Lecture 7

CSE 331

Please have a face mask on

Masking requirement

UB requires all students, employees and visitors – regardless of their vaccination status – to wear face coverings while inside campus buildings.

https://www.buffalo.edu/coronavirus/health-and-safety/health-safety-guidelines.html

HW0 Grades Released

note @61 stop following 72 views

HW0 Grades Released

HW0 has been graded. The scores and the feedback are now available on Autolab.

However, **if you haven't passed the syllabus quiz** (i.e., your score is < 18), you cannot see your grade. Your grade will be released when you pass the quiz.

Here are the stats (note that the stats are only over the students who submitted and not the entire class):

Q1(a):

Problem	Mean	Median	StdDev	Max	Min
Proof Idea	4.3	5.0	3.5	10.0	0.0
Total	4.3	5.0	3.5	10.0	0.0

Gale-Shapley Algorithm

Intially 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

Observation 1

Intially 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

Intially 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

Questions/Comments?

Today’s lecture

GS algorithms always outputs a stable marriage

Questions/Comments?

The Lemmas

Lemma 1: The GS algorithm has at most n^2 iterations

Lemma 2: S is a perfect matching

Lemma 3: S has no instability

Proof Details of Lemma 1

Gale Shapley algorithm terminates

This page collects material from Fall 17 incarnation of CSE 331, where we proof details for the claim that the Gale-Shapley algorithm terminates in $O(n^2)$ iterations.

Week 3 Mon, Feb 14	Gale Shapley algorithm outputs a stable matching F21 F19 F18 F17 x²	[KT, Sec 1.1] *Reading Assignment*: Proof details of GS termination Week 3 recitation notes

Where does the textbook talk about this?

`Section 1.1` in the textbook has the argument (though not in as much detail as below).

Fall 2017 material

Here is the lecture video (it starts from the part where we d the proof details):