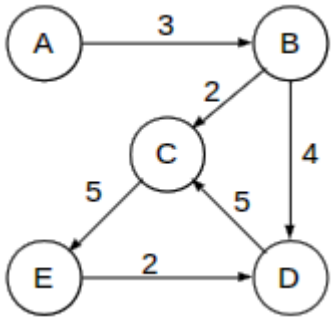
National University of Computer and Emerging Sciences, Lahore Campus

	Course:	Data Structure	Course Code:	
	Program:	BSCS	Semester:	4th
	Name:		Section:	4A
	Registration #:		Assessment	Quiz03
	Due Date:	9th June, 2020	Time Duration:	60 mins

Instruction/Notes:

1. Late submissions will not be entertained.

Q1: Given the following digraph and the following algorithm for topological sorting **[4]**

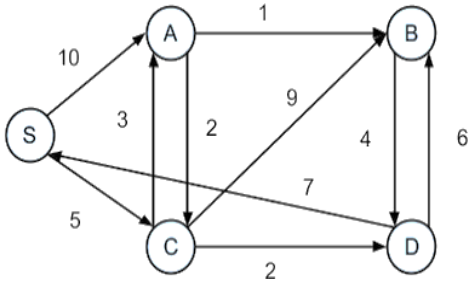



```
topologicalSort(digraph)
for each vertex v
      TSNum(v) = the number of edges coming to v; // indegree
      if TSNum(v) is 0
      enqueue(v);
i = 1;
      while queue is not empty
            v = dequeue();
            num(v) = i++;
            for each edge(vu)
                  TSNum(u)--;
                  if TSNum(u) is 0
                        enqueue(u);
```

Apply this algorithm to the graph in the above graph and show all changes in the queue and in TSNum's. Is this algorithm different from the topological sort algorithm discussed earlier? If yes, clearly state why?

Q2: **[2+2=4]**

Use the following graph for this problem. **Where needed and not determined by the algorithm, assume that any algorithm begins at node A.**



a. Give two valid traversal orderings of the nodes in the graph.

b. Imagine that the graph were undirected (i.e., ignore the directions of the edges). Make the MST(minimum Spanning Tree) on the graph above. Clearly mention the minimum tree cost

Q3: **[0.5+0.5+1=2]**

One of the applications of Graph like structure is the online social communities such as Facebook, Friendster, and MySpace . Using the concepts we learned in class, explain how the following statements could be posed as graph problems. Define what edges and vertices are.

a. Sonia is Jen's friend, and Jen is Sonia's friend.

b. Jerry is reachable from clicking one of Sonia's friends, then one of that friend's friends, so on.

c. Sonia has 8 friends, 57 friends of friends, and 291 friends of friends of friends, summing total to 356.