

Data Structures and Algorithms

Lecture Location: CSE E119

Lecture Time MWF 11 am - 12:15 pm

Discussion:

Tu 12:30-1:45 pm LIT 0121

or

Tu 3:30-4:45 pm CSE E220

Academic Term: Summer C 2019

Instructor:

Cheryl Resch

Cheryl.resch@ufl.edu

443-223-3562

Office Hours:

Office Location: CSE E508

TA:

Shashank Ranjan shashankranjan@ufl.edu

Course Description

Algorithm development using pseudo languages, basic program structures, program design techniques, storage and manipulation of basic data structures like arrays, stacks, queues, sorting and searching and string processing. Linked linear lists. Trees and multilinked structures.

4 Credit Hours

Course Pre-Requisites

COP 3504 or COP 3503 with minimum grade of C, COT 3100, and MAC 2234, MAC 2312, MAC 3473 or MAC 3512.

Course Objectives

This course covers implementation and use of data structures for use in problem solving. In particular, lists, stacks, queues, trees, tables and graphs will be covered. Algorithm development including recursive techniques will be covered. Sorting algorithms will be covered. Students will learn to solve problems using data structures and choose how those data structures will be implemented.

By the end of the semester, students should be able to

- Choose and implement data structures for solving problems based on their functions and situational appropriateness of application
- Choose an algorithm for solving a problem based on its computational complexity and appropriateness of application
- Use an abstract data type to describe a data structure

Professional Component (ABET):

This course is used to assess program outcomes for these ABET criteria:

a) an ability to apply knowledge of mathematics, science and engineering

e) an ability to identify, formulate, and solve hardware and software

computer engineering problems, accounting for the interaction

between hardware and software

k) an ability to use the techniques, skills, and modern engineering tools

necessary for computer engineering practice

Recommended Textbook and Software

- Data Structures and Algorithm Analysis in C++
- Mark Allen Weiss
- 4e, 2014
- 978-0-13-284737-7

Open Data Structures and Algorithms

<https://opensa-server.cs.vt.edu/ODSA/Books/Everything/html/> (Links to an external site.)
[Links to an external site.](#)

Attendance Policy, Class Expectations, and Make-Up Policy

Exams

Exams are held in CSE E119 during a class period and require the use of Respondus Lockdown Browser.

Exams may be made up when student has an excused absence.

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance>[Links to an external site.](#)) and require appropriate documentation.

Programming Assignments

Programming assignments require the use of C++. They will be compiled with g++ and your program must compile using this compiler.

Programming assignment grades include the use of data structures as taught in the class. The point of the class is to learn to make the best choices of data structures and algorithms, so choosing the most efficient data structures will be part of an assignment grade. Rubrics are not a step by step guide to getting 100% on the assignment, and passing all test cases does not mean you get 100% on the assignment.

Programming Assignments may be turned in late with a penalty of 10% per day up to 4 days late.

University Honesty Policy

You may work together but your code must be your own. Working together on an algorithm is OK, copying and pasting code from each other or the internet or anywhere else is not.

We will be checking your code using MOSS (measure of software similarity). If you're thinking of turning in code you didn't write, just don't. You don't learn that way, and isn't learning why you're here?

Do not store your code in a publicly accessible github.

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TA in this class.

Quizzes

Quizzes are given during the Tuesday discussion period. They will consist of a coding exercise that you will complete in small groups. Quizzes may not be made up.

Questions on grading of Exams, Quizzes and Programming Assignment must be brought up within 1 week of receiving a grade. After 1 week, the grade is set.

Practice Coding

Practice for the coding exercises you will be asked about on quizzes and exams is available using Stepik. Go to stepik.org and create an account.

Join this course:

<https://stepik.org/course/50935/syllabus> (Links to an external site.)[Links to an external site.](#)

Communication:

Every effort will be made to communicate all necessary information via Canvas. There will also be communications made in lecture. If something is said in lecture, it is considered to be communicated to the class. Therefore, if you miss class you may miss information.

The instructor will answer emails. However, emails that ask a question directly addressed in class or on Canvas may not be answered.

There will be a slack channel created for the class. It is forbidden to post code into the slack channel. The existence of a slack channel does not mean that TAs or the instructor will be available all the time. The TA and the instructor will be available often, but not all the time. [Here is the link to join](#) (Links to an external site.)[Links to an external site.](#)

Policy for Discussions- Be Nice, Be Helpful

1. Treat your classmates with civility and respect. Don't attack anyone and no discussion of controversial topics on channels.
2. If you have a question regarding code or content, always post it on a public channel. Don't be hesitant however simple is the question. You will be surprised how many students have the same question but are hesitant to ask.
3. Try to answer questions posted by your course mates if possible and help them. This is helpful to form a vibrant community.
4. If you are answering questions posted by your course mates use the reply feature to create threads in slack.

