Leading Computer-based Labs

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Q. If you could be reborn as one of these animals, which would you choose? Keep your choice in mind.

1: Axolotl

2: Hedgehog

3: Capybara

4: Guinea Pig

5: Chinchilla

6: Owl

7: Otter

8: Ferret

Overview

- Introductions
- What to do before my first lab/section?
- How to lead successful labs/sections?
- What to do in tricky / difficult scenarios? (group activity)
- Questions, log attendance and evaluate this workshop.

Introductions

Who Am I?

- My name is **Junrui** (he/him)
- I'm a 5th-year PhD student (Computer Science)
- I like…

8 courses as TA
2 courses as instructor
Lead TA for CS dept

Who Are You?

- I'd love to get to know y'all!
- Please tell everyone:
  - Your **name** and **pronouns** (if desired)
  - Which **department** are you from?
  - When was the **first time** you started programming?
  - What's your **biggest concern/worry** about teaching computer-based labs?
  - Which **one of the 8 animals** do you wanna be reborn as?

Q. If you could be reborn as one of these animals, which would you choose?

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What Are Computer-Based Labs Like at UCSB?

Computer-Based Labs at UCSB

Goal: help students complete a structured assignment

- 50 min
- 1 TA, 10-30 students
- Typical flow:
  - TA reviews basic concepts & go over lab instructions for 5-10 min
  - Remaining time:
    - Students work on the lab individually
    - TA walks around the room to offer individual help
- May differ from course to course!

Sample lab from CMPSC 8

- Lab instructions: https://ucsb-cs8.github.io/w20/lab/lab01/

- Pre-lab slides that TAs go over: https://drive.google.com/file/d/1OA7xF50ffKJbs5mdWFAsuEenmQV5O22S/view

Things To Do BEFORE Your First Lab Section

Check In With Your Instructor

- Ask them about:
  - **The Structure of Sections:**
    - Is there a pre-set lab that students will need to work through?
    - Are there worksheets you will need to cover?
    - Will students need to turn anything in after Section?
  - **TA Expectations:**
    - Are you expected to be more or less autonomous OR
    - Is there a lesson plan they would like you to adhere to?
    - Are there going to be weekly TA meetings?

Check In With Your Instructor

- **Workload Expectations:**
  - Will you be responsible for grading any student assignments?
  - How many labs per week will you lead?

- **General Course Logistics:**
  - What are the main course sites (e.g. Canvas, Gradescope, etc.)?
  - Do you (TAs) have access to them?
  - How will the instructor communicate with you going forward (e.g. email, course Slack space, etc.)?

Check Out the Lab Classroom

- Labs take place in specially-designed **computer labs**, operated by Collaborate (https://collaborate.ucsb.edu/spaces)
- These spaces come **equipped with computers**, so neither you nor your students need to bring personal computers.
- Before the start of your first Lab, **physically visit** the classroom to check it out!
    - Is there a whiteboard or a blackboard?
    - Where can you get teaching supplies (chalks, erasers, markers)?
    - Do you need a key to access lectern (multimedia system)?
    - How long does it take to get there? (Don't be late!)

You can use https://collaborate.ucsb.edu/spaces/labs or https://www.aaiscloud.com/UCA_SantaBarbara to check when your Lab is open/available

Lectern (Multi-Media System)

Lectern (Multi-Media System)

- Most campus classrooms come equipped with a built-in computer.
- In order to use this computer, you will need to get a lectern login account.
- You can do so by visiting KERR 1160 during normal operating hours (check https://id.ucsb.edu/classroom-services for more information)

Lectern Keys

- Keep in mind that some (though not many any more) projector systems require a key in order to operate.

MEL Key; Pick up at
Kerr 1160

  - Make sure you leave your key **in** the lectern and in the **on** position for the entire duration of your Section.

- Check with your dept that you have the right kind of key for the specific classroom you're teaching in

The Four P's

for how to lead successful lab sections

Preparation

Go through the lab/handout thoroughly **on your own** first.

Keep an eye out for:

- Are there any **typos** in the solutions?
- What could be some potential **pitfalls** or sources of **confusion** students might encounter?
- How would you solve **common bugs** students might run into?

Pacing

- Develop and adhere to your **Lesson Plan**
  - A Lesson Plan is a document outlining all of the things you want to do in Section, and how long you plan to allocate for these things.
  - As is the case with most Sections, creating a Lesson Plan can help you make sure you are using your Lab time wisely.
  - **Don't cram in too much info!**
- In some Lab sections, you may be tasked with providing a **short recap** of material at the start of the Section (before students start to actively work on the lab assignment/handout)
  - Make sure to allocate enough time for this (but not too much!)
- Example lesson plan: link

Participation

- From **YOU**: During the lab, make sure to be an "active TA"!
  - That is; don't just sit in the corner idly. Go around the room, check student work, give verbal time checkpoints, etc.
- From **students**: encourage collaboration (if allowed) and student participation wherever possible.
  - Sometimes students can learn a lot by grouping up and trying to tackle the same problem.
  - But make sure students aren't just showing each other their solutions. Everyone should still be completing their own work.

Patience

Resist the urge to type on student laptops!

It can be **super tempting** to take over when you see a student struggling

- "I already know the concepts, but my job is to help **you** to understand them!"
- Instead, see if you can give guidance on ***how*** the student should proceed **without** just giving them the answer.

My favorite trick: answer a question by **asking more questions**!

- "Can you walk me through what you've tried so far?"
- "What's the first step you think makes sense here?"
- "When you say ___, do you mean ___ or ___?"
- "What would happen if you tried a simpler example first?"

