Problem G. Good Training

Program:	`coaches.(c|cpp|java)`
Input:	`coaches.in`
Balloon Color:	`Blue`

When TCPC students were training for the national contest, they got offered a special training where they can register online and choose a coach to train them from a list of coaches. Each team member must register by choosing a coach and submitting their name to an online form.

Unfortunately some of the students registered with the same coach multiple times. In this case, these registrations would be considered as one registration. Some of them registered with more than one coach, that's when we had to exclude the student from all coaches' teams.

You'll be given the names of the coaches, each on a line. After each coach's name, you'll be given several lines, the names of the students who submitted a registration with that coach. The total number of names (coaches and students) will be N. Print a list of coaches' names and the number of valid registrations with them, sorted non-ascendingly according to the numbers of valid registrations (and lexicographically in the names of coaches in case of a tie). Each line of the list will be of the following form:
'Coach name' 'number of members'

Coaches' name will consists of upper-case letters and students' name of lower-case letters, both possibly containing spaces.

Input

The first line of the input contains a single number T ($1 \leq T \leq 256$) – the number of test cases.

The first line of each test case contains a single number N ($1 \leq N \leq 10^4$) – the number of lines, each line is a coach name or a student name.

Coaches' names are unique and consist of upper case latin letters and spaces.

Students' names consist of lower case latin letters and spaces.

The total length of the input file will not exceed 10^7.

Output

For each test case, output a summary of each Coach's Team. The summary is one line with the coach's names and number of the students, space separated. These lines should be printed in decreasing order of number of registrants. If two or more Coaches have the same number of students, they should be listed in alphabetical order.

Example

coaches.in	Standard Output
1 6 FEGLAZ soha maha noha HOSSAM naeeem	FEGLAZ 3 HOSSAM 1

Problem H. Harvest the Plants

Program:	`plants.(c|cpp|java)`
Input:	`plants.in`
Balloon Color:	`Gold`

Maha has a beautiful house in Tunisia with a wonderful garden. She loves taking care of this garden in her spare times and growing exotic plants. Maha bought a strange kind of exotic plants one day and she wanted to grow N plants in her garden. Each of them has 3 parameters:

- d_i: A positive integer which indicates the day when the plant i is fully grown.
- $s1_i$: A positive integer which indicates the amount of weight added to plant i each day before it is fully grown.
- $s2_i$: A positive integer which indicates the amount of weight added to plant i each day after it is fully grown.

Maha wants to plant all the seeds in the garden on day 0. She can harvest her plants starting from day 1, but she can only harvest one plant a day because of her busy schedule. She isn't interested if the plant she harvested is fully grown or not, she only cares about the weight of the harvested plants. Maha needs the overall weight of the harvested plants to add up to the minimal possible sum of their weights.

Can you help Maha find the minimum sum of plants' weights that she can achieve after harvesting all the plants?

Input

The first line of each test case contains a single number T ($1 \leq T \leq 128$) – the number of test cases.

The first line of each test case contains a single number N ($1 \leq N \leq 10^2$) – the number of plants. N lines follow, each contains 3 numbers d_i ($1 \leq d_i \leq 10^2$), $s1_i$ and $s2_i$ ($1 \leq s1_i, s2_i \leq 10^4$).

Output

For each test case print a single number in a single line, the required answer.

Example

plants.in	Standard Output
2 4 2 5 2 1 6 5 1 4 2 1 3 2 5 1 6 1 2 6 4 1 3 2 3 2 3 4 6 3	33 43

Problem I. Incredible Game

Program:	`maze.(c|cpp|java)`
Input:	`maze.in`
Balloon Color:	`Silver`

Maha invited coach Fegla to dinner in her house in Tunisia. He met her family and they were very nice. Her mom prepared delicious Tunisian food and he really enjoyed their company. Maha's brother Makram loves video games and he owns a Game Boy Color. He invited coach Fegla to play his favorite game with him and coach happily agreed.

In the game they met a puzzle: you are in a rectangular ice maze that possibly has rocks on some cells. You can take a step in one of 4 directions: North, East, South, and West. When you take a step, you keep moving in that direction till you hit a rock or a border and that entire move would be considered one step.

You're initially on some empty cell and to leave the cell you want to pass by some other empty cell. Given the rocks' positions, find the minimum number of steps you need to take to pass by the ending cell or print **-1** if there's no path.

Input

The first line of the input consists of a single non-negative integer T, the number of test cases. Each test case consists of several lines:

The first line consists of 3 space-separated integers: $(1 \leq R \leq 10^6)$, $(1 \leq C \leq 10^6)$, and $(0 \leq N \leq 10^5)$, the numbers of rows and columns and rocks, respectively.

The second line consists of 4 space-separeted integers: $(0 \leq S_r < R)$, $(0 \leq S_c < C)$, $(0 \leq E_r < R)$, and $(0 \leq E_c < C)$, the 0-based row and column numbers of start and end cells, respectively.

Then follow N lines, each line represents a rocks and consists of 2 space-separated integers: $(0 \leq r < R)$ and $(0 \leq c < C)$, the 0-based row and column numbers of the rocks, respectively.

Output

For each test case, output a line consisting of the answer.

Example

maze.in	Standard Output
1 10 10 3 7 6 4 7 7 2 3 3 4 9	3

Problem J. Join the Challenge

Program:	`game.(c|cpp|java)`
Input:	`game.in`
Balloon Color:	`White`

Coach Fegla and Nicole got invited to Bizerte for a training camp. It was in a lovely hotel by the sea and they enjoyed the peaceful city and Maha's company. During breaks they loved to challenge the camp attendees in a game, can you join that challenge?

You are given an N x M 2D array where each cell is either empty or it contains a ball, you can apply the following operations:

1. Press **UP**, then all the balls would move up until they hit another ball or a border in the same column.
2. Press **DN**, then all the balls would move down until they either hit another ball or a border in the same column.
3. Press **LF**, then all the balls would move left until they either hit another ball or a border in the same row.
4. Press **RT**, then all the balls would move right until they either hit another ball or a border in the same row.

Can you find out the minimum number of operations required to get the largest rectangular sub-grid full of balls?

Input

The first line of each test case contains a single number T ($1 \leq T \leq 256$) – the number of test cases.

The first line of each test case contains 2 numbers N and M ($1 \leq N, M \leq 10$) – the dimensions of the grid. Each of the N lines contains M cells, each cell contains a ball 'O' or empty '.'.

Output

For each test case print a single number in a single line, the required answer.

Example

game.in	Standard Output
2 2 3 OO. .O. 10 10 OOO..... .O..OOO... .O..O..... ....OOO... .... OOO..... O.O..... OOO...OOO. O.....O... O.....OOO.	0 2