Faculty of Engineering, University of Jaffna,

Department of Computer Engineering

EC4070: Data Structures and algorithms

Lab 07

Chapter 06: Graphs

Duration: 3 Hours Lecturer: Ms.Sujanthika M.

Instructions

i. Submit the code files and screenshot of the outputs in a zipped folder by naming as 2022EAAA_Lab07(AAA – Your Registration Number)
ii. Submit your zip file before the given deadline.
iii. Any plagiarized work will be given 0 marks.

Part 1- Basic implementation of graph data structure

1. Create a graph with,

   Vertices = {A, B, C, D, E}

   Edges = {A-B (4), A-C (3), B-C (1), B-D (2), C-E (6), D-E (5)}

2. Display the adjacency list representation of the graph
3. Implement Prim's Algorithm to find the Minimum Spanning Tree (MST) for a weighted, connected graph. You should output the edges of the MST and total weight of the MST

Part 2 – Graph data structure application

S	0	1	1	1
1	0	1	0	1
1	0	1	0	E
1	0	0	0	1
1	1	1	1	1

The above table illustrates a maze. Where,

S - Start

E - End

0 – Open cell

1 – Blocked cell

1. Represent this maze as a graph. Where each cell in the maze is a vertex and the edges exist between the adjacent open cells.
2. Implement BFS algorithm to find the shortest path from start to end of the maze.
    a. Output the shortest path as a list of coordinates
    b. Output the length of the path