Trie

Input file: `standard input`
Output file: `standard output`
Time limit: 1 second
Memory limit: 1024 megabytes

Recall the definition of a trie:

- A trie of size n is a rooted tree with n vertices and $(n-1)$ edges, where each edge is marked with a character.
- Each vertex in a trie represents a string. Let $s(x)$ be the string vertex x represents.
- The root of the trie represents an empty string. Let vertex u be the parent of vertex v, and let c be the character marked on the edge connecting vertex u and v, we have $s(v) = s(u) + c$. Here $+$ indicates string concatenation, not the normal addition operation.
- The string each vertex represents is distinct.

We now present you a rooted tree with $(n+1)$ vertices. The vertices are numbered $0, 1, \cdots, n$ and vertex 0 is the root. There are m key vertices in the tree where vertex k_i is the i-th key vertex. It's guaranteed that all leaves are key vertices.

Please mark a lower-cased English letter on each edge so that the rooted tree changes into a trie of size $(n+1)$. Let's consider the sequence $A = \{s(k_1), s(k_2), \cdots, s(k_m)\}$ consisting of all strings represented by the key vertices. Let $B = \{w_1, w_2, \cdots, w_m\}$ be the string sequence formed by sorting all strings in sequence A from smallest to largest in lexicographic order. Please find a way to mark the edges so that sequence B is minimized.

We say a string $P = p_1 p_2 \cdots p_x$ of length x is lexicographically smaller than a string $Q = q_1 q_2 \cdots q_y$ of length y, if

- $x < y$ and for all $1 \le i \le x$ we have $p_i = q_i$, or
- there exists an integer $1 \le t \le \min(x, y)$ such that for all $1 \le i < t$ we have $p_i = q_i$, and $p_t < q_t$.

We say a string sequence $F = \{f_1, f_2, \cdots, f_m\}$ of length m is smaller than a string sequence $G = \{g_1, g_2, \cdots, g_m\}$ of length m, if there exists an integer $1 \le t \le m$ such that for all $1 \le i < t$ we have $f_i = g_i$, and f_t is lexicographically smaller than g_t.

Input

There are multiple test cases. The first line of th input contains an integer T indicating the number of test cases. For each test case:

The first line contains two integers n and m ($1 \le m \le n \le 2 \times 10^5$) indicating the number of vertices other than the root and the number of key vertices.

The second line contains n integers $a_1, a_2, \cdots, a_n$ ($0 \le a_i < i$) where a_i is the parent of vertex i. It's guaranteed that each vertex has at most 26 children.

The third line contains m integers $k_1, k_2, \cdots, k_m$ ($1 \le k_i \le n$) where k_i is the i-th key vertex. It's guaranteed that all leaves are key vertices, and all key vertices are distinct.

It's guaranteed that the sum of n of all test cases will not exceed 2×10^5.

Output

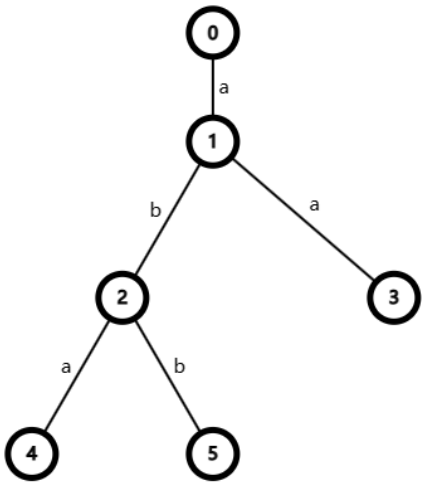
For each test case output one line containing one answer string $c_1 c_2 \cdots c_n$ consisting of lower-cased English letters, where c_i is the letter marked on the edge between a_i and i. If there are multiple answers strings so that sequence B is minimized, output the answer string with the smallest lexicographic order.

Example

standard input	standard output
2 5 4 0 1 1 2 2 1 4 3 5 1 1 0 1	abaab a

Note

The answer of the first sample test case is shown as follows.



The string represented by vertex 1 is “a”. The string represented by vertex 4 is “aba”. The string represented by vertex 3 is “aa”. The string represented by vertex 5 is “abb”. So $B = \{$“a”, “aa”, “aba”, “abb”$\}$.