CS 102 Fundamentals of Computation
Units: 2
Fall 2019

Location: 9 a.m. in GFS 106, 10 a.m. in THH 119 and at
http://bytes.usc.edu/cs102

Instructor: Mark Redekopp
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Office Hours: See website
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Teaching Assistant:
See website

Course Description

This course introduces students to the fundamental concepts of algorithmic thinking as a primer to programming. It is intended for students who have little to no prior programming experience with the goal of providing a strong foundation for CS 103 Introduction to Programming. The course introduces the mathematics and basic language constructs needed for programming as well as the problem-solving techniques required to analyze a problem and produce an algorithm. These techniques are put into practice over the course of the semester with an introduction to programming using C++. Weekly lab and programming assignments will provide hands-on experience and active learning techniques.

Concepts include data representation, basic discrete math, control structures (conditional and iterative structures), functions, and arrays. Weekly small-group discussions will provide the opportunity for students to practice the concepts learned in class, review and ask questions. Weekly assignments will provide opportunity to practice, apply, and deepen the knowledge gained from lectures. By the end of this course, students should feel comfortable to take information-based problem descriptions and write a software program in C++ to perform the required task.

Learning Objectives

Below are the specific, measurable skills a student will demonstrate by the end of the course. These objectives will be both taught and assessed in the course and are aligned with the assignments, assessments and learning materials.

1. Choose appropriate data and variable types to store specific kinds and ranges of information
2. Write, compile, and run a computer program
3. Use basic discrete mathematics to understand, describe, and solve computation problems
4. Understand the way computers represent and operate on data
5. Trace provided C and C++ code line-by-line to analyze what operations are being performed and describe what the program will output
6. Employ programming concepts: variables, control structures, loops, and arrays to develop programs that solve information problems.
7. Interpret written program requirements and develop a programmatic solution to meet those requirements.

Prerequisite(s): None

Co-Requisite(s): None

Recommended Preparation: Proficiency in high school math (including trigonometry, algebra, and basic probability).

Course Materials

All content will be provided on our website: http://bytes.usc.edu/cs102. PDF versions of lecture slides will be posted on our website before lecture and may be printed before coming to class or used electronically.

Course Websites

1. **Primary website**: All course assignments, content, office hour information, etc. will be posted at our main website: http://bytes.usc.edu/cs102.
2. **Q&A website**: A Q&A and announcement website will be utilized: http://www.piazza.com/. All official announcements regarding assignments, lectures, exams, etc. will be made via Piazza. It is your responsibility to check this site often.
3. **Blackboard**: Blackboard (http://blackboard.usc.edu) will also be used to record homework, quiz, and exam grades.
4. **Vocareum**: Lab and project code submissions will be made via http://www.vocareum.com. You will receive an invitation link to create your account sometime in the second week.

Technological Proficiency and Hardware/Software Required

A laptop and Internet connection will generally suffice to complete homeworks.

Required Readings and Supplementary Materials

The following textbooks are **recommended** but not required. We recommend you read the sections listed on the course schedule below for the corresponding week **BEFORE** attending the first lecture of that week.

1. C++ For Everyone, 2nd Ed., Cay Horstmann, J Wiley and Sons, 2012 (ISBN: 978-0470927137)
   Available at the bookstore and or from an online retailer.

Description and Assessment of Assignments

Homeworks

Availability: Assignments will be made available on the course web site (http://bytes.usc.edu/cs102) and are due on the indicated date (usually the following Thursday after it is made available). Submissions will be made via **vocareum.com**.

Vocareum Submissions: You are allowed an **unlimited** number of attempts and in most cases, automated tests will be run on your submission with feedback provided in the submission report indicating which test cases passed or failed. Some points from each submission will be based on visual inspection by our grading staff. You should indent and comment your code using the guidelines provided on our website.

Late Submission: You may submit homeworks up to 24 hours (1 day) late. A late submission is only eligible for 50% credit, so please try to get your work done and submitted on time. NO excuse for laptop connection/network issues, etc. will be accepted for late submissions. You should ensure you submit early to avoid any potential problems and thus avoid late penalties. After 24 hours, submissions will be rejected.

Solutions: Solutions to the homework problems will not be made available. However, if you want help fixing features of your code you could not get right, please reach out to course staff after the due date.

Collaboration and Academic Integrity: Lab assignments are to be completed individually unless otherwise noted. **You are NEVER allowed to show or share your code with another student**. Be careful of verbally guiding another student on what to write or what to do. If another student is confused, you may help them but should not share any details of your solution. The course staff is available to help students who are struggling. **Copying (and then modification) of any portion of code from Internet sources or fellow students is prohibited** unless cleared with the instructor. See the Statement on Academic Conduct.

Contesting Grades: You have **AT MOST 1 WEEK** after the HW scores are posted to contest your grade. To contest your grade you should inquire with the TA who graded your work and list your reasons for requesting a regrade.

Labs

Overview: Labs are small-group sessions led by one of our course staff. Most labs will have time to review some of the concepts presented that week along with a few exercises to perform. After that, Q&A time will be available for individual help and review.

