CPSC 170: Fundamentals of Computer Science

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Class Meetings: MWF: 10:50am - 11:50am

Lab: T: 3pm - 6-m

Office Hours: T: 12:00noon - 1:00pm; W: 1pm -2pm; Th: 1:30pm - 2:30pm; and by appointment

Syllabus

This course is part two of a two part introduction to the discipline of computer science. The course focuses on object oriented design and implementation of programs. We will use C++ as the programming language, and learn about various data structures, algorithms, and problem-solving techniques by designing and developing well-structured and well-documented C++ programs.

Reference Text: *Introduction to Algorithms*, by Cormen, Leiserson, Rivest and Stein, McGraw Hill.

Prerequisites: CPSC 120.

Intended Learning Outcomes

At the end of this course successful students will be able to:

1. design, implement (in the C++ programming language), and test algorithms to solve problems. Inparticular, to implement the algorithms the student will be able to

   (a) use inheritance, abstraction, polymorphism, exceptions, and recursion, and (b) implement linear data structures and associated algorithms.

2. explain the fundamental concepts underlying memory usage, objects, classes, and methods,
3. analyze and compare the asymptotic performance of algorithms,
4. use the Linux command line interface for running C++ programs and navigating the Linux file structure, and
5. understand representation of data using binary numbers, and express integers in twos complement andvice versa.

Mechanics

The course will meet in class for six hours during the week (three one hour sessions, and one three hour lab session).

The two tests will be on **Friday, February 23, 2024** and **Friday, April 5, 2024** in class. The cumulative final exam is scheduled for **Friday, April 26, 2024, 8:30am - 11:30am**.

In case of scheduling conflicts, make-ups for quizzes, tests and the final exam will be available *by prearrangement only*. After the tests, quizzes and final exam, make-ups will be available only in case of documented medical/family emergencies.

Unless specified otherwise, the quizzes, tests and the final exam must be taken in class.

Besides the exams, there will be regular quizzes in class, regular homework assignments, one programming project, and a co-curricular requirement.

This course expects you to spend about 12 hours each week inside and outside of class.

All programming assignments will be completed using the C++ programming language. All submitted programs must be able to be compiled and run on the computer science server. Please see the document "Computing Infrastructure" on the course Inquire page.

Quizzes: Quizzes will be in class, typically on Mondays, at the beginning of class. All quizzes will be *open handwritten notes*.

Homework: Homework will be assigned during the week, and will be due at the end of the week on Saturday by 10pm. Unless specified otherwise, all homework assignments must be handed in typed. **Late work will not be accepted. If there are circumstances out of your control, and you anticipate needing more time, please let me know at least 48 hours before the time when the homework is due.**

Tests and Final: The in-class tests during the semester and the final exam will be *open handwritten notes on both sides of one sheet of 8.5 in × 11 in paper*.

Projects: There will be one programming projects assigned at the end of the semester. You may complete your work either on the lab computers, the computer science server, or on your own computer. Regardless, your submission must be able to be compiled and run on the computer science server. The assignment writeups will contain the programming and submission guidelines for completing the projects.

Late work will not be accepted. If there are circumstances out of your control, and you anticipate needing more time, please let me know at least 48 hours before the time when the project is due.

Co-curricular Requirement: Besides the quizzes, homeworks and exams, there is a co-curricular requirement. The Mathematics, Computer Science and Physics department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face these disciplines. Each student is required to attend at least three of these sessions, and turn in a short paper describing the contents of the session, and the student's critical reflections about the topic and content. **These reflection papers are due by email within a week of the session. A paper submitted beyond a week from the event being discussed in the paper will not be accepted.** The MCSP Conversation Series website has the schedule of talks in the series.

Note: On some days, copies of the slides/notes used in class may be provided on the Inquire page. Printouts of these slides/notes **will not** be considered as handwritten notes. Similarly, scans and/or printouts of pages from a book **will not** be considered handwritten notes.

If you take notes on a computer/tablet, those notes (on the computer/tablet, or printouts) **will be** considered as handwritten notes.

If you are in doubt, please let me know the format of handwritten notes you would like to use and get the format approved by me.

Grading

The weights for the various components will be:

Component	Weight		
Co-curricular	4%		
Quizzes	16%	Homeworks	30%
Tests	(10 + 10 =) 20%		
Project	10%	Final	20%

There will be no curve for the final grade. At any time during the semester, your score on Inquire will determine

your course grade. The Inquire score will be rounded up. (For example, a score of 81.2 or 81.7 will be rounded up to 82.) The final letter grade will be computed according to the following scale:

< 60	60 – 62	63 – 65	66 – 69	70 – 72	73 – 75	76 – 79
F	D-	D	D+	C-	C	C+

80 – 82	83 – 85	86 – 89	90 – 92	> 92
B-	B	B+	A-	A

Class Attendance and Policies

Regular attendance in class is highly recommended. Regardless of attendance, students are responsible for all material covered or assigned in class.

Cell phones should be kept in your backpacks or pockets (essentially, out of sight), and turned to the silent mode throughout the duration of the class. Please do not remove your cell phones until you are outside the classroom/lab. Similarly, during office consultations or consultations in the lab (even when it is not during regular class time), your cell phones should be out of sight and in the silent mode.

If you use an electronic device such as a tablet or a laptop for note-taking or to read the textbook, the content that is open on the screen should be strictly restricted to documents and pages of relevance to the class. For example, you should not have any social media websites open in your browser window, even if it is in a tab that is not currently in focus.

Academic Integrity

Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be strictly the work of the student unless otherwise specified by the instructor. The policies as outlined in the Academic Integrity handbook will be enforced in the course.

Graded programs are subject to the Roanoke College Academic Integrity policies. Copying a program or a portion of a program (even a single line) or reading another person's program to obtain ideas for solving a problem is plagiarism. Other examples of integrity violation include writing code for someone else, using code written by someone else, telling someone else how to solve a problem or having someone tell you how to solve a problem (and using his/her method). These cases apply to any work that is handed in for a grade under the instructor's assumption that the work is your own. Unless specified otherwise by the instructor, discussion among students should be limited to general discussion of concepts and language details, not specific aspects of a solution to the assigned problem.

I reserve the right to call on you individually to explain any part of programs that you submit. If you cannot adequately explain the working of your code, it'll be considered plagiarism.

College Services

The Writing Center Roanoke College, located on the Lower Level of Fintel Library (Room 15), offers free tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of competence may visit the Writing Center at any point in their process—including brainstorming, drafting, organizing, editing, or polishing presentation skills—to talk with trained peer tutors in informal, one-on-one sessions. The Writing Center is open Sunday through Thursday from 4 to 9 PM. Simply stop in, or schedule an appointment at www.roanoke.edu/writingcenter. Questions? Email writingcenter@roanoke.edu or call 540-375-4949.

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4-9 PM, Sunday-Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (and small group) tutorials in over 80 courses taught at Roanoke College, including: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Check out all available subjects and schedule 30- or 60-minute appointments at www.roanoke.edu/tutoring. If you have a question, feel free to stop by, or contact us at subject tutoring@roanoke.edu or 540-375-2590. See you soon!

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current

documentation of a disability along with recommendations from the qualified specialist. Please contact Becky Harman, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Becky Harman at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Student Health & Counseling Services supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see https://www.roanoke.edu/shcs for more information and to access services.

If modifications need to be made to the syllabus during the semester, they will be made only after discussing them with the class.