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CS 581

I pledge my honor that I have abided by the Stevens Honor System.

HW8

1. In this graph, nodes D, E and F have the most power. This is because each node has two different options to trade with. Even if G decides to not trade with one of the nodes, the node has a dependency to trade with. G does not have all the power because all of its adjacent nodes can choose to trade with its dependencies and then node G has no trade.
2. In this graph you would attach to a node at either end point (C or B). This is because your adjacent node (C or B) would trade with you since they risk being alone if their adjacent node trades the other way. This way you have slightly more power then the node you attach to.
3.
    a. This graph is stable. This is because no node can make a better offer. A cannot offer anything to B without A losing more or B graining more. The same goes for C and D. With B and C, neither can offer each other something without one of them losing something. This all makes the graph stable.
    b. Graph 2 however is not stable. In this situation A can offer B a higher value then $\frac{3}{4}$ such as $\frac{5}{6}$ and A would gain $\frac{1}{6}$. Since A has 0 any amount, no matter how small would value it and give more to B. This then could be repeated in the next iteration by B and C. This is infinite.

4. $x + (1/2)s = (x + 1 - y)/2$

   a. For A:

      i. $0 + .5s = (0 + 1 - .5)/2$

      ii. $.5s = .5/2$

      iii. $s = 1/2$

   b. For B:

      i. $.5 + .5s = (.5+1-0)/2$

      ii. $.5 + .5s = .75$

      iii. $.5s = .25$

      iv. $s = .5$

   c. This is stable but not realistic. Since B can trade with an outside source for the same value, it would bargain higher giving it ¾ and A ¼.

   d. For C:

      i. $.25 + .5s = (.25 + 1 - .25)/2$

      ii. $.5s = .25$

      iii. $s = .5$

   e. For D:

      i. $.25 + .5s = (.25 + 1 - .25)/2$

      ii. $.5s = .25$

      iii. $s = .5$

   f. This is stable and realistic. This is because both gain the same amount and gain more than their outside sources.

5.

   a. The reason candidate A received all the votes was because of cascading. This means that the first person thought candidate A was good and the second person agreed. From there every person after followed the cascade since candidate A had more votes. They did not vote based on their opinions, they voted based on others opinions.
   b. A better way to have done the voting would be to have done it anonymously. If it was done anonymously then people would have been swayed by others opinions and there would have been no cascading.

6. To convince users to switch to your product you could do two things. The first thing is that you can lower the price in order to attract more customers. You know that consumers will pay double the price of the existing product so you can market your product between that price and the consumer's reservation price. The other way to attract customers would be to get a fashion leader to endorse it. By getting someone popular who people look up to to use the product, others will want to do that as well.
7. This effect will make it so that pages with a higher view count get viewed more. This is an example of the rich getting richer phenomenon. This happens because people's choices are greatly swayed by public opinion. A person that sees 30,000 people have liked something would be more inclined to visit that instead of something with only 100 likes. Adding a view count would follow the power-law distribution. If people did not know the view count they would be more inclined to click on whatever they thought was the most

interesting, however with the view count people will select the articles based on popularity.

8.

    a. Since nodes **g, d, h, j and k** are not visited by the set, they have a lower threshold then ½. Therefore they will all switch to behavior A.
    b. Nodes **g, d, h, j and k** form a different cluster because all together their threshold value is greater than 1-q = ½.

9. Cascading can spread a behavior throughout a graph very easily. However a cascade can be stopped if it hits something with a lower threshold then its own. If a cascade moves through a graph with a density of .5 and hits a tightly-knit community with a threshold of .4 then the cascade will stop.