 1000$, $1 \le a_i \le 1000$).

Output

Output the amount of possible positions of the new house.

Sample test(s)

input

```
2 2
0 4
6 2
```

output

```
4
```

input

```
2 2
0 4
5 2
```

output

```
3
```

input

```
2 3
0 4
5 2
```

output

```
2
```

Note

It is possible for the x-coordinate of the new house to have non-integer value.

B. Laser

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

Petya is the most responsible worker in the Research Institute. So he was asked to make a very important experiment: to melt the chocolate bar with a new laser device. The device consists of a rectangular field of $n \times m$ cells and a robotic arm. Each cell of the field is a 1×1 square. The robotic arm has two lasers pointed at the field perpendicularly to its surface. At any one time lasers are pointed at the centres of some two cells. Since the lasers are on the robotic hand, their movements are synchronized — if you move one of the lasers by a vector, another one moves by the same vector.

The following facts about the experiment are known:

- initially the whole field is covered with a chocolate bar of the size $n \times m$, both lasers are located above the field and are active;
- the chocolate melts within one cell of the field at which the laser is pointed;
- all moves of the robotic arm should be parallel to the sides of the field, after each move the lasers should be pointed at the centres of some two cells;
- at any one time both lasers should be pointed at the field. Petya doesn't want to become a second Gordon Freeman.

You are given n, m and the cells (x_1, y_1) and (x_2, y_2), where the lasers are initially pointed at (x_i is a column number, y_i is a row number). Rows are numbered from 1 to m from top to bottom and columns are numbered from 1 to n from left to right. You are to find the amount of cells of the field on which the chocolate can't be melted in the given conditions.

Input

The first line contains one integer number t $(1 \le t \le 10000)$ — the number of test sets. Each of the following t lines describes one test set. Each line contains integer numbers n, m, x_1, y_1, x_2, y_2, separated by a space ($2 \le n, m \le 10^9$, $1 \le x_1, x_2 \le n$, $1 \le y_1, y_2 \le m$). Cells (x_1, y_1) and (x_2, y_2) are distinct.

Output

Each of the t lines of the output should contain the answer to the corresponding input test set.

Sample test(s)

input

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

output

```
8
2
```

C. Industrial Nim

time limit per test: 2 seconds
memory limit per test: 64 megabytes
input: standard input
output: standard output

There are n stone quarries in Petrograd.

Each quarry owns m_i dumpers $(1 \le i \le n)$. It is known that the first dumper of the i-th quarry has x_i stones in it, the second dumper has $x_i + 1$ stones in it, the third has $x_i + 2$, and the m_i-th dumper (the last for the i-th quarry) has $x_i + m_i - 1$ stones in it.

Two oligarchs play a well-known game Nim. Players take turns removing stones from dumpers. On each turn, a player can select any dumper and remove any non-zero amount of stones from it. The player who cannot take a stone loses.

Your task is to find out which oligarch will win, provided that both of them play optimally. The oligarchs asked you not to reveal their names. So, let's call the one who takes the first stone «`tolik`» and the other one «`bolik`».

Input

The first line of the input contains one integer number n $(1 \le n \le 10^5)$ — the amount of quarries. Then there follow n lines, each of them contains two space-separated integers x_i and m_i $(1 \le x_i, m_i \le 10^{16})$ — the amount of stones in the first dumper of the i-th quarry and the number of dumpers at the i-th quarry.

Output

Output «`tolik`» if the oligarch who takes a stone first wins, and «`bolik`» otherwise.

Sample test(s)

input

```
2
2 1
3 2
```

output

```
tolik
```

input

```
4
1 1
1 1
1 1
1 1
```

output

```
bolik
```

D. Map

time limit per test: 2 seconds
memory limit per test: 128 megabytes
input: standard input
output: standard output

There is an area map that is a rectangular matrix $n \times m$, each cell of the matrix contains the average height of a corresponding area part. Peter works for a company that has to build several cities within this area, each of the cities will occupy a rectangle $a \times b$ cells on the map. To start construction works in a particular place Peter needs to remove excess ground from the construction site where a new city will be built. To do so he chooses a cell of the minimum height within this site, and removes excess ground from other cells of the site down to this minimum level. Let's consider that to lower the ground level from h_2 to h_1 ($h_1 \le h_2$) they need to remove h_2 - h_1 ground units.

Let's call a site's position optimal, if the amount of the ground removed from this site is minimal compared to other possible positions. Peter constructs cities according to the following algorithm: from all the optimum site's positions he chooses the uppermost one. If this position is not unique, he chooses the leftmost one. Then he builds a city on this site. Peter repeats this process untill he can build at least one more city. For sure, he cannot carry out construction works on the occupied cells. Would you, please, help Peter place cities according to the algorithm?

Input

The first line contains four space-separated integers: map sizes n, m and city sizes a, b ($1 \le a \le n \le 1000$, $1 \le b \le m \le 1000$). Then there follow n lines, each contains m non-negative space-separated numbers, describing the height matrix. Each number doesn't exceed 10^9.

Output

In the first line output k — the amount of constructed cities. In each of the following k lines output 3 space-separated numbers — the row number and the column number of the upper-left corner of a subsequent construction site, and the amount of the ground to remove from it. Output the sites in the order of their building up.

Sample test(s)

input

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

output

```
2
1 1 1
2 1 2
```

input

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

output

```
3
3 1 2
3 3 3
1 2 9
```

E. Triangles

time limit per test: 1 second
memory limit per test: 64 megabytes
input: standard input
output: standard output

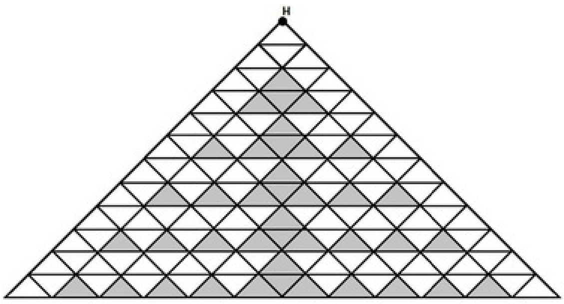
Last summer Peter was at his granny's in the country, when a wolf attacked sheep in the nearby forest. Now he fears to walk through the forest, to walk round the forest, even to get out of the house. He explains this not by the fear of the wolf, but by a strange, in his opinion, pattern of the forest that has n levels, where n is an even number.

In the local council you were given an area map, where the granny's house is marked by point H, parts of dense forest are marked grey (see the picture to understand better).

After a long time at home Peter decided to yield to his granny's persuasions and step out for a breath of fresh air. Being prudent, Peter plans the route beforehand. The route, that Peter considers the most suitable, has the following characteristics:

- it starts and ends in the same place — the granny's house;
- the route goes along the forest paths only (these are the segments marked black in the picture);
- the route has positive length (to step out for a breath of fresh air Peter has to cover some distance anyway);
- the route cannot cross itself;
- there shouldn't be any part of dense forest within the part marked out by this route;

You should find the amount of such suitable oriented routes modulo 1000000009.



The example of the area map for $n = 12$ is given in the picture. Since the map has a regular structure, you can construct it for other n by analogy using the example.

Input
The input data contain the only even integer n ($2 \le n \le 10^6$).

Output
Output the only number — the amount of Peter's routes modulo 1000000009.

Sample test(s)

input
2
output
10

input
4
output
74