

Vibe Check

Time limit	Memory limit
2 seconds	128 MB

Statement

You are the lead editor of a journal covering the art of *vibing*. You have just arrived in VibeLand, where you plan to send a team of M journalists, numbered 1 through M to report on the state of vibing. There are N cities numbered in VibeLand, numbered from 1 through N . City i has *journalistic value* v_i .

VibeLand is a developing nation. The country has only recently finished connecting up the N cities with $N - 1$ airline routes such that it is possible to travel between any 2 cities. For our purposes we assume airline routes take no time to use.

Each reporter arrives in city 1, the capital city, and reporter i wishes to spend d_i days in VibeLand, and on each day will cover the dances in **one** city in VibeLand. To avoid being repetitive, no reporter can cover the events in the same city for two days in a row. To achieve this, reporters must take a flight from the current city to another city at the end of every day. Reporters can finish their route at any city.

The journalistic value for a individual journalist is the sum of the journalistic values among the cities they cover throughout their trip, counted with duplicity (i.e if city 1 is visited twice then city 1's journalistic value will be counted twice). The total revenue for you is equal to the sum of journalistic value among all journalists. Calculate the maximum revenue you can obtain.

Input

The first line contains 2 integers N M . The next line contains N integers $v_1 \dots v_N$. The next line contains M integers $d_1 \dots d_M$. The next line contains $N - 1$ integers $a_2 \dots a_N$ meaning city i has a flight to city a_i .

Output

Output 1 integer, the maximum revenue. 64-bit integers are highly recommended.

Sample Input 1

```
5 3
3 4 3 5 1
5 2 1
1 2 3 4
```

Sample Output 1

```
28
```

Sample Input 2

```
5 2
1 1 100 100 100
2 3
1 1 2 2
```

Sample Output 2

```
203
```

Explanation

For sample input 1:

- Journalist 1 spends 5 days. They arrive at city 1 on their first day. Then they visit cities 2,3,4,3 in that order. Their journalistic value is $3 + 4 + 3 + 5 + 3 = 18$.
- Journalist 2 spends 2 days. They visit cities 1 and 2 and so gains value 7.
- Journalist 3 spends 1 day. They can only visit city 1 and so gains value 3.

Hence your revenue is $18 + 7 + 3 = 28$

Constraints

- $2 \leq N \leq 10^5$
- $1 \leq M \leq 10^5$
- $1 \leq v_i, d_i \leq 10^6$ for all i
- $1 \leq a_i < i$ for all i

Subtasks

Number	Points	Max N	Other constraints
1	10	100	$d_i \leq 100$ for all i
2	15	1000	$d_i \leq 1000$ for all i
3	25	10^5	$a_i = i - 1$ for all i and $M = 1$
4	20	10^5	$M = 1$
5	20	10^5	$a_i = i - 1$ for all i
6	10	10^5	No further constraints

For subtasks 3 and 5, $a_i = i - 1$ means that the graph forms a line.