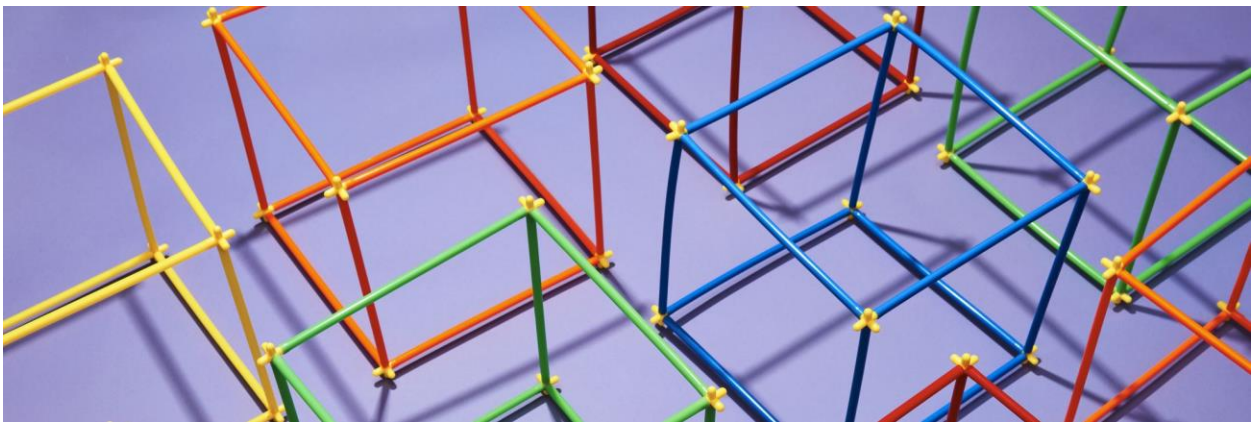
CS 2400- Data Structures and Advanced Programming

Summer 2023



Welcome to CS2400!

I am delighted that you signed up for this course section. Throughout this course, we will study data structures together to build efficient computer programs. In particular, we will focus on learning what data structures are, why data structures play an important role in computer science, and how to correctly implement efficient data structures in Java.

This course is offered online and fully asynchronous, from May 31, 2023 to July 5, 2023 (including the final exam week from July 3-5, 2023). Our course material is made accessible on the Canvas platform, with a structured course schedule with due dates that must be followed. If you have any questions or encounter problems, please contact me as soon as possible. I will be happy to help and support your learning.

Catalog Description

- Abstract data types and their implementation using linear and non-linear data structures. Interfaces and generics. Advanced file access. Recursive structures and operations. Big-O notation and introduction to algorithm analysis.
- Pre-requisite(s): CS 1300, CS 1400, and MAT 1140 with grades of C or better, or consent of instructor.

Course Learning Objectives

- Comprehend relationships between data structures and algorithms and performance issues involved.
- Use linear data structures such as bags, lists, stacks, queues, and dictionaries.
- Use non-linear data structures such as trees and graphs.
- Perform analysis of algorithms.
- Have proficiency in recursion.
- Know advanced file access.
- Gain experience in Java generic programming.
- Practice library facilities of a high-level programming language.

Instructor Information

- Instructor: Dr. Hao Ji
- Email: hji@cpp.edu

Required Textbook

- Data Structures and Abstractions with Java, 5th Edition, by Frank M. Carrano and Timothy M. Henry, Prentice Hall, 2018.

How to Get Help?

From May 31, 2023 to July 5, 2023, if you any questions about the course, please feel free to email me at hji@cpp.edu

You can also find me by either one of the following

- Attending (optional) weekly synchronous **office hours** sessions. The specific date/time and the zoom link for these optional sessions are as follows,
  - **Date/Time:** Monday, from 7:00 p.m. to 9:00 p.m.
  - **Zoom Link**: https://cpp.zoom.us/j/84735319557

  Notes:
  - Please kindly notify me via email about 2 hours in advance, if you plan to join an office hours session.
  - No office hours sessions after June 30, 2023.
- Posting a message in the "Course-Related Questions" forum on Canvas, which is a shared Q/A workspace for all students in this course section at https://canvas.cpp.edu/courses/74455/discussion_topics/650970

Course Expectations

- This course is a fast-paced course that requires you to **closely follow the deadlines provided**, study course material, and complete each weekly tasks.
- This course material is organized into weekly sessions including Session 0 "Start Here", Session-1, Session-2, Session- Exam I, Session-3, Session- Exam II, Session-4, and Session-Final Exam. Those sessions are available at https://canvas.cpp.edu/courses/74455/modules, particularly,
  - ***Session "Start Here"*** is to provide key course information and instructions to begin accessing course components.
  - ***Sessions 1, 2, 3,*** and **4** are to provide learning guidelines, online videos, and handouts for weekly course topics, discussion, and homework assignments.
  - ***Sessions about exams*** are to provide online, asynchronous exams.

  Please plan your study time to follow the course schedule and complete the weekly topic activities by the deadlines.
- Please start working on each assignment as early as possible. **For late assignment submissions, 20% of the grade is deducted per day after the assignment's due date** (but before the final exam date) unless you have a valid excuse with proper documentation.
- Please check your CPP email account regularly to avoid missing important information.
- If you have any questions or encounter problems, please contact me as soon as possible.

Grade Evaluation

- All work will be graded on a numerical scale. The overall course score will be the weighted sum of all work using the following weights:

  45% Assignments 15% Exam I
  15% Exam II 25% Final Exam
  Total 100%.

- Final letter grade will be based on your overall score as follows:

  A >= 90,
  90 > B+ >= 85,
  85 > B >= 80,
  80 > C+ >= 75,
  75 > C >= 70,
  70 > D+ >= 65,
  65 > D >= 60,
  F < 60.

Note: There is no rounding of grades in this class. The instructor reserves the right to adjust the scale for course grades, if necessary.

Tentative Course Outline

The course topics will be covered in the following tentative order. **Detailed course schedule with suggested completion date for each learning activity can be found in the "Syllabus" area on Canvas at https://canvas.cpp.edu/courses/74455/assignments/syllabus.**

Note: For Exam II and Final Exam only, additional 25 minutes and 30 minutes will be given for scanning or photo your answer sheet to file-based questions, respectively. No additional time will be given on Exam I.

Topics	Readings
• Introduction	• Introduction "Organizing Data"
• Review of Java Basics, Interfaces, and Generic Programming	• Appendix B, Prelude (Designing Classes), Appendix C, and Interlude 1
• Bags	• Chapters 1, 2 and 3
• Efficiency of Algorithms	• Chapter 4
• Lists	• Chapters 10, 11, and 12
• Stacks	• Chapters 5 and 6
• Recursions	• Chapter 9
• Queues	• Chapters 7 and 8
• Dictionaries	• Chapters 20 and 21
• Hashing	• Chapters 22 and 23
• Tree Basics	• Chapters 24 and 25
• Heaps	• Chapter 27
• Binary Search Trees	• Chapters 24 and 25
• Graphs	• Chapters 29 and 30

Academic Integrity

All of the work completed in this course is expected to be your own. Plagiarism or cheating will not be tolerated in this course. For more information, visit Academic Integrity Policies https://www.cpp.edu/studentconduct/academic-integrity/.

Accessibility Statement

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