

Stable Marriage questions

November 7, 2014

1) Decide whether you think the following statement is true or false. If it is true, given a short justification. If it is false, give a counterexample.

Consider an instance of the Stable Matching Problem in which there exists a boy b and a girl g such that b is ranked first on the preference list of g and g is ranked first on the preference list of b . Then in every stable matching S , the pair (b, g) belongs to S .

2) Decide whether you think the following statement is true or false. If it is true, given a short justification. If it is false, give a counterexample.

For any valid stable matching, there must be at least one person who is paired with the person ranked first on his or her preference list.

3) Consider the following preferences:

Girl	1	2	3	4	5
Allie	V	W	X	Z	Y
Bobbie	X	W	Z	Y	V
Cathy	Y	Z	V	X	W
Deanna	Z	X	Y	V	W
Eleanor	V	Y	Z	X	W

Boy	1	2	3	4	5
Von	A	B	E	C	D
Will	A	C	D	B	E
Xander	D	B	E	A	C
Yousef	E	D	C	B	A
Zack	C	D	A	B	E

Use the mating ritual algorithm to find both the boy-optimal and girl-optimal matchings (where the roles of boy and girl are switched). Are they the same or different?

4) If one finds that a boy-optimal matching and a girl-optimal matching are the same, what does that tell you about the set of all stable marriages?