

## Problem E. Pass the Ball!

There are  $n$  children playing with  $n$  balls. Both children and balls are numbered from 1 to  $n$ .

Before the game,  $n$  integers  $p_1, p_2, \dots, p_n$  are given. In each round of the game, child  $i$  will pass the ball he possesses to child  $p_i$ . It is guaranteed that no child will pass his ball to himself, which means  $p_i \neq i$ . Moreover, we also know that after each round, each child will hold exactly one ball.

Let  $b_i$  be the ball possessed by child  $i$ . At the beginning of the game, child  $i$  ( $1 \leq i \leq n$ ) will be carrying ball  $i$ , which means  $b_i = i$  initially. You're asked to process  $q$  queries. For each query you're given an integer  $k$  and you need to compute the value of  $\sum_{i=1}^n i \times b_i$  after  $k$  rounds.

### Input

There is only one test case for each test file.

The first line of the input contains two integers  $n$  ( $2 \leq n \leq 10^5$ ) and  $q$  ( $1 \leq q \leq 10^5$ ), indicating the number of children and the number of queries.

The second line contains  $n$  integers  $p_1, p_2, \dots, p_n$  ( $1 \leq p_i \leq n$ ) indicating how the children pass the balls around.

For the following  $q$  lines, the  $i$ -th line contains one integer  $k_i$  ( $1 \leq k_i \leq 10^9$ ) indicating a query asking for the result after  $k_i$  rounds.

### Output

For each query output one line containing one integer indicating the answer.

### Example

standard input	standard output
4 4	25
2 4 1 3	20
1	25
2	30
3	
4	

### Note

The sample test case is explained below.

Round	$b_1$	$b_2$	$b_3$	$b_4$	Answer
1	3	1	4	2	25
2	4	3	2	1	20
3	2	4	1	3	25
4	1	2	3	4	30