Week 3 Assignment
Social Networks

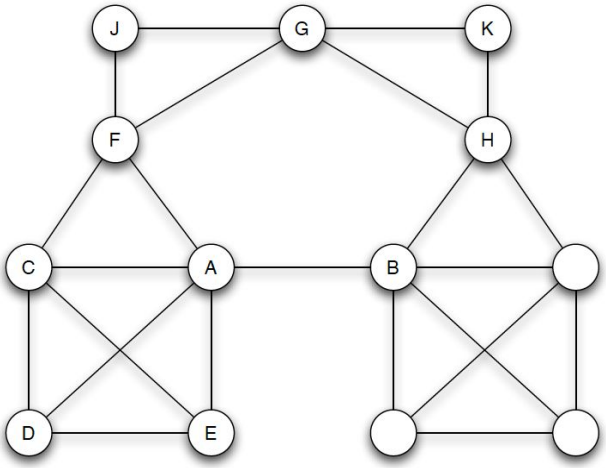
1. Girvan Newman Method is used for:
    a. Computing Clustering Coefficient
    b. Finding Triadic Closure
    c. Detecting Communities
    d. Calculating Embeddedness

    Explanation:
    The GirvanNewman algorithm is used for communities' detection, by progressively removing edges from the original network. The connected components of the remaining network are the communities.

2. Calculate the neighborhood overlap if no. of friends of A= 20, no. of friends of B= 10 and total no. of friends= 18.
    a. 0.33
    b. 0.66
    c. 0.99
    d. 1

    Explanation: Neighbourhood overlap of an edge connecting A and B is defined as the ratio of number of nodes who are neighbors of both A and B to the number of nodes who are neighbors of at least one of A and B. Using given data, the no. of common friends= 12. Hence, neighborhood overlap= 12/18 = 0.66

3. While executing Girvan Newman algorithm on the following network, which edge will be removed first?



    a. AB

b. FG
c. GH
d. AC

Explanation: AB will have the highest betweenness. (Moreover, its a local bridge.)

4. In social networks, friends and acquaintances respectively lead to:
   a. Strong ties, weak ties
   b. Weak ties, strong ties
   c. Both lead to strong ties
   d. Both lead to weak ties

   Explanation:
   In social networks, friends lead to strong ties and acquaintances lead to weak ties.

5. Granovetter argued that while searching for a new job:
   a. Close friends are important.
   b. Distant acquaintances are important.
   c. None of close friends or distant acquaintances are important.
   d. Both close friends and distant acquaintances are important.

   Explanation:
   Granovetter argued that while searching for a new job, acquaintances are more likely to provide details that even the close friends may not be able to provide.

6. Triadic closure implies that:
   a. Two people having a common enemy have more probability of becoming friends with each other.
   b. Three people having a common enemy have more probability of becoming friends with each other.
   c. Two people having a common friend have more probability of becoming friends with each other.
   d. Two people having a common person as a distant acquaintance have more probability of becoming friends with each other

   Explanation:
   Triadic closure implies that two people having a common friend have a good probability of becoming friends with each other.

7. Girvan Newman Method is based on the concept of:
   a. Node Betweenness
   b. Edge Betweenness

c. Node Clustering Coefficient
d. Node Degree

Explanation:
GirvanNewman algorithm focuses on removal of edges that are most likely 'between' communities, hence, it is based on the concept of 'Edge Betweenness'.

8. Computing betweenness Centrality of a given node involves computing which of the following?:
    a. All the shortest paths between the given node and the highest degree node.
    b. All the longest paths between the given node and the highest degree node.
    c. All the shortest paths that pass through the given node.
    d. All the longest paths that pass through the given node.

    Explanation:
    Betweenness centrality is a measure of centrality in a graph based on shortest paths. For every pair of nodes in a connected graph, there exists at least one shortest path between the nodes. The betweenness centrality for each node is the number of these shortest paths that pass through the node.

9. In the end, the Karate Club network got divided into how many communities?:
    a. 1
    b. 2
    c. 3
    d. 4

    Explanation:
    As per the well-known history of Karate club, a fight happened between the instructor and the club administrator, due to which the network got divided into two communities by the end.

10. Which of the following is True with respect to Girvan Newman Method:
    a. It starts from a set of nodes of the given graph with no edges, and keeps adding the edges one by one based on some criteria.
    b. It starts from the given graph with all the nodes and edges and keeps removing the edges based on some criteria.
    c. It removes the edges one by one and then computes the clustering coefficient of all the nodes.
    d. It adds the edges one by one and then computes the clustering coefficient of all the nodes.

    Explanation:
    The GirvanNewman algorithm is used for communities' detection, by progressively removing edges from the original network. The edges with high betweenness are removed, since they usually connect different communities.