Task GT4. SHOPPING

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You will be shopping from a big store in a few days. That's why you are making plans in advance what will you be buying. There are N items in the store each of type t_i and costing c_i. For each type you have made a restriction on the number of items you will buy - you must buy not less than l_j and not more than r_j items. The cost of a shopping plan is equal to the sum of the costs of the items bought.

Write the program **shopping** that finds the K cheapest shopping plans that follow all restrictions. Two shopping plans are considered different if there is an item that is in one of the plans and not in the other.

Input

The first line of the standard input contains three positive integers N, M and K - the number of items in the store, the number of types and the number of requested plans. Each of the following N lines contains 2 integers: t_i c_i describing the type and cost of the i-th item. Each of the last M lines contains 2 integers: l_j r_j - the interval restriction for the number of items of type j.

Output

Output K integers on separate lines - the cost of the cheapest shopping plan following all restrictions, the second cheapest and so on. If there are fewer than K shopping plans following all restrictions, you have to output -1 instead of the cost for the non-existing plans.

Constraints

- $1 \le N, M, K \le 200\,000$;
- $1 \le t_i \le M$;
- $1 \le c_i \le 10^9$;
- $0 \le l_j \le r_j \le N$.

Subtasks

Subtask	Points	Required subtasks	N, M	l_j	r_j	Other constraints
0	0	—	—	—	—	The example test.
1	21	0	$\le 4\,000$			$K \le 4\,000$
2	13	0		$= 1$	$= 1$	$c_i \le 4\,000$
3	17	$0 - 2$				
4	20	—	$\le 200\,000$	$= 0$	—	—
5	29	$0 - 4$		—	—	

The points for a subtask are given only if all tests for it and the required subtasks are passed successfully.

Example

Input	Output	Explanation
5 2 7 1 5 1 3 2 3 1 6 2 1 1 1 1 1	4 6 6 7 8 9 -1	There are 3 items of type 1 with costs $5, 3$ and 6 and 2 items of type 2 with costs 3 and 1. Our cheapest shopping plan following all restrictions is taking the second and fifth items for $3 + 1 = 4$. Because of the restrictions we only have $3 \times 2 = 6$ possible shopping plans and that is why the seventh number in the output is -1.