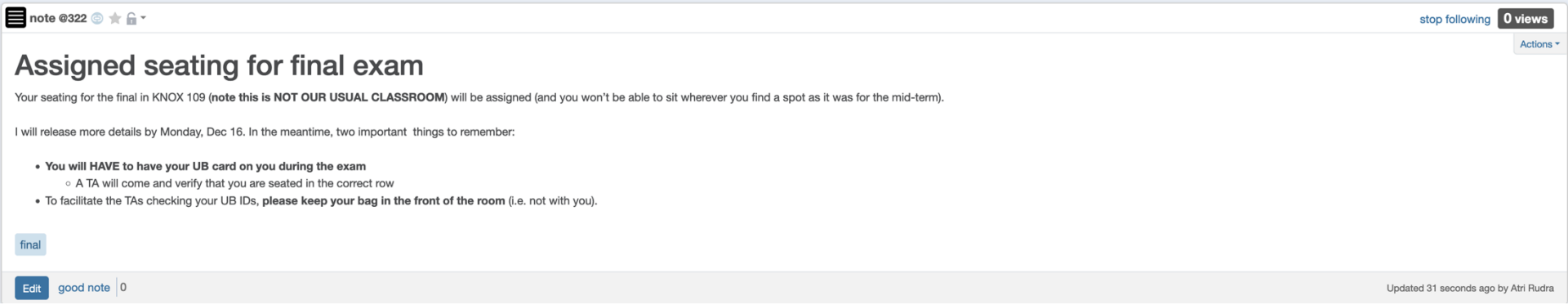
# Lecture 38

CSE 331

Dec 4, 2024

# Bring UB card to final exam



# Final exam post

note @323 stop following 0 views Actions

## Final exam post

I'll start off with some generic comments:

- The final exam will be based on all the material we will see in class up to NP-completeness of k-colorability (we'll finish that stuff by either by Friday, Dec 6 or Monday, Dec 9).
  - In case you want a head-start we will cover Sections 8.1-8.4 and Section 8.7 in the textbook. For the rest the schedule page details what sections of the book we have already covered.
- Exam will be from **8:30am to 11:00m** on Tuesday, **Dec 17** in **KNOX 109 (*this is NOT our usual classroom)***. Note that the exam will be for 2.5 hours and *not 3 hours* as it says on HUB.
- **DO NOT FORGET TO BRING YOUR UB CARD TO THE EXAM** (@322)

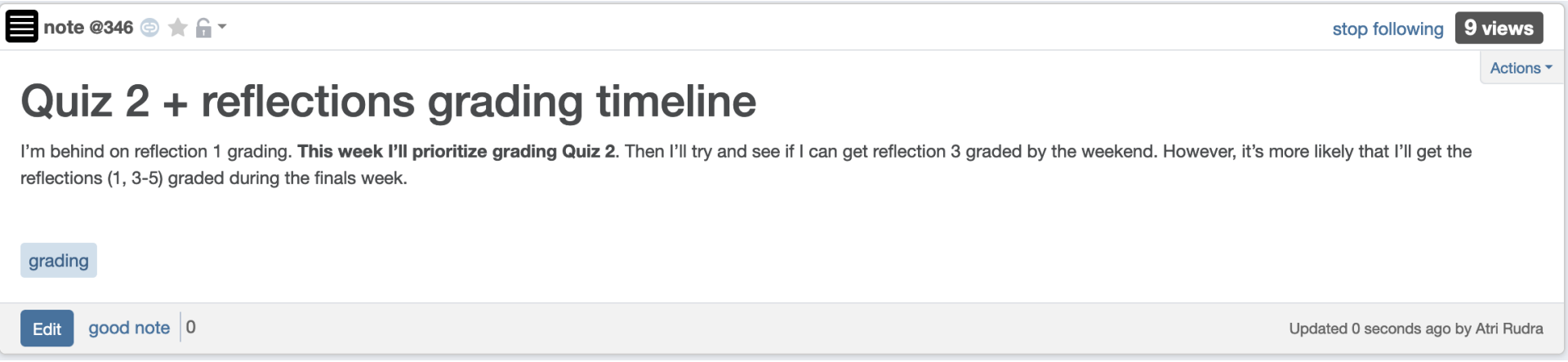
Next are comments related to **preparing for the finals**:

