Problem: Construction Project

Time limit: 5 seconds
Memory limit: 256 MB

Problem Statement

The government of IOI country wants to upgrade its traffic network to link the cities in the country. IOI country can be represented on an xy-plane with N cities. The i-th city is represented by the point (X_i, Y_i). The development procedure is as follows:

- Airports are going to be constructed at some or all of the N cities. However, at least one airport needs to be constructed and there is a fixed cost for constructing an airport in any city.
- Roads are also going to be constructed directly between the cities. The roads must either be parallel to the x-axis or y-axis and the cost of building a road is exactly equal to its length.

The upgrading must be done such that the following conditions are met.

- Due to unfavourable land conditions in IOI country, there are M regions where roads cannot be constructed. Each region is represented by a rectangle with the j-th region represented by a lower-left corner of (P_j, Q_j) and an upper corner of (R_j, S_j). It is guaranteed that $P_j < R_j$ and $Q_j < S_j$. No roads can be constructed within the region or along the edges of the region
- Each of the N cities must be connected by roads to at least 1 city with an airport so that it is always possible to get from 1 city to another

A total of C construction companies have been nominated as possible contractors of this project. The k-th contractor offers a cost of B_k for building an airport and will only build up to H_k airports. The cost of building roads are the same for all companies and there is no limit to the number and length of roads built by any company. For each of the companies, you want to know what is the minimum total cost required to complete the upgrading project such that it satisfies the conditions above.

Input

The input consists of the following

- The first line of input consists of 3 integers, N, M, C representing the number of cities in IOI country, the number of regions where roads cannot be built and the number of construction companies.
- The next N lines each contain 2 integers, X_i, Y_i representing the coordinates of the location of the i-th city. No 2 cities will share the same coordinates
- The next M lines each contain 4 integers, P_j, Q_j, R_j, S_j representing the bottom left and top right coordinates of the j-th region where roads cannot be built. No city will lie within or on any of the regions
- The next C lines each contains 2 integers, B_k, H_k representing the cost of building an airport and the maximum number of airports that can be built for the k-th company

Output

The output should contain C lines. The k-th line should represent the minimum total cost required to complete the upgrading project such that it satisfies the required conditions, given the cost and limit for the k-th company. If it is impossible to satisfy the conditions, output -1

Subtasks

Subtask	Score	N	M	C
1	10	$1 \leq N \leq 200000$	$1 \leq M \leq 100$	$1 \leq C \leq 100$
2	30	$1 \leq N \leq 200000$	$1 \leq M \leq 200000$	$1 \leq C \leq 100$
3	30	$1 \leq N \leq 200000$	$1 \leq M \leq 100$	$1 \leq C \leq 500000$
4	30	$1 \leq N \leq 200000$	$1 \leq M \leq 200000$	$1 \leq C \leq 500000$

For all test cases, all coordinates will lie in the range $[0, 10^9]$.
Also, $1 \leq B_k \leq 10^9$ and $1 \leq H_k \leq N$ for all $1 \leq k \leq C$

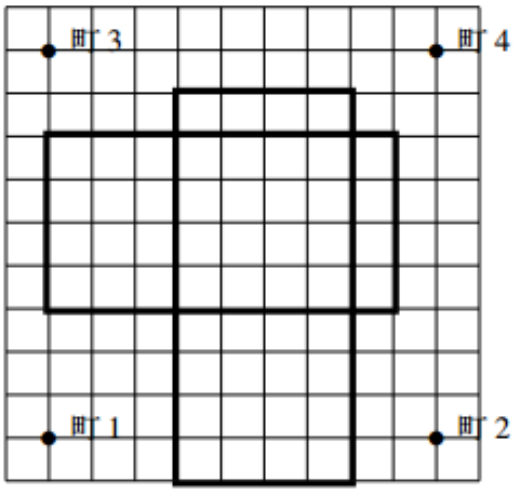
Sample Input

```
4 2 3
1 1
10 1
1 10
10 10
4 0 8 9
1 4 9 8
7 4
10 3
1 1
```

Sample Output

```
28
38
-1
```

Sample Explanation



Refer to the diagram above. We cannot build a road between cities 1 and 2 because it passes through the first region and we cannot build a road between cities 1 and 3 because it passes along the edge of the second region which is not allowed. Thus, we can only build a road between cities 3 and 4 or cities 4 or 2.

For the first company, we can build up to 4 airports for a cost of 7 each. The optimal method would be to build an airport in every city and no roads, giving a total cost of $7 \times 4 = 28$

For the second company, we can build up to 3 airports for a cost of 10 each. The optimal method would be to build 2 roads costing 9 each between cities 3 and 4 and cities 4 and 2. After that, we build airports at cities 1 and 2 giving a total cost of $10 \times 2 + 9 + 9 = 38$

For the third company, we can build up to 1 airport with a cost of 1 each. Since we can only build those 2 roads, to satisfy the conditions in the question we need to build at least 2 airports. Thus the conditions cannot be fulfilled and we output -1.