Attendance/Participation: Graded based on attendance and giving an honest effort. Your lab leader will provide instructions for how to log your attendance. You may miss **at most 3 labs** during the semester without penalty. For each lab missed thereafter you will lose 1% of the 5% of your course grade dedicated to lab participation. **If you have a dispute about attendance, please contact your discussion leader directly (and not the instructor or head TA)**.

Exams

Time and Location: There will be one midterm exam and one final. The midterm exams will be held during one of the lecture sessions usually during Week 8. The dates of the exams are shown on the attached schedule but may be moved to a different date in exceptional cases. The exams may also be moved to a different classroom. Always check with the instructor as the listed exam date approaches to confirm the date and time. The exam location will be announced in class and on the web site. You are responsible for finding out when and where the exams will be held. Makeup exams will be given if you have a valid excuse (e.g. serious illness or accident but proof will be required).

Academic Accomodations: If you have USC approved academic accomodations, please check with your instructor 2 weeks before the exam to determine when and where you will take the exam.

Exam Style: Exams are designed to not only test your retention of the material but your ability to apply it to design and analyze new or novel problems. In this way, your mastery and depth of understanding of the course content will be assessed. Some portion of the exam will contain general knowledge questions and be fill-in/multiple choice. However, the majority of points will come from coding problems or tracing through provided code to analyze its behavior. This is where struggling with the homework and lab exercises on your own will greatly pay off. *Students who simply "get the assignments done" without reviewing and understanding each facet will often stuggle on the exam*s.

Grading Breakdown

Assignment	Points	% of Grade
Homeworks 1-2	0	Ungraded
Homeworks 3-12	9 x 20 pts.	30%
Labs	5 pts.	5%
Midterm	50 pts.	30%
Final	60 pts.	35%

Grading Scale:
Course final grades will be determined using the following scale. If the grade distribution is lower than expected the scale may be shifted downward but will never be shifted upward.

A	94-100	B+	87-89	C+	77-79	D+	67-69	F	59 and below
A-	90-93	B	83-86	C	73-76	D	63-66		
		B-	80-82	C-	70-72	D-	60-62		

Assignment Rubrics
See the section above for relevant assessment procedures for homeworks. Lab and project rubrics will be posted on the course website at the start of each lab and project.

Assignment Submission Policy
Submission policies are outlined with the relevant assignment type in the sections above.

Grading Timeline
Homeworks will be graded on the Vocareum website (http://www.vocareum.com) with feedback and comments annotated inline with your code submission. The grade and feedback will be usually be posted within 1.5 weeks of submission.

Course Schedule: A Weekly Breakdown

Below is a detailed course calendar that provides a thorough list of deliverables—readings, assignments, examinations, etc., broken down on a weekly basis. **For each unit of in-class contact time, the university expects two hours of out of class student work per week over a semester.**

	Topics/Daily Activities	Readings and Homework	Deliverable/ Due Dates	Lab
Week 1	Computer System Overview; Data Representation (Video Lecture) Discrete Math and Programming Language Sytax	Ch. 1.1-1.4		
Week 2	**Holiday** Types, Constants, Variables	Ch. 2.1-2.3	HW 1 Due (See website)	Github & Binary
Week 3	Expressions	Ch. 2.1-2.3	HW 2 Due (See website)	Vocareum & Types
Week 4	Conditional (If) Statements	Ch. 3	HW 3 Due (See website)	Expr. & Variables
Week 5	Functions (Part 1)	Ch. 5.1-5.4	HW 4 Due (See website)	Casting & Functions
Week 6	More Functions Iterative Structures (Loops)	Ch. 4.1, 4.2, 4.4	HW 5 Due (See website)	If Statements
Week 7	More Loops	Ch. 4.3	HW 6 Due (See website)	Loops
Week 8	Nested Loops **Fall Break**	Ch 4.3		More Loops
Week 9	Review; **Midterm (Oct. 23 in class)**	Ch 4.8	HW 7 Due (See website)	
Week 10	Array Basics; Debugging 1	Ch 6.1-6.2	HW 8 Due (See website)	Nested Loops & Arrays
Week 11	Loops and Arrays; User-defined functions	Ch. 6.1-6.2 Ch 5.	HW 9 Due (See website)	Arrays
Week 12	Functional Decomposition Passing Arrays as Arguments;	Ch 5, 6.3	HW 10 Due (See website)	Functions
Week 13	Strings Debugging (Part 2)	Ch 2.5, 7.3		Strings; Debugging
Week 14	Searching/Sorting **Holiday**	Class Notes	HW 11 Due (See website)	**No Lab Holiday**
Week 15	Languages beyond C++ Review	Class Notes	HW 12 Due (See website)	Review
FINAL	**9 a.m. Section**: Mon. Dec. 16th, 11 a.m. **10 a.m. Section**: Mon. Dec. 16th , 8 a.m.		.	

Statement on Academic Conduct and Support Systems

Academic Conduct:
Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Support Systems:
Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support
Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs
Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC
Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information
Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.
Provides overall safety to USC community. dps.usc.edu