Problem G. Gathering Mushrooms

BaoBao is picking mushrooms in a forest. There are n locations in the forest, and in the i-th location there grows an infinite amount of mushrooms of type t_i. Each location also has a wooden sign. The sign of the i-th location points to location a_i (it is possible that $a_i = i$).

As it is very foggy in the forest, BaoBao decides to move between locations according to the signs just for safety. Starting from location s with an empty basket, each time BaoBao walks into a location c (including the starting location $c = s$, and regardless of whether he has visited location c before), he will pick one mushroom of type t_c into his basket and move to location a_c.

Given an integer k, for each $1 \le s \le n$, determine the first type of mushroom that appears at least k times in the basket.

Input

There are multiple test cases. The first line of the input contains an integer T ($1 \le T \le 10^4$) indicating the number of test cases. For each test case:

The first line contains two integers n and k ($1 \le n \le 2 \times 10^5$, $1 \le k \le 10^9$) indicating the number of locations and the required times of appearance of mushrooms.

The second line contains n integers $t_1, t_2, \cdots, t_n$ ($1 \le t_i \le n$), where t_i is the type of mushroom growing in location i.

The third line contains n integers $a_1, a_2, \cdots, a_n$ ($1 \le a_i \le n$), where a_i is the location pointed to by the sign in location i.

It's guaranteed that the sum of n of all test cases will not exceed 2×10^5.

Output

To decrease the size of output, for each test case, output one line containing one integer indicating $\sum_{i=1}^{n}(i \times v_i)$, where v_i is the answer for $s = i$.

Example

standard input	standard output
3 5 3 2 2 1 3 3 2 5 1 2 4 5 4 2 2 1 3 3 2 5 1 2 4 3 10 1 2 3 1 3 2	41 45 14

Note

For the first sample test case, $v_1 = 2$, $v_2 = 3$, $v_3 = 2$, $v_4 = 3$, $v_5 = 3$, so you should output $1 \times 2 + 2 \times 3 + 3 \times 2 + 4 \times 3 + 5 \times 3 = 41$. Consider $s = 3$, the types of mushrooms BaoBao picks in order are $\{1, 2, 2, 3, 3, 2, \cdots\}$, so mushrooms of type 2 is the very first type which appears at least 3 times in the basket.