

Matchings under preferences - Assignment

March 29, 2019

1. Consider the following version of the Gale-Shapley algorithm for the stable marriage problem with strict and complete lists: When a woman y receives a proposal from a man z , the men appearing after z in y 's list are deleted from her list and y is deleted from their list. Thus, at the end of the algorithm, we obtain reduced preference lists for all men and women.
 - (a) Are all the pairs appearing in the reduced lists stable? If not, give a counter-example.
 - (b) If the reduced lists at the end of the man-proposing algorithm are used for executing a woman-proposing algorithm, and are reduced further by applying a similar rule, are all pairs in the resulting lists stable?
2. Construct an example to show that the stable matchings in a roommates instance do not form a lattice.
3. We have discussed in class that, in a man-proposing Gale-Shapley algorithm, women benefit by truncating their preference lists at their woman-optimal stable partner. This results in incomplete lists. Given an example to show the following:

Even with the restriction that preference lists need to be complete, it is possible for a woman to falsify her list so that the woman-pessimal stable matching (obtained by man-proposing Gale-Shapley algorithm) is better for her (and no worse for any other woman) than that in the original instance.