Lab 1 — due 8/05

- Turn in everything through gradescope before the deadline!
Goals

• Practice what you will learn in CSE142
• Extend what you will learn in CSE142
  • Understand deeply how a architecture affects performance
  • Understand deeply how to become a “performance programmer”
Course format

- Five labs
  - Due on every Friday
- Zoom Lectures —
  - The same Zoom link to CSE142’s lecture
  - Please check the schedule on [https://calendar.google.com/calendar/u/0/r?cid=eng.ucsd.edu_utnoi975hsports6lhifavtttm0@group.calendar.google.com](https://calendar.google.com/calendar/u/0/r?cid=eng.ucsd.edu_utnoi975hsports6lhifavtttm0@group.calendar.google.com)
  - We plan to only do 142L lectures on Thursday
  - Discussing current or upcoming labs
  - Like group office hours
- Youtube: [https://www.youtube.com/profusagi](https://www.youtube.com/profusagi)
- No final exam
# Grading

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Instructor

• Instructor: Hung-Wei Tseng
  • Lectures:  
    8/2, 8/4, 8/11, 8/18, 8/25 4p-4:50p
  • Lab/Office hours: Tu 11a-12p, F 9a-12p
    https://ucsd.zoom.us/j/96417349749
• Check the calendar on our website
  http://goo.gl/VSL97g
Tutors

- https://ucsd.zoom.us/j/96417349749
- Kimberly Liu
  - TuW 7p-10p and F 7p-9p
- Stella Ma
  - Th 12p-2p, 5p-7p, F 12p-4p
- Alex Wu
  - MW 4p-7p, Tu 5p-7p
Office hour scheduling

Every business day is covered!
And we do give you the weekends!

https://calendar.google.com/calendar/u/0/r?cid=eng.ucsd.edu_utnoi975hspours6lhifavttm0@group.calendar.google.com
Course resources

• Course webpage:
  https://www.escalab.org/classes/cse142l-2022summer/

• Gradescope (for turning in hw)
  https://www.gradescope.com/courses/410303

• Lab Hours
  https://ucsd.zoom.us/j/96417349749

• Calendar for office/lab hours
  http://goo.gl/VSL97g

• Discussion board:
  • Search before ask
  • https://piazza.com/class/l62q5nlhbyh5cc
CSE142/CSE142L

• You must be concurrently enrolled
  • You will not do well in 142L without being in 142 at the same time.

• Other common questions
  • Can I mix and match between 141/L and 142/L (e.g. I took 141 last quarter and I want to take 142L this quarter)
    • No! You cannot mix and match.
    • You must take either (141 and 141L) or (142 and 142L).
    • If you try, it will not count toward your degree.
Hey, I need help... (part 1)

- "Is the lab asking us to graph performance based on working set size or just describe the relationship?"
  - Piazza
- "I’m lost on the lab – I don’t know how input size impacts how the code runs on hardware"
  - Office hours or lab hours.
- "I need to turn in the lab late"
  - No late labs
  - Turn in what you have. It’ll be your ½ weight lab.
Hey, I need help... (part 2)

• “I’m going to miss class”
  • Watch YouTube

• In-depth class concept question (e.g., what’s the difference between pass-by-value vs. pass-by-reference)
  • Lecture/Office Hours

• Administrative question (“When’s Lab 1 due?”)
  • Try to answer it yourself first, then Piazza
Hey, I need help... (part 3)

• I’m sick...."
  • I’m sorry, that sounds awful L. Please take care of yourself.
  • Your lowest scoring lab will count 0 as much as the others
  • Turn in what you have.
  • However, if you have a severe illness that will cause you to miss whole lab, I will ask you to contact the Dean of Student Affairs for your college so they can workout arrangements on your behalf.
Hey, I need help... (part 4)

- “My grade is wrong in gradescope for Lab 2”
  - Regrade request on gradescope
- Illness in the family, child’s daycare changed schedules, etc.
  - E-mail Professor or see them during OH
- Disability Accommodations
  - Email htseng@eng.ucsd.edu with your “paper work” by the end of week 2.
Hey, I need help... (part 5)

• The autograder output contains an uncaught exception
• The autograder doesn’t return a score.
• The autograder times out repeatedly.
• The autograder seems to be otherwise misbehaving.
  • Post on Piazza under “Autograder bugs”.
The course infrastructure is a shared among all the students in the class.

