

Lecture 7

CSE 331

Feb 15, 2021

Pass the syllabus quiz

No graded material will be handed back till you pass the syllabus quiz!
There are still 28 students who did not pass this!


Syllabus Quiz


Options

[View handin history](#)

[View writeup](#)

[Download handout](#)

 Due: February 28th 2021, 3:47 pm

 Last day to handin: February 28th 2021, 5:47 pm

Academic Integrity

Question 1: Sharing my answers to this syllabus quiz with other 331 students

- Is OK if I do it to help out a friend
- It does not matter since there is no grade attached with it
- Is an academic integrity violation and should not be done
- Is an academic integrity violation but I can take the chance

Question 2: Penalty for academic violation in CSE 331 is an automatic

- Warning and a chance to make-up
- A zero in the assignment AND a letter grade reduction (for first violation across all CSE courses) and an F in the course (for 2nd violation across all CSE courses)
- A zero in the corresponding assignment and nothing else
- Expulsion from UB

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

HW 1 posted

Homework 1

Due by **8:00pm, Friday, February 19, 2021**.

Make sure you follow all the [homework policies](#).

All submissions should be done via [Autolab](#).

Check the [week 3 recitation notes](#) for this homework.

Start with Q1!!!

Post questions on Piazza!

Some Questions on Stable Matching

Sample Problem

The Problem

Decide whether the following statement is true or false:

In every Stable Marriage problem instance where a man m and woman w have each other as their least preferred partner, the following is true. There is no stable matching for the instance where (m, w) are matched.

If you state true then you will have to formally argue why the statement is correct. If you state false, then you have to give a counter-example.

[Click here for the Solution](#)

More Practice Questions

HW 1 posted

Remember this!

Collaboration policy

Collaboration is generally allowed on the non-programming questions on the homeworks. Here are the policies regarding collaboration:

1. You are allowed to collaborate provided you have thought about **each problem for at least 30 minutes on your own**. This will help you in the exams.
2. You can collaborate on any homework in a **group of size at most 3**, including yourself. Note that you *cannot* collaborate with different groups for different problems.
3. You must write the name of **everyone** in your group on your submission. You will have the ability to do this in your [Autolab](#) submission.
4. You can **only discuss the problems with your group till you come up with the ideas (e.g. proof ideas)**: the details (e.g. the formal proof) is something you should work on alone.
5. Your submitted homework must be **written in your own words**. Everything, including the proof idea, has to be written up individually. In particular, at no point of time should you have in your possession the written homework of someone else.

⊘ NO collaboration on programming question

There is **no** collaboration allowed on the programming question on the homeworks. The programming questions have to be done individually. **Unlike some of your previous CSE courses, you cannot even discuss data structures with other students.**

You are also not supposed to look up programming based questions *unless it is one of the allowed sources for programming*: see the [list of allowed sources](#) for more specifics.

⊘ Grade reduction in the course

Deviating from the rules above will be considered cheating with a **minimum** penalty of a **letter grade reduction** for the course for the **first violation of academic integrity**. If the violations if student's second violation in CSE then this will lead to an automatic **F in the course**.

Questions/Comments?

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

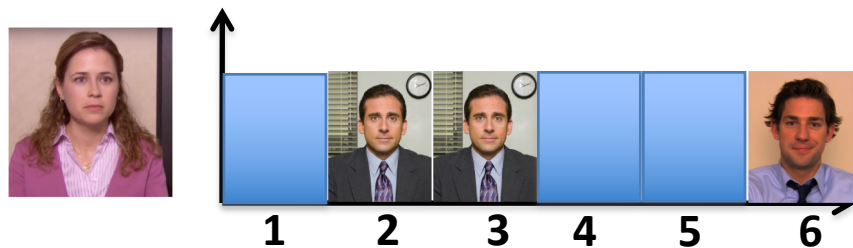
(m,w) get **engaged** and w' is **free**

