

CSE 20211 – Fundamentals of Computing – Fall 2012

Course Website: <http://www.nd.edu/~dthain/courses/cse20211/fall2012>

Course Help Line: fundcomp@listserv.nd.edu

Prof. Douglas Thain dthain@nd.edu
Head TA: Everaldo Aguiar eaguiar@nd.edu
Grad TA: Mark Costanzo mcostanz@nd.com
Grad TA: Vincent Killion vkillion@nd.edu
Ugrad TA: Chas Jhin cjhin@nd.com
Ugrad TA: Jeremy Vercillo jvercill@nd.edu

Overview

This course is the first semester in the Fundamentals of Computing sequence for computer science majors. In this course, students will learn how to formulate algorithms, apply basic problem solving strategies, and apply techniques to different problem domains. The programming assignments are the main component of the course, where students will spend a significant amount of time learning the craft of programming and problem solving. The assignments are also designed to give students a “tour” of computer science, touching on algorithms, data processing, simulation, languages, graphics, and more. This course will be a lot of work and also a lot of fun.

Course Outcomes

To successfully complete the course, students must be able to:

- Demonstrate basic proficiency in the C programming language.
- Formulate algorithms to solve basic computational problems.
- Construct larger programs by identifying and solving sub-problems.
- Apply basic concepts of software engineering.
- Apply pointers, arrays, and structures correctly.
- Apply basic I/O operations to read and write data files.
- Use basic data structures, such as linked lists.
- Understand the basic concepts of algorithmic complexity.
- Apply basic architectural concepts to program design.
- Demonstrate a basic understanding of the C++ programming language.

Textbook

Deitel and Deitel: C: How to Program, 7th edition. **(Required)**

(Note: The 6th edition can be used, however, the optional review problems won't match up.)

Weekly Structure

| | |
|-----------|-------------------------------------|
| Monday | Introduce New Topic in Lecture |
| Mon-Wed | Start Programming Assignment in Lab |
| Wednesday | Continue Topic in Lecture |
| | Continue Assignment on Your Own |
| Friday | Applications and Practical Session |
| Monday | Assignment Due at Noon |

Assignments will have several parts. The first parts will consist of simpler exercises to demonstrate that you can reproduce what you have learned from the book and the lecture. The latter parts will be opened-ended exercises that ask you to write a program that solves a non-trivial problem, making use of the same techniques. Use your creativity and write programs that reflect your interest and skills!

Meeting Times

| | | | |
|---------------|-------------------------|-----------------|----------------------------|
| Lecture: | 140 DeBartolo | Mon, Wed, Fri | 9:35 – 10:25 |
| Labs: | Cushing 303 | Monday | 3:00 – 3:50 |
| | (Pick one) | Monday | 4:00 – 4:50 |
| | | Tuesday | 2:30 – 3:20 |
| | | Wednesday | 1:55 - 2:45 |
| Office Hours: | Prof. Thain in 382 Fitz | Tue, Thu | 2-4 PM (or by appointment) |
| | TAs in 149 Fitzpatrick | Mon-Thu and Sun | evening hours TBA |

Email Help Line

Email any questions or problems to fundcomp@listserv.nd.edu, and the instructor or one of the TAs will respond when they are able, typically on weekday afternoon or evenings. (This is the fastest way to get an answer!) If your question is of interest to the whole class, we may post a summary to the class mailing list or web site.

Where to Find Linux Machines

- Cushing 303 is available anytime a class is not scheduled, usually after 5PM.
- Fitzpatrick 149 (Engineering Library) is open 24 hours, swipe card late at night.
- Stinson-Remick 105 and 216 have a small number of Linux machines.
- At all hours, you may access any of the following machines remotely using the secure shell protocol (use ssh on Linux/Mac or Putty on Windows)
 - student[00-03].cse.nd.edu
 - remote[201-208].helios.nd.edu

You may use your laptop or personal computer to work on assignments for this class. However, be warned that operating systems and compilers can vary in subtle ways, so a program that works on your machine may need some minor changes before it runs on the ND machines, or vice versa. Your work will

be graded on the ND Linux machines, so leave some extra time to copy your program to the ND machines and verify that it compiles and runs correctly before turning it in.

