PA

The famous Korean internet company nhn has provided an internet-based photo service which allows The famous Korean internet company users to directly take a photo of an astronomical phenomenon in space by controlling a high-performance telescope owned by nhn. A few days later, a meteoric shower, known as the biggest one in this century, is expected. nhn has announced a photo competition which awards the user who takes a photo containing as many meteors as possible by using the nhn photo service. For this competition, nhn provides the information on the trajectories of the meteors at their web page in advance. The best way to win is to compute the moment (the time) at which the telescope can catch the maximum number of meteors.

You have n meteors, each moving in uniform linear motion; the meteor m_i moves along the trajectory $p_i + t \times v_i$ over time t, where t is a non-negative real value, p_i is the starting point of m_i and v_i is the velocity of m_i. The point $p_i = (x_i, y_i)$ is represented by X-coordinate x_i and Y-coordinate y_i in the (X, Y)-plane, and the velocity $v_i = (a_i, b_i)$ is a non-zero vector with two components a_i and b_i in the (X, Y)-plane. For example, if $p_i = (1, 3)$ and $v_i = (-2, 5)$, then the meteor m_i will be at the position (0, 5.5) at time $t = 0.5$ because $p_i + t \times v_i = (1, 3) + 0.5 \times (-2, 5) = (0, 5.5)$. The telescope has a rectangular frame with the lower-left corner (0, 0) and the upper-right corner (w, h). Refer to Figure 1. A meteor is said to be in the telescope frame if the meteor is in the interior of the frame (not on the boundary of the frame). For example, in Figure 1, p_2, p_3, p_4, and p_5 cannot be taken by the telescope at any time because they do not pass the interior of the frame at all. You need to compute a time at which the number of meteors in the frame of the telescope is maximized, and then output the maximum number of meteors.

