

Solutions to Week4-Assignment1

1. A

Homophily refers to the theory which states that, based on node attributes, similar nodes may be more likely to attach to each other than dissimilar ones.

2. D We have a network in which a $p = 1/4$ fraction of all individuals are male, and a $q = 3/4$ fraction of all individuals are female. Consider a given edge in this network. If we independently assign each node the gender male with probability $p = 1/4$ and the gender female with probability $q = 3/4$, then both ends of the edge will be male with probability $p^2 = 1/16$, and both ends will be female with probability $q^2 = 9/16$. On the other hand, if the first end of the edge is male and the second end is female, or vice versa, then we have a cross-gender edge, so this happens with probability $2pq = 2 * 1/4 * 3/4 = 3/8$.

According to Homophily Test, If the fraction of cross-gender edges is significantly less than $2pq=3/8$, then there is evidence for homophily.

3. B

Dynamics of friendships formation and behavior of people in a network is impacted by both, selection as well as social influence.

4. D

In affiliation networks, there can not be edges between two people and there can not be edges between two foci. All the edges are between people and foci only.

5. B

In affiliation networks, there can not be edges between two people and there can not be edges between two foci. All the edges are between people and foci only. Hence, affiliation networks are Bipartite and not complete.

6. A

Unlike affiliation networks, in social-affiliation networks, there can be an edge between two people but there can not be an edge between two foci.

7. D

Focal Closure is the tendency of two people to form a link when they have a focus in common. If 'a' and 'b' are people, and 'c' is a focus, then 'b' takes part

in a focus that her friend 'a' is already involved in. This is called *membership closure*. *Triadic closure* is the property among three nodes 'a', 'b', and 'c', such that if a link exists between 'a'-'b' and 'a'-'c', then 'b' and 'c' are likely to form a link.

8. C

Probability of forming a link due to one of the common friends = p

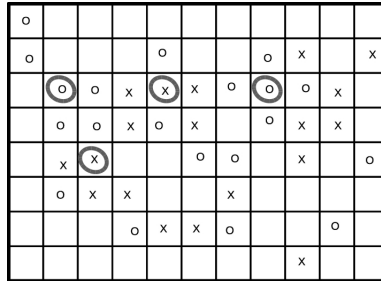
Probability of not forming a link due to one of the common friends = $1 - p$

Probability of not forming a link due to all the 'k' common friends = $(1 - p)^k$

probability of forming a link due to atleast one of the 'k' common friends = $1 - (1 - p)^k$

9. B

Following are the satisfied agents given that they are surrounded by atleast 4 neighbors of their own type.



10. C

Following network shows the six edges in the new network formed.

