



School of Engineering
*Information
Technology Program*

ITP 365 – Managing Data in C++

Units: 4

Spring 2020

Time: See schedule of courses

Location: See schedule of courses

Instructor: Nathan Greenfield

Office: See Contacts on Blackboard

Office Hours: See Contacts on Blackboard

Contact Info: All general course/assignments questions should be asked on Piazza (every student will receive an invitation at the start of the semester).

Other questions should be asked via email: ngreenfi@usc.edu.

Teaching Assistant: TBD

Office: TBD

Office Hours: TBD

Contact Info: See Contacts on Blackboard

Course Description

ITP365 teaches students the fundamentals of C++ and Data Structures in C++. We will explore many types of Data Structures across the semester. Students will learn how to evaluate a problem and choose the appropriate supporting Data Collections to solve the problem.

Learning Objectives

- Understand C++ programming fundamentals including variables, control statements, loops, arrays, pointers, functions and object-oriented programming
- Learn the process of how data structures are implemented
- Learn the mechanisms used to evaluate the performance of various algorithms
- Learn problem solving through advanced recursion and parallelism
- Learn how and when to use a variety of core data structures

Prerequisite(s): ITP 265

Course Notes

Lecture slides and assignments will all be posted on Blackboard. Course discussions will occur on Piazza. Assignments will be submitted through GitHub.

Lectures will feature in-class polls conducted via PollEverywhere. Students can respond to these polls via their mobile device or laptop.

Technological Proficiency and Hardware/Software Required

Students should have access to their own computer running either Windows, MacOS, or Linux, and should be familiar with the basic operation of their computer.

Required Readings and Supplementary Materials

Optional: Malik, D.S.. *C++ Programming: Program Design including Data Structures 8th Edition*. Cengage Learning. 2017. ISBN-10: 9781337117562.

Additional readings such as excerpts from other books or online articles will be provided on Blackboard.

Description and Assessment of Assignments

Tentatively, there are eight different homework assignments in this course. Students will have between one and two weeks to complete each homework assignment. Students are expected to complete these programming assignments *individually*. Each assignment's instructions include a grading rubric for that assignment.

Exams

There is a midterm exam and a final exam. All exams are cumulative.

Participation

Participation will be evaluated based on participation in in-class polls.

Grading Breakdown

Item	% of Grade
Assignments	56
Midterm	20
Final	20
Participation	4
Total	100

Grading Scale (Example)

Course final grades will be determined using the following scale

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	69
D	67-69
D-	66
F	65 and below

Half percentage points will be rounded up to the next whole percentage. For instance, 89.5% is an A-, but 89.4% is a B+.

Assignment Submission Policy

Programming assignments must be submitted to student's GitHub repositories by 11:59PM of the deadline date or will be considered late. Programming assignments that do not compile on Travis CI will receive a 0. Information about Travis CI is provided in the first week of class.

Late Policy

Programming assignments will be accepted up to two days late. Assignments submitted within 24 hours after the due date receive a 20% deduction. Assignments submitted before 48 hours of the due date receive 50% deduction. Extensions are only provided in the event of a documented reason satisfactory to the instructor, such as an illness or family emergency.

Make-up Policy for Exams

To make up for a missed exam, the student must provide a satisfactory reason (as determined by the instructor) along with documentation. Make-up exams are only allowed under extraordinary circumstances.

Grading Issues

Students will have one week after graded feedback is given to contest scores (e.g. assignments and exams). After that week scores will not be changed.

Plagiarism and Individual Work Policy

In this class, programming assignments are expected to represent the individual effort of each student. All programming assignment submissions will be compared with current, previous, and future students' submissions using MOSS, which is a code plagiarism identification program. If your code significantly matches another student's submission, you will be referred to SJACS with a recommended penalty of an F in the course.

Students may discuss solutions to specific problems with other students but may not look through another person's code. It does not matter if this code is online or from another student. Do not share your code with anyone else in this or a future section of the course, as allowing someone else to copy your code carries the same penalty as copying the code yourself.

Course Material Policy

Do not reproduce, distribute, or post any lecture material, assignments, assignment solutions, or exams publicly without written consent of the instructor. You may take notes and make copies of course materials for your own use. You may not post course materials on sites like CourseHero. Doing so is a copyright violation and in some cases may also be an academic integrity violation that will be dealt with accordingly

Course Schedule: A Weekly Breakdown

	Topics	Readings	Work Due
Week 1	Introduction getting up to speed with C++	Malik: Chs 1 - 6	
	Functions and files	Malik: Chs 7 - 8	
Week 2	Dynamic memory	Malik: Ch 12	
	Debugging	Malik: Ch 12	
Week 3	Object oriented C++	Malik: Chs 9 - 11	
	Operator overloading	Malik: Chs 13 - 14	HW1
Week 4	About C++ data structures	Malik: Ch 13	
	Vectors	Malik: Ch 13	HW2
Week 5	BigO	Malik: Ch 18	
	Using linear C++ data structures	Malik: Ch 17	HW3
Week 6	Implementing linear C++ data structures	Malik: Ch 17	
	Data representations		HW4
Week 7	Midterm Exam		
	C++ Graphics		
Week 8	Intro to recursion	Malik: Ch 15	
	Using recursion	Malik: Ch 15	
Week 9	Linked lists	Malik: Ch 16	
	Iterators	Malik: Ch 16	HW5
Week 10	Binary search trees	Malik: Ch 19	
	Tree traversal	Malik: Ch 19	
Week 11	Other trees	Malik: Ch 19	
	Hash maps		HW6
Week 12	Implementing hash maps		
	Graphs	Malik: Ch 20	
Week 13	Graph traversal	Malik: Ch 20	
	Sorts	Malik: Ch 18	HW7
Week 14	Parallel programming	Readings provided on Blackboard	
	Thanksgiving Holiday (no class)		
Week 15	About threading	Readings provided on Blackboard	
	Implementing C++ threads	Readings provided on Blackboard	HW8
FINAL	Date: For the date and time of the final for this class, consult the USC <i>Schedule of Classes</i> at www.usc.edu/soc .		

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, policy.usc.edu/scientific-misconduct.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following *protected characteristics*: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

uscса.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.