CSE 390B, Spring 2022

Building Academic Success Through Bottom-Up Computing

Course Introduction

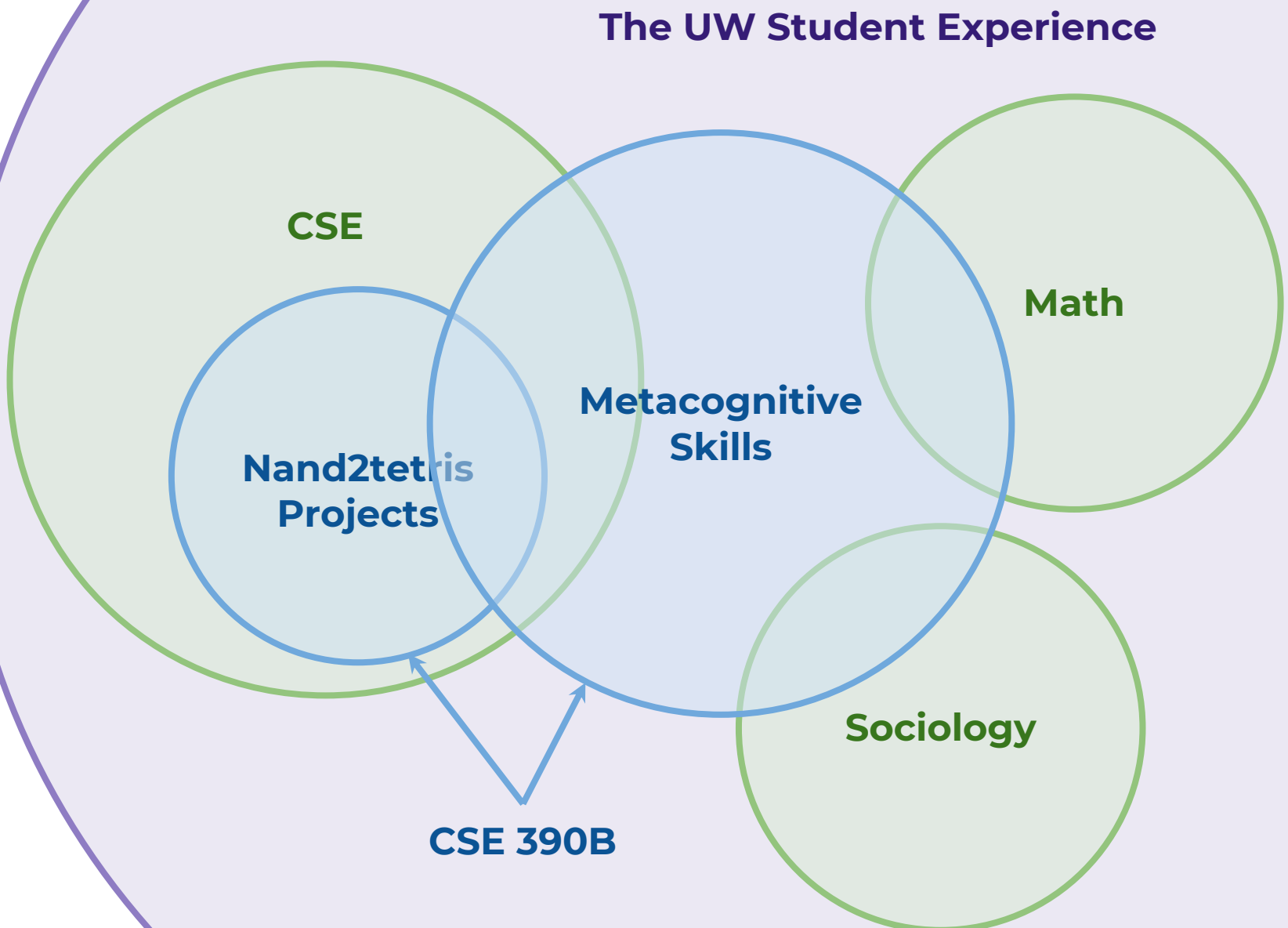
Welcome to CSE 390B!

