

Problem F. Flood (16+)

We all know that King Triton doesn't like us and therefore shipwrecks, hurricanes and tsunamis do happen. But being bored with the same routine all these years Triton has decided to make a spectacular flood this year.

He chose a small town in a hilly valley not far from the sea. The power of Triton is enough to pour one heavy rain on the hill. He is worried however that water will miss that chosen town due to various river basins and water flows. Triton asks you to help him help calculate the amount of water that reaches the chosen town.

There are water ponds in a hilly valley on the way to the town. Some of them are connected to each other with rivers. If some pond is overfull with water, the water begins to flow evenly to the connected ponds (or to the sea, if there are no connected ponds). Each pond contains some water initially, and the maximum pond capacity is also known. The chosen town is located on the bank of one pond — you should calculate the water level in this pond after all water flow is run out.

Input

On the first line of input integers N and K ($2 \leq N \leq 10^4, 0 \leq K \leq 10^5$) are given — the number of water ponds and the number of pond connections respectively.

On the next N lines of input integers P_i and A_i ($0 \leq A_i \leq P_i \leq 10^6$) are given — these are the maximum i^{th} water pond capacity and its initial water level.

On the next K lines of input integers F_j and T_j ($1 \leq F_j, T_j \leq N, F_j \neq T_j$) are given — they denote a possible river flow connection from F_j to T_j water pond (reverse water flow is not possible). Consider water flow from a pond to be equally distributed between all possible flow connections from that pond. Triton is absolutely sure that there are no cycles in river flows between the ponds, and there are no multiple rivers between any two ponds.

On the last line of input integers X, Y and Z ($1 \leq X, Z \leq N, 1 \leq Y \leq 10^6$) are given — the water pond that receives Triton's heavy rain, the amount of water that is added to this pond and the target pond (near the chosen town) to test respectively.

Consider that excessive water flows from a water pond if and only if its capacity is full. If some pond is overfull and no water flows are defined from that pond consider that all excessive water has flown out to the sea.

Output

The first line of the output should contain a single floating-point number L_z — the final water level in the target pond when all water flow is complete. Answers with absolute or relative error less than 10^{-4} are considered correct.

Examples

stdin	stdout
4 4 10 10 1 0 1 0 10 0 1 2 1 3 2 4 3 4 1 5 4	3.0