Attendance and Time Management

To succeed in the class, you should attend all lectures and lab sessions. If you happen to miss class for a minor illness or other reason, please obtain notes from another student in the class. We don't take attendance or give excused absences. Class participation points are earned as follows:

1 point – Complete the first part of an assignment during lab, and show it to the TA. (one per week.)

1 point – Stop by Prof. Thain's office hours once during the semester. (max one point.)

1 point – Volunteer for a classroom exercise during lecture. (max two points.)

Your class participation grade is (points earned / 10), so you can earn a few extra credit points this way.

Programming is a time-intensive activity. Programming is best done in a state of 'flow' when you are concentrating on the problem at hand for an extended period of time without distractions. Expect to use the lab sessions as an opportunity to get started on your assignment, typically completing the first one or two sections in lab. Especially as the assignments become more difficult, expect to spend several hours in the lab on your own time during the week. If you get stuck, you may find it helpful to put the work down, think about it, talk to the instructor or the TA, and return to it later. Both Prof. Thain and the TAs are available throughout the week to assist you.

Most assignments will be due at Monday on noon, but you are strongly encouraged to complete them earlier in the week when more help is available. "Last call" for help with the assignment is the end of office hours on Sunday evening.

Grading

The final grade will consist of the following components:

55 percent – Programming assignments

20 percent – In-class exams

20 percent – Final exam

5 percent – Participation

Any request to regrade an item should be submitted to Prof. Thain by email within one week of receiving the grade. Factual or clerical errors will be cheerfully corrected. Matters of judgment are unlikely to be modified. After one week, grades are final.

Late assignments are not accepted; turn them in well before the deadline.

There are no makeup exams; be in the right place at the right time.

In grave circumstances, exceptions will be made according to the rules outlined in the Notre Dame duLac student handbook.

Approximate Schedule

| Week of... | Reading | Topic | Assignment |
|------------|-----------------|--------------------|---------------------------|
| Aug 20 | Chapter 1 and 2 | Introduction | |
| Aug 27 | Chapter 3 | Basic Control Flow | Lab 1 Assigned |
| Sep 3 | Chapter 4 | More Control Flow | Lab 1 Due, Lab 2 assigned |
| Sep 10 | | Writing Algorithms | ... |
| Sep 17 | Chapter 5 | Functions | |
| Sep 24 | | Graphics | Exam I Friday |
| Oct 1 | Chapter 6 | Arrays | |
| Oct 8 | Chapter 7 | Pointers | |
| Oct 15 | Fall Break | | |
| Oct 22 | Chapter 8 | Strings | |
| Oct 29 | Chapter 9 & 11 | File I/O | |
| Nov 5 | Chapter 10 | Structures | Exam II Friday |
| Nov 12 | Chapter 12 | Data Structures | |
| Nov 19 | Chapter 15 | Intro to C++ | Thanksgiving Wed-Fri |
| Nov 26 | | Intro to C++ | |
| Dec 3 | | Catch Up | Lab 12 Due |
| Dec 10 | | | Final Exam Week |

On Collaboration and Academic Honesty

As a Notre Dame undergraduate, you have already agreed to abide by the ND Honor Code:

<http://honorcode.nd.edu/>

In this class, you are encouraged to seek out help from other students, from other books, and from sources on the Internet. However, the end goal of any such collaboration is for you to **understand the principles so that you can do the work yourself**. Any programming or written work must flow from **your** brain through **your** fingers to **your** computer. Submitting someone else's work as if it were your own will result in a referral to the honor committee, where penalties include failure of the course and dismissal from the University. To clarify, some examples are:

- Discussing concepts and algorithms with others is permitted.
- Helping each other to understand an error message or debug a problem is permitted.
- Looking up the documentation for a function on the Internet is permitted.

- Copying code or solutions from others (regardless of their permission) is **not** allowed.
- Writing code or completing homework for someone else is **not** allowed.
- Copying a program (or part of a program) from the Internet is **not** allowed.

If you aren't sure whether a certain form of collaboration is allowed, you should assume that it is not, until you consult with the instructor.