Martin Ziegler *Total 16 pts*

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CS204

Spring 2018, Homework #11

Problem 1. *4 + 4 pts*

Consider the simple directed graph on the picture. Make a spanning tree whose root is

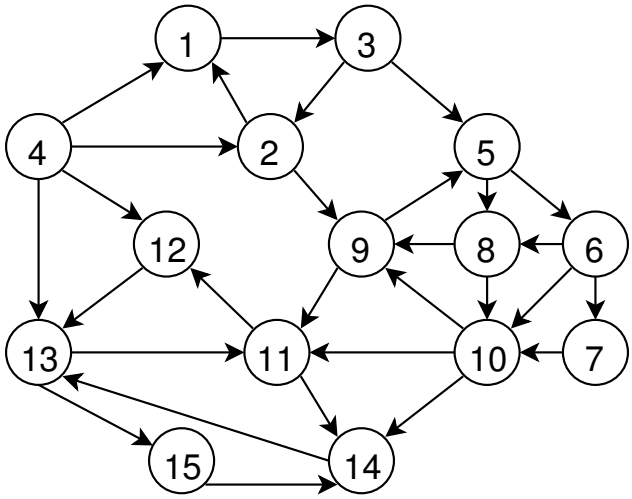

FIGURE 1. A given digraph whose vertices are numbered.

the vertex 4 using

(a) depth first search;
(b) breadth first search.

For both method, you should visit the vertex whose number is minimal if there are two or more candidates. For instance, when you perform BFS and you are currently at the vertex 4, visit 1 first and 13 last among four vertices.

Problem 2. *3 pts*

Prove that every tree is a bipartite graph, or give a counterexample.

Problem 3. *2 + 2 + 1 pts*

There is a sequence of numbers and arithmetic operators which is expressed in a prefix:

$$\times\ /\ +\ 4\ 5\ -\ \times\ 3\ 2\ 6\ +\ \times\ 9\ 0\ /\ 1\ -\ 7\ 8$$

(a) Express it as an infix expression and draw an expression tree.
(b) Express it as a postfix expression.
(c) What is the result of the calculation?