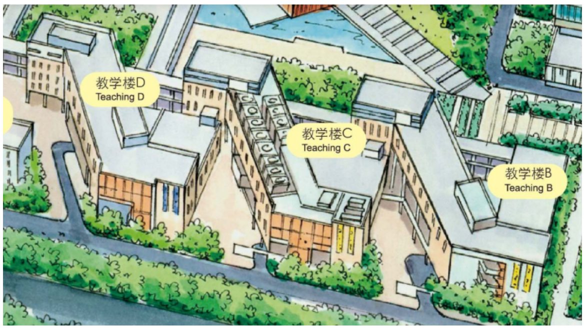
Teaching Building

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes



As a student of The Chinese University of Hong Kong, Shenzhen, Little B got lost when entering the teaching building for the first time (because TB is above TC, and TC is above TD). Years later, Little B became the designer of the new campus teaching building, and now he is designing the cross-sectional view of the building.

The new teaching building will have $2n$ teaching areas, numbered from 1 to $2n$. The designed footprint length is $2n$ units, and the building height is limited to $n+1$ units, meaning that the cross-sectional view can be regarded as an $(n+1) \times (2n)$ grid. Each grid point must contain a number from 0 to $2n$. $1 \sim 2n$ indicates the teaching area number at that position, and 0 means that the position does not belong to any teaching area. Each teaching area must be **4-connected*** in the cross-sectional view.

Let $a_{i,j}$ denote the teaching area number at the grid point in the i-th row and j-th column. We say that teaching area x is *above* teaching area y ($x \neq y$) if there exist i, j ($1 \le i \le n$, $1 \le j \le 2n$) such that $a_{i,j} = x$, $a_{i+1,j} = y$.

For structural clarity and elegance, Little B has determined $(2n-1)$ relations. The i-th relation is of the form "teaching area x_i is above teaching area y_i". If we add a directed edge from x_i to y_i, the $2n$ teaching areas exactly form a **downward tree**** rooted at teaching area 1.

Now, you need to design a valid cross-sectional view (i.e., assign a teaching area number to each grid cell) such that the directed graph corresponding to this cross-sectional view is exactly the same as the tree given by Little B. (That is, the relationships specified by Little B must be satisfied, while the relationships not specified by Little B must not be satisfied.)

Please output any valid filling scheme, or report that no solution exists.

***4-connected**: A set of grid points is called 4-connected if any two points in the set can be connected by a sequence of adjacent (up, down, left, right) grid points that also belong to the set.

****Downward tree**: A rooted tree with a specified root, where every edge is directed from the parent to the child (i.e., from the upper level to the lower level). In this problem, the given $2n-1$ relations "teaching area x_i is above teaching area y_i" correspond to directed edges $x_i \to y_i$, and these edges form a downward tree rooted at 1.

Input

The first line contains an integer T ($1 \le T \le 500$), indicating the number of test cases.

For each test case, the first line contains an integer n ($1 \le n \le 500$).

Then $2n-1$ lines follow, each containing two integers x_i, y_i, representing a relation. It is guaranteed that the input forms a downward tree rooted at 1.

It is also guaranteed that $\sum n \le 2000$.

Output

For each test case:

- If a valid solution exists, output $(n + 1)$ lines, each containing $2n$ integers representing the construction. If multiple solutions exist, output any of them.
- If no solution exists, output a single line containing the string `No solution`.

Example

standard input	standard output
1 2 1 2 1 3 2 4	2 1 1 1 2 2 2 3 4 4 0 3