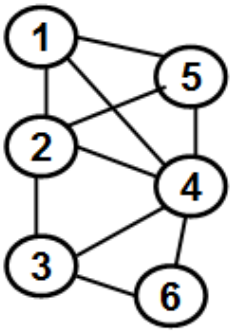
Student Name: _____ J#: _____

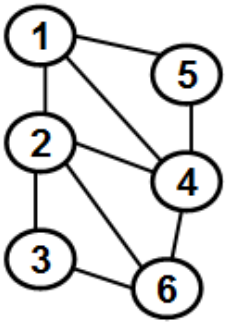
CSC 641 Network Science, Fall 2018
Exam 1 (Take Home: Due: Sept. 25, 2018: 7.30 PM) **Total: 100 pts**

Hardcopy (Neatly written or typed), due in Class

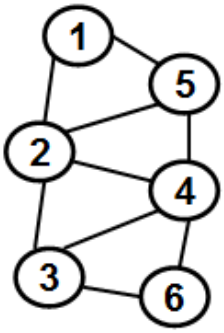
1) **(20 pts)** For the graph given below:
(a - 9 pts) Find the probability distribution for the degree of the vertices
(b - 4 pts) Use the probability distribution of (a) to determine the average degree of the vertices in the graph.
(d - 13 pts) Determine the average local clustering coefficient of the vertices in the graph.
(g - 12 pts) Determine the number of paths of length 4 between vertices 1 and 3.



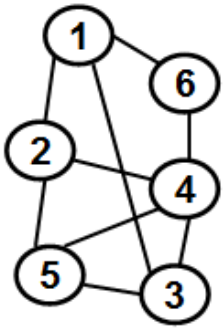
Dave, Hitanshu



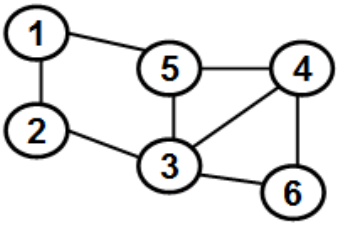
Davis, Carolyn



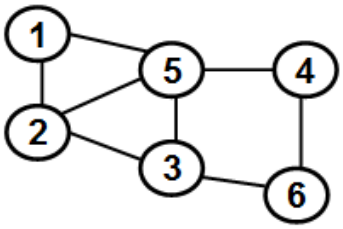
Evans, Rashad



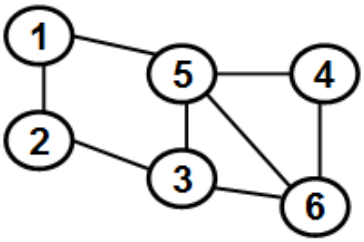
Faris, Amanuel



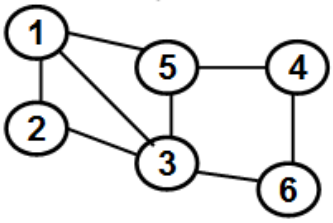
Fiesha, Temesgen



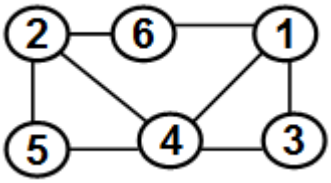
Ramos, Ciji



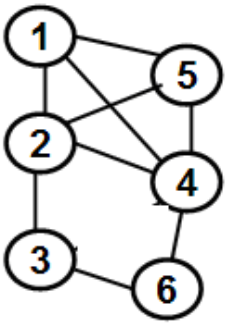
Sarker, Md Imran



Tutika, Raj



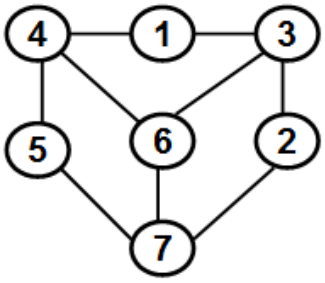
Whitfield, Nicholas



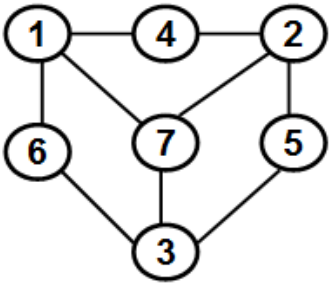
Jones, Daryl

Student Name: _____ J#: _____

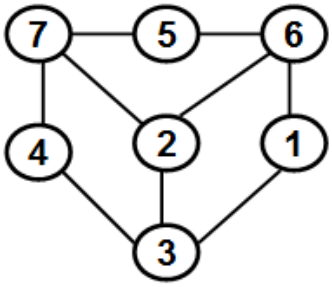
2) **(25 pts)** The graph given below is bipartite.
(a) Use the Breadth First Search (BFS) algorithm to determine the two partitions of the graph.
(b) Let the smaller partition determined from (a) be considered as the "Vertex Set" and the larger partition be considered as the "Group Set". Find the Group Projection of the bipartite graph.
Show all the work.



