Problem PJ
Lead Time Estimation

Time limit: 1 second
Memory limit: 1024 megabytes

Problem Description

The lead time is critical for earning orders, and several issues would result in various lead times when preparing the products. For example, the processes switched between different working areas and the workload of each process. The production manager should accurately estimate the lead time for the target products when the order inquiry is received. Please develop a program to help the product manager estimate the lead time.

The lead time of an inquiry stands for the production time, including several jobs such as material preparation, manufacturing, quality checking, shipping, etc. The processing time of each position could be determined by an execution time while transferring the process from one job to the next requires a transmission time. For an inquiry, the production manager has three pieces of information about the target products.

- The number of jobs and transmissions, e.g. $|T^j|$ and $|T^t|$,
- the processing time of each job, where $T^j = \{t_0^j, t_1^j, t_2^j, \ldots, t_{|T^j|-1}^j\}$, and
- the transmission time between jobs, where $T^t = \{t_0^t, t_1^t, t_2^t, \ldots, t_{|T^t|-1}^t\}$.

The process may begin or end with several starting jobs. This situation could easily insert virtual starting and finishing jobs to simplify the problem. We can assume that the inquiry processes include one starting job and one finishing job.

Input Format

The input includes three parts: (1) the number of jobs and transmissions in the first row, (2) the job processing time in the second row, and (3) the transmission time in the remaining rows. The first input row consists of $|T^j|$ and $|T^t|$ with a space for the separation. The second input row should be T^j, and the comma separates each element in T^j. The transmission time information is revealed from row number three to $(2 + |T^t|)$. Each row of transmission time information involves three data: the source job, the destination job, and the transmission time.

Moreover, the test cases have some restrictions.

- There may be one transmission time for any pair of jobs at most.
- There may be multiple cases in a file.

Output Format

The total time of delivering the products that is denoted by z should be provided, and that means all jobs should be done in z. Also, the production manager is interested in the manufacturing process. If there is exactly one processing path that dominates the lead time, please output the job sequence of the processing path and the letter "M" in upper case otherwise. A comma separates each element in the output sequence. In other words, the output sequence should be like either "z,v_1,v_2,..." or "z,M", where v_1 and v_2 represent the jobs.

Technical Specification

Each inquiry includes precisely one entry and one exit. In each inquiry, at least one path will dominate the lead time, indicating no cyclical manufacturing processes. The boundaries of each variable are listed as follows.

- $2 \leq |T^j| \leq 50$.
- $1 \leq |T^t| \leq 100$.
- $1 \leq t_x^j, t_y^t \leq 50$.

Sample Input 1

```
8 11
2,7,2,6,5,1,2,7
6 7 2
0 1 4
0 2 2
1 3 6
1 4 5
1 5 3
2 4 1
3 6 2
3 7 9
4 5 2
5 7 2
```

Sample Output 1

```
41,0,1,3,7
```

Sample Input 2

```
6 7
10,8,9,10,11,12
0 1 1
1 2 2
1 3 3
1 4 4
2 5 5
3 5 6
4 5 7
6 7
10,8,9,11,11,12
0 1 1
1 2 2
1 3 4
1 4 4
2 5 5
3 5 7
4 5 7
```

Sample Output 2

```
53,0,1,4,5
53,M
```