

The Phantom Menace

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 1024 megabytes

Putata has brought his newest string problem to this contest. You are given two string sequences A, B , each of the sequences contains exactly n strings, and all strings have a length of m . You are asked to reorder the strings so that concatenation of the strings in the two sequences are cyclic isomorphic after concatenation.

Formally, you should choose two permutations p, q of $1, 2, \dots, n$, so that $A_{p_1} + A_{p_2} + \dots + A_{p_n}$ and $B_{q_1} + B_{q_2} + \dots + B_{q_n}$ are cyclic isomorphic. String $R = S + T$ satisfy that for $i \leq |S|$, $R_i = S_i$, otherwise $R_i = T_{i-|S|}$. Two strings S, T are said to be cyclic isomorphic if and only if there exists an integer d , such that $S_i = T_{((i+d) \bmod |S|)+1}$ for all $1 \leq i \leq |S|$, and $|S| = |T|$.

Please help Budada to find p and q , or report that there is no such p, q .

Input

The first line contains one integer t ($1 \leq t \leq 10^6$), denoting the number of test cases.

For each test case, the first line contains two integers n, m ($1 \leq n, m \leq 10^6, 1 \leq n \cdot m \leq 10^6$).

Then n line follows, the i -th of which contains one string A_i ($|A_i| = m$).

Then n line follows, the i -th of which contains one string B_i ($|B_i| = m$).

It is guaranteed that all input strings only contain lowercase English letters.

It is also guaranteed that the sum of $n \cdot m$ over all test cases does not exceed 10^6 .

Output

For each test case, if permutation p and q exists, output them in two lines, and the elements in one permutation are separated by spaces. Otherwise output -1 in one line.

Example

standard input	standard output
2	1 3 2
3 3	1 2 3
abc	-1
ghi	
def	
bcd	
efg	
hia	
1 3	
abc	
def	