Introduction to CSE 390B, Course Logistics, and Programming Projects Overview

Lecture Outline

- **What is CSE 390B About?**
  - **Overview of CSE 390B**
  - **Why the Course Matters**
- Course Logistics
  - Lectures and Assignments
  - Course Policies and Expectations
- Programming Project Series
  - Nand2tetris Overview
  - Tools demonstration

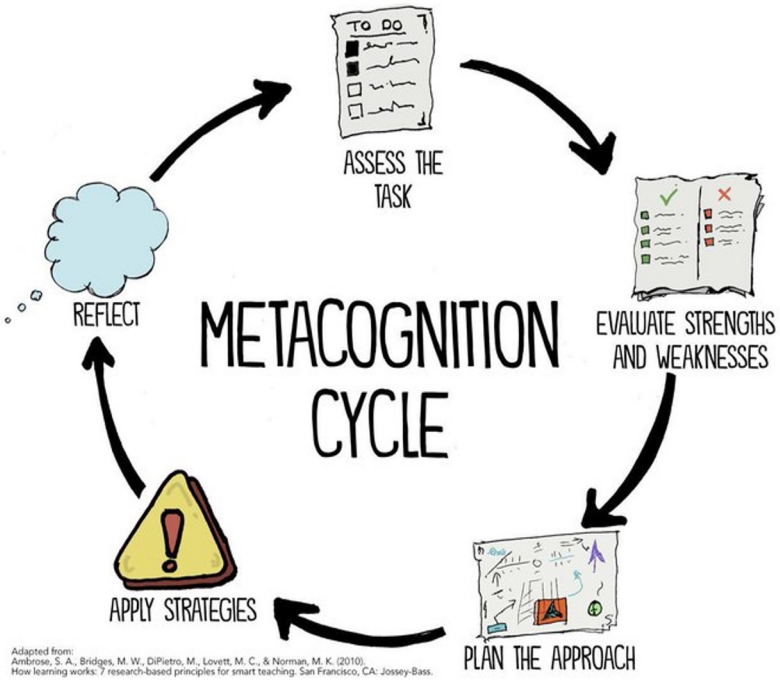
What is CSE 390B?



Metacognitive Skills

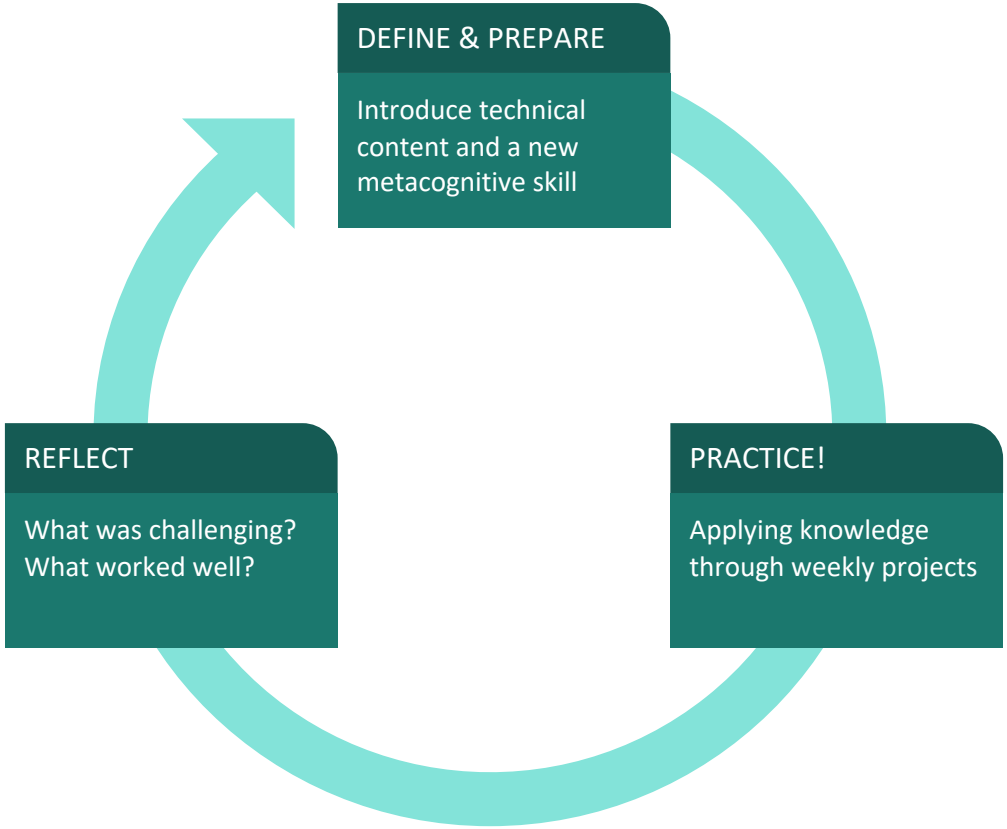
- What does **metacognition** mean?
  - Awareness of your thought processes

