

Problem E: ARAM Account

ARAM is a popular *League of Legends* game mode. One curiosity of this game mode is that in ARAM, the champion that a player will play is selected uniformly at random from the pool of champions currently available to the player. Furthermore, as some champions are better than others at ARAM, the player has some interest in unlocking a certain set of champions.



The champions currently available to a player is the union of two sets:

- The champions that the player has *unlocked*
- The champions on the *free week rotation*

For the purposes of this problem, in order to be eligible to play a game of ARAM, a player must have *unlocked* at least U champions from the overall champion pool. The player may have as much overlap as they like between their *unlocked* champions and the champions that on the *free week rotation*.

Every champion has a given quality Q_i , and can be *unlocked* for free (observe, though, that the player may not want to unlock all the champions). Recalling that the champion chosen is taken completely at random from all the available champions, what is the best expected quality of the champion the player can receive?

Input Specification:

The input begins with an integer T , the number of test cases. Each test case takes up three lines. The first line contains positive integers $N \leq 10^5$, the number of champions, and $U \leq 10^5$, the minimum number of champions the player must *unlock*. The second line consists of N non-negative integers $Q_i \leq 1000$, the quality of champion i . Finally, the third line consists of N numbers representing the *free week rotation* - if champion i is available on the rotation then the i^{th} number will be a 1, otherwise it will be 0.

Output Specification:

For each test case output a single number, rounded to five decimal places - the maximum expected quality the player can receive when they *unlock* the optimal set of champions.

Sample Input:

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1
3 2
9 6 3
0 1 1
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Sample Output:

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6
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