

- (c) In any execution of the algorithm, there is at least one candidate who only receives a single proposal.
(Hint: use the parts above!)

3 Be a Judge

By stable matching instance, we mean a set of jobs and candidates and their preference lists. For each of the following statements, indicate whether the statement is True or False and justify your answer with a short 2-3 line explanation:

- (a) There is a stable matching instance for n jobs and n candidates for $n > 1$, such that in a stable matching algorithm with jobs proposing, every job ends up with its least preferred candidate.
- (b) In a stable matching instance, if job J and candidate C each put each other at the top of their respective preference lists, then J must be paired with C in every stable pairing.
- (c) In a stable matching instance with at least two jobs and two candidates, if job J and candidate C each put each other at the bottom of their respective preference lists, then J cannot be paired with C in any stable pairing.

(d) For every $n > 1$, there is a stable matching instance for n jobs and n candidates which has an **unstable** pairing where **every** unmatched job-candidate pair is a rogue couple or pairing.