Assignment 1

Design & Analysis of Algorithms Lab

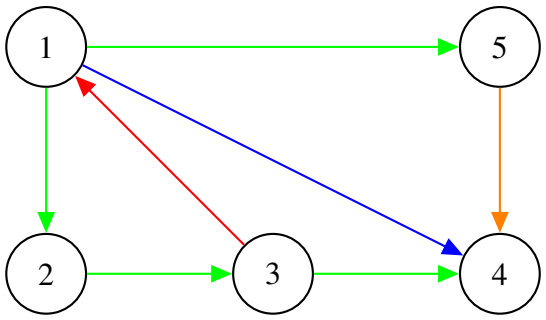
January 04, 2022

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.

   Input:
   Vertices: 5 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. Given an unweighted undirected graph, write a C/C++ program that will check whether the graph is bipartite or not.

Submission Instruction:

File Name: A1_RollNo.c/cpp
Email to: *pds2016autumn@gmail.com* with **subject line**: A1_RollNo