1 Exercises

Exercise 1. Consider a directed graph with the following adjacency list:

0: 5 1 1: 0 3 2: 5 2 3 2 3: 4: 5: 4 940 6: 68 79 7: 8: 9: 11 10 10: 12 11: 4 12 12: 9

a. Is the graph a DAG (ie, a directed acyclic graph)?

b. What are the pre-, post-, reverse-post depth first orders for the graph if the source vertex is 0?

c. What is the adjacency list of the reverse graph?

Exercise 2. Consider the following acyclic digraph. Assume the adjacency lists are in sorted order: for example, when iterating through the edges pointing from 0, consider the edge $0 \rightarrow 1$ before $0 \rightarrow 6$ or $0 \rightarrow 7$.



- a. Run DFS on the digraph, starting from vertex 2. List the vertices in preorder.
- b. Run DFS on the digraph, starting from vertex 2. List the vertices in postorder.
- c. Run DFS on the digraph, starting from vertex 2. List the vertices in topological order.
- d. Run BFS on the digraph, starting from vertex 2. List the vertices in the order in which they are dequeued from the FIFO queue.

2 Solutions to Exercises

Solution 1.

a. No

b. Preorder: 0 5 4 3 2 1 6 9 11 12 10 7 8; Postorder: 2 3 4 5 1 0 12 11 10 9 6 8 7; Reverse postorder: 7 8 6 9 10 11 12 0 1 5 4 3 2

7:	8		
8:	7		
9:	12	8	6
10:	9		
11:	9		
12:	11	10	

Solution 2.

a. $2\ 0\ 1\ 4\ 6\ 3\ 5\ 7\ 8$

- b. 453617082
- c. $2\ 8\ 0\ 7\ 1\ 6\ 3\ 5\ 4$

d. $2\ 0\ 1\ 8\ 6\ 7\ 4\ 3\ 5$