



CIS 2353 – Data Structures Fall 2023 Syllabus

Instructor Information

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Office Location: F-113

Course Information

Meeting Days and Times: Asynchronous delivery, online
Classroom Location: ONLINE/REMOTE

Course Catalog Description

Students will investigate the programming techniques and theories involved in implementing linked lists, queues, stacks and tree structures. Recursion, searching techniques and sorting algorithms will also be considered. Students will be required to complete computer-based assignments inside/outside of class.

Course Prerequisites

CIS 1500 (CIS 2151 is strongly recommended as prerequisite or at least corequisite)

Course General Education Outcomes

A student in CIS 2353:

- Critical Thinking
 - Recognizes and understands the implications of relationships between ideas
 - Uses information to develop conclusions/solutions
 - Applies knowledge to the assigned task
 - Accomplishes the assigned task
- Quantitative Literacy
 - Shows all of the necessary steps to solve the problem
 - Performs computations with appropriate accuracy
 - Uses critical thinking to draw correct inferences from relevant information
 - Models mathematical information symbolically
- Information Literacy
 - Is able to evaluate information critically (Evaluate)
 - Is able to integrate information to accomplish the planned objective (Synthesize)

Common Course Outcomes

1. Describe the general structure and behavior of stacks, queues (including priority queues), linked lists, binary search trees, hash tables and heaps;
2. Identify the most appropriate type of data structure to use for a given set of requirements;
3. Describe performance issues related to each data structure (identified in objective 1) for basic operations such as insert, delete, and find;
4. Demonstrate how to implement at least three data structures (identified in objective 1) using the Java Collections Framework;
5. Demonstrate how to override the “toString” and “equals” methods of Java Collections classes and how to implement the Comparable interface;
6. Demonstrate the ability to create structures within structures using the Java Collections Framework (e.g., a TreeMap of Linked Lists, ArrayList of ArrayLists);
7. Identify three classic $O(n \log n)$ and three $O(n^2)$ sorting algorithms and describe their general properties;
8. Illustrate the execution sequence of recursive methods

Course Goals / Topics

- Review of Object Oriented concepts
- Analysis of Algorithms
- The Java Collections Framework
- Recursion
- Lists
 - Array-based
 - Linked structure based
- Stacks
- Queues
- Binary Trees and Binary Search Trees
- Sorting
- Tree maps and sets
- Priority Queues (Heaps)
- Hashing
- Graphs, Trees and Networks

Textbook and Supplementary Materials

Required Text

Data Structures & Abstractions with Java – 5th edition

by F.M. Carrano and T.M. Henry

© 2018 – Pearson (publisher)

ISBN: 978-0134831695

Note: The 4th edition (2015) is also acceptable

Supplemental Materials

Slides, notes, and other materials may be posted to D2L.

Assessment Policies and Procedures

Plagiarism and Cheating

It is college policy that no student shall engage in behavior which, in the judgment of the instructor of the class, may be construed as academic dishonesty. This may include, but is not limited to, plagiarism, presenting another individual's ideas, data, words, images, or other products without giving credit to the originator, or other forms of academic dishonesty, such as the acquisition (without permission) of tests or other academic materials and/or distribution of the same. This includes students who aid and abet, as well as those who attempt such behavior. (OCC Student Life Handbook)

Grading Policy

I use a straight point system for this course.

- Project 1: 100 pts
- Project 2: 125 pts
- Project 3: 125 pts
- Project 4: 200 pts
- Mid-Term Exam: 100 pts
- Final Exam: 200 pts
- Homework: varies

Grading Scale

Letter Grade	Percentage Scale
A	94 to 100%
A-	90 to 93.9%
B+	86 to 89.9%
B	83 to 85.9%
B-	80 to 82.9%
C+	76 to 79.9%
C	73 to 75.9%
C-	70 to 72.9%
D+	66 to 69.9%
D	63 to 65.9%
F	Below 63%

N Mark (Grade) Non-Attendant Policy

This mark is awarded to students who, though registered, never attended class, did not officially drop, and (if an online or hybrid class) have no gradable work. Marks of "N" do not satisfy prerequisites and are non-transferable. This mark is not used in the calculation of GPA, but it may affect eligibility for financial aid. Instructors confirm non-attendance by the "N" Mark Report Date (found in MyOCC for

each section) and then submit their "N" marks to the institution. Students who have received an "N" mark will not be permitted to enter the class, nor will the student be able to drop the class. After the "N" mark has been submitted, a change of grade will not be accepted for the student. For more information refer to [OCC's Grading Policy](#).

