**Homework week 5**

**Trees**

1. Given a tree, your task is to write a program with following functions

* Calculate the height of the tree.
* Write out the order of nodes following the preorder traversal.
* Write out the order of nodes following the postorder traversal.
* Check if the given tree is a binary tree? If yes, write out the order of nodes in inorder traversal.

Input: Data come from the keyboard:

* The first line contains integer numbers *N, M* indicating the number of nodes, and edges, respectively.
* *M* following lines each contains two integer numbers *u, v* indicating that *u* is the parent of *v*.

Output: Data are written to the screen as following:

* The height of the tree
* The order of nodes in preorder traversal
* The order of nodes in postorder traversal
* The order of nodes in the inorder if the tree is binary. Otherwise, write the string ‘NOT BINARY TREE’

|  |  |
| --- | --- |
| Keyboard | Screen |
| 5 4  1 2  1 3  2 4  2 5 | 2  1 2 4 5 3  4 5 2 3 1  4 2 5 1 3 |

*Tips: Using two-dimension array or linked list to construct a tree. To compute the height of the tree, you can apply breath first search algorithm or using the following recursive method: Height (v)=1+max {Height(ui)| ui are v's children)}. Please read carefully traveling algorithms in the lecture 5 to do the last three tasks,*