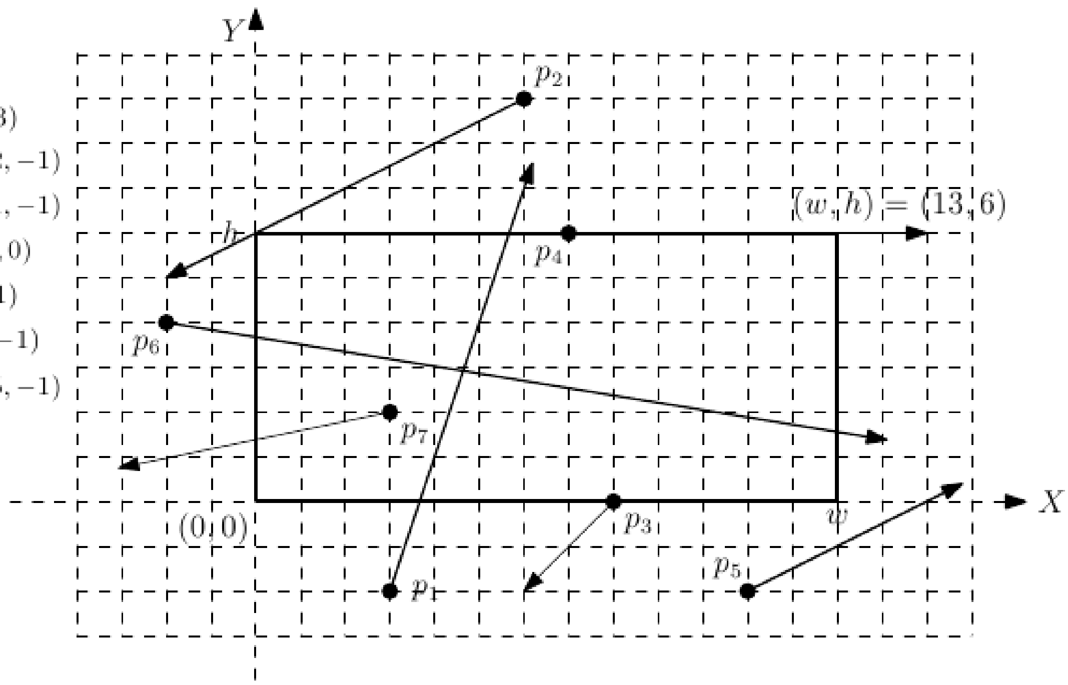

Figure 1

Input

Your program is to read the input from standard input. The input consists of T test cases. The number of test cases T is given in the first line of the input. Each test case starts with a line containing two integers w and h ($1 \le w, h \le 100,000$), the width and height of the telescope frame, which are separated by single space. The second line contains an integer n, the number of input points (meteors), $1 \le n \le 100,000$. Each of the next n lines contain four integers x_i, y_i, a_i, and b_i; (x_i, y_i) is the starting point p_i and (a_i, b_i) is the nonzero velocity vector v_i of the i-th meteor; x_i and y_i are integer values between -200,000 and 200,000, and a_i and b_i are integer values between -10 and 10. Note that at least one of a_i and b_i is not zero. These four values are separated by single spaces. We assume that all starting points p_i are distinct.

Output

Your program is to write to standard output. Print the maximum number of meteors which can be in the telescope frame at some moment.

Sample Input

```
2
4 2
2
-1 1 1 -1
5 2 -1 -1
13 6
7
3 -2 1 3
6 9 -2 -1
8 0 -1 -1
7 6 10 0
11 -2 2 1
-2 4 6 -1
3 2 -5 -1
```

Sample Output

```
1
2
```

PB

Bob is a strategy game programming specialist. In his new city building game the gaming environment is as follows: a city is built up by areas, in which there are streets, trees, factories and buildings. There is still some space in the area that is unoccupied. The strategic task of his game is to win as much rent money from these free spaces. To win rent money you must erect buildings, that can only be rectangular, as long and wide as you can. Bob is trying to find a way to build the biggest possible building in each area. But he comes across some problems — he is not allowed to destroy already existing buildings, trees, factories and streets in the area he is building in.

Each area has its width and length. The area is divided into a grid of equal square units. The rent paid for each unit on which you're building stands is 3$.

Your task is to help Bob solve this problem. The whole city is divided into K areas. Each one of the areas is rectangular and has a different grid size with its own length M and width N. The existing occupied units are marked with the symbol '`R`'. The unoccupied units are marked with the symbol '`F`'.

Input

The first line of the input file contains an integer K — determining the number of datasets. Next lines contain the area descriptions. One description is defined in the following way: The first line contains two integers-area length $M \leq 1000$ and width $N \leq 1000$, separated by a blank space. The next M lines contain N symbols that mark the reserved or free grid units, separated by a blank space. The symbols used are:

`R` - reserved unit
`F` - free unit

In the end of each area description there is a separating line.

Output

For each data set in the input file print on a separate line, on the standard output, the integer that represents the profit obtained by erecting the largest building in the area encoded by the data set.

Sample Input

```
2
5 6
R F F F F F
F F F F F F
R R R F F F
F F F F F F
F F F F F F

5 5
R R R R R
R R R R R
R R R R R
R R R R R
R R R R R
```

Sample Output

```
45
0
```

PC

A sequence of N positive integers ($10 < N < 100\ 000$), each of them less than or equal 10000, and a positive integer S ($S < 100\ 000\ 000$) are given. Write a program to find the minimal length of the subsequence of consecutive elements of the sequence, the sum of which is greater than or equal to S.

Input

Many test cases will be given. For each test case the program has to read the numbers N and S, separated by an interval, from the first line. The numbers of the sequence are given in the second line of the test case, separated by intervals. The input will finish with the end of file.

Output

For each the case the program has to print the result on separate line of the output file.

Sample Input

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

Sample Output

```
2
3
```

PD

Flatland government is building a new highway that will be used to transport weapons from its main weapon plant to the frontline in order to support the undergoing military operation against its neighbor country Edgeland. Highway is a straight line and there are n construction teams working at some points on it.

