



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Computer Science and Engineering Continuous Assessment Test II

Fall Semester 2018-2019, Slot: A2+TA2

Course: CSE 3021 – Social and Information Networks

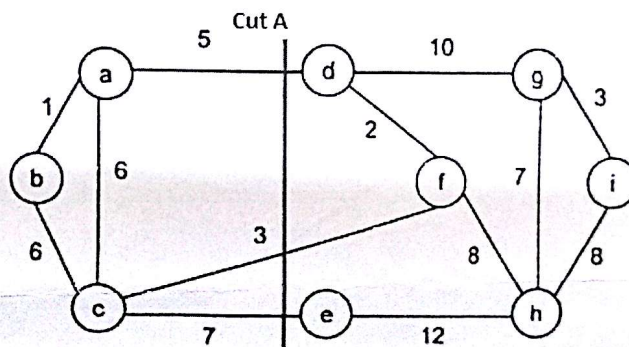
Time: 90 Minutes

Max. Marks: 50

Answer ALL Questions ($5 * 10 = 50$ Marks)

1. a) The following **weighted** graph shows the actors and relationships. It also shows a cut by which the graph is partitioned into communities. Find out the ratio cut and normalized cut for this state of partition.

[5]

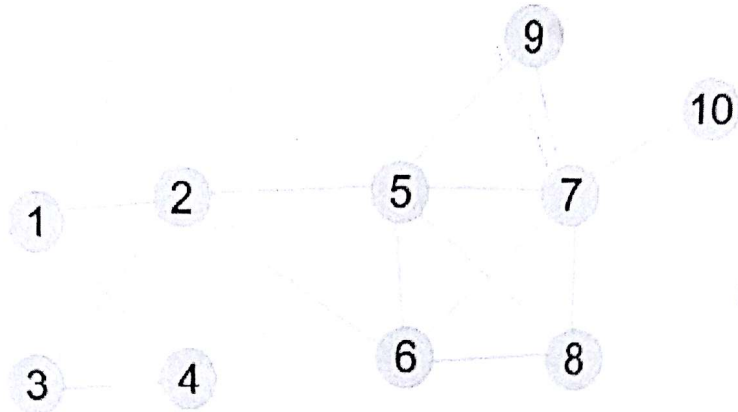


- b) The following two tables show the resultant eigenvector matrices (the first two columns) after applying spectral clustering and modularity maximization respectively on a social network having twelve actors. In reality, it came out to be that the first seven actors belong to community A and the remaining five actors belong to community B. Apply normalized mutual information to find out which of the two approaches (spectral clustering or modularity maximization) gives better clustering results.

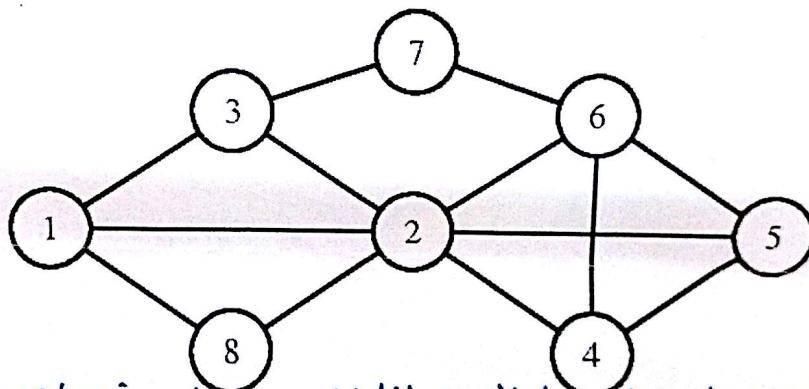
[10]

Spectral Clustering		Modularity Maximization	
0.08	-0.22	0.08	0.08
0.08	-0.22	0.08	0.08
0.08	-0.13	0.09	0.04
0.08	-0.08	0.09	-0.04
0.08	0.0001	0.04	-0.08
0.08	0.0001	0.04	-0.08
0.08	0.0002	0.0002	0.02
0.08	0.005	0.0001	0.01
0.08	0.005	0.0001	0.01
0.08	0.08	-0.002	-0.03
0.08	0.08	-0.002	-0.02
0.08	0.08	-0.008	0.05

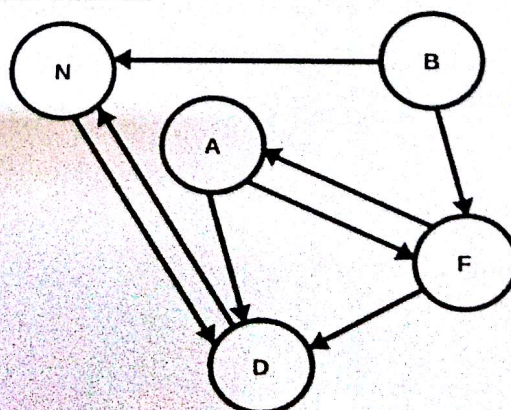
2. Apply a group based community detection method for the following graph, which removes the weakest links hierarchically to isolate the communities. An edge is a weak link if it acts as a bridge between different communities. Remove the edges hierarchically for three times and show the members of the resultant communities. [10]



3. Apply a member based community detection method for the following graph, which uses cliques as seeds (of size 3) to find overlapping communities. Deduce the actors who belong to the overlapping communities. [5]



4. For the graph given below, find the suitable network model based on the graph properties. Also justify your answer. [10]



5. a) Provide appropriate properties to identify the phase transition in an evolving network that eventually grows to a giant component. [5]
b) Construct a Regular Lattice of degree 4 with 8 nodes. [5]