- Metacognitive skills we will cover:
  - Time Management
  - Annotation Strategies
  - Test-Taking
  - Note-Taking
  - Written & Oral Communication
  - Testing & Debugging
  - Design Decisions



The Connection

- How do the different elements of practicing metacognitive skills and working on technical projects connect?



Technical Sneak Peek of CSE 390B

- Fascinating question:
  - What happens **under the hood** when code runs?
- Fascinating answer:
  - Many layers of **abstraction**, each with its own answer
- Nand2tetris: Project for exploring bottom-up layers
  - Can do everything with NAND gates and input / output
- **Empowering**: A coordinated, broad look at "how computers really work"
  - Closest to the Hardware / Software Interface CSE 351 but lower level, with elements from Digital Design (CSE 369), Operating Systems (CSE 451), and Compilers (CSE 401)

Why Does CSE 390B Matter?

- Technology is based on bottom-up computing
  - Learning how computers work is foundational to computer science
  - You'll see the birds-eye view of computer science and understand how your courses fit into the big picture
- This course equips you with a toolbox
  - A CSE degree isn't just about learning technical concepts
  - A college education is also about preparation for a career and your future (collaboration, organization, etc.)
- This course empowers you to explore
  - You will become independent learners and be autonomous in your learning for future UW courses and beyond

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Succeeding in CSE 390B

- This course will have frequent assignments and move through many topics
  - Stay organized, falling behind makes it difficult to catch up
  - You will not be successful in this course if you wait until the day before to do your assignments
- This course rewards participation
  - Lecture participation and TA meetings are expected
  - In-class activities are meant to help you with your weekly projects
- This course is not a way to earn an easy 4.0
  - What you get out of the course is what you put in
  - Not the course to “boost” your GPA
  - We expect students to work hard and give their best effort

