Syllabus

Lecture: T/Th 3:30-5:30, via Zoom
Instructor: Prof Pisan Email: **pisan@uw.edu (mailto:pisan@uw.edu)**
Office Hours: By appointment, see **Canvas Calendar to book a time (https://canvas.uw.edu/files/68553874/)** . If you cannot make it to any of the times, email me with 3 possible dates and times.

Course Description

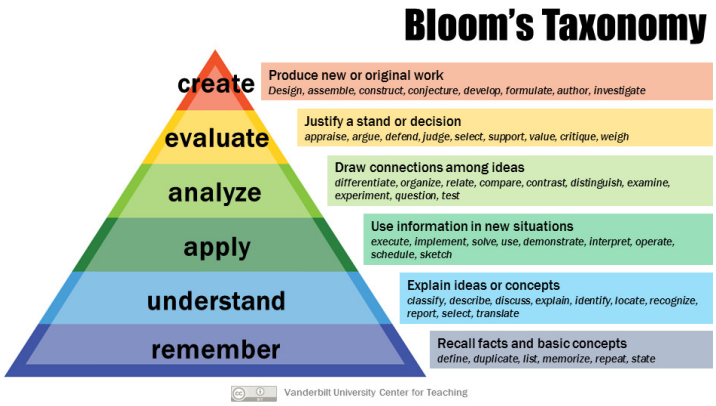
This fast-paced course is intended to enable students to design solutions to programming problems using object-oriented techniques. The course integrates the fundamental discrete mathematics aspects of computing with detailed instruction in end-to-end software design. By the end of this quarter, you will be familiar with much of the C++ language and the basics of object-oriented programming. You will understand how to analyze a problem and design a solution. You will understand the basic data structures and algorithms which are the basis for much of computer science. You will also be able to analyze the trade-offs among memory, execution time, and implementation complexity associated with them. Topics include: recursion, computational complexity and algorithm analysis, logic, induction, lists, stacks, queues, sorting and searching. Also covered are object oriented fundamentals such as abstraction, encapsulation, hierarchy, and polymorphism.

Textbooks

- Data Abstraction and Problem Solving with C++: Walls & Mirrors (7th Edition), Frank M. Carrano, Addison-Wesley.
- An Active Introduction to Discrete Mathematics and Algorithms (version 2.6), Charles Cusack, David Santos, GNU Free Software, 2016. (available online **(https://cusack.hope.edu/Notes/?Instructor=Books)**)

Grading

A scale of 90s (3.5-4.0), 80s (2.5-3.4), 70s (1.5-2.4), 60s (0.5-1.4) is a rough guide. 2.0 decimal grade corresponds to 75%. The above percentage grades are the minimum required to get the decimal mark indicated. If you get 80%, you are guaranteed to get at least 2.5. In general, grades are not curved, so your success is not determined by how well or badly other students in the class are doing.



- **Exercises** 15% - can miss one without any penalty. Exercises are assessments from the lower levels of Bloom's taxonomy. These exercises test whether you remember and understand the concepts discussed and whether you can apply them in novel situations. We will have in-class exercises, Canvas quizzes, short group exercises and other activities as part of the course.
- **Projects** 35% - can submit one of them 1-day late for any reason except #5 which is completed as a group. Projects are substantial assessment items from the higher levels of the Bloom's taxonomy. Projects require you to analyze and evaluate new information as well as create original work. Projects take significant time and effort. Most, but not all, of our projects in this course will be designing and implementing programs.
- **Midterm** 25%. Open-book, open-internet, 2-hour exam with questions from the higher levels of the Bloom taxonomy.
- **Final** 25%. Open-book, open-internet, 2-hour exam with questions from the higher levels of the Bloom taxonomy. I will provide sample questions for Midterm and Final to help you prepare.

Policies

Attendance: Attend all classes. If you are going to miss a class, I'd appreciate a courtesy email with an explanation, but it is not required. You are responsible for all the material covered in class, as well as any announcements including change of due dates or assignment specifications.

While there is no penalty for missing a class, missing a class might also mean you will miss one or more graded Exercises. Your lowest mark in "Exercises" will be automatically dropped (see under Canvas > Assignments to see which of the assignments are under the "Exercises" heading). If you know that you will be missing several classes, you should reconsider dropping this course.

If you miss a class, you need to make-up for it on your own by asking your friends, reviewing the textbook, lecture materials, etc. Emailing me to ask if "there was anything important', expecting me to repeat the lecture or summarize it for you is considered rude. You are welcome to ask clarifying questions once you have made a good faith effort to understand the material using the available resources.

Staying focused during online courses is challenging, but there are several things you can do to keep focused:

- When and if possible, find a quiet room where you can work undisturbed for the duration of the lecture
- Close all browser windows or documents open that are not relevant for the current class activity
- Close your email account, log out of social media accounts
- Keep your camera on to help you stay on task and to strengthen our classroom as a supportive learning environment. It is OK if your pets, kids, friends or parents make an occasional appearance. We all have lives beyond the classroom. If you do not have a desktop camera, you can login to Zoom simultaneously through your desktop computer and your phone.
- Ask questions. Use the "raise hand" feature to get your instructor's attention. If you do not have that option, use the chat or unmute your microphone to ask a question.
- Participate fully in breakout room exercises. If somebody in your breakout room is not participating in the exercise, let me know via email. I will monitor the situation. If somebody is failing to contribute over multiple sessions, I will contact them to address the issue.
- For some people, having something to eat or drink can also help focus. Be mindful of your choices, so you are not eating lots of unhealthy snacks and compromising your health at the expense of trying to remain focused.
- An important aspect of the course is creating a supportive learning environment, finding and connecting with peers that you can reach out when you are stuck. Breakout rooms give you opportunities to work with your classmates. Being able to see each other, even when it is a tiny picture on Zoom, strengthens these social connections.