TopHat

3% of your grade is participation in TopHat questions in lecture.

TopHat costs \$20/semester (no matter how many classes).

Join code 865039

Evaluation of Grades

Assignment	Percentage of Final Grade
Programming Assignments (2)	30%
Sorting Analysis	10%
Quizzes	12%
Mid Term Exam	20%
Final Exam	25%
Top Hat	3%
	100%

Grading Policy

Percent	Grade	Grade Points
93 - 100	A	4.00
90.0 – 92.9	A-	3.67
87 - 89.9	B+	3.33
83 - 86.9	B	3.00
80.0 – 82.9	B-	2.67
77 - 79.9	C+	2.33
73 - 76.9	C	2.00
70.0 – 72.9	C-	1.67
67 - 69.9	D+	1.33
63 - 66.9	D	1.00
60.0 – 62.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> (Links to an external site.)
[Links to an external site.](#)

Commitment to a safe and inclusive learning environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination.

It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu

- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@ufl.edu

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals> ([Links to an external site.](#))[Links to an external site.](#). Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/> ([Links to an external site.](#))[Links to an external site.](#).

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Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:

<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html> (Links to an external site.)
[Links to an external site.](#)

Campus Resources:

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Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc> (Links to an external site.)
[Links to an external site.](#), and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/> (Links to an external site.)Links to an external site..

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Academic Resources

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E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml> (Links to an external site.)Links to an external site..

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/> (Links to an external site.)Links to an external site..

Library Support, <http://cms.uflib.ufl.edu/ask> (Links to an external site.)Links to an external site.. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/> (Links to an external site.)Links to an external site..

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/> (Links to an external site.)Links to an external site..

Student Complaints Campus:

https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf (Links to an external site.)
[Links to an external site.](#)

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process> (Links to an external site.)
[Links to an external site.](#)

Course Summary:

Date	Details
Fri Jun 14, 2019	Mid Term Exam due by 12:15pm
Fri Jun 28, 2019	Programming Assignment One due by 11:59pm
Fri Jul 19, 2019	Sorting Analysis due by 11:59pm
Fri Aug 2, 2019	Programming Assignment Two due by 11:59pm
Fri Aug 9, 2019	Final Exam due by 12:15pm

Date	Topic	Readings	Discussion Activity	Notes
May 13	Intro, Computational Complexity, Algorithm Analysis	Weiss Chapter 2		
May 15, 17	Lists, Stacks and Queues	Weiss Chapter 3		No live lecture May 17. A video will be provided.
May 21, 23	Recursion		May 21 – Stacks Coding Quiz	
May 25, 29	Trees, Tree Traversals, Binary Search Trees	Weiss 4.1-4.4	May 28 – Recursion Coding Quiz	
May 31, June 3	AVL Trees, Splay Trees	Weiss 4.5-4.7		

June 5, 7	B-Trees, Red Black Trees	Weiss 4.6, 4.7, 12.2	June 4 - Tree Traversal Coding Quiz	
June 10, 12	Review		June 11 – AVL Tree Coding Quiz	
June 14	Exam 1			
Jun 18, 20	Sets and Maps	Weiss 4.8	June 19 -Review exam	No live lectures – there will be videos on the material available
June 22	Hashing	Weiss Chapter 5	June 25 – Review Programming Assignment 1 Due June 28	
July 1	Heaps	Weiss Chapter 6	July 2 Heap Coding Quiz	
July 3, 5, 8	Sorting	Weiss Chapter 7	July 9 Review Sorting Analysis Due July 19	
July 10, 12, 15	Graph Traversals, Graph Implementation, Topological Sort	Weiss 9.1-9.2	July 16 Graph Traversal Coding Quiz	
July 17, 19, 22	Shortest Paths, Minimum Spanning Trees, Network Flow	Weiss 9.3-9.5	July 23 Graph Algorithm Coding Quiz	
July 24	Introduction to NP Completeness	Weiss 9.7		
July 26	Greedy Algorithms	Weiss 10.1		
July 29, 31	Dynamic Programming	Weiss 10.3	July 30 Dynamic Programming Coding Quiz	
			Review Programming	

Assignment Due
Aug 2

Aug 2 Games Weiss
10.5.2

Aug 5, 7 Review

Aug 6 Review

No live
lectures. I'll
have videos of
review
material and
you are
welcome to
contact me
electronically

Aug 9 Final Exam