Output the engaged pairs as the final output

Preferences

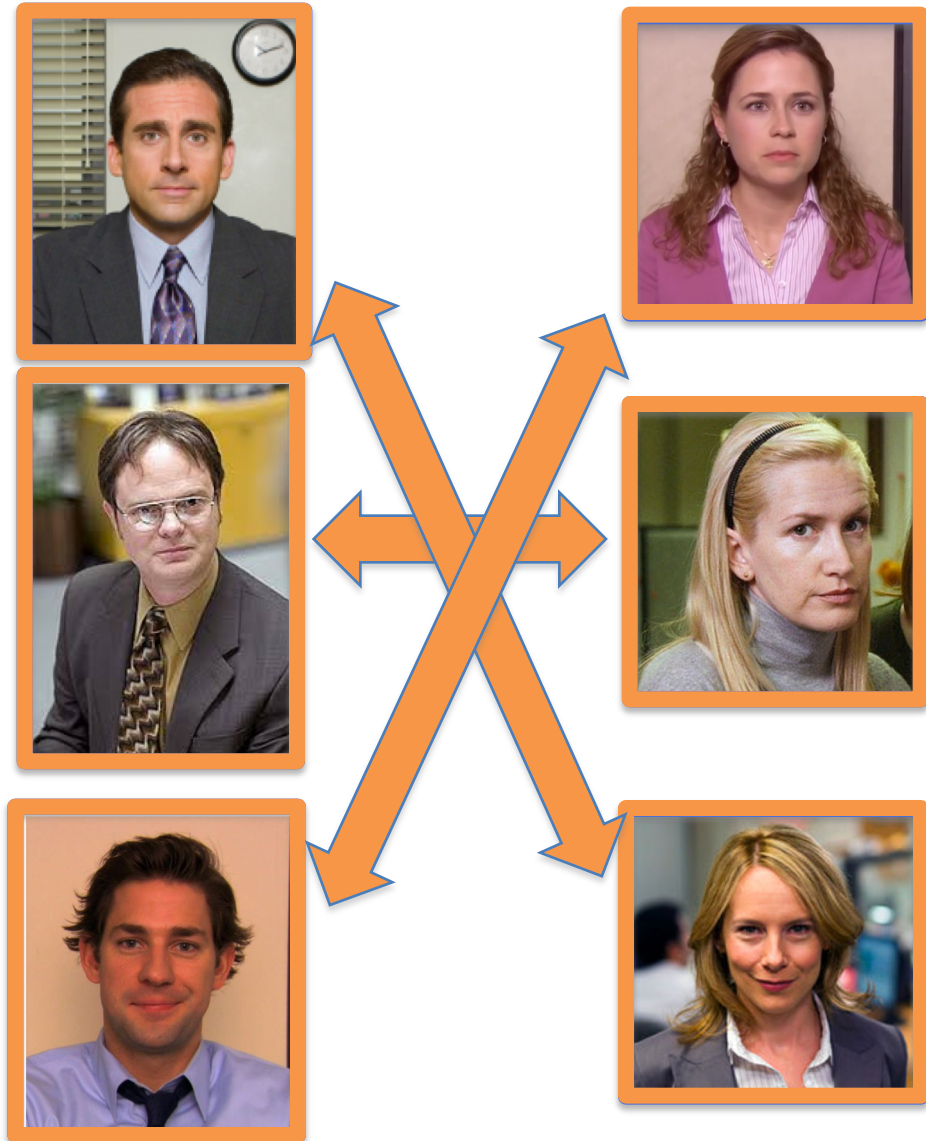
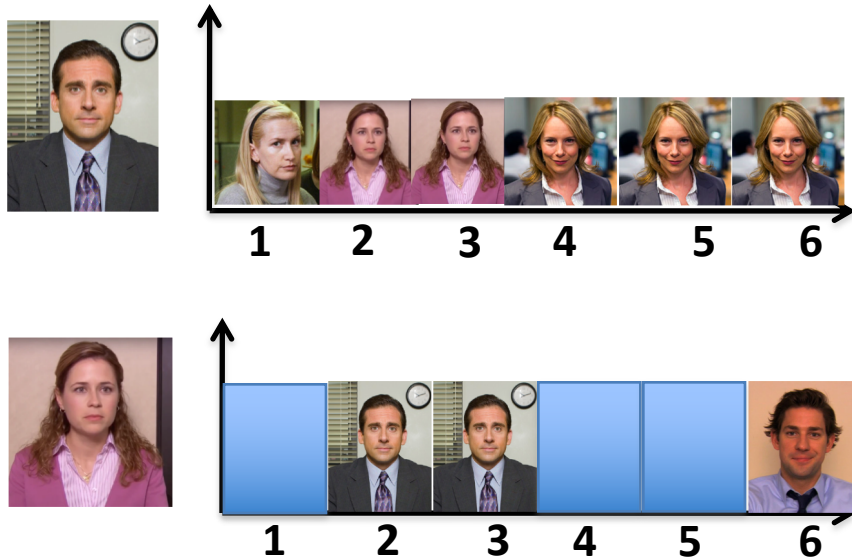


GS algorithm: The Office Edition



Any other stable matching in this example?

No!



Observation 1

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**

Once a man gets engaged, he remains engaged (to “better” women)

Output the engaged pairs as the final output

Observation 2

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**

If w proposes to m after m' , then she prefers m' to m

Output the engaged pairs as the final output

How many iterations?

n^2

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

Questions/Comments?

Why bother proving correctness?

Consider a variant where any free man **or** free woman can propose

Is this variant any different? Can you prove it?

New GS variant does not output a stable marriage



Brad Pitt (BP)



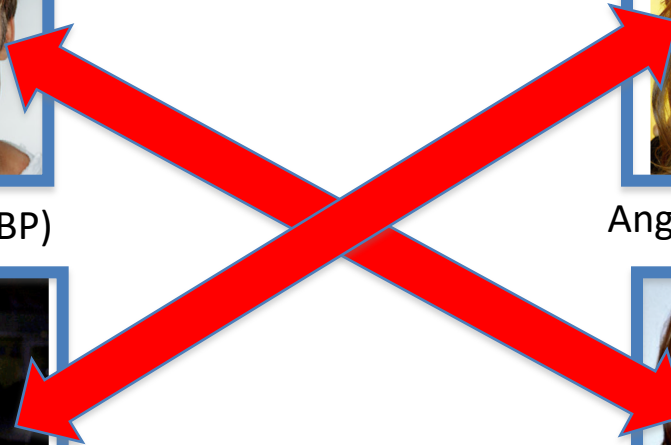
Angelina Jolie (AJ)



Billy Bob Thornton (BBT)



Jennifer Aniston (JA)



Today's lecture

GS algorithms always outputs a stable marriage