Water Crisis

Problem Code: **WATERCR**

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Due to the current water crisis, the local water board has decided to distribute water from a tanker located in the city center. Each resident of the city has to go to the tanker in order to collect water. Note that different residents require different amounts of water. In order to ensure a fair distribution, the conditions for the water supply are as follows: - One unit of time is spent in collecting one unit of water. - The residents will generally be handled on a first-come-first-serve basis, depending on their arrival times (counting of time begins from 1). You can assume that all the arrival times are distinct. - There is a restriction that a single person will not be allowed to collect more than Q units of water in a single turn. Whenever a person has already collected Q units after getting his chance and still not satisfied his total water requirement, he has to move to the end of the current queue to get another turn. Conceptually, if the person required to collect B buckets of water (where $B > Q$) when he got his last turn at time t, then you can picture this situation as the person arriving again at time $t + Q$ but now with a requirement of $B - Q$ units. - In order to ensure fairness, whenever there is a clash (in FCFS order of arrival times) between a person who has just arrived for the first time and a person who is trying to return to the queue after getting a turn already, the person who has just arrived will be given priority.

If we sort all the persons with respect to the time at which they were able to collect enough water to completely meet their own requirements, then your job is to print out the names of the last K people in reverse order (i.e. name of the last person to complete his requirement has to be printed first). You can assume that there is enough water in the tanker to meet the needs of all the families residing in the city.

INPUT FORMAT

- The first line contains 3 integers:
  - N, the number of residents in the city
  - Q, the maximum units of water each person can fill in a single turn
  - K, the number of residents whose names have to be printed out
- The next line contains:
  - N strings $S_1, S_2, \ldots, S_N$ that represent the names of the residents
- The next line contains:
  - N integers $T_1, T_2, \ldots, T_N$ representing the arrival times of each resident, where $T_j \leq 10000$ for $1 \leq j \leq N$
- The last line contains:
  - N integers $B_1, B_2, \ldots, B_N$ representing the number of units of water required by each resident, where $B_j \leq 500$ for $1 \leq j \leq N$

OUTPUT FORMAT

- A single line containing the names of the last K persons to have completed their water requirements in reverse order, where each consecutive pair of names is separated by a single space.

Sample Input 0:

```
5 2 2
A B C D E
1 2 3 4 5
5 3 1 2 3
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Sample Output 0:

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E A
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Constraints:

$1 \leq N \leq 10^5$

$1 \leq Q \leq 100$

$1 \leq k \leq K$

Explanation:

- At first unit of time, A comes and joins the queue. Since A needs 5 units of water, at a particular time but he can have only 2 units, so he will have to join the queue again.
- By the time A is being served, B and C have already joined the queue. Then A joins after C for getting served again. The current status of the queue is: B->C->A)
- Then, B is served 2 units, and by the time B is served, D and E also join the queue. Hence B joins after E. The current status of the queue is: C->A->D->E->B.
- Then C is served completely as he requires only one unit of water. The current status of the queue is: A->D->E->B.
- Then from the queue, it is the turn of A again, and A is again served 2 units. A still needs one more unit, and hence he joins the queue again. The current status of the queue is: D->E->B->A.
- Now again, D is served completely at once. The current status of the queue is: E->B->A.
- Now E needs 3 units. E is served 2 units, and hence E joins the queue again. The current status of the queue is: B->A->E.
- Now, each of them need only one unit of water, and hence are served in order. Therefore, the last 2 persons to be served are E and A.

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Comments