Introduction to Programming in C

Columbia University, Summer 2017

Instructor: Richard Townsend (rtownsend@cs.columbia.edu)

Class Sessions: Monday-Friday, 11:10 am - 1:00 pm (Hamilton 302),
Monday-Friday, 3:10 pm - 5:00 pm (Hamilton 411)

Course Description

An intensive course designed to develop logic and programming skills through immersion in the fundamentals of programming in C. Programming projects, mathematical problems, and logic games challenge students to develop their logical reasoning, systematic thinking, and problem-solving skills. Students become familiar with fundamental computer science concepts, data structures, and algorithms and learn proper coding practices during hands-on labs in which they work on individual and collaborative projects. Labs are carried out in Linux Virtual Machines configured for the class and installed into the students' personal laptop computers.

Course-Level Learning Goals

By the end of this course, students should be able to…

- demonstrate computational problem solving with basic programming constructs.
- critique a C program based on its aesthetic value and correctness.
- interpret a sequence of English instructions (an algorithm) as a C program and vice versa.
- design a complex, multi-file software project (e.g. a solution to a real-world problem, a usable tool or service, or video or board game).

Course Policies

- This course is **inclusive** of all participants, regardless of previous programming experience or personal identity (gender, race, sexual orientation, etc.). Discrimination of any form will not be tolerated.
- Students must have personal laptops with (8GB-10GB of free space) brought to each class; all work will be done in a Linux Virtual Machine that will be set up on the first day.
- The majority of work will be done in class sessions, but external readings and mini-projects will be used to reinforce concepts.
- Programming projects will be done in pairs, groups, and alone, just as one would experience in the real world.

- Students requiring extra help (outside of the normal class sessions) will be accommodated as needed. Please contact the instructor if extra help is desired/needed.

Schedule (Subject to change based on pace set by students)

Day	Topics
1	Introduction: Computer Science, Programming, and Virtual Machine Setup
2	Basic Printing, Variables, and Data Types
3	User Input and Control Flow I: Loops
4	More Loops and Control Flow II: Conditionals
5	Switch and Randomness
6	Functions
7	Arrays
8	Strings
9	In-class assignment: Hangman
10	2D Arrays
11	In-class assignment: Game of Life
12	Game of Life (continued work)
13	Recursion
14	Project Hack-a-thon