CENG 2002 - Data Structures - Spring 2021
Homework #5

Due date : 18/06/2021 - 23:59

Assignment:
Generate a graph by forming an adjacency matrix with random numbers. The graph will have 10 nodes. The connections will be generated randomly with the following rules.

- Each pair may have a connection with 60% probability. It means that the connection weight for a node pair will be 0 with 40% probability.
- If a pair has a connection, the connection weight will be drawn from a uniform distribution in the range 1 to 10. Connection weights will be positive integer values.
- The graph is directed. Some connections may be one way and some connections can be bidirectional.
- Each node will have a letter as label, such as 'A', 'B', 'C'

After creating the graph, implement the following functions:

- A function to generate adjacency list from the generated graph
- A function to check if the graph is connected
- If it is not connected, a function to return number of clusters (disjoint subgraphs) with number of nodes in each cluster
- A function to return breadth-first listing of each cluster. (It will return label list in the order of breadth-first)
- A function to return depth-first listing of each cluster
- A function to compute minimum-spanning tree for each cluster
- A function to return list of shortest path from a user given node name to all nodes in a the cluster that node is located.

Notes:

- You can use the implementations in the lab sessions.

Submit:

- **All cpp and header files**

Late submission:

- You get no credits for late submissions