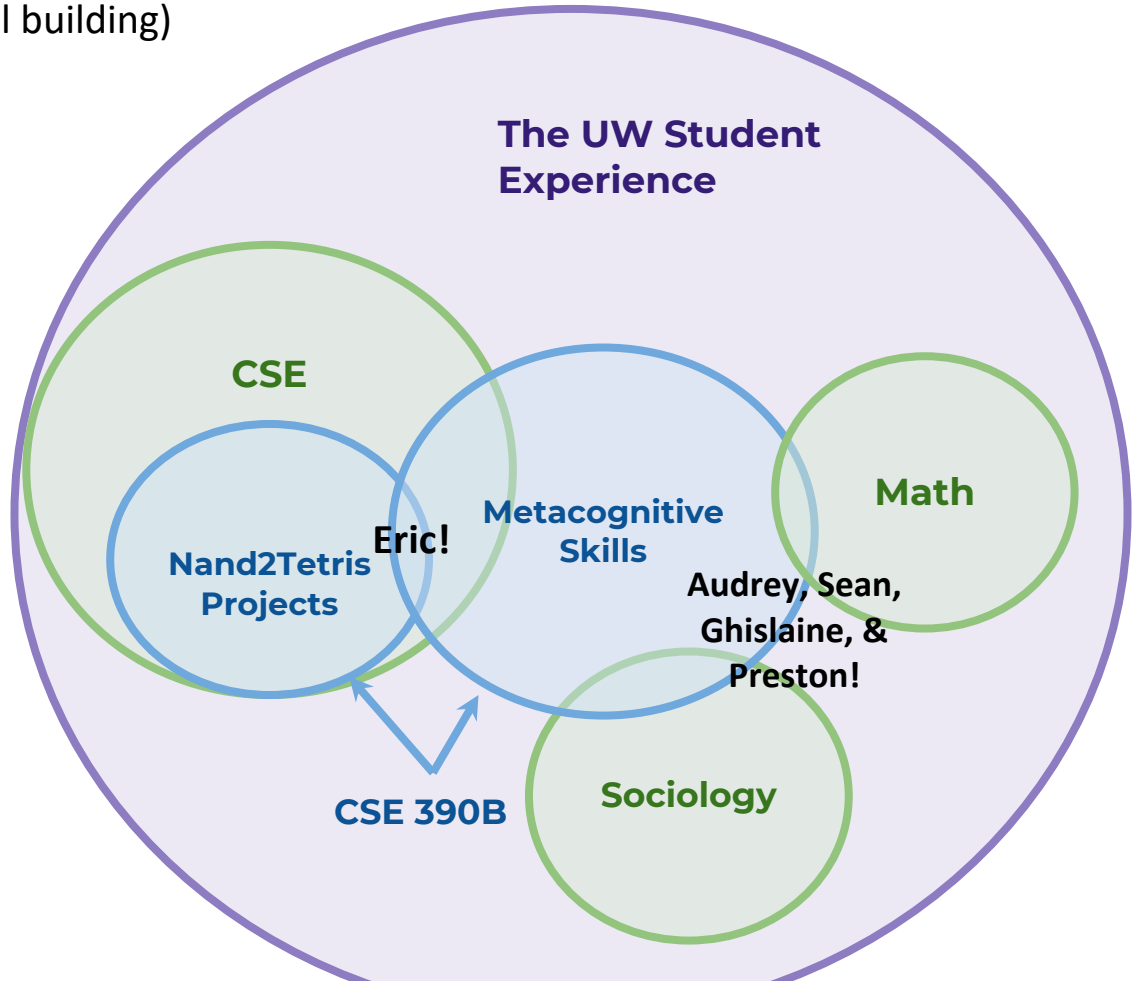
Course Staff Roles

Eric

Teaching the technical (bottom-up computing) and metacognitive (academic skill building)

Audrey, Sean, Ghislaine, and Preston

Weekly TA meetings as a touch point in practicing the application on course concepts and study skills



Logistics: Grading Breakdown

- 50%: A sequence of eight projects
  - Each will have a metacognitive and technical, programming component
  - Projects will be assigned on Thursdays and generally due the following Thursday
- 15%: Midterm Examination
- 15%: Final Project & Presentation
- 20%: Participation
  - 10%: Lecture attendance and Poll Everywhere questions
  - 10% Student-TA meeting attendance and engagement

Logistics: Academic Integrity

- Work to be completed and submitted **individually**
  - Do not share your solutions with others
- Collaboration allowed and *encouraged*, but discussions must be at a high-level
  - You may share implementation strategies and debugging tricks, but NOT lines of code or your entire solution
- Do not seek answers or solutions from those not in the class or from the website
- If you have any questions about what is considered academic integrity or not, please ask the course staff