Grading Computing Assignments

Learning Management Systems (LMS)

- Many programming courses opt to use a **Learning Management System** (LMS) to aid in the collection, grading, and return of computing assignments.
- The two most commonly used at UCSB are: **Canvas** and **Gradescope.**
  - UCSB has a great Canvas support team that provides great resources and help with Canvas.
- Some courses utilize **autograders** (a special program that tests and grades student submissions).
  - If your class is using an autograder, check with your Instructor to make sure you understand both how to use the autograder but also how the autograder functions.
  - If you're in CS department, we'll cover how to build autograders in CS 501.

Handling *Tricky* Scenarios

Scenario (Warm-Up)

When you walk around the classroom, you notice that a student is copying lab instructions, pasting them into ChatGPT one by one, and asking ChatGPT to solve the lab for them.

What would you do?

Use of AI in Classroom

UCSB Academic Integrity:

- Taking credit for any work you did not create… or utilizing artificial-intelligence programs **without prior approval from instructor**
- **Unauthorized** use of artificial-intelligence programs to complete course work

Ultimately, the course **instructor** decides the AI policy for the course.

- Ask your instructor to *clarify* which use(s) are acceptable, and which ones are not.
- If you suspect a student of unauthorized use of AI, you can let the instructor know.

If you could keep one of the following animals as a pet, which one would you pick?

1: Axolotl

2: Hedgehog

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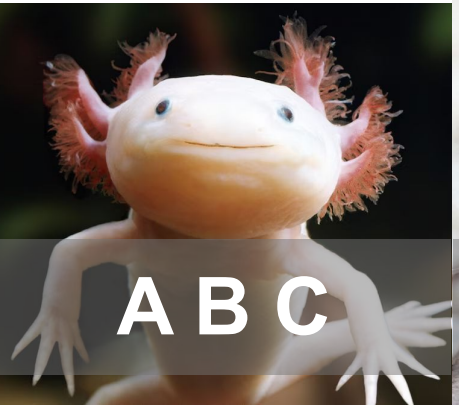
Instructions

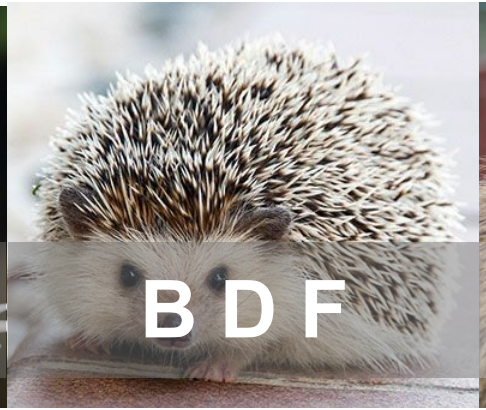
1. Based on your choice (1-8), move to the designated space.
2. Introduce yourselves, and assign the following roles:
    - The **Recorder** will take notes on a provided Google slide
    - The **Time-keeper** will keep track of time (15 min total)
    - The **Speaker** will summarize your group's discussion and share it with the rest of us.
3. Have your group's **Recorder** navigate to the appropriate Slide Deck.
    - **10am:** https://tinyurl.com/tao-10
    - **11am:** https://tinyurl.com/tao-11
4. As a group, discuss the situations outlined on your slide, and add sticky notes brainstorming possible solutions/resolutions.
5. After 15 minutes, we will reconvene and discuss.

15:00

Scenarios to discuss for each group:



1: Axolotl



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Scenario A

While grading a particular Lab Assignment, you find a student whose code, though correct, contains several functions that were not covered in lecture. Furthermore, you note that their code for this particular Assignment has a significantly different style (e.g. formatting, variable naming conventions, etc.) than previous work they have submitted.

What concerns might you have in this case?
How might you proceed?

Scenario B

There is a typo in the lab instructions that makes the lab significantly harder than intended. However, none of your students bring this to your attention during the lab section.

How do you grade the lab?
How do you communicate this with your students?

Scenario C

There is a student in your section that demands a lot of your time. They frequently need one-on-one debugging help at their computer, and struggle with basic troubleshooting (where many of their questions could be answered by referencing documentation or a quick online search). You are afraid you are spending too much time with this student at the expense of not being able to help other students.

How do you handle this situation?
How can you best help this student?

Scenario D

Consider a scenario where students work in pairs. There is one pair where you find that one student writes all of the code and does most of the work while the other student does not contribute much at all.

What are some potential downsides (for the students) of an arrangement like this?
How would you address this pair?

Scenario E

Consider a scenario where students submit code they wrote to be automatically graded using a test suite. You find one student who struggled with some edge cases and ended up "hard coding" their program's output to exactly match the test suite.

Do you think this is a violation of academic integrity?
How would you address this student's submission?

Scenario F

Near the end of the quarter, a student comes to your office hours to protest grades on their past programming assignments. The student argues that while their code does not pass all of the tests, they should still get some partial credit for getting close to the solution.

How would you handle this student?

Scenario G

A student encounters a bug in their program that you've never seen before. You try troubleshooting with them for a while, but cannot find a solution. The student seems distressed that they can't get past this bug and complete the lab.

What do you do? What do you say to the student?

Scenario H

For most of the lab section time, your students are working at their computers and do not seem to have many questions or problems.

How would you spend this free time?

Acknowledgements

Many thanks to the Office of Teaching and Learning (OTL) team, and all the previous TAs who have historically run this workshop!

Thank you!

And please return the handouts to me so that I can reuse them!