1. Take a look at the sample final (@320) and spend some quality time solving it. Unlike the homeworks, it might be better to try to do this on your own. Unlike the sample mid-term, this one is an actual 331 final exam so in addition to the format, you can also gauge how hard the final exam is going to be (your final exam will be the same ballpark). However as with the sample mid-term, you make deductions about the coverage of topics at your own peril (but see points below). Once you have spent time on it on your own, take a look at the sample final solutions (@320).
2. The actual final will have the same format as the sample final: The first question will be T/F, 2nd will be T/F with justification, the rest of the three will be longer questions and will ask you to design algorithms (parts of them might be just *analyzing* an algorithm.)
3. For the T/F questions (i.e. the first two questions), anything that was covered in class or recitations or piazza is fair game. If you want to refresh your memory on what was covered, take a look at the schedule page. If you want quick summaries of (almost all) the lectures, review the lecture notes or slides or videos.
4. To get more practice for the T/F questions, review all the T/F polls on piazza (@41)
5. For the remaining 3 questions, one will be on greedy algorithms, one will be on divide and conquer algorithms and one will be on dynamic programming. However, note that Chapter 2 and 3 in the book are basic stuff and almost any question in the final could fall under the purview of those two chapters. There will be **at least** one T/F and one T/F with justification Q for the NP-complete material so y'all should definitely focus on those as well but I will not ask any "proof based" Qs on that material.
6. In previous finals, like your mid-terms, there have been questions that are either straight lifts from homeworks or are closely related and this trend will continue in the actual exam (though to a lesser extent than the mid-term). This means that you should review your homeworks (all of them) before the exam. Also make sure to review the support pages and recitation notes.
7. If you are short on time and you are prioritizing the topics to study, keep points 5 and 6 above in mind.
8. Sections in the book that were not covered at all in the class but were handed out as reading assignments or recitation notes: I can also ask any direct questions from them. In addition, it might be useful to read them to get a better feel for the material. In any case once you have read the material covered in class a couple of times, it might do your brain some good to read some different material.
9. You can bring in **two** 8.5"X11" review sheets (you can use both sides on both). Use this judiciously: they can be a very useful tool to note down some weird things you have a hard time remembering and/or noting down specific references. However, do **not** spend a lot of time preparing these sheets: they can be huge time sinks without much payoff.

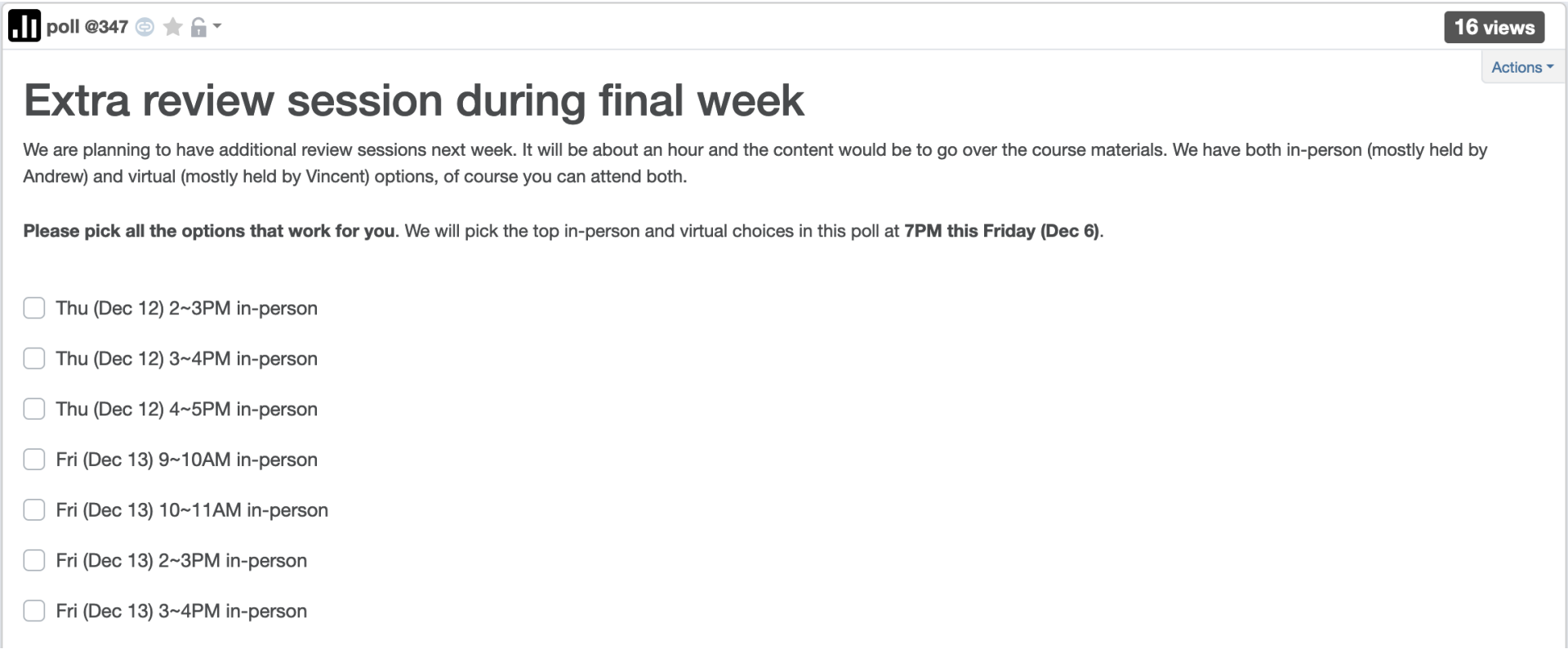
Next are some suggestions for when you are **in the exam**:

