

COSC-2336-48F
Program Fundamentals III (Data Structure)
Fall Semester 2017

Instructor: Jing Zhang, PhD
Maes Building, Room 72
(409) 880-7995
jing.zhang@lamar.edu

Office hours: 2:30pm-4:30pm on TR and anytime by email appointment

Course objectives:

This is a course about further applications of programming techniques, introducing the fundamental concepts of data structures and algorithms. Topics include recursion, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), and algorithm analysis.

Pre-requisites: at least a 'B' grade in Programming Fundamentals II (COSC 1337) and at least a 'C' grade in Calculus I (Math 2413)

Student learning outcomes: Students who successfully complete the course will be able to demonstrate the ability effectively to use the following techniques:

1. Create useful software architecture documentation at the program, class, method, and block levels.
2. Develop correct and efficient programs to implement software.
3. Debug implemented software in a proficient manner.
4. Demonstrate familiarity with searching and sorting algorithms for (non-)linear structures.
5. Define and distinguish among frequently used discrete structures such as lists, trees, and graphs to computer science problems.
6. Use elementary concepts of combinatorics, probability, and statistics to analyze and evaluate the efficiency of algorithms.
7. Demonstrate basic understanding of time complexity.
8. Design efficient algorithms and compare competing designs.
9. Demonstrate basic understanding of some design approaches such as greedy algorithms, dynamic programming and divide-and-conquer.

Course materials:

The course is taught from the adopted book. As a programming language to implement the assignments, Java programming language in a Windows/Unix environment can be used.

Adopted textbook:

Y. Daniel Liang: Introduction to Java Programming, Comprehensive Version (10th Edition, Prentice Hall, ISBN: 978-0-13-376131-3

Grading criteria:

The grade for the course will be based on assignments, a mid-term written exam, and one comprehensive final written exam, with percentages assessed as follows:

1. Assignment: 30%
2. Mid-Term Exam: 35%
3. Written final exam: 35%

Course Outline:

Units	Chapters – Topics
Lecture 1 and Assignment 1	Generics (Chapter 19)
Lecture 2 and Assignment 2	Lists, Stacks, Queues, and Priority Queues (Chapter 20)
Lecture 3 and Assignment 3	Sets and Maps (Chapter 21)
Lecture 4 and Assignment 4	Developing Efficient Algorithms (Chapter 22)
Lecture 5 and Assignment 5	Sorting (Chapter 23)
Lecture 6 and Assignment 6	Implementing Lists, Stacks, Queues, and Priority Queues (Chapter 24)
Lecture 7 and Assignment 7	Binary Search Trees (Chapter 25)
Lecture 8 and Assignment 8	Hashing (Chapter 26)
Lecture 9 and Assignment 9	Perfectly Balanced (AVL) trees (Chapter 27)
Lecture 10 and Assignment 10	Graphs and Applications (Chapter 28)
Lecture 11 and Assignment 11	Weighted Graphs and Applications (Chapter 29)
Lecture 12 and Assignment 12	Multithreading and Parallel Programming (Chapter 30)
Lecture 13	Review of all lectures (Chapters 18-30)

Policies:

1. Assignments that are turned in late will be assessed with the following late penalty applied to the score received:
 - 1 day late (Immediately after the deadline up to 24 hours later): -10%
 - 2 days late: -25%
 - 3 days late: -30%
 - > 3 days late: -100% (we will not accept it).
2. There is no make-up final exam unless you have a DOCUMENTED medical or personal EMERGENCY.
3. All work in this course is to be your own. Anyone caught copying, plagiarizing or otherwise cheating on a homework assignment will get a 0 on that assignment. Anyone caught copying, plagiarizing or otherwise cheating on the final exam will get an F in the course. The same applies to those who allow their materials to be copied.
4. The Attendance Policy: Students are expected to login online regularly and are solely responsible for anything missed in the class. Poor attendance will ultimately be reflected in the course grade. Therefore, an “A” student must read and submit assignments for all classes in time and actively provide thoughtful, relevant comments to class discussions.
5. The Campus Closure Policy: In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University website's homepage (www.lamar.edu) for instructions about continuing courses remotely.

Students with disabilities:

The Professor will make reasonable accommodations for students with documented disabilities. Students needing accommodations must first have them approved through the **Office of Services for Students with Disabilities, Communication Building, room 105, phone number 409-880-8059**. Please notify the Professor during the first week of class regarding accommodations needed for the course.

Emergency Procedures

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at:

<http://www.lamar.edu/about-lu/administration/risk-management/index.html>. Following are procedures for the first two:

Severe Weather:

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter (CADD):

- **CALL** - 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID**- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY**- Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND**- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.