Logistics: Student-TA Meetings

- Weekly 1:1 Student-TA Meetings
  - A required element of the course (factored into participation grade)
  - 45 minutes each week (the first meeting will be one hour)
  - 1:1 Student-TA meetings will begin Week 2 based on the availability of you and the TA
- Student Expectations
  - Come prepared, on time, and ready to work
  - Absences or frequent reschedules will negatively impact your grade
  - See syllabus for additional information and policies
- TAs will coordinate the first Student-TA Meeting

Logistics: Lecture Pre-readings

- Short readings to be completed before each lecture
  - Posted under the course calendar under each lecture
- Allows for more student interaction and engagement with course material during lecture
  - Individual or group work during lecture for project preparation
- Research shows that "active learning" leads to improved learning and better grades (Freeman et al., 2014)
  - Added benefit of interacting with your peers and the course staff

Freeman, Scott et al. "Active learning increases student performance in science, engineering, and mathematics." *Proceedings of the National Academy of Sciences of the United States of America* 111, 23 (2014): 8410–8415. https://www.pnas.org/content/111/23/8410.

Logistics: Lecture Polling

- A way for you to instantly practice and solidify the concepts covered in lecture
  - Research shows the act of thinking about an application question is a highly effective way to learn
- Factored into participation grade (completion only)
- We will be using Poll Everywhere
  - Sign up now for an account at https://pollev.com/
  - New policy that requires SSO log-on

Poll Everywhere

Vote at https://pollev.com/cse390b

How will Poll Everywhere be used in lectures?

A. To grade you on whether you get the questions we ask correct
B. To aid your learning by giving you a chance to practice applying the material we are covering
C. To factor into the participation grade based on correctness of responses
D. To see who is paying attention during lecture
E. We're lost…

Logistics: Late Policy

- **Five late days** for the quarter
  - Do not need to tell the course staff ahead of time
  - **Maximum of two late days** can be used per project
  - Use late days wisely, intended to offer additional flexibility

- Under extenuating circumstances, you may make an extension request
  - Only considered if the request is made before the project deadline
  - See syllabus for extension request instructions

- You are *guaranteed* to pass the course if you meet all minimum passing requirements of each project
  - Importance of staying persistent and resilient

Logistics: Late Policy

- Projects submitted past late days allotted or new deadline via extension request will receive a **10% deduction** per day

- Example scenario: Submitting a project three days late would use two late days and receive a 10% deduction

Logistics: Course Resources

- Course Webpage
  - Main source for everything related to CSE 390B
  - Includes syllabus, course calendar, project specifications, and all the relevant resources for the course

- Canvas
  - Access to lecture recordings via Panopto
  - Check remaining late days (updated after every project)
  - Accessing necessary resources for projects

- Mailing Lists
  - Course staff will reach out via cse390b_sp22@uw.edu for urgent course announcements
  - Email cse390b-staff@cs.washingtonn.edu for any urgent matters

Logistics: Course Resources

- Ed Discussion Board
  - The place to ask and answer questions related to the class (logistics, projects, general questions, etc.)
  - Course staff will post non-urgent announcements here
- GitLab
  - Project distribution and submission
- Gradescope
  - Where you will submit the metacognitive parts of the projects
  - You will receive your project grades and feedback here

Meet Your Peers

1. Introduce yourself! Share your name, pronouns, and a unique fact about yourself
2. Share what you are excited for in CSE 390B
3. Share what you are concerned about in CSE 390B

- Appoint a facilitator to steer the conversations
- Appoint three presenters: (1) Share the names in your group, (2) share one excitement about CSE 390B, and (3) share one concern about CSE 390B

Five-minute Break!

