

CS 241 Data Organization using C

Spring 2018

Instructor

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Office Hours: Thursday 2-4 and Friday 10:30-noon (and by appointment)

Textbook

Kernighan, Brian W. & Ritchie, Dennis M. *The C Programming Language, 2nd ed.*, ISBN: 0-13-110362-8.

This little book has been around since 1988, so it shouldn't be difficult to find a copy.

Description

CS 241 is an introduction to the C Programming language, an introduction to using a command-line interface of the Linux operating system, and an introduction to machine level data organization and memory allocation. Students taking this course should already be familiar with basic concepts of computer programming such as variables, conditional control flow and loops. Developing mastery of these fundamental concepts is one of the goals of CS 241. Students in CS 241 author many C programs. Some lab assignments will be short and relatively simple. Others will be more interesting and touch on a wide range of computer applications including encryption, numerical analysis, databases, artificial intelligence, genetic algorithms and games. Many examples used in this course involve implementation of standard data structures such as linked lists and trees. However, mastery of such data structures is not within the course's domain.

The primary goals of CS 241 are for the student to be able to:

1. Read and apply the C syntax covered in the textbook (The C Programming Language by Kernighan and Ritchie).
2. Without a computer, determine the output of C language source code involving triply nested loops, conditional control flow, function calls, pointers, arrays, arithmetic, logical and bit operators, structures and memory allocation.
3. Use a Linux command-line environment to manipulate files, and directories, and to edit, compile, run and debug C programs. This includes the use of simple makefiles and a low level debugger such as valgrind.
4. Implement, in C, any given algorithm with a complexity level equivalent to that of quicksort or a doubly linked list with accuracy, efficiency and clarity

Grading

- 60% Programming Assignments (labs)
- 30% Exams (midterm and final)
- 10% Lecture, quizzes, and participation

I use standard cutoff points when determining grades (e.g. A is [93-100], A- is [90-93), B+ is [87-90), etc.). I reserve the right to curve grades up, but not down.

Syllabus¹

Weeks	Topics	Chapter
1 - 2	Types, Operators, Expressions, Scope, Control Flow, Intro to Functions, and Bit Manipulation.	K&R: Chap 1-3
3 - 4	Functions and Program Structure	K&R: Chap 4
5 - 6	Pointers, Arrays, Structures, Linked Data Structures	K&R: Chap 5-6
7 - 8	I/O and System Interface	K&R: Chap 7-8
9 - 10	Linear Data Structures, Efficient debugging techniques, Lists, Strings, and Dynamic Memory Allocation	Supplemental reading
11 - 12	Hashing and other efficient data structures	Supplemental reading
13 - 14	Sorting, memory management	Supplemental readings
15	Makefiles, Debugging, Profiling and performance tuning, Review	Supplemental readings

Submitting Assignments

All assignments must be in UNM Learn in order to receive credit for them. If Learn is down, you may e-mail the assignment to the lab instructor in order to prove it was done on time. However, it must be inside Learn before you can receive credit for it.

It is your responsibility to make sure the correct file is submitted to Learn before the deadline. Always double-check your submissions. If you realize you accidentally attached the wrong file, immediately resubmit the correct file with a note explaining the error.

Assignments are due at 11:59PM. You are permitted to submit multiple times and the most recent on time submission will be the one graded, so feel free to submit partial solutions as you complete milestones.

Pay attention to deadlines! Assignments are not always due on the same day of the week. You will generally have at least a week for each one, but some larger assignments may give you more time.

Lab Attendance

Lab class meets once per week in a computer lab. You are expected to attend. If for some reason you cannot attend your regularly scheduled lab class but are able to attend one of the other lab classes during the same week, then that other lab can count as your lab attendance.

NOTE: Before attending a different lab section, check with that sections lab instructor to make sure there is an open space for you.

NOTE: In order to receive credit for attending a different lab section, it is your responsibility to make sure the lab instructor of that section counts you as present while you are in the lab class (NOT after the fact). Your name will not be on that instructors roster. You must make sure to speak to the lab instructor during the lab class, telling him or her first and last name, and in what section you are registered. If you feel you need extra help or would simply like to attend lab section in addition to your own, then you are encouraged to do so. First, however, please contact the lab instructor of the extra lab you want to attend to make sure that there is enough space.

Cheating and collaboration

I encourage students to work together on homework assignments and studying. Collaboration is essential part of science. However, directly copying material from another source is not allowed and will result in an F. If you use sources not given to you during class, you need to properly cite the material in your writing and/or comment a

¹Exact schedule subject to change

link to the source in your code. When you work with fellow classmate, copying their work is not allowed. Rather, you are allowed to take notes while working together with a classmate. Then you need to write up your assignment subsequently all on your own. This is effectively Yoshi Kohno's Gilligans Island rule. I take cheating seriously and follow the associated university policies. Not being able to explain how some significant part of your code works will result in a zero for the assignment.

Cheating can look like:

- Copying code from another person or having someone else write your code.
- Copying code from the Internet or another source. (If theres some code that you would really, really like to use, please check with us before you do it.)
- Attempting to disassemble, decompile, or otherwise reverse engineer compiled example programs.
- Allowing another person to copy your code.
- Leaving your code (paper or electronic copies) where others can find it. You are responsible for the security of your intellectual property.
- Use of external libraries other than those included with `gcc` without documenting it. Note: If you do document usages of external libraries, it will not be considered cheating. However, you still might not receive full marks if the library covers too much of the assignment. It is best to check with one of the instructors before using an external library.
- Violation of copyright or license agreements on external libraries. If you use external library code, it is your responsibility to understand and comply with the appropriate copyright and license issues.
- Violation of the University policy on acceptable computer use.

Late Work

I expect you to submit your work on time. There are three exceptions to this:

1. You will be given 4 lateness coupons. Each can be used to turn in any homework assignment 24 hours late. You may combine them. If you are planning on using any lateness coupons on an assignment, before the assignment is due, you need to private message the instructor group on Piazza with the subject line: Lateness Coupon.
2. If there are extenuating circumstances such as a serious illness, let me know as soon as possible to work out an accommodation.
3. If theres an unforeseeable incident affecting most students (eg power goes out on campus for hours right before the assignment is due), then I will provide a reasonable accommodation.

Extra Credit

I do not grant extra credit on a per-student basis.

Computer Science Advisement

Whether or not you have been officially admitted to the CS program yet, please consult the Department of Computer Science Undergraduate Advisor with any questions you may have. This is especially important when navigating the prerequisites for certain courses and resolving scheduling issues. More general university advisors are not always familiar with the details of the computer science program.

Ethical scholarship and proper use of UNM resources

You're responsible for understanding the laws and UNM policies pertaining to everything we do in class. You are expected at all times to comply with all policies and laws, and to behave in an ethical and responsible manner.

UNM statement of compliance with ADA

Qualified students with disabilities needing appropriate academic adjustments should contact the professor as soon as possible to ensure your needs are met in a timely manner. Students must inform the professor of the disability early in the class so appropriate accommodations can be met. Handouts are available in alternative accessible formats upon request.