Problem B. Bitterballen Borrel

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	1024 mebibytes

The Dutch bitterbal is a must-have at any pub; the combination of the small, round croquette and a cold glass of beer is hard to beat. Sadly, there are never enough bitterballen to go around. We will therefore have to optimize the bitterbal consumption!



Figure 2: The famous Dutch bitterbal snack, a crispy fried outer layer with a thick meat stew inside, usually served with mustard.

Waiter Leon has a plate, which can carry at most p bitterballen, and he will walk around the pub with the goal of handing the bitterballen out to guests. The evening contains a series of events, where each event is either a new batch of bitterballen that can be picked up in the kitchen, or a group of guests waiting for their deep fried snack delivery.

- If event i is a new batch being available in the kitchen, there will be b_i new bitterballen available. Leon fills up his plate with as many bitterballen as possible. The rest of the bitterballen that don't fit on Leon's plate are thrown away immediately.
- If event i is a group of guests waiting for bitterballen and Leon arrives at the group, he can hand them b_i bitterballen, and the total happiness is increased by h_i. If there are not enough bitterballen on the plate to meet the full demand b_i of the group, they will not accept any bitterballen out of politeness, and the total happiness will not change. Leon is allowed to walk past a group and thus not hand out the bitterballen, even if enough are available.

Leon is not able to be in two places at the same time. We model which events he can attend by a directed graph on the events. A directed edge from event i to event j means that Leon can make it from event i to event j. It is guaranteed that this graph will not contain any cycles, as Leon cannot travel backwards in time.

Leon starts at event 1 with a full plate of p bitterballen, and he moves between the events according to the directed edges. If Leon distributes the bitterballen in the optimal way, what is the maximum possible total happiness that can be gained?

Input

The first line of the input consists of three integers p, n and m ($1 \leq p \leq 100$, $1 \leq n \leq 1000$, $0 \leq m \leq 1000$), the maximum number of bitterballen that Leon can store on his plate, the number of specified events, and the number of movements that are possible between events.

Next, there are n lines, which specify the events. Line i (describing the i'th event) may take one of two forms:

- The character "`k`" followed by one integer b_i ($0 \leq b_i \leq 100$), representing an event to visit the kitchen. In this event, you can add at most b_i bitterballen to the plate.
- The character "`g`" followed by two integers b_i and h_i ($1 \leq b_i \leq 100$, $1 \leq h_i \leq 10^6$), representing an event to visit a group. If served, the group consumes b_i bitterballen, and the total happiness is increased by h_i.

Lastly, there are m lines, each containing two integers i, j ($1 \leq i, j \leq n$, $i \neq j$), meaning that it is possible to move from event i to event j. It is guaranteed that all ordered pairs (i, j) are distinct.

The graph with directed edges (i, j) does not contain any cycles. Note that the events themselves are not sorted in the input, so $i < j$ is not guaranteed.

Output

Output one integer, the maximum total happiness achievable when starting at event 1 with a full plate of p bitterballen.

Examples

standard input	*standard output*
50 3 2 g 20 100 g 20 50 g 20 100 1 2 2 3	200
50 4 4 g 20 25 g 30 50 g 20 75 k 20 1 2 2 3 1 4 4 2	150
50 5 5 g 20 25 g 30 50 g 20 75 k 30 g 10 20 1 2 2 3 1 4 3 5 4 2	150

Note

In the first example, there are 3 events, all corresponding to groups. All groups want 20 bitterballen, and they return 100, 50, and 100 happiness in return. Leon starts with 50 bitterballen, so he cannot serve all 3 groups. It is optimal to serve only groups 1 and 3. This can be done by following the path $1, 2, 3$ and not serving group 2 (even though this would be possible).

In the second example, there are 4 events. The first 3 events correspond to groups, and the fourth event is a visit to the kitchen. Leon starts with 50 bitterballen. He can serve all groups by following the path $1, 4, 2, 3$, and by adding 20 bitterballen to the plate in the kitchen. The maximum total happiness achievable is thus 150.

The third example resembles the second example closely, but there is an extra group reachable from event 3. If Leon would follow the path $1, 4, 2, 3, 5$ and add 30 bitterballen in the kitchen, then he could serve all groups. Unfortunately, the 30 extra bitterballen do not fit (only 50 bitterballen fit on the plate), so he cannot serve all groups. It is optimal to serve 1, 2, and 3, giving total happiness 150.