Problem . An Array and Several More Arrays

There are k arrays of integers $a_1, a_2, \ldots, a_k$, where the array with index i contains l_i elements. Let $n = l_1 + l_2 + \ldots + l_k$.

You need to find k integers $d_1, d_2, \ldots, d_k$ such that the numbers $(a_{i,j} + d_i)$ are pairwise distinct and satisfy $1 \le a_{i,j} + d_i \le n$.

Input

The first line contains two integers n and k ($1 \le n \le 10^4$, $1 \le k \le 5$) – the total number of elements in the arrays and the number of arrays, respectively.

The next k lines contain the arrays. The i-th line contains an integer l_i ($1 \le l_i \le n$) and l_i integers $a_{i,1}, a_{i,2}, \ldots, a_{i,l_i}$ ($1 \le a_{i,j} \le n$) – the length and elements of the i-th array, respectively.

It is guaranteed that $n = l_1 + l_2 + \ldots + l_k$.

Output

If the required values of d do not exist, output a single line "No".

Otherwise, output "Yes" on the first line.

On the second line, output k integers $d_1, d_2, \ldots, d_k$ – the values that need to be added to the elements of the arrays to form a total of n distinct integers from 1 to n.

If there are multiple correct answers, any one of them may be output.

Examples

test	answer
5 5 1 1 1 2 1 3 1 4 1 5	Yes 0 0 0 0 0
6 4 2 2 3 1 6 1 4 2 1 5	Yes 1 -5 1 1
7 2 4 1 4 5 6 3 1 2 6	Yes 0 1
4 2 2 2 3 2 2 4	No

Note

In the first example, $d = [0, 0, 0, 0, 0]$ satisfies the condition, since after adding the corresponding values, the arrays [1], [2], [3], [4], [5] are formed.

In the second example, $d = [1, -5, 1, 1]$ satisfies the condition, since after adding the corresponding values, the arrays $[3, 4]$, $[1]$, $[5]$, $[2, 6]$ are formed.

In the third example, $d = [0, 1]$ satisfies the condition, since after adding the corresponding values, the arrays $[1, 4, 5, 6]$ and $[2, 3, 7]$ are formed.

Scoring

1. (8 points): $k = 1$;
2. (9 points): $a_{i,j} + 1 = a_{i,j+1}$ for $1 \le i \le k$, $1 \le j < l_i$;
3. (15 points): $k \le 2$;
4. (21 points): $k \le 3$;
5. (10 points): $a_{i,j} + 2 = a_{i,j+1}$ for $1 \le i \le k$, $1 \le j < l_i$;
6. (10 points): $(\max_{j \in [1;l_i]} a_{i,j}) - (\min_{j \in [1;l_i]} a_{i,j}) = (n - k)$ for $1 \le i \le k$;
7. (10 points): $n \le 30$;
8. (17 points): without additional constraints.