Assignment 08 -- Power, Behavior, Dynamics

I. Read the following in the text:

Power in Social Networks: Chapter 12
Behavior of Social Networks: Chapters 16 - 18
Dynamics of Social Networks: Chapter 19

II. Listen to the presentations for this week:

Power In SN.mp4
Behavior Of OSN.mp4
Dynamics Of OSN.mp4

The associated .pptx files are also posted on Canvas.

III. Answer the questions below. *Use whole sentences and correct grammar for explanations.* Submit your answers in a .pdf or Word format document on Canvas, in a document **labeled with your last name**, eg: Dugas_HW3.pdf. You may include legible hand-drawn diagrams in your document, but all other text must be typed. PowerPoint is a good tool for drawings.

1.   a. Suppose a network exchange theory experiment is run on the graph to the right using the one-exchange rule. Which node or nodes you would expect to make the most money? (i.e. receive the most favorable exchanges)
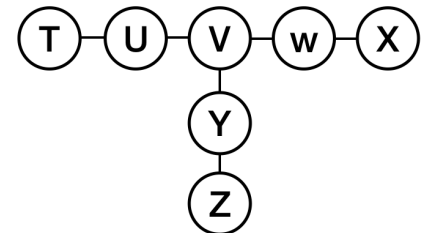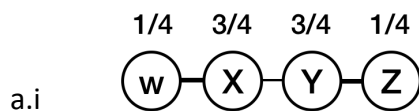

       b. Explain your answer

2.   a. Suppose a network exchange theory experiment is run on the graph to the right (i.e. a graph that is a 3-node path), using the one-exchange rule. Now you, playing the role of a fourth node W, are told to attach by a single edge to one of the nodes in the network. How should you attach to the network to put yourself in as powerful a position as possible, where power will be determined by the result of a network exchange theory experiment run on the resulting 4-node network?
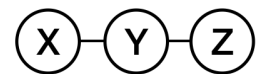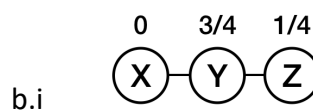

       b. Explain your answer

3.   The graphs below represent the outcomes of a network exchange theory experiment. For each, determine whether the outcome is stable or unstable, and explain your answer.

|	
1/4 3/4 3/4 1/4	0 3/4 1/4
a.i W—X—Y—Z	b.i X—Y—Z

a.ii   Explain your answer -- not just numerically (< 1, etc), but also explain what that actually means regarding bargaining position.

b.ii   Explain your answer -- not just numerically (< 1, etc), but also explain what that actually means regarding bargaining position.

4. The stem graph below represents the outcome of a network exchange theory experiment in which the participants have outside options. In this experiment, A bargained with B and C bargained with D. Use the Nash Bargaining Solution equations to show that this is a balanced outcome. ***Show your work.***
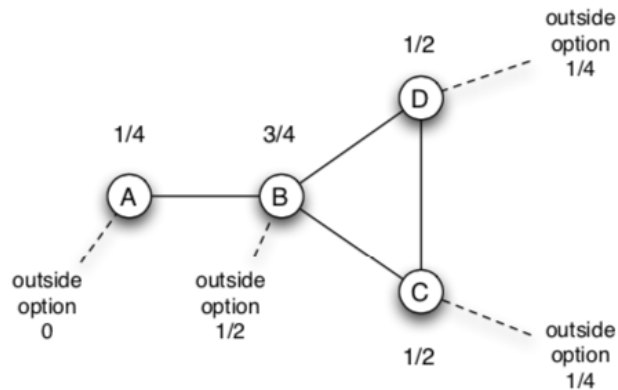

5. Social media influencers are powerful members of social networks, many attracting millions of followers. Write a brief essay (200 words) about an influencer or two that you follow, and why you follow them. If you don't follow any influencers, then research an influencer or two and discuss their position and influence on social media.

