

Lecture 6















































CSE 331

Feb 12, 2021

If you need it, ask for help.
Take advantage of OHs
(No one came on Wed!)



Reading Assignments and Preparation Videos

Date	Topic	Notes
Mon, Feb 1	Introduction    S21  S20  F19	HW 0 out   Week 1 recitation notes
Wed, Feb 3	Main Steps in Algorithm Design    S21  S20  F19	 
Fri, Feb 5	Stable Matching Problem     S21  S20  F19	[KT, Sec 1.1]
Mon, Feb 8	Perfect Matchings     S21  S20  F19 \times^2	HW 0 due [KT, Sec 1.1]   Week 2 recitation notes
Wed, Feb 10	Stable Matching Problem     S21  S20  F19 \times^2	[KT, Sec 1.1]
Fri, Feb 12	Gale Shapley algorithm  S20  F19 \times^2	HW 1 out [KT, Sec 1.1]  
Mon, Feb 15	Gale Shapley alg. outputs a stable matching  S20  F19 \times^2	[KT, Sec 1.1]   <i>Reading Assignment:</i> Pigeonhole principle <i>Reading Assignment:</i> Asymptotic notation care package <i>Reading Assignment:</i> Using a Progress Measure
Wed, Feb 17	Efficient algorithms and asymptotic analysis  S20  F19 \times^2	[KT, Sec 1.1]   <i>Reading Assignment:</i> Worst-case runtime analysis notes <i>Reading Assignment:</i> [KT, Sec 1.1, 2.1, 2.2, 2.4]

Sign-up for mini projects

Deadline: Friday, Mar 5, 8:00pm

note @100 109 views Actions

Video Project Team Composition and Case Study due on Mar 5

This is a reminder that the Video Project Team Composition and Case Study is due on Mar 5. Please submit the required information for you team via this [google form](#). Once we received the form, your chosen algorithm and case study will be reviewed by our TA. A list of case studies already chosen can be found [online](#). Remember that while two groups can pick the same (class of) algorithm that solve (similar) problems, the ethical impacts have to be different for different group.

video_project

- An instructor (A. Erdem Sariyuce) thinks this is a good note -

edit · undo good note | 1

Updated 21 hours ago by Chik Lam

Questions/Comments?

Stable Marriage problem

Set of men M and women W

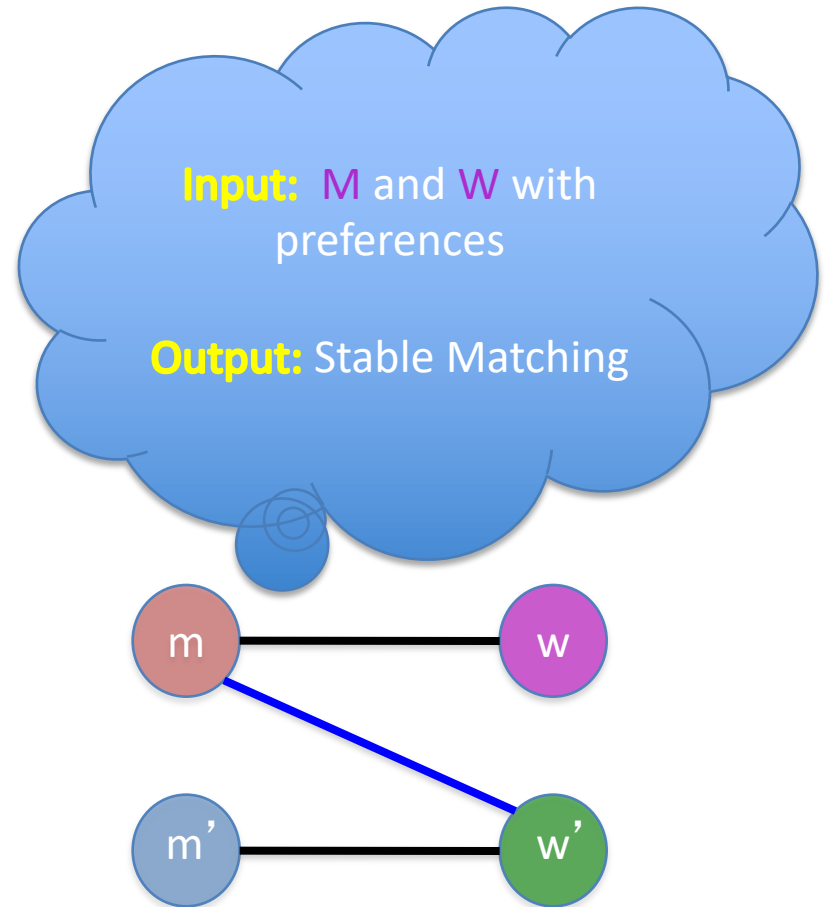
Preferences (ranking of potential spouses)

Matching (no polyandry/gamy in $M \times W$)

Perfect Matching (everyone gets married)

Instability

Stable matching = perfect matching + no instability



Remember Two Questions

Does a stable marriage always exist?

If one exists, how quickly can we compute one?

Moral of the story...



Rest of today's agenda

GS algorithm

Run of GS algorithm on an instance

Prove correctness of the GS algorithm

Gale-Shapley Algorithm (cont.)

Gale-Shapley Algorithm

Initially all men and women are **free**

While there exists a free woman who can propose

Let w be such a woman and m be the best man she has not proposed to

w proposes to m

If m is free

(m,w) get **engaged**

Else (m,w') are engaged

If m prefers w' to w

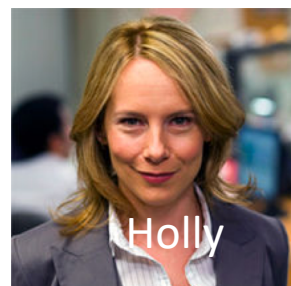
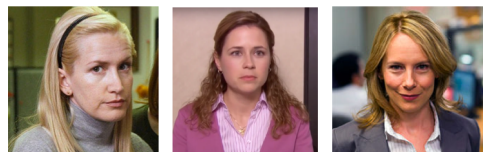
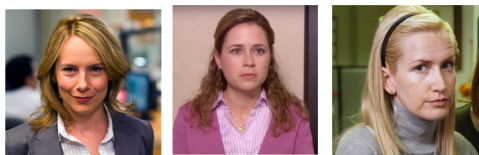
w remains **free**

Else

(m,w) get **engaged** and w' is **free**

Output the engaged pairs as the final output

Preferences



GS algorithm: The Office Edition

