

CMPS 101
Fall 2010
Homework Assignment 6

1. (1 Point) p.548: 22.3-9
Modify the pseudocode for depth-first search so that it prints out every edge in the directed graph together with its type. (Hint: use the result stated in the last paragraph of page 546.)
2. (1 Point) p.549: 22.3-11
Show that a depth-first search of an undirected graph G can be used to identify the connected components of G , and that the depth-first forest contains as many trees as G has connected components. More precisely, show how to modify depth-first search so that each vertex v is assigned an integer label $cc[v]$ between 1 and k , where k is the number of connected components of G , such that $cc[u] = cc[v]$ if and only if u and v are in the same connected component.
3. (1 Point) p.551: 22.4-1
Show the ordering of vertices produced by TOPOLOGICAL-SORT when it is run on the dag of Figure 22.8, under the assumption of Exercise 22.3-2.
4. (1 Point) p.557: 22.5-2
Show how the procedure STRONGLY-CONNECTED-COMPONENTS works on the graph of Figure 22.6. Specifically, show the finishing times computed in line 1 and the forest produced in line 3. Assume that the loop of lines 5-7 of DFS considers vertices in alphabetical order and that the adjacency lists are in alphabetical order.