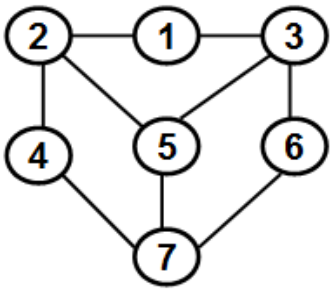
Dave, Hitanshu



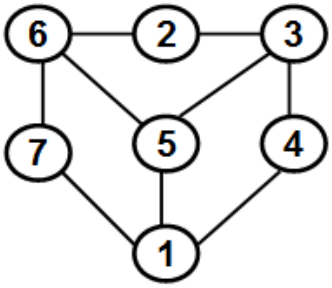
Davis, Carolyn



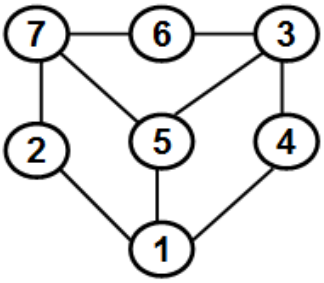
Evans, Rashad



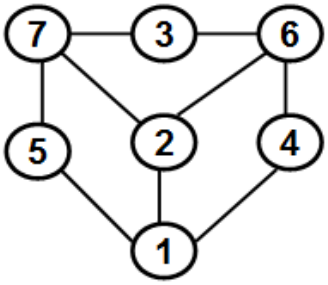
Fiesha, Temesgen



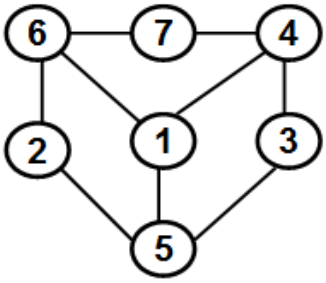
Ramos, Ciji



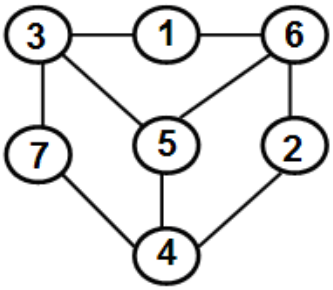
Sarker, Md Imran



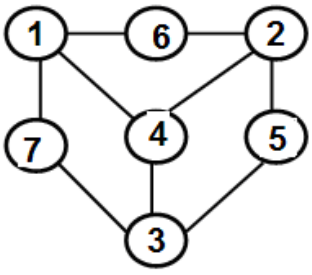
Tutika, Raj



Whitfield, Nicholas



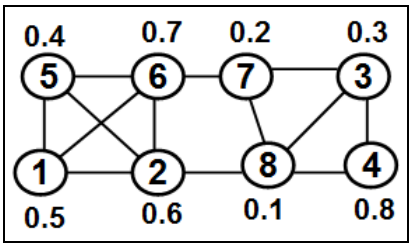
Faris, Amanuel



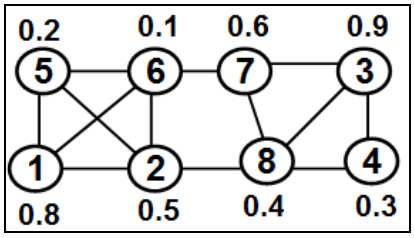
Jones, Daryl

Student Name: _____ J#: _____

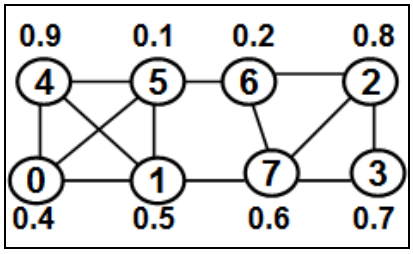
3) **(35 pts)** Determine the **maximal node matching** and **maximal assortative matching** for the following graph. Determine the following for each of the above: (i) the set of edges constituting the matching (ii) the % of node matches (iii) assortative index of the matching.



