# Problem F. Subway

Time limit: 2.5 seconds
Memory limit: 1024 megabytes

In Pigeland, the subway system is quite advanced. It consists of $n$ sites, numbered from 1 to $n$, and $k$ directed subway lines, numbered from 1 to $k$. Subway line $i$ travels through sites $x_{i,1}, x_{i,2}, \cdots, x_{i,p_i}$ in order, where $x_{i,j}$ is the $j$-th site visited by line $i$. It takes $w_{i,j}$ units of time to travel from site $x_{i,j}$ to site $x_{i,j+1}$ on line $i$.

When multiple lines meet at the same site, passengers can transfer between lines. If a passenger is at a site on line $x$, while line $y$ also passes through this site, he/she can spend $a_y \times b_x$ units of time to transfer from line $x$ to line $y$, where $a_y$ and $b_x$ are given coefficients for lines $y$ and $x$. After transferring, the passenger is still at the same site, but on line $y$.

You start at site 1. Find the minimum time needed to reach site $s$ for all $2 \le s \le n$. In particular, you can start by choosing any line at site 1 with no transfer time cost. It is guaranteed that all sites are reachable from site 1.

## Input

There is only one test case in each test file.

The first line contains two integers $n$ and $k$ ($2 \le n \le 2 \times 10^5$, $1 \le k \le 2 \times 10^5$), indicating the number of sites and the number of subway lines.

The second line contains $k$ integers $a_1, a_2, \cdots, a_k$ ($1 \le a_i \le 10^6$).

The third line contains $k$ integers $b_1, b_2, \cdots, b_k$ ($1 \le b_i \le 10^6$).

For the following $k$ lines, the $i$-th line first contains an integer $p_i$ ($2 \le p_i \le n$), indicating the number of sites line $i$ travels through. Then $(2p_i - 1)$ integers $x_{i,1}, w_{i,1}, x_{i,2}, \ldots, x_{i,p_i-1}, w_{i,p_i-1}, x_{i,p_i}$ follow ($1 \le x_{i,j} \le n$, $1 \le w_{i,j} \le 10^9$), where $x_{i,j}$ is the $j$-th site visited by line $i$, and $w_{i,j}$ is the travel time from site $x_{i,j}$ to site $x_{i,j+1}$ on line $i$. The sites traveled through by a subway line are distinct.

It is guaranteed that $\sum_{i=1}^{k} (p_i - 1) \le 2 \times 10^5$.

## Output

Output one line containing $(n-1)$ integers $d_2, d_3, \cdots, d_n$ separated by a space, where $d_i$ is the minimum time cost from site 1 to site $i$.

## Examples

| standard input | standard output |
|---|---|
| 6 3<br>1 5 1<br>5 5 1<br>3 1 2 2 3 3<br>3 5 1 2 1 4<br>3 3 4 5 4 6 | 2 5 21 14 18 |
| 6 3<br>1 5 1<br>5 5 1<br>5 1 2 2 100 3 100 6 1 4<br>5 1 100 2 4 3 100 5 1 4<br>2 3 1 5 | 2 31 43 37 136 |