Project 2 Proposal
The Stable Marriage Problem

Kristen Lawler

February 7, 2017

In mathematics, there is a famous problem known as the "stable marriage problem". It essentially asks if there exists a set of "stable marriage" pairings that encompass a given population. Typically, for the most traditional example, a population is split into men and women. This could be changed to any defining characteristic. In this problem, each individual of the population makes a preferential list of their potential mates. Then, following certain conditions of what constitutes a "stable pairing" the population goes through various iterations of proposals until stability is reached or deemed impossible.

What makes this problem interesting is its applicability (consider dorm room assignments or on-line dating applications) and also its unique definition of "stability". Consider two couples. If one is content with their pairing but the other is not, so long as the population consists of only these two couples, we have two "stable marriages". However, if both couples are content with their spouse, this is also considered a stable pairing.

As my Project 2, I would like to use Java to model this famous problem. The resulting program should receive the inputs of population size as well as the various lists of preference for each individual in the population. It should then separate the population into two distinct groups, and run as many iterations as possible until it

reaches stability, or can conclude that no such stable pairings exist. Ideally, this Project would also have a visual component so users can see the various pairings and how they change with each iteration.

Mathematically, whichever side of the population does the "proposing" is left with a final pairing that is on average less "preferential" than those who were proposed to. If done successfully, this is something that could be statistically observed with the final product of this Project 2.