Homework #3: Spanning Tree Algorithm

Due date: May 22, 2023

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"**

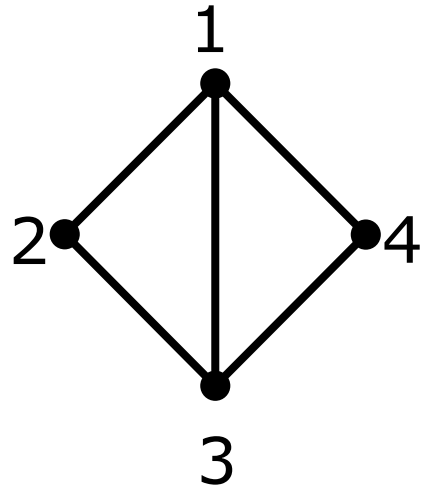2. **result data file named "result.mat" that contains the following**

   ● **spanning tree matrix named "tree".**

Other requirement:

   ● **You should use "load" to get inputdata.**

   ● **Programs should have comments.**

Example:

$$
A = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array}
\begin{array}{cccc}
1 & 2 & 3 & 4 \\
\left[\begin{array}{cccc}
0 & 1 & 1 & 1 \\
1 & 0 & 1 & 0 \\
1 & 1 & 0 & 1 \\
1 & 0 & 1 & 0
\end{array}\right]
\end{array}
$$

$$
t = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array}
\begin{array}{cccc}
1 & 2 & 3 & 4 \\
\left[\begin{array}{cccc}
0 & 1 & 1 & 1 \\
1 & 0 & 0 & 0 \\
1 & 0 & 0 & 0 \\
1 & 0 & 0 & 0
\end{array}\right]
\end{array}
$$