

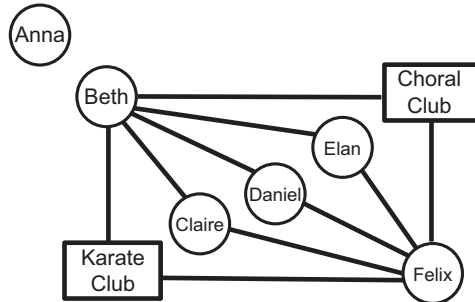
CSC 200—Social and Economic Networks
Quiz 2 Practice Question

Answer all questions on this paper. You are allowed to use one, two-sided 8.5” by 11” sheet of *hand-written* notes. No other materials or aids of any type are permitted.
Time: 20 minutes; Total Marks: 20

1. (12 pts) Consider the following social affiliation network within a school, with six students and two clubs. Anna is new to the school and has not yet formed any close friendships; but she knows the structure of this network and is acquainted with Beth.

Anna is especially interested in forming a close friendship with Felix, and wants to decide how best to go about it. She has a choice of how to invest her time: she can *either* become close friends with Beth or she can decide to join both the Karate and Choral clubs. But Anna must choose *only one of these options*. She does not know any of the students well enough to become close friends quickly, except for Beth.

Assume that each triadic closure in the network occurs with probability 0.5 and that focal closure (based on club membership) occurs with probability 0.1. These closures occur *independently* at the end of each month. There is no membership closure in the network. So if two people A and B , who are not friends, have f friends in common and belong to c common clubs, then the probability that A and B will be friends at the end of the month is $1 - (1 - 0.5)^f(1 - 0.1)^c$.



(a) Suppose Anna’s goal is to become Felix’s friend *within one month*. Should she become friends with Beth or join the two clubs in order to make this happen with the highest probability possible? Briefly explain your answer.

(b) Suppose Anna’s goal is to become Felix’s friend *within two months*. Should she become friends with Beth or join the two clubs in order to make this happen with the highest probability possible? Briefly explain your answer.