

## Problem A - Dog Breeding

Derrick Dodge needs your help: He is a very successful dog breeder, but he has some problems with his paperwork. He has messed up the pedigree of his dogs! Fortunately, his dog breeding association has very strict rules for naming the dogs.

In the pedigree have been exactly  $n$  dogs, for your convenience numbered from 1 to  $n$ . The name of each dog is an uppercase letter concatenated with the name of its mother. The exception is the first dog in the pedigree, dog number 1, whose name is just a single uppercase letter. To simplify, we only consider the female dogs.

As an example, ENERYS could be the mother of AENERYS (as the name AENERYS consists of the single uppercase letter A concatenated with ENERYS, which is her mother's name). Similarly, AENERYS could be the mother of DAENERYS and YAENERYS.

You are given the description of all the dogs. Your task is to determine, for certain interesting strings  $s$ , the number of dogs for whom  $s$  is a prefix of their name. For example, consider Sample Input 1 below, with a breeding line that goes straight from S to AENERYS (through YS, RYS, ERYS, NERYS and ENERYS), with each dog having exactly one puppie. Then AENERYS has two children — DAENERYS and YAENERYS, with the latter having one child, RYAENERYS. In such a pedigree, RY is a prefix of the names of two ladies: RYS and RYAENERYS. E is a prefix of the names of ERYS and ENERYS. N is a prefix only of NERYS's name, while S is a prefix only of the name of the founder, S. AY is not a prefix of any dog's name.

### Input

The first line of input contains two integers  $n$  and  $k$ , where  $n$  ( $1 \leq n \leq 10^6$ ) is the total number of dogs and  $k$  ( $1 \leq k \leq 10^6$ ) is the number of query strings. Then follow  $n$  lines describing the dogs. The  $i$ th of these lines describes the dog numbered  $i$ , and contains an uppercase letter  $c_i$  (A-Z) and an integer  $p_i$ , where  $c_i$  is the first letter of the name of dog  $i$ , and  $p_i$  ( $p_1 = 0$  and  $1 \leq p_i < i$  for  $i > 1$ ) is the number of its mother (or 0, in the case of the first dog). All the names are unique. The remaining  $k$  lines each contain one nonempty query string, consisting only of uppercase letters. The sum of the lengths of the query strings is at most  $10^6$ .

### Output

Output  $k$  lines, with the  $i$ th line containing the number of dogs who have the  $i$ th query string as a prefix of their name.

**Sample Input 1**

10 5  
S 0  
Y 1  
R 2  
E 3  
N 4  
E 5  
A 6  
D 7  
Y 7  
R 9  
RY  
E  
N  
S  
AY

**Sample Output 1**

2  
2  
1  
1  
0