Defeat the Enemies

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

You are tasked with defeating n enemies. Each enemy i has a_i health points and b_i armor points. You can use attacks to defeat your enemies. For each of your attacks, you can choose to deal x points of damage to all enemies, where $1 \le x \le k$. Each attack with damage x costs c_x units. You can perform any number of attacks.

When an enemy takes damage, the damage is first absorbed by its armor. When the armor is destroyed, any remaining damage does not carry over to the health. Formally, when enemy x takes y damage, the following happens:

- If $b_x > 0$, b_x is reduced by y.
- Otherwise, a_x is reduced by y.
- The enemy x is considered defeated if at any moment $a_x \le 0$.

Your task is to determine the minimum total cost required to defeat all enemies, and the number of distinct attack strategies (combinations of attacks) that achieve this minimum cost, modulo 998 244 353.

A strategy is an array of integers $x_1, x_2 \dots x_m (1 \le x_i \le k)$, representing the damage dealt in each attack. Two strategies are different if and only if the array x is different.

Input

The first line contains an integer $T (1 \le T \le 1000)$, representing the number of test cases.

For each test case, the first line contains two integers n, m $(1 \le n \le 5 \cdot 10^5, 1 \le m \le 10^4)$, representing the number of enemies, and the maximal health point and armor point.

The following two lines contain two arrays of integers a and b $(1 \le a_i, b_i \le m)$, each of length n, representing the health and armor points of the enemies, respectively.

The following line contains a single integer k $(1 \le k \le 100)$, representing the maximum possible damage per attack.

Then followed by an array of integers c $(1 \le c_i \le 10^9)$, of length k, the i-th integer c_i represents the cost of dealing i damage to all enemies.

It is guaranteed that the sum of n does not exceed $5 \cdot 10^5$, and the sum of m does not exceed 10^4.

Output

For each test case, output one line containing two integers: the minimum total cost to defeat all enemies, and the number of distinct strategies to achieve this cost, modulo 998 244 353.

Example

standard input	standard output
4 5 5 3 5 2 1 2 3 1 3 2 3 3 2 3 4 3 2 2 2 2 2 2 2 3 2 3 3 7 6 5 3 4 6 6 3 4 4 6 4 2 3 5 5 4 2 4 6 7 10 100 38 49 79 66 49 89 21 55 13 23 67 56 26 39 56 16 84 50 92 82 11 6 6 7 8 9 9 9 9 9 9 9	9 1 6 4 18 18 99 44387