Assignment 3

CSC 303: Social and Information Networks

Posted March 27,2020
Due: April 16, 2020, 4:59 PM

Be sure to include your name and student number with your assignment. All assignments are to be submitted on Markus by the due date.

You will receive 20% of the points for any (sub)problem for which you write "I do not know how to answer this question." You will receive 10% if you leave a question blank. If instead you submit irrelevant or erroneous answers you will receive 0 points. You may receive partial credit for the work that is clearly "on the right track."

1. (20 points)

   For each of the following path graphs, indicate a balanced solution.

   If there are other stable solutions, give one. Otherwise, give a brief argument why your balanced solution is the only stable solution.

   - (10 points) The 6 node path graph.
   - (10 points) The 5 node path graph.

2. (30 points)

   Consider the following stable matching scenario. There are three women: Alice (A), Beth (B), and Carol (C), and three men: Dan (D), Eric (E) and Frank (F). Each of the individual's preferences are:

$$\begin{array}{ll} Women & Men \\ \mathbf{A} : E \succ D \succ F & \mathbf{D} : A \succ B \succ C \\ \mathbf{B} : D \succ E \succ F & \mathbf{E} : B \succ A \succ C \\ \mathbf{C} : F \succ D \succ E & \mathbf{F} : A \succ C \succ B \end{array}$$

   - (10 points) Consider the following matching:

$$A : E, \qquad B : F, \qquad C : D$$

     Is the matching stable? If yes, justify your answer; if your answer no, indicate a blocking pair.

- (10 points)

  Suppose we run the female-proposing deferred acceptance algorithm (FPDA). Describe each round of the algorithm, and the resulting matching.

- (10 points) Run the male-proposing version (MPDA) of the algorithm. Describe each round of the algorithm, and the resulting matching.

3. (30 points) Exercise 1 in Chapter 8.