Lecture 32

CSE 331

Nov 17, 2023

Homework 7 reminders

Homework 7

Due by **11:30pm** **Tuesday, November 28, 2023**.

Make sure you follow all the homework policies.

All submissions should be done via Autolab.

! Note on Timeouts on HW 7 Q3

For this problem the total timeout for Autolab is 480s, which is higher the the usual timeout of 180s in the earlier homeworks. So if your code takes a long time to run it'll take longer for you to get feedback on Autolab. **Please start early to avoid getting deadlocked out before the feedback deadline.**

Also for this problem, `C++` and `Java` are way faster. The 480s timeout was chosen to accommodate the fact that Python is much slower than these two languages.

Our recommendation

- Either code in `C++` or `java` OR
- If you want to program in `python` then test on first five test cases and test for all 10 only if they pass the first five.

Hint

For part `(b)` convince yourself that one should always schedule a job on the last day and then use it. If in your solution you use the hint, you will also have to convince the grader why you are convinced if you choose to use the hint, i.e. just using the hint as given (without any justification) will result in loss of points.

⊘ Common Mistake

Students correctly state the recurrence for the optimal solution for part `(b)` but do not state the order in which to solve the sub-problems.

Apply to be a CSE 331 TA in 2024!

note @490 stop following 0 views Actions

Want to be a UTA for 331 in 2024?

Prof. Akhter be teaching 331 in the upcoming Spring semester and is looking for UTAs. I expect to be teaching 331 again in Fall 2024 (though this is **not** finalized and is subject to change) and will be looking for TAs then as well. So Prof. Akhter and I are looking to jointly interviewing candidates for CSE 331 TAs for 2024 (on **zoom** tentatively the final week (Dec 14 and after) and/or the week after that (week of Dec 18), 2023).

(As an aside: I also have openings for doing research but I'll post on those once I'm done with all 331 related stuff: i.e. after the grades have been submitted.)

These will be *paid* positions. Time-commitment wise here is what we're looking for

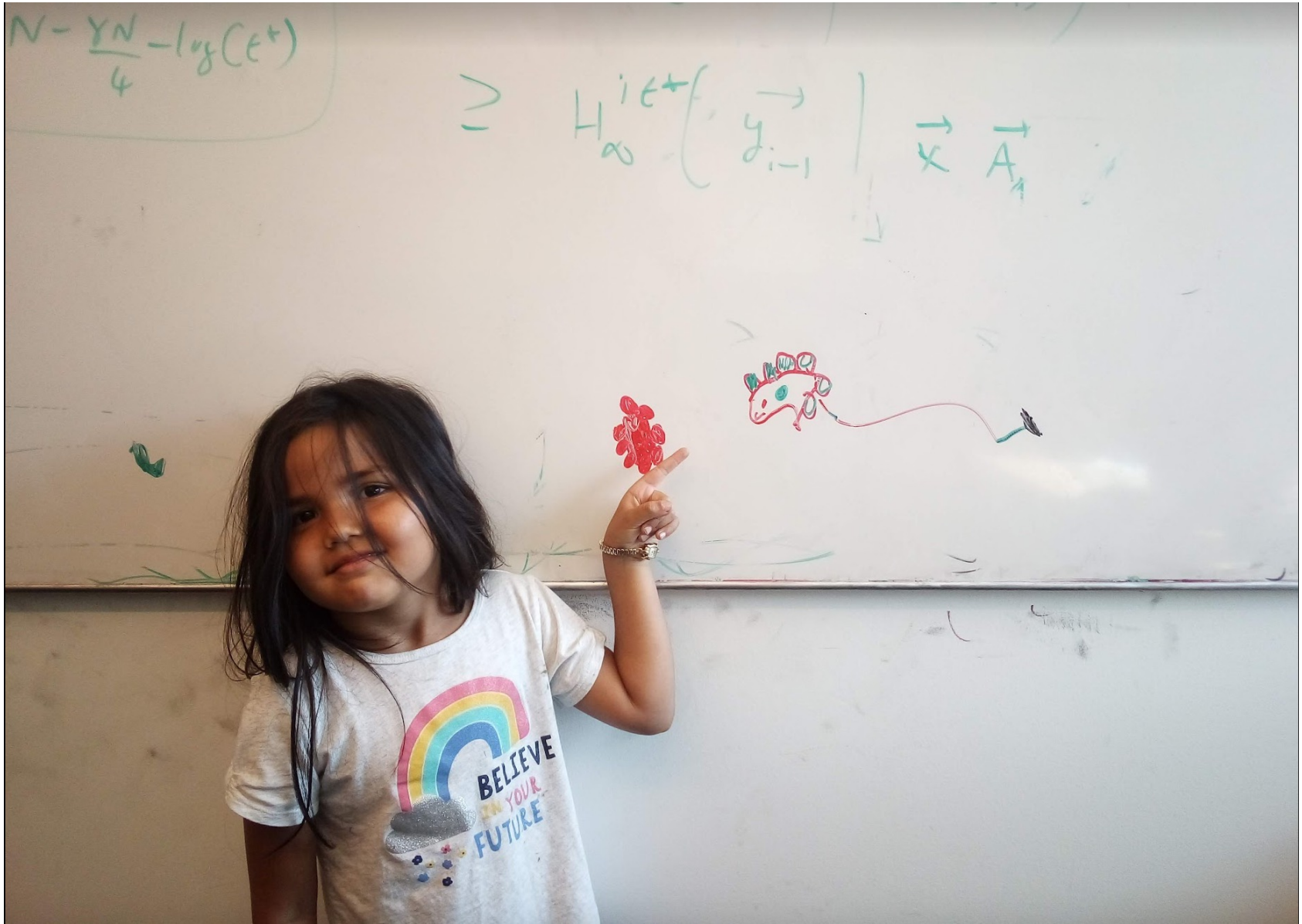
- *Ideally,* you should be able to commit close to 10 hours/week on average. More is of course better!
- Depending on your background (e.g. if you have TAed before), we're willing to be OK with ~5 hours/week on average but no lower than that (and no more than 1-2 TAs with << 10 hrs/week).