During last days the threat of a nuclear attack from Edgeland has significantly increased. Therefore the construction office has decided to develop an evacuation plan for the construction teams in case of a nuclear attack. There are m shelters located near the constructed highway. This evacuation plan must assign each team to a shelter that it should use in case of an attack.

Each shelter entrance must be securely locked from the inside to prevent any damage to the shelter itself. So, for each shelter there must be some team that goes to this shelter in case of an attack. The office must also supply fuel to each team, so that it can drive to its assigned shelter in case of an attack. The amount of fuel that is needed is proportional to the distance from the team's location to the assigned shelter. To minimize evacuation costs, the office would like to create a plan that minimizes the total fuel needed.

Your task is to help them develop such a plan.

Input

The input file contains several test cases, each of them as described below.

The first line of the input file contains n — the number of construction teams ($1 \leq n \leq 4000$). The second line contains n integer numbers - the locations of the teams. Each team's location is a positive integer not exceeding 10^9, all team locations are different.

The third line of the input file contains m — the number of shelters ($1 \leq m \leq n$).

The fourth line contains m integer numbers — the locations of the shelters. Each shelter's location is a positive integer not exceeding 10^9, all shelter locations are different.

The amount of fuel that needs to be supplied to a team at location x that goes to a shelter at location y is equal to $|x - y|$.

Output

For each test case, the output must follow the description below.

The first line of the output file must contain z — the total amount of fuel needed. The second line must contain n integer numbers: for each team output the number of the shelter that it should be assigned to. Shelters are numbered from 1 to m in the order they are listed in the input file.

Sample Input

```
3
1 2 3
2
2 10
```

Sample Output

```
8
1 1 2
```

PE

In the good old days when Swedish children were still allowed to blow up their fingers with fire-crackers, gangs of excited kids would plague certain smaller cities during Easter time, with only one thing in mind: To blow things up. Small boxes were easy to blow up, and thus mailboxes became a popular target. Now, a small mailbox manufacturer is interested in how many fire-crackers his new mailbox prototype can withstand without exploding and has hired you to help him. He will provide you with k $(1 \le k \le 10)$ identical mailbox prototypes each fitting up to m $(1 \le m \le 100)$ crackers. However, he is not sure of how many fire-crackers he needs to provide you with in order for you to be able to solve his problem, so he asks you. You think for a while and then say: "Well, if I blow up a mailbox I can't use it again, so if you would provide me with only $k = 1$ mailboxes, I would have to start testing with 1 cracker, then 2 crackers, and so on until it finally exploded. In the worst case, that is if it does not blow up even when filled with m crackers, I would need $1 + 2 + 3 + \ldots + m = m * (m + 1)/2$ crackers. If $m = 100$ that would mean more than 5000 fire-crackers!". "That's too many", he replies. "What if I give you more than $k = 1$ mailboxes? Can you find a strategy that requires less crackers?"

Can you? And what is the minimum number of crackers that you should ask him to provide you with?

You may assume the following:

1. If a mailbox can withstand x fire-crackers, it can also withstand $x - 1$ fire-crackers.
2. Upon an explosion, a mailbox is either totally destroyed (blown up) or unharmed, which means that it can be reused in another test explosion.

Note: If the mailbox can withstand a full load of m fire-crackers, then the manufacturer will of course be satisfied with that answer. But otherwise he is looking for the maximum number of crackers that his mailboxes can withstand.

Input

The input starts with a single integer N $(1 \le N \le 10)$ indicating the number of test cases to follow. Each test case is described by a line containing two integers: k and m, separated by a single space.

Output

For each test case print one line with a single integer indicating the minimum number of fire-crackers that is needed, in the worst case, in order to figure out how many crackers the mailbox prototype can withstand.

Sample input

```
4
1 10
1 100
3 73
5 100
```

Sample Output

```
55
5050
382
495
```