CS 121 – Computer Science II / Data Structures

Course Syllabus   Fall 2023

Instructor: Bruce Bolden   JEB 232   `bruceb@cs.uidaho.edu`
Text: *Data Structures and Program Design in C++*,
                   Kruse and Ryba, Prentice Hall, 1999.
(recommended)   *The C Programming Language*, Kernighan & Ritchie, Prentice-Hall, 1988

Schedule (lecture dates may change)

Week	Day			Topic	Text
1	August	21	M	Introduction/Overview	Chap 1
			W	Dynamic Memory (review)	
			F	Structs (review)	
2	August	28	M	Dynamic Data Structures: Linked Lists	
			W	Dynamic Data Structures: Linked Lists	
			F	Introduction to C++ Classes	
3	September	4	M	** Labor Day – NO Classes **	
		6	M	Lists/Classes	
			W	Lists/Templates	
4		11	M	No class / Program Design	
			W	Stacks	
			F	Stacks	
5		18	M	Queues	
			W	Queues	
			F	Order Analysis / Review for Exam	
6		25	M	Recursion	
			W	Recursion	
		30	F	*** Test 1 ***	
7	October	2	W	Trees	
			W	Trees	
			F	Trees	
8		9	W	Review Exam	
			W	Trees	
			F	Heaps	
9		16	M	Hash Tables	
			W	Hash Tables	
			F	AVL Trees	
10		23	M	Other Trees	
			W	Review of Trees	
			F	Order Analysis	
11	October	30	M	Sorting/Searching	
	November	1	W	Searching	
			F	Review for Exam	

12		6	M	Sorting
			W	Sorting
		10	F	*** Test 2 ***

13		13	M	Graphs
			W	Graphs
			F	Review Exam

| 14 | November | 20 - 24 | | ** Thanksgiving Break – NO Classes ** |

15	November	27	M	Graphs
			W	Graphs
			F	Graphs

16	December	4	M	Other topics
			W	Other topics
			F	Review for Final Exam

Final: Monday, December 11 10:15 AM – 12:15 PM – **To be confirmed**

Grading

The letter grade you receive from the course will be determined as follows:

A	90%	–	100%
B	89.9%	–	80%
C	79.9%	–	70%
D	69.9%	–	60%
F	59.9%	–	0%

The instructor reserves the right to adjust these percentages up or down a maximum of five (5) percent if deemed necessary.

Typical Point Distribution

	Points
Attendance/Participation	20
Final Exam	120
Quizzes (8–12)	160
Homework/Programming Projects	120
Total	420

Programs
All programming assignments must be submitted as specified. Class time will not be spent on homework. No late homework assignments will be accepted.

Quizzes
Quizzes will normally be given most Fridays on the material covered since the last quiz.

Knowledge of material in this class is cumulative. Your lowest quiz grade will be dropped. No makeup quizzes will be given.

Exams/Final Exam

The midterm and final exams are cumulative. No makeup exams will be given.

Major Topics Covered

- Algorithms, programs and data structures (3 hours)

- Pointers, with arrays, dynamic memory (2 hours)

- Program complexity concepts (2 hours)

- Linked Lists (4 hours)

- Classes / Templates (2 hours)

- Stacks (2 hours)

- Queues (2 hours)

- Recursion (2 hours)

- Trees (2 hours)

- Binary Search Trees (3 hours)

- Other Trees (2-3, AVL, Red-Black, B-trees, etc.) (1 hour)

- Hash Table (2 hours)

- Tables, priority queues, heaps (2 hours)

- Graphs (4 hours)

- Searching performance comparison (2 hours)

- Sorting techniques (insertion, merge-sort, and quick-sort) (3 hours)

Course Outcomes (to be revised)

- Make a description of a problem that has a straight forward computing solution, design, construct, and test a complete program that solves the problem.

- Understand the potential consequences of program failure.

- Understand the expectations for academic integrity as they apply to software development.

- Students will be able to document computer solutions with well written reports in a standard format that emphasizes insight into the problem solving, not just the presentation of the output.

- Use basic system tools (e.g., top and time) to analyze a program's behavior with respect to the use of computer memory and CPU time.

- Use code libraries.

- Understand how to use type casting and how the compiler converts between types in mathematical/logical expressions.

- Build program units consisting of the sequence, selection, and repetition programming structures of C++. More specifically they will be able to determine under what conditions each of the following structures should be used: Sequence: assignment statement; Selection: if, if-else, if-else if-else if-else, and switch structures; Repetition: for , while, and do-while structures.

- Read/Write information to/from files.

- Create and call functions having arguments and return values. They will know when arguments should be passed by value or reference.

- Use and manipulate one and two dimensional arrays.

- Use and understand the use of recursion.

- Understand how to allocate memory dynamically using arrays and pointers.

- Use and manipulate singly-linked lists using pointers.

- Create simple classes having data members and member functions. They will be able to read class header files and be able to call object member functions defined in the header files.

Center for Disability Access and Resources (CDAR) Reasonable Accommodations Statement Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through the Center for Disability Access and Resources located in the Bruce M. Pitman Center, Suite 127 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

Phone: 208-885-6307
Email: cdar@uidaho.edu
Website: www.uidaho.edu/current-students/cdar

University of Idaho Classroom Learning Civility Clause
In any environment in which people gather to learn, it is essential that all members feel as

free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (5-6757), the UI Counseling & Testing Center's confidential services (5-6716), or the UI Office of Human Rights, Access, & Inclusion (5-4285).

Academic Dishonesty

Academic dishonesty in any form will not be tolerated. Academic dishonesty includes, but is not limited to:

Cheating Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term "academic exercise" includes all forms of work submitted for a grade earned in a course that generates credit hours.

Fabrication Falsification or invention of any information or the source of any information in an academic exercise.

Collusion Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

Plagiarism Copying or imitating the language, ideas, and/or thoughts of another author and passing off the same as one's original work.

If academic dishonesty is suspected, I will withhold a grade until we have discussed the circumstances. Any work that I determine is dishonest will receive an automatic F and you may receive an F for the course. I will also forward a report of the incident to the Dean of Student for prosecution in accordance with the University of Idaho Student Code of Conduct.

Do your assignments on your own. Consulting with friends is permitted. However, blatant copying will not be tolerated and will be dealt with according to the guidelines on academic dishonesty: University of Idaho Academic Integrity.

Policies For Healthy Vandals

It is a longstanding tradition that Vandals take care of Vandals, and we all do our best to look out for the Vandal Family. The simple precautions listed below go a long way in reducing the impact of coronavirus on our campuses and in our communities. With everyone engaging in these small actions, we can continue to participate in our vibrant campus culture where we are able to learn, live, and grow. Visit U of I's COVID-19 page often for updated information. Questions related to U of I's coronavirus response can be sent to `covid19questions@uidaho.edu`.

In-Person Class Attendance
Refrain from attending class in-person if you are ill, if you are experiencing any of the known symptoms of coronavirus, or if you have tested positive for COVID-19 or been potentially exposed to someone with COVID-19.

If you display symptoms and/or test positive, you should quarantine following the CDC's recommendations. Do not return to class until you meet the CDC's requirements. If you have been exposed but are asymptomatic, you should stay home for 14 days from the last exposure if you remain asymptomatic, adhering to the CDC's requirements.

Documentation (a doctor's note) for medical excuses is not required; instead, email me to make arrangements to submit any missed work and make plans to use Zoom and/or online course materials to stay current with the course schedule.