

Stable Marriage Problem

We are interested in matching n men with n women so that they could stay happily married ever after.

The input for our problem consists of:

- A set of n men, $M = m_1, \dots, m_n$
- A set of n women, $W = w_1, \dots, w_n$
- For each men and women we have a list of all the members of the opposite gender in order of preference.

Let $M \times W$ denote the set of all possible ordered pairs of the form (m, w) , where $m \in M$ and $w \in W$. A *matching* S is a set of ordered pairs, each from $M \times W$, with the property that each member of M and each member of W appears in at most one pair in S . A *perfect matching* S' is a matching with the property that each member of M and each member of W appears in *exactly* one pair in S' .

A marriage is called stable, if there is no pair (m, w) such that $w \in W$ prefers $m \in M$ to her current partner and m prefers w over his current partner.

Given these information, find a stable marriage.