- We'll take a five-minute break close to the middle of every lecture
  - Feel free to stand up, stretch, use the restroom, drink some water, review your notes, or ask questions
- We'll be back at:
- Research shows that mid-lecture breaks reduce the decline of attention (Olmsted, 1999)
- Any song recommendations? Respond on Poll Everywhere at https://pollev.com/cse390b

Olmsted III, John. "The Mid-Lecture Break: When Less Is More." *Journal of Chemical Education* (1999). https://pubs.acs.org/doi/abs/10.1021/ed076p525.

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- **Programming Project Series**
  - **Nand2tetris Overview**
  - **Tools demonstration**

Programming Project Series

- nand2tetris
  - You will build an entire (simulated) computer
  - Source: Single hardware logic gate
  - Destination: A computer program that runs a game of Tetris
  - Topics: Hardware concepts (Boolean logic, sequential logic, computer chips, etc.), low-level software, fundamentals of operating systems, virtual machines, compilers

- Acknowledgements
  - Projects adapted from the open-source nand2tetris curriculum
  - Everything you need will be distributed by the course staff

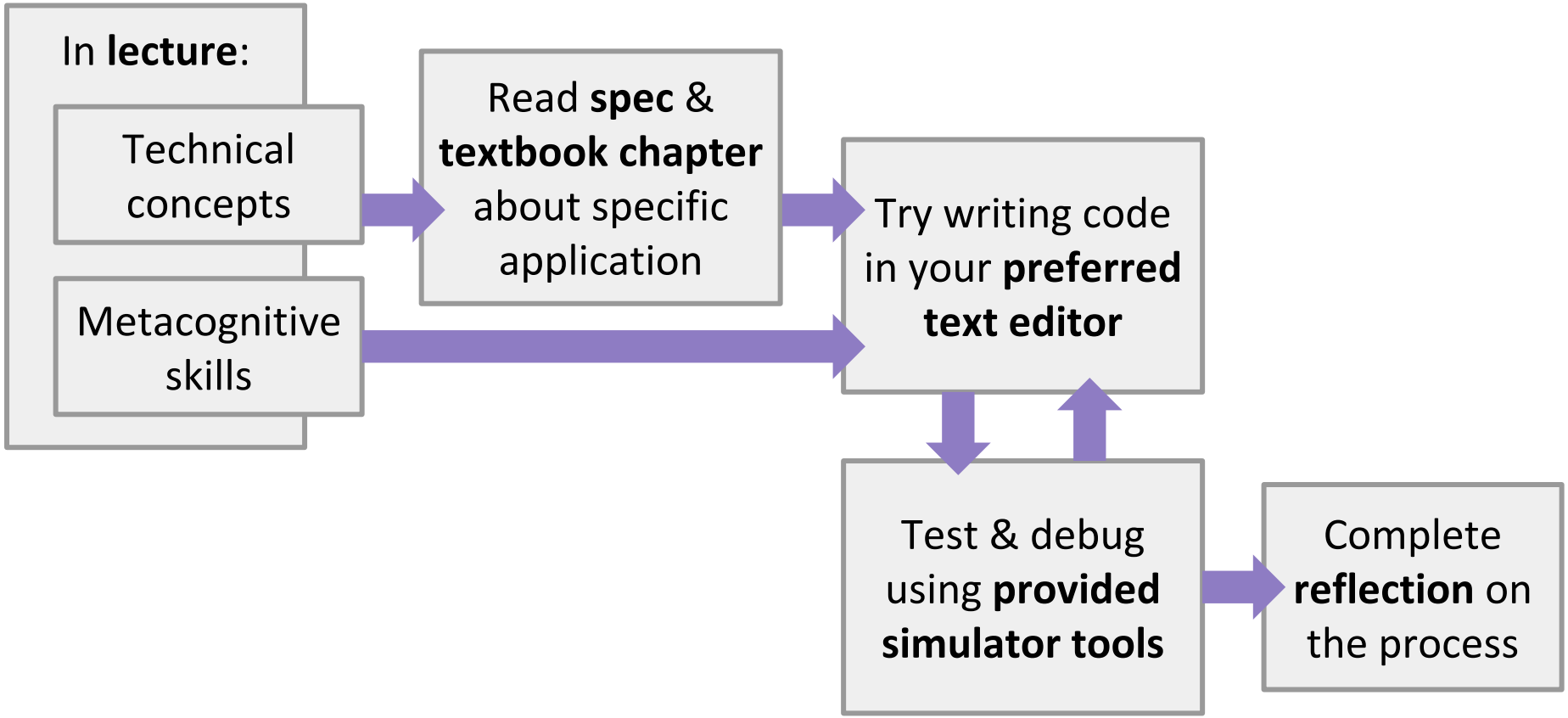
Programming Project Series

- Getting your assignments
  - You will have your own GitLab repository for the quarter
    - For distributing starter code
    - Used for organizing and submitting your projects

- Specifications, textbook chapters, and references will be on the course website
  - We'll provide the instructions you need for using Git

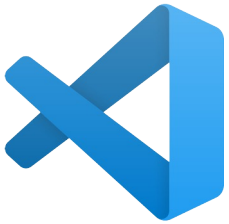
Programming Project Series

- Roadmap for completing the programming projects:



Course Infrastructure Demo

1. Understanding and using Git
2. Find your CSE 390B GitLab Repository
3. Add your SSH Key
4. Explore the starter code using your favorite editor
5. Make a commit



Steps outlined in detail in [Project 1 website]

Project 1 Overview