1. Spend 5-10 minutes reading all of the questions in one pass: this'll let the problems germinate in your subconscious until you actually get to solving them.
2. You should have plenty of time for the exam: by my count a well prepared student should be done by spending at most one minute per point, i.e. 100 minutes. The exam will be for 150 minutes, so you will have 50 extra minutes.
3. If you are not sure how to design an algorithm for a problem in the exam I generally recommend the following sequence:
   - Try and see if you can reduce the problem to something you have already seen in class;
   - If not, then try and slightly modify an existing algorithm we have not see;
   - If not, only then try and build an algorithm from scratch.
4. Just to be sure the point above is just a recommendation-- your mileage may vary. E.g. if you immediately see a direct algorithm to solve a problem, go for it!
5. Note that even if a problem might look similar to another problem you have seen before, you *might* need to solve the new problem using a different algorithmic technique. So while "pattern matching" on the problem statement might be a good place to start be wary of surface similarities.
6. Once you reach the exam room, try to relax. Once you are there, you have done all the hard work, stressing out about the exam is not going to make the exam any easier for you. **Relax, it's just an exam!** The worst thing that can happen is you will do a bit badly: but it's just some course. I got a C in my undergrad algorithms course. So even if you do badly in 331 life will still go on and things will work out.

# My grading timeline



# Extra review sessions

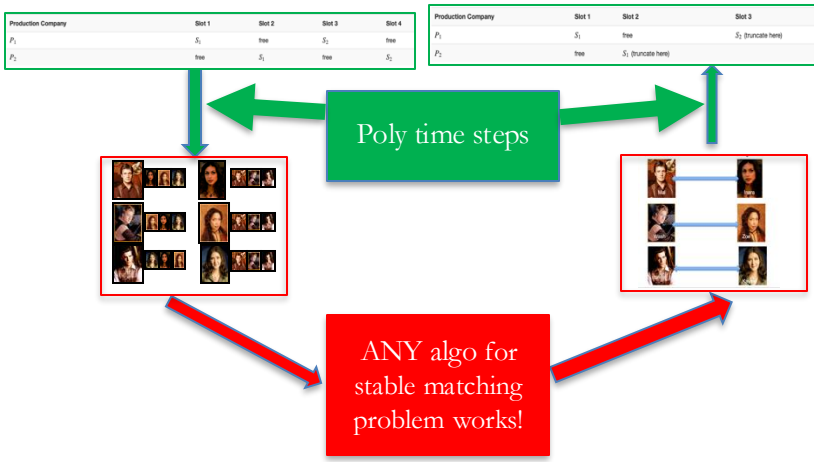


# Questions?

Question 2 (Syke(s) you out)

