

Sale-Shapley Algorithm

See 6

- ① Initially men & women are free
- ② In a loop: a free woman will propose to some man
↑ (diff from the book)
- ③ You have n matched pairs

Initial state: All n men & women are free.

- ① Let w be a free woman

Q: Who should w propose to?

A: w should propose to man m on top of her pref list

- ② w propose to m .

Q: What should m do?

Case 2.1: m accepts w 's proposal & they get matched.

Issue: m could get a better proposal later on.

Case 2.2: m rejects w 's proposal.

Issue: He might not get a better proposal.

Case 2.3: m accepts w 's proposal, (m, w) get engaged

General state: ⑥ All men & women are engaged

\Rightarrow Algo will terminate \Rightarrow the n engaged pairs get matched

ELSE

- ① \exists a free woman w .

Q: Who should w propose to?

A: Let m be the best man she has NOT proposed to yet.

- ② w proposes to m

Q: What should m do?

Case 2.1: m is free $\Rightarrow m$ accepts w 's proposal
 (m, w) engaged

Case 2.2 Let (m, w') be engaged

Case 2.2.1: $w' > w$ in L_m : no changes

Case 2.2.3: $w > w'$ in L_m : (m, w) get engaged
 w' is free