6. Your company has decided to interview two candidates A and B for a single job. A hiring committee was formed to decide which of the two candidates to hire. Everyone on the committee was interested in making the best possible hire, but after the interviews it was clear that members of the committee had different ideas about which of the two candidates was the best choice. When the committee met to make the final decision they decided to go around the room and ask each person on the committee to announce which of the two candidates they believed to be the best choice for the company. In fact, everyone on the committee said that candidate A seemed to be the best choice, so the offer was made immediately to candidate A without additional discussion. Now that candidate A has worked for the firm for a while it is clear that candidate B would have been a better choice.

    a. Your boss has asked you to explain how the committee members could have unanimously supported candidate A when she was reasonably certain that before the committee meeting at least some of the members of the committee thought that B was probably the best choice. ***Based on the teachings of chapter 16***, what can you tell her?

    b. ***Based on the teachings of chapter 16***, can you suggest another procedure that the committee could have used that would have revealed the initially differing opinions about the candidates and which might have avoided the unanimous choice of candidate A and resulted in the actually better choice of candidate B?

7. You have developed a new product which performs the same service as an established product, but your product is much better than the established product. If the number of users of the two products were the same, then each potential purchaser's reservation price for your product would be twice their reservation price for the existing product. The difficulty that you face is that no one wants to use more than one of the two products. Currently, every potential purchaser is using the established product. Your cost of production and your competitor's costs of production are exactly the same and they are equal to the price at which your competitor's product is sold. If all of the potential purchasers switched to your product the maximum price that you could charge (and still have all of them buy your

product) would be twice the current price. So clearly you could make a nice profit if you could attract these potential purchasers. ***Based on the teachings of Chapter 17***, what strategies would you use to try to convince users to switch to your product?

8.   Consider an on-line news site, such as cnn.com, which consists of a front page with links to many different articles. The operators of these sites generally track the popularity of the various articles that get posted. Suppose that the operators of the site are considering changing the front page, so that next to each link is a counter showing how many people have clicked on the link. (e.g., next to each link it might say: "30,480 people have viewed this story," with the number getting updated over time.)

a.   What effect do you think this change will have on the behavior of people using the site? Explain your answer.

b.   Do you expect that adding this feature will cause the popularity distribution of the articles to follow a power-law distribution more closely or less closely, compared to the version of the site before these counters were added? Explain why or why not.

9.   Consider the network to the right. Suppose that each node starts with the behavior B, and each node has a threshold of q = 1/2 for switching to behavior A.
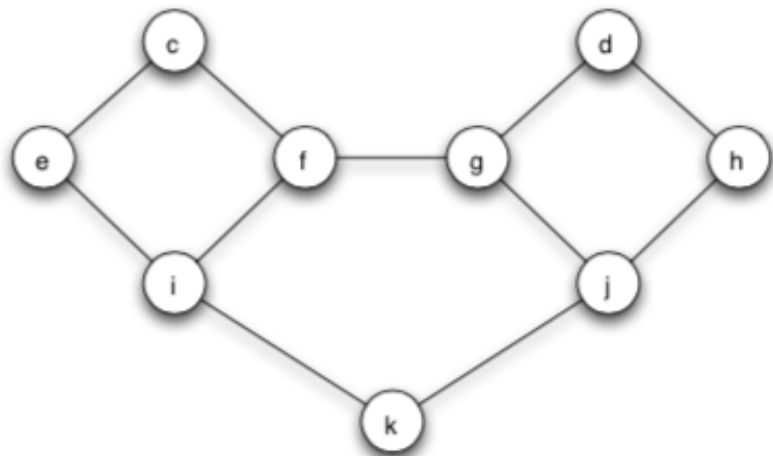
a. Let e and f form a two-node set S of initial adopters of behavior A. If other nodes follow the threshold rule for choosing behaviors, which nodes will eventually switch to A?

b. Find a cluster of density greater than **1 - q = 1/2** in the part of the graph outside S that blocks behavior A from spreading to all nodes, starting from S, at threshold q. This should be the **smallest** cluster that will work.

10.   Using several sentences, in general terms, in your own words, explain the effect that a tightly-knit community can have on a cascade.