Traffic Lights A

Your road network has an infamously severe congestion problem. Every road has an extremely small carrying capacity.

You are the boss of a company named Stream of Bytes, where you have **x** employees. As a employer that cares about your employees, you aim to pay transportation costs for all of your employees! Your employees live in **K** different residential areas, with **L** different workplaces that they can choose to go to. We know the amount of workers living in each residential area, and that each workplace must be filled to capacity.

Note that there is no restriction on the number of cars on each road. If a road would have a non-integer number of cars in the optimal solution, this is allowed. It is assumed that the worker there simply chooses with some probability to go on that road.

It is guaranteed that the total number of employees living at residential areas is greater than or equal to the total number of employees required at workplaces.

You will be given a network of roads and its associated gasoline cost to travel on that road.

Your task:
Find the minimum cost of transportation for transporting all of your employees from a predetermined list of residential areas to another list of workplaces. The sum of the capacities of each workplace is exactly equal to the number of employees in your company, **x**.

Bounds:
$0 \le U, V, K, L \le N \le 1000$
$0 \le M \le 10000$
$0 \le F, P, C \le 10^6$
$0 < I \le 10^6$

Input:
The first line of input consists of the integers **N M K L**, where **N** is the number of intersections of roads (nodes), **M** is the number of roads (edges), **K** is the number of residential areas (source nodes), and **L** is the number of workplaces (sink nodes).
Lines **2** through **M+1** consist of integers **U V I F**, where (**U**, **V**) represents a one-way road on your road network. **I** is the cost of gasoline to travel this road, and **F** is the maximum number of cars (max flow) that can pass through this road.
Lines **M+2** to **K+M+1** are in the format **U P**, where **U** is the location (node number) of the residential area and **P** is the number of employees living in the area.
Lines **K+M+2** to **K+M+L+1** is in the format **U C**, where **U** is the location (node number) of the workplace and **C** is the maximum number of employees that work at the workplace.

Output:
Your output is the minimum cost needed to transport all of your employees from their residential area to a workplace. Your answer must be correct to within 6 decimal points if it is not integral. If the test case is impossible, print “Impossible”. If the test case has an unbounded solution, print “Infinity”. In all cases, your output must end with a newline.

Sample Input:
5 4 1 3
1 2 5 4
1 3 2 3
2 4 2 2
2 5 6 2
1 5
3 1
4 2
5 2

Sample Output:
38

This is a minimally connected DAG, so there is only one way for employees to travel from the residential area at 1 to the three workplaces at 3, 4, and 5.
4 employees take the road (1, 2), incurring a cost of 5 * 4 = 20
2 employees take the road (2, 4), incurring a cost of 2 * 2 = 4
2 employees take the road (2, 5), incurring a cost of 6 * 2 = 12
1 employee takes the road (1, 3), incurring a cost of 2 * 1 = 2
The total cost is thus 20 + 4 + 12 + 2 = 38.