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Assignment 8

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**
    a. I would expect nodes U, W and Y to make the most money and receive the most favorable exchanges.
    b. Each node has a decision to exclude either adjacent node, although G might connect the graph together U, W, Y can exclude it altogether. Nodes T, Z, X are dependent on that set of three nodes and can also be excluded from trade. Since we are using the one-exchange rule, U, W, Y have the advantage of exchange for both neighbors.
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**
    a. I would attach myself to either node X or Z to give myself the most powerful position.
    b. This is because if X excludes me then, X is in danger of being excluded by Y. Attaching myself in this way releases Y from being the most favorable in the exchange and gives X and Z an alternative to trade. This in return also makes my placement more powerful.
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.**
    a.
        i. The outcome is stable
        ii. There is no edge between two nodes where their sum is < 1. X and Y should not engage in exchange because they can not receive anything better from each other.
    b.
        i. The outcome is not stable
        ii. The sum of the edge between X and Y is < 1. X could give a better bargain than Z effectively making Y choose X.
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.

a. For Nodes A, B
   S = 1 - (0 + ½) = ½
   Prediction: ½(½) = ¼
   New Bargain: A = ½ & B = 1
   The New Bargain is > 1, meaning that they were balanced before the Nash Bargaining Solution
b. For Nodes C, D
   S = 1 - (¼ + ¼) = ½
   Prediction: ½ (½) = ¼
   New Bargain: C = ¾ & D = ¾
   The New Bargain is > 1, meaning that they were balanced before the Nash Bargaining Solution
   All four nodes failed the solution therefore the graph is a balanced outcome.

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.**
   Currently I do not follow any social media influencers or check what sort of information they tell their followers. Kylie Jenner is a big influencer and looking at her recent posts, it seems that she uses her platforms in order to advertise her cosmetic business. Since she has amassed such a big following, she can form a loyal community that uses her cosmetics. Since she is the face of the business even if the product is not the best, the community will have a high threshold to change to a different product. One of the reasons the business is so successful is because of the backings of people who have followed her throughout the years, even before the business.
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.**
   a. Information cascade is the reason why this occurred in the hiring process. Since each person on the committee explained their choice in order, people giving their choice later believe that they are missing information from the first decisions. If the first two are in agreement about A then the rest of the committee would choose A because the option would cascade everyone believing that the previous has more information than them.
   b. The committee could have picked their best option at the same time so a cascade effect would be avoided. Whether it's using an app or piece of paper it doesn't really matter. If the committee doesn't know each other's decisions it would be unbiased.

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.**

    There are two methods to convince users to switch to my product. First is to lower the price so that people are inclined to switch, because a better price outweighs loyalty to a product in many people. Once information keeps spreading about my product through their friends or social media, the product will gain more popularity. Once a loyal customer base has been made the price of the product can then be raised to the intended market price.

    The other method would be to strike deals with influencers who can help spread information about the product. Old users might see how the new product operates better than their old product which will convince them to switch. Also new users can be formed because they might have not thought of buying the product before their influencer used it.

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. This would promote the rich get richer effect because people would be more inclined to click articles with more views because it implies that it is important. People want to know information that others know as well and want to be in the loop. Therefore an article with more views will generate more clicks.
    b. It would cause the popularity distribution to follow a power-law distribution more closely. This is because readers will be able to tell which articles are more popular, leading them to want to read it just because of that.
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. The initial set of adopters S will be {e, f}. Next c will be added to the set because it's neighbors are $1 > ½$, {c, e, f}. Next i will be added because its neighbors are $⅔ > ½$, {c, e, f, i}. Next k will be added because its neighbors are $½ = ½$, {c, e, f, i, k}. Next g will not be added because $⅓ < ½$ so the set stays the same. Next j will not be added because $⅓ < ½$, so the set stays the same. Therefore the final set that converts to A will be {c, e, f, i, k}.

b. The cluster that denies A from spreading to all nodes is the set {g, j, h, d}. This is the smallest cluster that prevents threshold q to spread.

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

Cascades have a hard time taking over tightly-knit communities because every node interacts with nodes within the community. The threshold for each node to convert to innovation or a new behavior will be higher because they are surrounded by nodes with the same behavior leading them to stick to the old. The cluster in the previous one shows a tightly-knit community that did not let behavior A take over them. In some cases it would take a majority to change behavior in order for nodes to start changing as well.