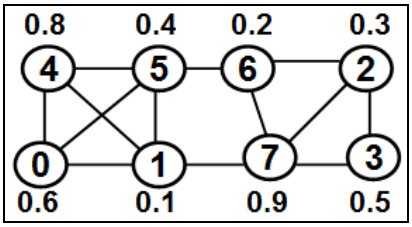
Dave, Hitanshu



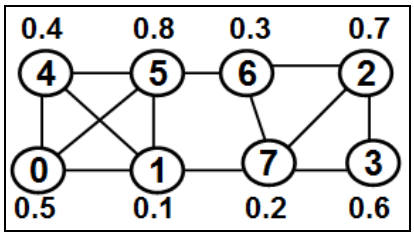
Davis, Carolyn



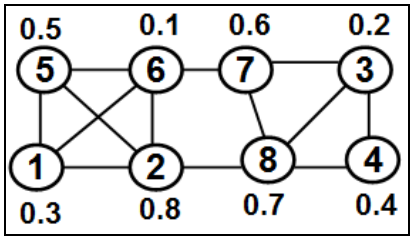
Evans, Rashad



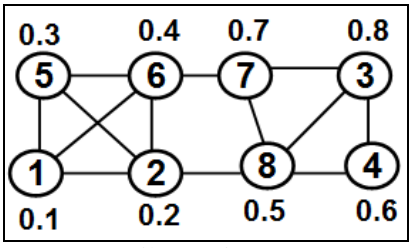
Fiesha, Temesgen



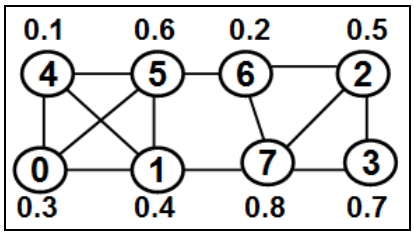
Ramos, Ciji



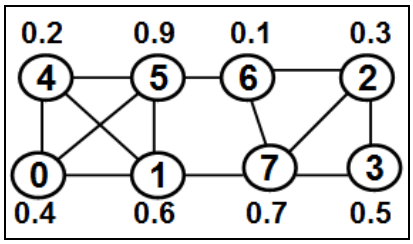
Sarker, Md Imran



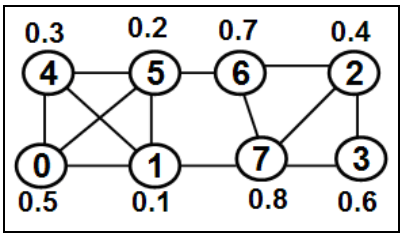
Tutika, Raj



Whitfield, Nicholas



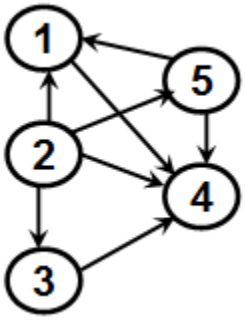
Faris, Amanuel



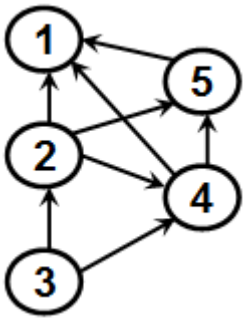
Jones, Daryl

Student Name: _____ J#: _____

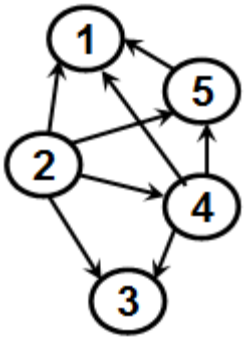
4) **(20 pts)** For the directed graph assigned to you below, determine the following:
i) Cocitation coupling matrix. Determine the pair(s) of vertices that are most strongly coupled.
ii) Bibliographic coupling matrix. Determine the pair(s) of vertices that are most strongly coupled.



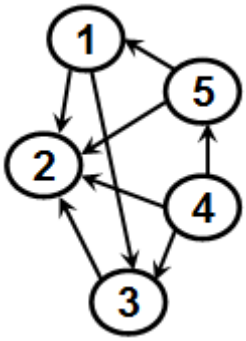
Dave, Hitanshu



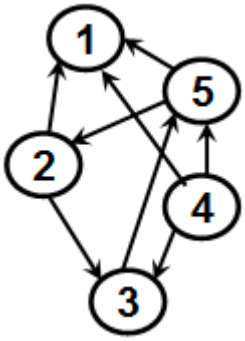
Davis, Carolyn



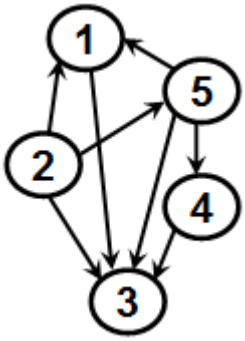
Evans, Rashad



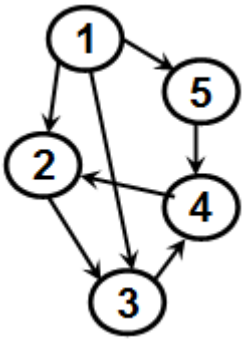
Faris, Amanuel



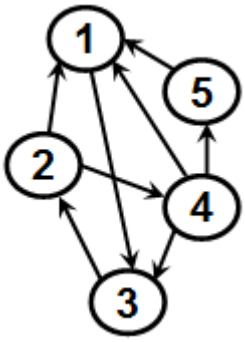
Fiesha, Temesgen



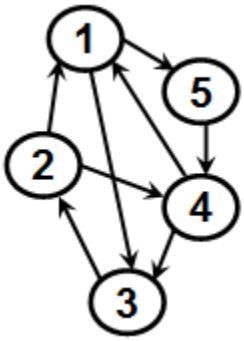
Ramos, Ciji



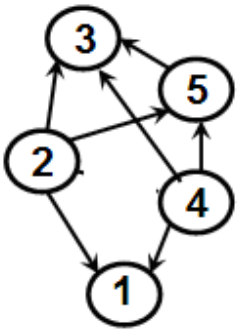
Sarker, Md Imran



Tutika, Raj



Whitfield, Nicholas



Jones, Daryl