CSE 142L: Intro & Lab 1

Hung-Wei Tseng

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 Thursday (except for Lab #1)
- Zoom Lectures —
  - The same Zoom link to CSE142's lecture
  - Please check the schedule on https://calendar.google.com/calendar/u/0/r?cid=c_373ea7ba1adb25dcb44c3a3d1cb62af934f7601955381cdc89116d91596ba4af@group.calendar.google.com
  - We plan to only do 142L lectures on Thursdays
  - Discussing current or upcoming labs
  - Like group office hours
- Youtube: https://www.youtube.com/profusagi
- No final exam

Grading

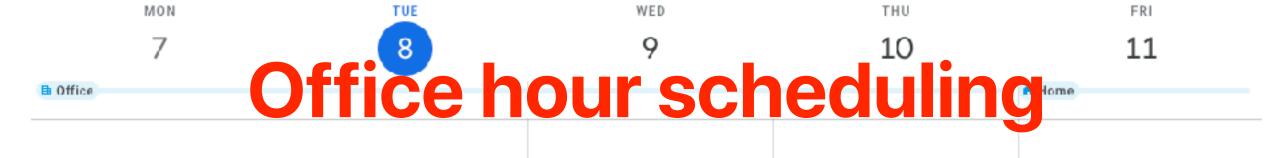| Achievement	Final Grade	Due
Lab 2 PA	A+	8/22/2023
Lab 5 PA	A	9/7/2023
Lab 5	A-	9/7/2023
Lab 4 PA	B+	8/31/2023
Lab 4	B	8/31/2023
Lab 2	B-	8/22/2023
Lab 3 PA	C+	8/24/2023
Lab 3 Notebook	C	8/24/2023
Lab 1 PA	C-	8/15/2023
Lab 1 Notebook	D	8/15/2023
	F	

Instructor

- Instructor: Hung-Wei Tseng
  - Lectures
    Tu (8/8) and
    Th (8/10, 8/17, 8/24 and 8/29)
    5:00p - 5:50p @ WCH 2205/Zoom
  - Lab/Office hours:
    Tu 3:30-5:30p @ CSE 3128
    starting from 8/15
  - Zoom: M 8:30p-9:30p — check Canvas for the link

Tutors

- https://ucsd.zoom.us/j/95484637243
- Chris Chen (in-person @ CSE B230): MTh 9:30a-1:30p
- Honghao Lin (in-person @ CSE B260A): MW 11:30a-1:30p, F 1p-4p
- Elijah Pichler (Zoom): TuTh 6:30p-9:30p, W 5p-7p
- Andrei Secor (Zoom): TuThF 10a-12p, F 5p-7p

Office hour scheduling

Every business day is covered!

MON 7

CSE 142L Chris' Office Hour
9:30am – 1:30pm
B230 Computer Science and
Engineering Building, 3235 Voigt
Dr, La Jolla, CA 92093, USA

CSE 142L Honghao Office Hour
(In Person)
11:30am – 1:30pm
CSE building B260A (at
basement)

CSE142 Lectures
2 – 3:30pm

CSE142 Jerry's Office Hour
(Zoom)
4 – 6pm
https://ucsd.zoom.us/j/95484637
243

TUE 8

Andrei office hours - remote
10am – 12pm

CSE142 Leon's Office Hour
(Zoom)
12 – 2pm
https://ucsd.zoom.us/j/95484637
2/3

CSE142 Lectures
2 – 3:30pm

Hung-Wei's Office Hour (In-person)
3:30pm, CSE 3128

CSE142L Lectures
5 – 6pm

CSE 142L Elijah's Office Hour
(Zoom)
6:30 – 9:30pm

WED 9

Andrei office hours - remote
10am – 12pm

CSE 142L Honghao Office Hour
(In person)
11:30am – 1:30pm
CSE Building B260A

CSE142 Lectures
2 – 3:30pm

CSE142 Discussion Section
4 – 5pm

CSE142L Elijah's Office Hour
(Zoom)
5 – 7pm

THU 10

CSE 142L Chris' Office Hour
9:30am – 1:30pm
B230 Computer Science and
Engineering Building, 3235 Voigt
Dr, La Jolla, CA 92093, USA

CSE142 Leon's Office Hour
(Zoom)
12 – 2pm
https://ucsd.zoom.us/j/954846
37243

CSE142 Lectures
2 – 3:30pm

Hung-Wei's Office Hour (In-person)
3:30pm, CSE 3128

CSE142L Lectures
5 – 6pm

CSE142L Elijah's Office Hour
(Zoom)
6:30 – 9:30pm

FRI 11

Andrei office hours - remote
10am – 12pm

CSE 142L Honghao Office Hour
(Remote)
1 – 4pm

Andrei office hours - remote
5 – 7pm

Course resources

- Course webpage:
  https://www.escalab.org/classes/cse142L-2023su/

- Gradescope (for turning in hw)
  https://www.gradescope.com/courses/564383

- Lab Hours
  https://ucsd.zoom.us/j/95484637243

- Calendar for office/lab hours (you must login @ucsd.edu to view the schedule)
  https://calendar.google.com/calendar/u/0/embed?src=c_373ea7ba1adb25dcb44c3a3d1cb62af934f7601955381cdc89116d91596ba4af@group.calendar.google.com

- Discussion board:

  - Search before ask

  - https://piazza.com/class/lkwyxou6s2v381

CSE142/CSE142L

- You must be concurrently enrolled
  - You will not do well in 142L without being in 142 at the same time.
  - The content of CSE142L this summer has considered the 5-week nature in summer sessions
- 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 ó 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 <u>htseng@ucsd.edu</u> 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".

Resources – Shared Infrastructure Use Policy

- 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.

  - 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 Juypter 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-2023su/

- Click invitation link for the current lab

- Log into https://www.escalab.org/datahub

- 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.

- Git can be complex, but the basics are enough for this class.

Datahub @ escalab.org

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 computer hosted by my lab @ UCR)

Using cse142 is a privilege

- Your code runs in the cloud with elevated (although not quite total) access to the machine

- There are probably still ways for you to "hack" the servers — please don't

- If you try to do any malicious, we'll revoke your access and you can find another way to complete the labs

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 <u>escalab.org</u>'s server.

Lab Questions

- There are about 20 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.

Programming assignment

Programming assignments

- Each lab will have a programming assignment in C/C++ for you to practice your skills of code optimizations

- escalab.org/datahub provides

  - VSCode server if you're more familiar with it

  - You may also use the editors in jupyterhub for code development

- The performance & grading are based on "gradescope's" server, not our servers.

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

Announcement

- Lab 1 due next Tuesday

- We will only have lectures on Thursdays for the rest 4 labs

- Please make sure that you can login <u>escalab.org/datahub</u> as early as possible

**Computer
Science &
Engineering**

142L

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