

6441 Horrible Quiz

Gori, a programmer, participated in the Horrible Quiz and passed the elimination stage. Therefore, he was invited to the final stage: the Horrible Quiz Onsite! Gori will start with a balance of \$15,000. He will be given N problems. For each problem, if he solves it, his balance remains unchanged otherwise his balance is multiplied by -1 .

He asked you (whom he sees as a friend) to help him. You decided to give him a slip of paper containing the solution to each problem. You claimed that you are one of the staff but you will not guarantee that those solutions are correct. Specifically, you may give wrong solutions to at most M of the problems. You know the correct solution to each of the problems before the quiz starts and it is entirely up to you whether you want to give the wrong or correct solution to each problem.

When the i -th problem is given, there is a $C_i\%$ chance that Gori will come up and submit a correct solution by himself, a $W_i\%$ chance that he will come up and submit a wrong solution, and a $(100 - W_i - C_i)\%$ chance that he can't come up with any solution and is forced to submit the solution in the paper you gave him.

Gori has a strange sense of sportsmanship. Although he is cheating by asking for your help, he will not deliberately submit a wrong solution, that is, if he submits a wrong solution it must be either from the solution you gave him or the solution he came up with the $W_i\%$ probability.

You are not a very nice person and you have decided to give him the worst possible set of solutions, that is, the one that minimized Gori's expected balance after the game. Output this expected balance, up to three digits after decimal points.

You should assume that Gori's performance of each problem is independent to his performance on all other problems previously given to him. You must provide all solutions to Gori before the start of the quiz. It's not possible to change them during the quiz.

Input

The first line of input contains an integer T ($T \leq 100$) denoting the number of cases. Each case begins with two integers N and M ($1 \leq N \leq 1,250$; $0 \leq M \leq N$) denoting the number of problems and the maximum number of wrong solution you might give Gori respectively. The next line contains N integers C_i ($0 \leq C_i \leq 100$) representing the chance that Gori will come up and submit a correct solution to the i -th problem. The last line of each case contains N integers W_i ($0 \leq W_i \leq 100$; $C_i + W_i \leq 100$) representing the chance that Gori will come up and submit a wrong solution to the i -th problem.

Output

For each case, output 'Case # X : Y ', where X is the case number starts from 1 and Y is the minimum expected balance with three digits decimal points. Output which differs by at most 10^{-3} to the actual output will be considered correct.

Notes:

- Explanation for 1st sample case
Gori never comes up with his own solution, so he submits all your (correct) solutions.
- Explanation for 2nd sample case
Give (only) one wrong solution and Gori will certainly end up with \$-15,000 balance.

- Explanation for 3rd sample case
Gori is able to answer all questions correctly without your help.
- Explanation for 4th sample case
Gori has 90% chances of getting the correct answer.
- Explanation for 5th sample case
Give a wrong solution to the first problem and correct solutions to the rest.

Sample Input

```
5
2 0
0 0
0 0
2 2
0 0
0 0
4 1
100 100 100 100
0 0 0 0
1 0
50
10
3 1
25 25 25
25 25 25
```

Sample Output

```
Case #1: 15000.000
Case #2: -15000.000
Case #3: 15000.000
Case #4: 12000.000
Case #5: -1875.000
```