

Lecture 7

CSE 331

Feb 10, 2020

Pass the syllabus quiz

No graded material will be handed back till you pass the syllabus quiz!
There are still 31 students who did not pass this!


Syllabus Quiz


Options

[View handin history](#)

[View writeup](#)

[Download handout](#)

 Due: May 8th 2020, 12:14 pm

 Last day to handin: May 8th 2020, 2:14 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, Feb 28, 11:00am

Signup for Mini Video project

Actions ▾

Folks,

Please check the video project page: <https://cse.buffalo.edu/~erdem/cse331/spring20/mini-project/index.html>. Go over the details and make sure you understand what's expected.

Then, form groups of exactly 3 (three) by signing up here: https://docs.google.com/forms/d/e/1FAIpQLSctYiXnwY_riSI38-x226TstaZ2wwXlvC64-B-NWP1ISvedbw/viewform (link is available in the project page too). There are 153 of you, so don't worry about being left out in the remainder (I told you! :)).

You can use Piazza to find teammates. Then you can decide on the topic.

The deadline for team formation and algorithm/case study selection is **February 28, 11am ET**.

project

edit · good note | 0

Updated Just now by A. Erdem Sariyuce

followup discussions *for lingering questions and comments*

Start a new followup discussion

Compose a new followup discussion

HW 1 posted

Homework 1

Due by **8:00am, Monday, February 17, 2020**.

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

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

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](#)

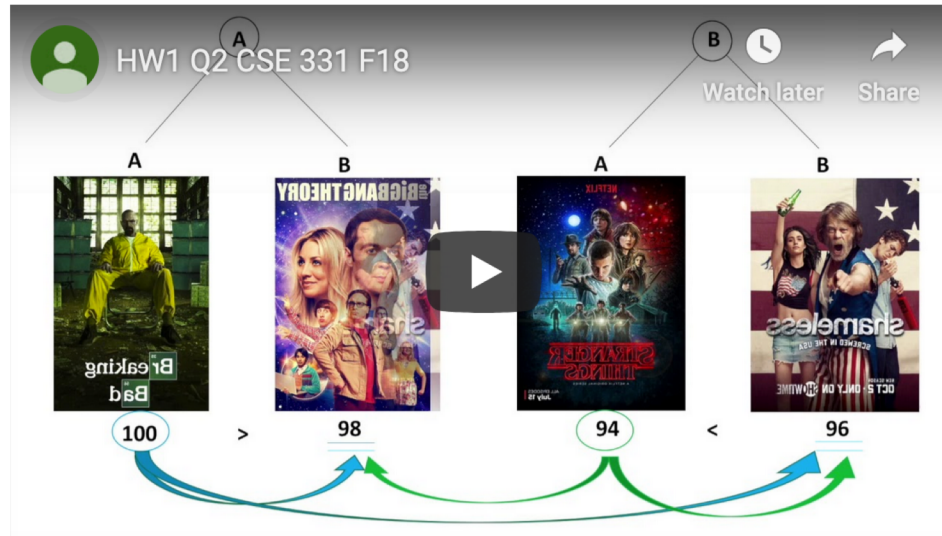
More Practice Questions

HW 1 posted

Watch the walkthrough videos

Walkthrough video

Here is the walkthrough video from Fall 18, which would work just as well for this year-- just ignore the fact that it talks about Q2 (instead of Q1) on HW1 (thanks to [Iman Abdul-Rashed](#) for the video):



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

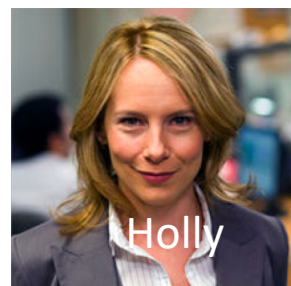
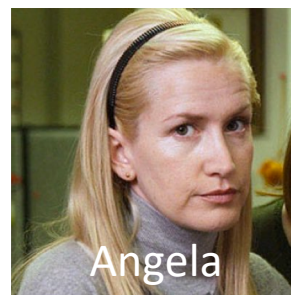
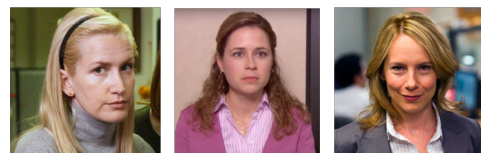
w remains **free**

Else

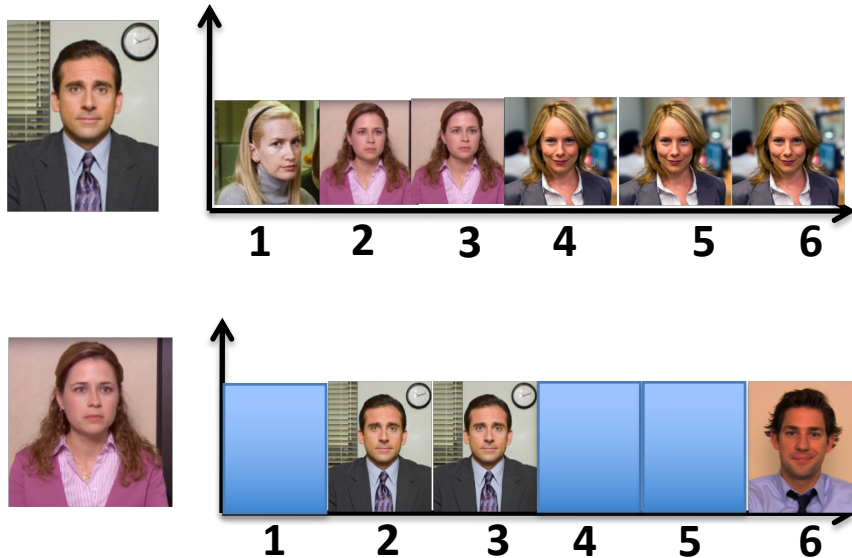
(m,w) get **engaged** and w' is **free**

Output the engaged pairs as the final output

Preferences



GS algorithm: The Office Edition



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 set S of 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 set S of 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)



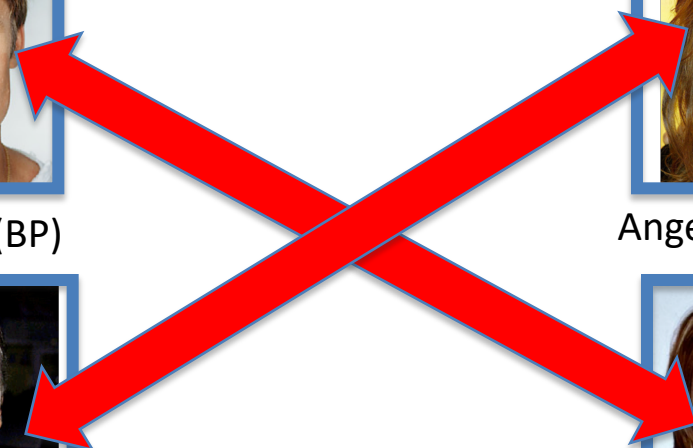
Angelina Jolie (AJ)



Billy Bob Thornton (BBT)



Jennifer Aniston (JA)



Today's lecture

GS algorithms always outputs a stable marriage