UVa Online Judge

775 Hamiltonian Cycle

A few definitions first:

Definition 1 A graph G = (V, E) is called "dense" if for each pair of non-adjacent vertices u and v, $d(u) + d(v) \geq n$ where $n = |V|$ and $d(\bullet)$ denotes the degree of the vertex $\bullet$.

Definition 2 A "Hamiltonian cycle" on G is a sequence of vertices $(v_{i_1} v_{i_2} \ldots v_{i_n} v_{i_1})$ such that $v_{i_l} \neq v_{i_h}$ for all $l \neq h$ and $\{v_{i_l}, v_{i_{l+1}}\}$ is an edge of G.

The problem is: write a program that, given a dense indirect graph G = (V; E) as input, determines whether G admits a Hamiltonian cycle on G and outputs that cycle, if there is one, or outputs 'N' if there is none.

Input

The input file contains several descriptions of graphs (each one ending with a '%'), in the form:
n_1
u_{i_1} u_{j_1}
u_{i_2} u_{j_2}
...
%
n_2
u_{i_1} u_{j_1}
u_{i_2} u_{j_2}
...
%

where n_i is the number of vertices ($0 < n_i \leq 256$) and u_{i_h} u_{i_l} are integers between 1 and n_i indicating that there exists an edge between vertex u_{i_h} and u_{i_l}

Output

For each test case, output a line that must contain the sequence of vertices that form a Hamiltonian cycle in the form:

u_{i_1} u_{i_2} u_{i_3} ...

or containing:

N

Sample Input

```
4
1 2
2 3
2 4
3 4
3 1
%
```

```
6
1 2
1 3
1 6
3 2
3 4
5 2
5 4
6 5
6 4
%
```

Sample Output

```
1 2 4 3 1
1 3 2 5 4 6 1
```