While there might be a good reason to take a screenshot of the lecture notes being shared, there is no good reason to take a screenshot of Zoom participants, just like you don't usually take pictures of the class when you attend an in-person class. If you can’t resist the awkward screenshot, do NOT post it on the internet without getting permission from all the people in the screenshot. Regardless of your intentions, once posted any image can be misinterpreted, modified, go viral, and can cause real harm.

I understand that you may need to abruptly leave the Zoom session to attend to any number of unexpected events from a barking dog to a child needing attention. Very few people have a private room where they won't be interrupted for their Zoom sessions. Do the best you can. Attend to any emergencies, take care of your family. If you have to leave the Zoom session for an extended period of time, review the recordings and send me an email afterwards.

Assignment Submission: Late assignments are not accepted. Your lowest mark in "Exercises" will be automatically dropped (see under Canvas > Assignments to see which of the assignments are under the "Exercises" heading). For the projects, you can submit one of them (except #5) one day late for any reason.Follow the assignment submission instructions as each assignment will have different requirements.

I will make allowances for exceptional circumstances such as sickness, bereavement and official university business. I will not make exceptions for work, other classes, personal obligations, etc.

Effort: Expect to spend 10-15 hours per week outside class. If an assignment is worth 10%, expect to spend 10-20 hours on the assignment. If you are spending too much time or too little time, let me know we'll adjust the course content. Learning happens best when your are challenged and get to stretch your limits.

Exam Procedures: Midterm and Final exam will be open-book, open-internet during. I will provide sample questions to help you prepare for the exam.

Academic Integrity: Do the right thing. If in doubt, see **Academic Integrity and Plagiarism Prevention Resources (http://guides.lib.uw.edu/bothell/ai)** for details on what is "right". Talking about code is OK, looking at each others code is not OK. Looking at references to understand how a function gets used is OK; searching the internet for assignment solutions is not OK.

Communication: Join the **course channel on Discord (https://discord.gg/5mEm92e)**. Discord is an extension of the classroom, so use a meaningful nickname and act professionally. If your question can be answered by a classmate, post it to Discord rather than using email or waiting for office hours. If your question needs my attention, tag me on discord. Office hours are for complex issues or topics you are struggling with.

Use your UW email rather than "Canvas Messaging" if you need to communicate directly with me on issues that cannot be discussed on discord. "Canvas Submission Comments" should only be used to draw the grader's attention to a specific part of your submission.

Problems: If you are having difficulties, make an appointment and talk to me. If I don’t know about it, I cannot help you. Small problems can be fixed easily early in the quarter, but might become impossible to fix later on.

Access and Accommodations: Your experience in this class is important to me. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law. If you have already established accommodations with Disability Resources for Students (DRS), please activate your accommodations via myDRS so we can discuss how they will be implemented in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but not limited to; mental health, attention-related, learning, vision, hearing, physical or health impacts), contact DRS directly to set up an Access Plan. DRS facilitates the interactive process that establishes reasonable accommodations. Contact DRS at uwbdrs@uw.edu **(mailto:uwbdrs@uw.edu)**.

For Our Veterans: Welcome! We at UW Bothell understand that the transition into civilian life can be challenging for our veteran students and we have many resources for any who may want to reach out for guidance or assistance. This includes our Vet Corp Navigator through the WDVA and our Student Veterans Association (SVA). Please contact Veteran Services at 425.352.5307 or **rosal@uw.edu (mailto:rosal@uw.edu)** For those of you needing more URGENT support, please call The Suicide

Prevention Hotline 1.800.273.8255 or connect with the **UWB CARE Team (https://www.uwb.edu/studentaffairs/care-team)** .

Religious Accommodations: Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at **Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/)** . Accommodations must be requested within the first two weeks of this course using the **Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/)**

Common Course Policies for the School of STEM: See **STEM Policies (https://www.uwb.edu/stem/about/stem-policies)** for additional information on Academic Integrity, Access and Accommodations, Classroom Emergency Preparedness, support for Our Veterans, Grade of Incomplete, Inclement Weather, Parenting Resources, Respect for Diversity. Student Support Services, Surviving Sexual and Relationship Violence, Wondering How to Address Faculty? etc. (P.S. I prefer to be addressed as 'Professor Pisan')

Course Material: Lectures slides and recordings will be posted to Canvas the day after the lecture.

Topics

Week 1: Introduction, C++ Fundamentals

Week 2: C++ Classes, Arrays, References, Pointers

Week 3:Recursion and Induction

Week 4: Array Based Implementations, Link-Based Implementations

Week 5: Problem Solving

Week 6: Algorithm/Complexity Analysis

Week 7: Sorting

Week 8: Lists

Week 9: Queues

Week 10: Problem Solving

Week 11: Propositional and Predicate Logic