

## Homework #3: Spanning Tree Algorithm

**Due date: May 23, 2022**

In this homework, you are asked to write a MATLAB program to find the adjacency matrix of the spanning tree via the spanning tree algorithm in the lecture notes. Please download the adjacency matrix of network A

(**network\_A.mat** that contains a 100x100 **matrix named “A”**) on eLearn.

1. The matrix A is the adjacency matrix of a network with 100 nodes.
  - $A(i,j)=1$ , if there is an edge between nodes i and j and 0 otherwise.
2. Node “1” is root.
3. Please use matrix A to find the adjacency matrix t of the spanning tree via the spanning tree algorithm in the lecture notes.
  - matrix t is the adjacency matrix of the spanning tree and  $t(i,j)=1$  if there is an edge between nodes i and j in the tree and 0 otherwise.

**Upload two files to eLearn.(Please code by matlab.)**

1. source code **file named “code.m”**

2. result data **file named “result.mat”** that contains the following

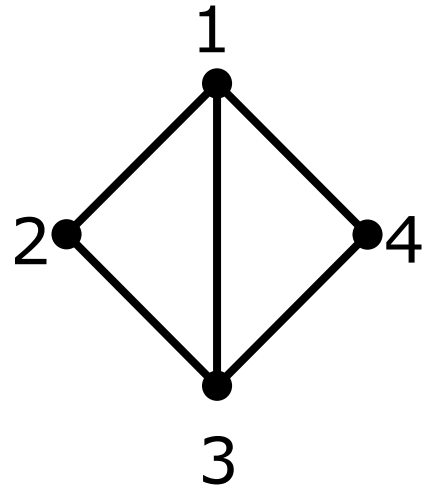
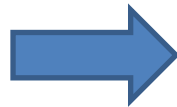
- **spanning tree matrix named “tree”.**

Other requirement:

- You should use “load” to get inputdata.
- Programs should have comments.

Example:

$$A = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix} \end{matrix}$$



$$t = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} \end{matrix}$$

