

CSCI 3230 DATA STRUCTURES

Summer 2019

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Office hours:	MTWRF 3:40 pm – 4:40 pm; or by appointment
Lecture class:	MTWRF 2:00 pm – 3:40 pm; CEIT 2212
Folio:	Course materials (such as syllabus, slides, and homework descriptions) are available in Folio.
Important Dates:	May 20, Class begins and Attendance Verification May 20 – 22, Drop/Add May 27, Memorial Day – No classes June 5, Last day to withdraw without academic penalty June 19, Last day of classes

Course Description: This course introduces basic data structures and their application using the Java programming language. We introduce a mathematical framework for evaluating the efficiency of Java code, and develop implementations of basic data structures such as lists, stacks and queues. We study searching and sorting algorithms and introduce recursion as a strategy for improving the running time of these algorithms. This leads us to study more advanced data structures that are defined recursively, such as trees and heaps. We cover several advanced topics, such as hash tables and the storage and exploration of graphs.

Prerequisite(s): A minimum grade of “C” in CSCI 1302, MATH 2130.

Textbook: No textbook is required. All necessary material will be posted on online.

Objectives: Proficiency in data structures (including containers, trees, heaps, priority queues, hash tables and graphs) and algorithms for manipulating data (including sorts and tree traversals). Develop the ability to implement those data structures and analytic understanding of the time and space trade offs of different data structures and different implementations. Write larger programs that require interacting with a data structure.

At the end of the course, a successful student should be able to:

- Use the object-oriented programming paradigm to write understandable and maintainable Java programs.
- Given a specification, design and implement an algorithm in Java that correctly satisfies the specification.
- Rigorously analyze the time and space efficiency of a Java program.
- Compare and contrast the relative merits (in terms of efficiency) and applicability of standard data structure.

Course Policy:

- **Academic Honesty:** Consultation with fellow students is encouraged. However, directly copying another student's work (past or present) defeats the purpose of the assignments and exams and is an honor code violation. Unless otherwise noted, you are expected to complete all assignment **individually**. Violations will result in serious penalties including **course failure** and possible disciplinary action. Honor Code (refer to Georgia Southern's Faculty Handbook):

I will be academically honest in all my course work and will not tolerate the academic dishonesty of others. I also pledge to engage in ethical behavior on-campus and off-campus, to live an honorable lifestyle, and to create a campus environment that is characterized by individual responsibility, civility, and integrity.

- **Attendance and Punctuality:** Each of the lectures will build on the previous lectures. Thus, it is very important that you attend every class. Once you start slipping behind it is very hard to catch up. For that reason, **attendance is very important for this course**. You are expected to attend the all of the lectures and discussion sessions for which you are enrolled. You are expected to come to lectures, discussions, and examinations on time; arriving late and/or leaving early is disrespectful and disrupts the entire class.
- **Late Assignments:** No late homework assignments are accepted. Lab assignments must be completed in lab time.
- **Make-up work/tests:** This course moves along at a very fast pace. As a consequence I expect everyone to keep up. With the possible exception of documented illness or injury, make-up work and/or tests will **not** be given.
- **Reporting illness or injury:** Although I believe most students are honest and trustworthy, as a matter of policy, I must ask you to verify an illness or injury with a doctor's certificate. Please note that other family or personal issues will **not** be accepted as a justification for absence.
- **Accommodations** (see faculty or student handbook): Georgia Southern University is an Equal Opportunity and Affirmative Action institution committed to providing reasonable accommodations for any person with a disability who meets the definition of disabled as described in the Americans with Disabilities Act. Students requiring academic accommodation should contact the Director of the Student Disability Resource Center for assistance at (912) 478-5136 or TDD: 912-478-0273.
- **Distribution of course materials:** Lecture notes, homework assignments/quizzes/exams, as well as their sample solutions, are prepared for students in this course only. Any other use, distribution, or posting in places outside this course are prohibited without written permission from the instructor.
- **Note about recording:** Audio or video recording of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Recorded material is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the instructor.

Grading Policy: Your final grade will be derived from your performance in three areas:

- **Homework:** sets of theoretical problems and short coding assignments.
- **In-class Coding:** implementation of common data structures in the class.
- **Project:** somehow large coding assignment that require the development of solutions to practical problems. Students need to work in groups with size **at least 2, at most 3**.

- **Written Exams:** one mid-term exam during the semester and one final exam. The exams are **closed-book**, **closed-notes** and evaluate how well you retained and understood the course content as well as how well you can apply the course concepts to new problems. For each exam, an in-class review session will be held to provide time for resolving issues regarding the content and procedure of the exam.

Homework and in-class coding assignments are assigned according to the schedule posted on the Folio. Solutions to homework and in-class coding assignments **must** be submitted on Folio. Exams are held according to the schedule on the Folio. The final grade will be graded with the following weighting:

Homework: 20%; **In-class coding:** 30%; **Project:** 20%; **Mid-term:** 15%; **Final:** 15%.

You are encouraged to track your scores on Folio to ensure that you have received the appropriate credit for each of your assignments and exams. No extra credit or “make-up” assignments will be given (with exception to the cases stated in the course policy).

The final grade is based on the following standards:

A: 90% or above; B: 80 – 89.99%; C: 70 – 79.99%; D: 60 – 69.99%; F: 59.99% below.

Tentative Course Outline: Please note that the schedule is **tentative**, which might change during the semester. In particular, please double check the time for our final exam on our University website around the last day of classes.

Date	Topics	Homework
Week 1: May 20 – May 26		
Class 1	Attendance Verification ; Introduction	
Class 2	Asymptotic Analysis of Algorithms	
Class 3	Asymptotic Analysis of Algorithms (continue)	
Class 4	Recursion	
Class 5	Linear Data Structures	A1 Due
Week 2: May 27 – June 2		
Class 1	Memorial Day, No classes	
Class 2	Linear Data Structures (continue)	
Class 3	Tree	
Class 4	Priority Queues and Heaps	
Class 5	Priority Queues and Heaps (continue); Review	A2 Due
Week 3: June 3 – June 9		
Class 1	Midterm	
Class 2	Maps and Hash Tables	
Class 3	Search Trees	
Class 4	Search Trees	
Class 5	Comparison Sorts	A3 Due
Week 4: June 10 – June 16		
Class 1	Comparison Sorts	
Class 2	Linear Sorts	
Class 3	Graphs – ADTs and Implementations	
Class 4	Graphs – DFS and BFS	

Class 5	Graphs – Shortest Path and MST	A4 and Project Due
Week 5: June 17 – June 19		
Class 1	Final Review	
Class 2	Project presentations	
Class 3	Final exam	