MATH 151

Tree

Lecture 9

By Khaled A Tanash

ktanash@ksu.edu.sa

Exercise 1: The graph represented by adjacency matrix. Is a tree why?

$$\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}$$

Exercise 2: Let G be a graph with 7 edges and vertices a, b, c, d, e, f whose respective degree are x, $2x$, $2x$, $2x$, $3x$, $4x$

   i.   Find x
  ii.   Can G be a tree? (justify your answer)

Exercise 3: Let G be a graph with 7 edges and vertices a, b, c, d, e, f whose respective degree are x, $2x$, $2x$, $2x$, $3x$, $4x$

 i. Find x
 ii. Can G be a tree? (justify your answer)

Exercise 4: Represent all ono isomorphic force whose 4 vertices

Exercise 5: If T is a tree and degree of its 5 vertices are $1,1,1,2,d$. Find the value of d .

Exercise 6: If T is a tree whose sequence-degree $1,1,1,1,3,d$. Find the value of d .

**Exercise 7:** Find k if you know there is a tree with sequence- degree $1,1,1,1,2,2,k,2k$

Exercise 8: Let T be a tree with n vertices $v_1, v_2, ... v_n$ where $n > 2$. Find $\deg(v_n)$ if you know that $\deg(v_1) = \deg(v_2) = ... = \deg(v_{n-1}) = 1$

Exercise 9: Is there a tree with v vertices and e edges such that $3v = 5e$ (justify your answer)

Exercise 10: Given an example of graph G which is complete, complete bipartite and tree.

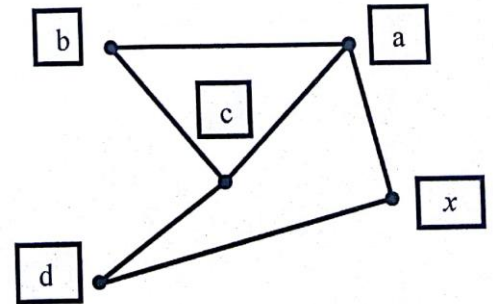**Exercise 11:** For the graph G below, find spanning tree with root a

i.　Using depth-first search

G
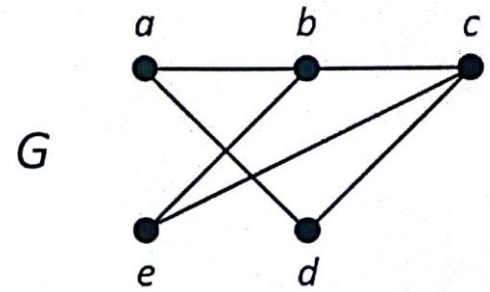
ii.　Using breadth-first search
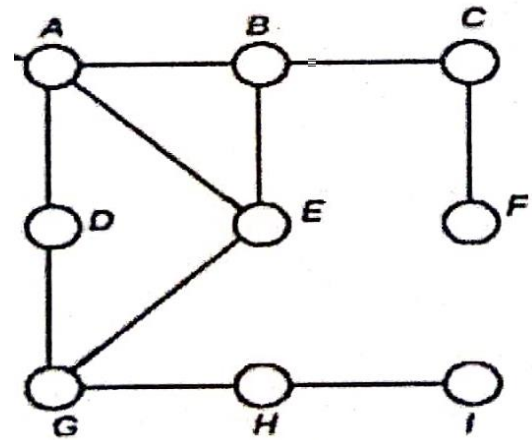
Exercise 12: Let G be the following graph

i.   Find depth firs search tree with the vertex x to be the root

ii.   Find breadth firs search tree with the vertex x to be the root

Exercise 13: Let G be the following graph

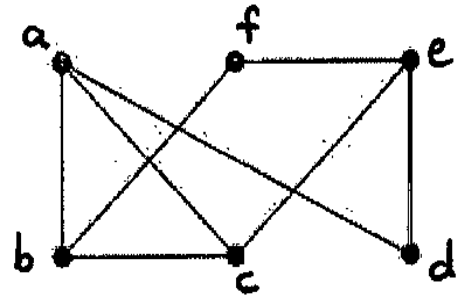i. Find depth firs search tree with the vertex A to be the root

ii. Find breadth firs search tree with the vertex A to be the root
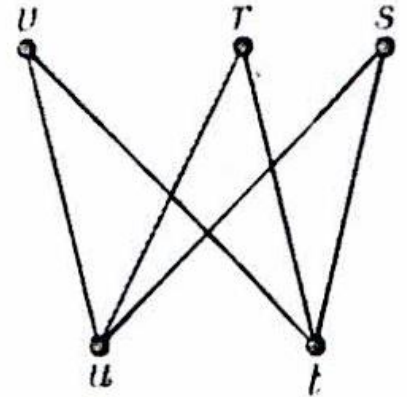
Exercise 14: Let G be the following graph

i.   Find depth firs search tree with the vertex a to be the root

ii.   Find breadth firs search tree with the vertex a to be the root

Exercise 15: For the graph G below, find spanning tree with root r
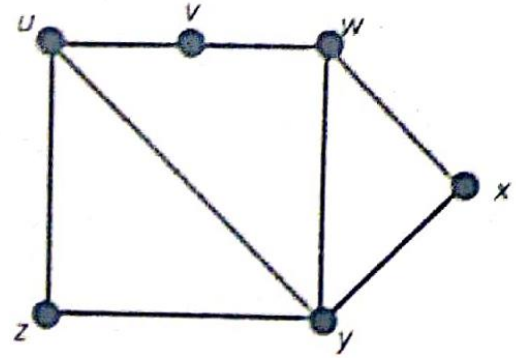
   i.   Using depth-first search

   ii.   Using breadth-first search

Exercise 16: For the graph G below, find spanning tree with root v

   i.   Using depth-first search

   ii.   Using breadth-first search

Exercise 16: From a binary search tree for the words: **mathematics-physics-geography- statistics- engineering- meteorology- geology- zoology- chemistry.**

Exercise 16: From a binary search tree for the words: **beetle- fly- ant- butterfly-bee- termite.**

Exercise 16: From a binary search tree for the words: **jeans- sweater- dress- skirt- socks- coat- gloves- shoes- boots- belt- scarf**

Exercise 16: From a binary search tree for the words: **orange- blue- red- green- purple- black- pink**