Late Policy

Please submit your completed assignment to the Desire2Learn under the appropriate assignment listed. Assignments will be accepted up until midnight of the due date without penalty. Any assignment submitted after the due date will be considered late. A 5% deduction will be applied for every day that the assignment is late. After 5 business days, the assignment will no longer be accepted unless I approve such an exception. I reserve the right to wave any penalties due to extenuating circumstances. I encourage everyone to do their best to complete and upload their assignments on or before the due date.

Student Policy and Support Information

FERPA

Per the Family Educational Rights and Privacy Act (FERPA), college personnel are not allowed to release a student's personal information to anyone, including other students. Please read [Oakland Community College's FERPA policy](#) for more information.

Americans with Disabilities Act (ADA)

Students requiring special assistance (including those affected by the Americans with Disabilities Act) should contact the [ACCESS](#) office, which will inform the instructor of any special conditions pertaining to their learning.

Academic Support Center

The [Academic Support Center](#) (ASC) provides programs and services that help OCC students to be successful in achieving their academic goals. They offer [tutoring](#), Supplemental Instruction (SI), and study skill seminars.

Technology Appropriate Use Regulations (TAUR)

Information technology resources (computers; voice, video and data networks; electronic data and information) are provided by Oakland Community College to its faculty, staff, administration and students in support of the College mission. Users of the information technology resources will abide by applicable federal and state laws and the College's regulations governing the use of these resources and will use them in support of activities directly related to duties and assignments. Please read [Oakland Community College's Technology Appropriate Use Regulations](#) (TAUR) for more information.

Public Safety

The Oakland Community College Department of Public Safety is committed to providing the students, faculty, staff, and visitors with a safe and secure environment. Please read [Oakland Community College's Public Safety](#) website for more information.

Course Schedule

Disclaimer: This schedule is subject to change if circumstances deem a change. I will give you reasonable notice for any revisions.

NOTE: Readings are indicated in the 4th edition in normal font. Dark red is for 5th edition (if it differs from 4th edition chapter ordering)

Week	Date	Topics	Readings [Dark red = 5 th ed. chapters]	Assignments/Due Dates
1	8/28/2023	Basic programming, Java Essentials, Classes	Appendices A-C	
2	9/4/2023	Introduction and Review	Appendices C-E; (A-C) Prelude: Designing Classes	
3	9/11/2023	The ADT Bag	Chapters 1-3	
4	9/18/2023	ADT Bag, cont'd; Efficiency of Algorithms	Chapter 3; Chapter 4	
5	9/25/2023	Stacks and their implementations	Chapters 5-6;	Programming Project 1
6	10/2/2023	Recursion; Sorting	Chapter 7 (14); Chapters 8-9 (15-16)	
7	10/9/2023	ADTs Queue, Dequeue, and Priority Queue and implementations	Chapters 10-11 (7-8)	
8	10/16/2023	Study for your mid-term!	No new material	Programming Project 2
9	10/23/2023	Mid-Term Exam		
10	10/30/2023	The List ADT and its implementations	Chapters 12-14 (10-12)	Programming Project 3
11	11/6/2023	List ADT (cont'd); Iterators; ADT Sorted List	Chapters 15-16 (13, 17)	
12	11/13/2023	Searching; Dictionaries and Implementations; Hashing	Chapters 18-22 (19-21)	Programming Project 4
13	11/20/2023	Thanksgiving Recess (Nov. 20-25)		
14	11/27/2023	Hashing (con'td); Trees and Implementations; Binary Search Trees	Chapters 23-25 (22-26)	
15	12/4/2023	Heaps and Balanced Search Trees; Graphs; Review for Final	Chapters 26-29 (27-30)	
16	12/11/2023	Final Examination		