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CSCI 303: Algorithms, HW 9

Due: 3:00 pm, Friday, 11/2

1. Problem 1

(a) Adjacency Matrix

0	0	0	1	1	0	1
0	0	1	0	1	1	0
0	0	0	1	1	0	0
0	0	0	0	1	0	0
0	0	0	0	0	1	1
0	0	0	0	0	0	1
0	0	0	0	0	0	0

(b) Adjacency List

v_1	v_4	v_5	v_7
v_2	v_3	v_5	v_6
v_3	v_4	v_5	
v_4	v_5		
v_5	v_6	v_7	
v_6	v_7		
v_7			

(c) The graph is a directed acyclic graph.

2. Problem 2

(14 points)(b) Is the topological ordering produced during your execution in problem 2a the unique topological ordering for this graph? If so, explain why. If not, explain why not (giving an alternative topological ordering suffices). (1 point) (c) Does the use of the adjacency list, augmented with a queue, enforce a consistent outcome for topological sort? If so, explain why. If not, explain why not. Again, think like a computer! (1 point)

(a) Topological sort

Indegree	Vertex	1	2	3	4	5	6	7
0	v_1	0	0	0	1	1	0	1
0	v_2	0	0	1	0	1	1	0
1	v_3	0	0	0	1	1	0	0
2	v_4	0	0	0	0	1	0	0
4	v_5	0	0	0	0	0	1	1
2	v_6	0	0	0	0	0	0	1
3	v_7	0	0	0	0	0	0	0

Queue		
0	v_1	v_2

3. Problem 3