Problem J
Join Strings

Problem ID: joinstrings
CPU Time limit: 1 secor
Memory limit: 1024 ME

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Source: NUS Competitiv Programming

You are given a collection of N non-empty strings, denoted by $S_1, S_2, \ldots, S_n$. Then you are given N-1 operations which you execute in the order they are given. The i^{th} operation is has the following format: 'a b' (1-based indexing, without the quotes), which means that you have to make the following changes:

1. $S_a = S_a + S_b$, i.e. concatenate a^{th} string and b^{th} string and store the result in a^{th} string,
2. S_b = "", i.e. make the b^{th} string empty, after doing the previous step.

You are ensured that after the i^{th} operation, there will be no future operation that will be accessing S_b. Given these operations to join strings, print the last string that will remain at the end of this process.

Input

The first line contains an integer N ($1 \leq N \leq 10^5$) denoting the number of strings given. Each of the next N lines contains a string denoting the S_i. All the characters in the string S_i are lowercase alphabets from 'a' to 'z'. The total number of characters over all the strings is at most 10^6, i.e $\sum_{i=1}^{N} |S_i| \leq 10^6$, where $|S_i|$ denotes the length of the i^{th} string. After these N strings, each of the next N-1 lines contain two integers a and b, such that $a \neq b$ and $1 \leq a, b \leq N$ denoting the i^{th} operation.

Output

Print the last string which remains at the end of the N-1 operations.

Warning

The I/O files are large. Please use fast I/O methods.

Sample Input 1

```
4
cute
cat
kattis
is
3 2
4 1
3 4
```

Sample Output 1

```
kattiscatiscute
```

Sample Input 2

```
3
howis
this
practicalexam
1 2
1 3
```

Sample Output 2

```
howisthispracticalexam
```