NRMP
National Resident Matching Program

$$Y \leq_P X$$




Arbitrary Y instance

Pre-process the input

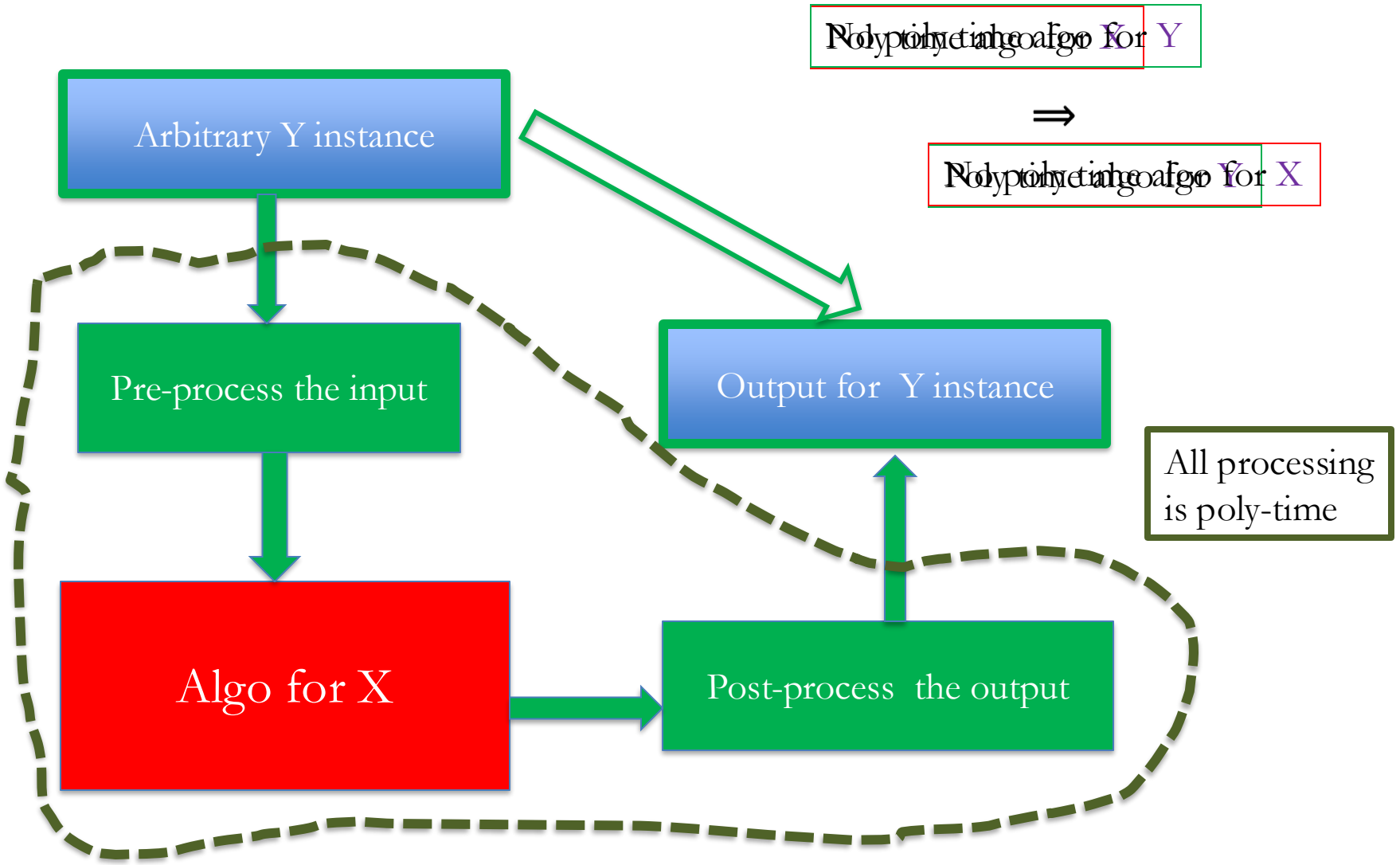
Algo for X

Post-process the output

Output for Y instance

All processing is poly-time

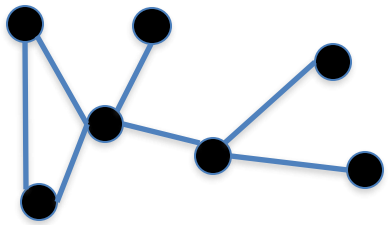
# Implications of $Y \leq_P X$



# Independent Set (IS)

*Input:* Graph $G = (V,E)$ and number $k$

*Output:* Yes iff $G$ has an IS of size $\geq k$



# Today's agenda

Define 3-SAT problem

Redux from 3-SAT to IS

Recap of NP-completeness