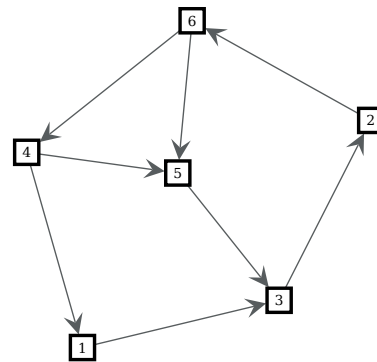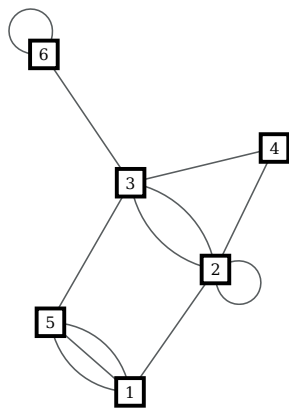# Computational Assignment 1
Complex Networks 1

1. Save each of the following networks in the computer memory as an adjacency matrix, and then write a code to compute the degree of each vertex using the adjacency matrix.

2. The files *lesmis.dat* and *polbooks.dat* contain a list of edges for two networks. Write a code which constructs adjacency matrices using these edge lists as inputs, and then compute the following for these networks:

   (a) Average degre and density

   (b) Local clustering coefficients

   (c) Degree distribution

   (d) Matrix of vertex similarities (Cosine and Katz)

3. Read the adjacency matrix of a directed network from the file celegans.dat, and write a code to compute the following:

   (a) Cocitation and bibliographic coupling matrices

   (b) Eigenvector centralities of the vertices

   (c) Pagerank centralities of the vertices

4. For the following bipartite network, compute:

   (a) Incidence matrix

   (b) Adjacency matrices for the projections on the vertices and on the groups
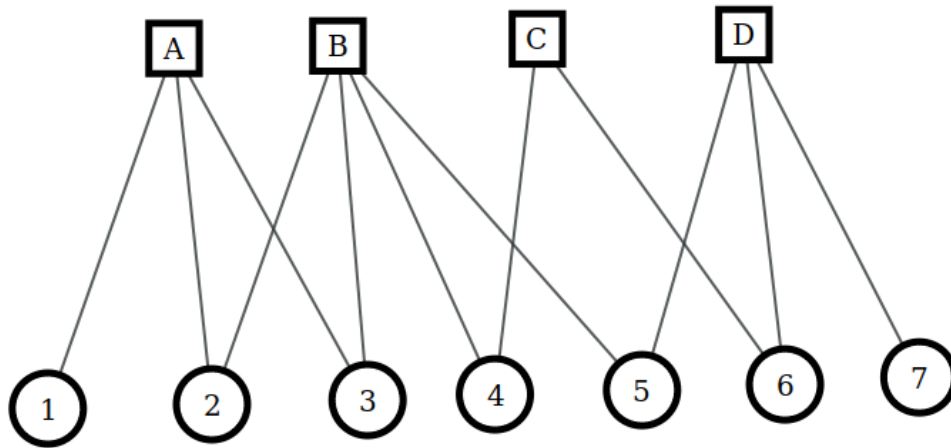
5. Write a code which checks whether a given directed graph is acyclic (DAG). Apply the code to celegans.dat and dirneural.dat to check if they are DAGs.