Computer Systems Lab

Assignment-3

Date of Assignment: 17-Sept-2020 **Date of Submission: 23-Sept-2020**

1. Given a directed unweighted graph, write a code for depth first traversal. For each vertex, print start time (st) and finish time (fin). Also, print the edges and their types as Tree edge, Back Edge, Forward Edge and Cross Edge.

(u, v) is a Tree edge: u is a parent of v in DFS tree and st(u) < st(v) < fin(v) < fin(u)

(u, v) is a Back edge: st(v) < st(u) < fin(u) < fin(v)

(u, v) is a Forward edge: u is NOT a parent of v in DFS tree and st(u) < st(v) < fin(v) < fin(u)

(u, v) is a Cross edge: st(v) < fin(v) < st(u) < fin(u)

Note: Output depends on the order of visit of vertices in the graph.

Example:

Input:

Number of Vertices: 5

Number of Edges: 7

Directed Edges

1 2

2 3

3 4

3 1

1 4

5 4

1 5

Output:

Vertex (start time, finish time)

1 (1, 10)
2 (2, 7)
3 (3, 6)
4 (4, 5)
5 (8, 9)

1 2 Tree Edge

2 3 Tree Edge

3 4 Tree Edge

3 1 Back Edge

1 4 Forward Edge

5 4 Cross Edge

1 5 Tree Edge

2. Write a C/C++ program for Breadth-First Traversal in a directed unweighted graph.

Submission Instruction:

File Name: A3_Your Roll Number.c/cpp (A3_20CS06002.c or A3_20CS06002.cpp)
Mail to: joy@iitbbs.ac.in
Subject Line: A3_20CS06002