

Step 9

Gale-Shapley algo

① Initialize all men & women to be free

① In a loop:  
A free woman proposes to a man  
(stuff happens)

② You have n matched pairs

book: men proposes

Initial state: all n men + women are free

① Let w be a free woman

Q1: Which man m should w propose to?

A1: The man m on top of L<sub>w</sub>  
w proposes to m

Q2: What should m do?  
Accept? X m should get engaged to w  
Reject? X

General state: A man/woman is either free/engaged.

Case 1: All n men & n women are engaged  
→ Algo terminates

Case 2: A free woman w  
Q3: Who should w propose to?  
A3: To the best man m that she has not proposed to yet?

Running Example

n=2, M = {BP, BBT}, W = {JA, AJ}

L<sub>AJ</sub>: BBT > BP      L<sub>BP</sub>: JA > AJ  
L<sub>JA</sub>: BP > BBT      BBT: AJ > JA

AJ	JA	BP	BBT
F	F	F	F

Q1: Who should JA propose to?

A: BP

(JA → BP)

Q2: What should BP do?

Accept? X

Reject? X

(BP, JA)

get engaged

AJ	JA	BP	BBT
F	E	E	F

Engaged

Q3: Who should AJ propose to?

A3: BBT

(AJ → BBT) proposed

Q4: What should BBT do?

(AJ, BBT) get engaged

AJ	JA	BP	BBT
E	E	E	E