

## Problem E. Code-Cola Plants

Input file: *standard input*  
Output file: *standard output*  
Time limit: 4 seconds  
Memory limit: 512 mebibytes

Berland consists of  $n$  cities which are numbered by integers from 1 to  $n$ . There are  $m$  directed roads connecting some pairs of cities. There is no directed cycle of roads in Berland.

There are two Code-Cola plants in Berland. The first one is a *producing* plant, it is located in the city  $a$ . The second one is a *recycling* plant, it is located in the city  $b$ .

The Code-Cola Corporation decided to use  $n - 1$  roads for delivery. Using this set of roads, it must be possible to reach all of the  $n$  cities from the production plant (that is, from the city  $a$ ). Also the Code-Cola Corporation decided to use some **other**  $n - 1$  roads by recycling trucks which will deliver empty Code-Cola bottles to the recycling plant. Using this second set of roads, it must be possible to reach the recycling plant (that is, the city  $b$ ) from all of the  $n$  cities.

Help the Code-Cola Corporation to find two **disjoint** sets of roads such that:

- each of the two sets contains  $n - 1$  roads;
- it is possible to get to any city from the city  $a$  by moving along the first set of roads;
- it is possible to get from any city to the city  $b$  by moving along the second set of roads.

### Input

The input contains one or more test cases. The input format for each test case is described below.

Each test case starts with a line containing four integers:  $n$ , the number of cities in Berland,  $m$ , the number of roads,  $a$ , the city with the producing plant, and  $b$ , the city with the recycling plant ( $2 \leq n \leq 5 \cdot 10^5$ ,  $1 \leq m \leq 10^6$ ,  $1 \leq a, b \leq n$ ). It is possible that  $a = b$ .

The following  $m$  lines contain descriptions of the roads, one description per line. The  $i$ -th description consists of two integers  $x_i$  and  $y_i$  meaning that there is a directed (one-way) road from  $x_i$  to  $y_i$  ( $1 \leq x_i, y_i \leq n$ ). It is guaranteed that there is no directed cycle of roads in Berland. Between a pair of cities, there can be multiple roads in the same direction.

The sum of all values of  $n$  over all test cases in a test does not exceed  $5 \cdot 10^5$ . The sum of all values of  $m$  over all test cases in a test does not exceed  $10^6$ . The test cases just follow one another without any special separators.

### Output

For each test case, print the answer as follows:

If there is a solution, print “YES” on a separate line, followed by two lines containing  $n - 1$  road indices each. The first line must describe the roads from the first set, the second line must describe the roads from the second set. All  $2 \cdot (n - 1)$  indices must be distinct. The roads are numbered from 1 to  $m$  in order of their appearance in the input. You can print numbers on a line in any order. If there are several possible solutions, print any one of them.

If there is no solution, print “NO” on a separate line.

## Example

standard input	standard output
4 7 1 4	YES
1 2	2 5 6
1 2	3 7 4
1 4	NO
2 3	YES
2 3	1 3 4 8
3 4	5 6 2 7
3 4	
4 3 1 2	
1 2	
2 4	
4 3	
5 8 3 1	
3 2	
5 2	
3 4	
4 5	
4 1	
2 1	
3 5	
3 1	