A few important points:

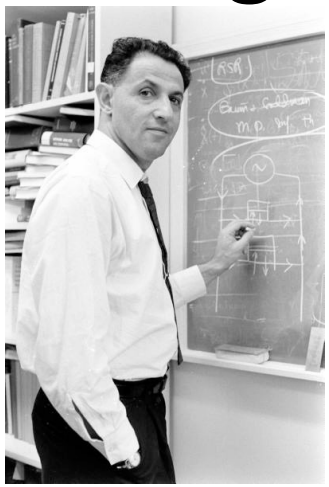
- There is *no* formal minimum grade requirement to be a 331 UTA (Of course you don't know your grade by now). For now, we're basically looking for interested students who enjoyed 331 so far and would be excited to help others.
- A large fraction of your current TAs will be TAing CSE 331 this spring (but pretty much all of them will be gone by the summer) so there will be fewer slots for Spring 24 (5-10) as compared to Fall 24 (10+).
- Being a 331 UTA is definitely a great experience (feel free to ask one of your TAs!) and also **a great preparation for your interviews -- there is no better way to learn algorithms than to teach it!**
- The application process is basically you presenting an algorithm that is covered in class to a "mock recitation"-- once you apply, we will provide more details on the process.

No piazza help during break

Questions/Comments?



When to use Dynamic Programming



Richard Bellman

There are polynomially many sub-problems

$$OPT(1), \ldots, OPT(n)$$

Optimal solution can be computed from solutions to sub-problems

$$OPT(j) = \max \{ v_j + OPT(p(j)), OPT(j-1) \}$$

There is an ordering among sub-problem that allows for iterative solution

$OPT(j)$ only depends on $OPT(j-1), \ldots, OPT(1)$

Scheduling to min idle cycles

n jobs, i^{th} job takes w_i cycles

You have W cycles on the cloud

What is the maximum number of cycles you can schedule?

Subset sum problem

Input: n integers $w_1, w_2, \ldots, w_n$

bound W

Output: subset S of $[n]$ such that

(1) sum of w_i for all i in S is at most W

(2) $w(S)$ is maximized

Questions?

Today's agenda

Dynamic Program for Subset Sum problem

Algo on the board…