We expect you to use it as intended and treat it with respect.

The autograder takes some steps to prevent malicious and/or accidental damage, but it’s not perfect.

- Finding imperfections is not part of the class.
- It logs everything, so we can see everything you do.

Any attempt to disrupt, damage, or abuse gradescope/autograder will result in you losing access.

- To complete the course, you'll need to purchase time on your own baremetal cloud server for ~$600/month.
- We will file an academic integrity case as well.
Warnings

• You only have about one week for each lab
• You are strongly encouraged to read the lab, so you can come to class prepared.
• Some exercises/demonstrations in a Jupyter Notebook
  • Interactive data collection and analysis.
  • Very little coding. Lots of thinking.
  • Worth a lot of points.
• A programming assignment
  • Write/modify some code to apply what you’ve learned.
  • Worth a lot of points.
• Post-lab survey
  • Provide some feedback on the lab.
  • Worth a few points
Overview of a “Lab”
Not just for Lab 1, but almost the same for every lab

- Go to course home page: https://www.escalab.org/classes/cse142l-2022summer/
- Click invitation link for the current lab
- Log into datahub.ucsd.edu
- Select this option and click “Launch Environment”
- Open a terminal
- Clone your starter repo.
- Open up Lab.ipynb
- Follow the instructions
GitHub
Course Infrastructure: Github and github classroom

- We will use github classroom to distribute starter code for the labs
- You’ll use git/github to manage revisions etc.
- Github classroom is easy to use
- Git can be complex, but the basics are enough for this class.
Course Infrastructure: Bare metal Servers in The Cloud

• We will do a lot of measurement in this class
  • Program performance
  • Program energy/power consumption
  • Detailed hardware behavior
• All of this requires “bare metal” servers
  • Bare metal – no virtualization
  • Full access to underlying processors (esp. performance counters)
• The Jupyter Notebook (and the autograder) run your code on some bare metal servers “in the cloud” (actually a UCSD computer center somewhere)
Course Infrastructure: Docker

- All development and autograding takes place in a docker container.
- Containers provide:
  - An isolated execution environment.
  - A reproduceable, consistent execution environment.
  - A convenient way to bundle a set of tools together.
- The lab docker container provides everything you’ll need for the labs.
- It also ensures that your code compiles/runs in the same way for you and for the autograder.
Using cse142 is a privilege

- Your code runs in the cloud with elevated (although not quite total) access to the machine
- Your code is “sand boxed” in a docker container and time-limited
- There are probably still ways for you to “hack” the servers
- If you try to do any malicious, we’ll revoke your access and you can find another way to complete the labs
- Renting a bare-metal server costs ~$3000/month.
Jupyter Notebook
Course Infrastructure: Jupyter Notebook

• A large part of each lab is done in a Jupyter Notebook
  • Jupyter Notebook is a web-based, interactive computing environment
  • It’s good for collecting and visualizing data
• If you haven’t used Jupyter Notebook before...
  • That’s fine. It’s not that hard.
• We’ll be accessing Jupyter Notebook via UCSD’s datahub.ucsd.edu server farm.
Lab Questions

• There are 20-30 questions per lab.
• Correctness
  • Demonstrate mastery
  • Give the right answer — earn points
• Completeness
  • “forcing function” to get you to engage with the material
  • Give an answer — earn points
  • We will grade ~5 of these at random per lab.
• Optional
  • Optional material for interested students.
  • Give the right answer — earn a sense of personal accomplishment
Course Infrastructure: cse142

• ‘cse142’ is a command line tool you’ll use to run your code.
  • It can do several things.
  • The most common is something like
• cse142 job run “echo hello world”
• What this does:
  • Gathers up all the files in the directory
  • Ships them to the bare metal machine in the cloud
  • Runs your command
  • Gathers up any files that changed.
  • Ships them back to you.
• It looks mostly like “echo hello world” ran locally.
Submission!
Course Infrastructure: Gradescope

- All assignments will mostly be submitted via gradescope
- Jupyter Notebook PDFs
  - PDF submission
  - Submitted via upload
- Programming assignments
  - Autograded
  - Submitted via github
- Post-lab survey
  - Embedded in the lab as a google form.
Let’s walk through Lab 1