- Programming Component: **GitLab Setup**
  - Will prepare for future CSE 390B projects
- Metacognitive Component: **Course Resources Worksheet** and **Project 1 Reflection**
  - Organize your resources for this spring quarter
  - Identify key learning resources that you will be accessing throughout the quarter
- Estimated time to complete: 30-60 minutes
- **Project 1 due this Thursday (3/31) at 11:59pm PDT**

Lecture Readings

- First lecture reading is posted on the course calendar
  - Please complete it before lecture this Thursday
  - Jot down your questions and ask them this Thursday

- The reading should take around ten minutes
  - Intention of pre-readings is initial exposure, not mastery

March				
Monday	Tuesday	Wednesday	Thursday	Friday
28	29 14:30-15:50 Lecture 1: Course Intro (pdf, pptx) CSE2 G04 Reading 1: Course Syllabus 18:30-19:30 Office Hours (Eric) CSE2 153	30 13:30-14:30 Office Hours (Eric) CSE2 153	31 14:30-15:50 Lecture 2: Boolean Logic & Project 2 Overview (pdf, pptx) CSE2 G04 Reading 2: Boolean Logic and Functions 16:00-17:00 Office Hours (Ghislaine and Preston) CSE2 153 23:59 Project 1: Course Resources Worksheet & GitLab Setup due	01

Wrapping Up

- **Project 1 due Thursday, 3/31 at 11:59pm PDT**

- Office hours times and locations on course calendar
  - Feel free to stop by to just work on projects or say hello!

04	05	06	07	08
12:30-13:30 Office Hours (Sean) CSE2 153	13:00-14:00 Office Hours (Audrey) CSE2 153	13:30-14:30 Office Hours (Eric) CSE2 153	14:30-15:50 Lecture 4: The ALU & Growth Mindset (pdf, pptx) CSE2 G04 Reading 4: Negative Numbers in Binary	
	14:30-15:50 Lecture 3: Boolean Arithmetic & Time Management (pdf, pptx) CSE2 G04 Reading 3: Binary & Boolean Arithmetic		16:00-17:00 Office Hours (Ghislaine and Preston) CSE2 153	
	15:50-16:30 Office Hours (Eric) CSE2 153		23:59 Project 2: Study Skills Inventory & Boolean Logic	

- Use the Ed Discussion Board to ask and answer questions

- See you all on Thursday! 👋