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Assign 08 – Power, Behavior, Dynamics

1.
   a. Node G
   b. I would expect Node G to make the most money since it is connected to the highest number of nodes when compared to any other node in the graph. Even if not all the 3 nodes decide to exchange, Node G has the most chances to exchange than any other node, therefore it is the most powerful and expected to make the most money.

2.
   a. Attach to Node A and choose A to trade with
   b. This is because this location would limit the power of Nodes B and C since their only trading partner is node A.

3.
   a.
      i. Stable
      ii. There is an even number of nodes, so none are left out of an exchange. Nodes B and C offer a satisfying value to their neighbors, and A and D respond to their respective partner with the value that they need to add to 1.
   b.
      i. Unstable
      ii. There is odd number of nodes, leaving at least 1 one out of an exchange. In this case, Node A is completely left out of exchanging with B, and B and C exchange the values they need. A does not receive anything from B, nor does it offer anything to B.

4.
   a. A and B
      i. To A: $\frac{0+1-.5}{2} = \frac{1}{4}$
      ii. To B: $\frac{.5+1-0}{2} = \frac{3}{4}$
   b. C and D
      i. To C: $\frac{.25+1-.25}{2} = \frac{1}{2}$
      ii. To D: $\frac{.25+1-.25}{2} = \frac{1}{2}$
   c. This is a balanced outcome since the profits of each node and their partner add to 1.

5.
   a. Despite some dissenters, the hiring committee ended up unanimously recommending candidate A because of information cascade or herding. This could be due to seeing most of their fellow members support candidate A and

following suit based on their credence that their fellow members would have made an informed and correct decision.

    b. If each committee members' decision of support was made anonymously and other members had no knowledge of their fellow members' decision, this could have resulted in avoiding the choice of candidate A over B. This would have revealed the initially differing opinions because no information cascade would have occurred as a result of members looking to other members and the majority decision to inform their own decision.

6. Since the decision to buy a product is so largely influence by the amount of buyers currently buying and using the product, an effective strategy to attract buyers would be to convince a large portion of the existing market that the new product is a better alternative, thus causing your product to have the larger population and consequently more future buyers. A way of doing this is to offer the new product at an introductory price that is lower than the current product or offering it for free. A common use of this tactic is to offer free samples of the new product to both get the population interested in the potential benefits of the new product over the existing one, and to asses your product's actual potency against the existing product and see if people actually consider it to be better. Early on, clearly this would result in less profits but if the product is well received and succeeds past the tipping point needed to swing the population in favor of the new product, then the price can be raised and the initial losses can be handled. Another strategy includes using someone else's platform to promote your product, given that they have access to many of the target population in their network. This can be successful since their endorsement and the following acceptance by those present in their network is based on the two's relationship of trust.

7.

    a. This change would increase or decrease the number of people who click on a certain article, depending heavily upon the number of people who have previously clicked on it. If a large number of people clicked on an article, more people are likely to click on it in the future because of information cascade type effects that inform their decision that the article is interesting. People would think that since many people chose to read this article, it must be interesting based on their credence that other people are like-minded as them and are also searching for interesting articles. Likewise, if less people choose to click on an article, the specific article will likely receive less views because of this same phenomenon.

    b. Adding this feature will cause the popularity distribution of the articles to follow a power-law distribution more closely. This is because articles that are popular to begin with will only become more popular as a result of information cascade from the number of views being displayed next to the link. This will cause an overall slowing of the decay in popularity in articles as the power-law distribution describes when compared to the normal distribution.

8.

    a. Nodes E and F have Nodes C and I as their neighbors. This means that the threshold value of Node C and I is greater than q, therefore C and I belong to the

same group as Nodes E and F. Nodes G, D, H, J, K are not visited by the set S which means they form a separate cluster as their threshold value is less than q. Also, Node K belongs to Node I, thus its threshold value is equal to q. Thus, Nodes E, F, C, I, and K will switch to behavior A.

b. Since Nodes G, D, H, J, and K do not follow behavior A, their threshold value is less than q which drives them to form a separate cluster. Since the given equation shows that the threshold value is ½, this forms a different cluster starting from S at threshold q. This cluster includes Nodes G, D, H, J, and K.

9. A tight knit community can more likely cause information cascade. This is because the members of the community are more likely to be in communication with each other and therefore influence each other's decisions because of information sharing. Since the community is tight knit, it can be assumed that each member has a high degree of trust in the other members' judgement and decisions of which informs a member to follow suit and make the same judgements and decisions. Information cascade is then more likely to occur in this scenario because members will consult each other's best judgement of the situation based on their credence and faith in their fellow members more than the objective facts of the situation in order to make a decision, thus leading to a more unanimous agreement on the situation as seen in previous problems.