7064 GRE Words Once More!

Now Matt is preparing for the Graduate Record Examinations as Coach Pang did in 2013 and George did in 2011.

Thanks to modern techniques, Matt uses automata instead of old-fasioned vocabulary books.

The automata used by Matt is a directed acyclic graph (DAG) with N vertices and M edges. The vertices are conveniently numbered by 1, 2, ..., N. Each edge is labeled with an integer. Additionally, some vertices are marked as special.

A GRE word is obtained by concatenating the labels on the path from vertex 1 to a special vertex.

Now, Matt has Q questions. The i-th question is asking for the length of k_i-th smallest words among all the GRE words he can obtain in lexicographical order.

Input

The first line contains only one integer T, which indicates the number of test cases.

For each test case, the first line contains three integers N, M, Q ($2 \leq N \leq 10^5$, $0 \leq M \leq 10^5$, $1 \leq Q \leq 10^5$).

The second line contains $N-1$ integers s_2, ..., s_n. If the i-th vertex is special, then $s_i = 1$. Otherwise, $s_i = 0$. Vertex 1 is never special.

Each of the following M lines contains three integers a_i, b_i, c_i denoting an edge from vertex a_i to vertex b_i labeled with c_i ($1 \leq a_i, b_i \leq N$, $1 \leq c_i \leq 10^9$). For each vertex v, all outgoing edges are labeled with distinct integers.

Each of the following Q lines contains the integer k_i ($1 \leq k_i \leq 10^8$) of the i-th question.

Output

For each test case, output '`Case #`x`:`' in the first line, where x is the case number (starting from 1).

Then, for each question, output the length of the word in one line. If the word does not exist, output '`-1`' (without quotes) instead.

Hint: There are 3 GRE words in total (sorted in lexicographical order):

1. (1)
2. (1, 3)
3. (12)

Sample Input

```
1
3 3 4
1 1
1 2 1
1 3 12
2 3 3
1
2
3
4
```

Sample Output

```
Case #1:
1
2
1
-1
```