CS 0445 Data Structures (Spring 2024)

Instructor: Yuqi Ouyang	**Section 1:** Thursday, 8:15 – 11:00, 3-105
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Office Hours:

Tuesday, 9:00 – 12:00. Thursday, 14:00 – 17:00. New SCUPI building, Room 523.
By appointment only. Please send emails to schedule a meeting.

Teaching Assistants & Lab Hours:

Xiangyi Peng (Section 1): 2998194565@qq.com. Friday 10:00-12:00. 3-105
Xuanle Li (Section 2): 2022141520215@stu.scu.edu.cn. Friday 10:00-12:00. 3-105

Course Description:

This course focuses on basic abstract data types (ADTs) in Computer Science. Participants will gain proficiency in using the JAVA programming language to implement these ADTs and associated algorithms. The focus extends to problem-solving techniques for tasks like data searching and sorting. Simultaneously, participants will comprehend the complexity of basic algorithms without direct implementation. The course also explores the art of selecting appropriate algorithms or ADTs to efficiently address computational tasks.

Course Objectives:

• Mastering ADTs: Develop a comprehensive understanding of essential ADTs and their role in solving computational problems.
• JAVA Programming Proficiency: Acquire proficiency in using the JAVA programming language to implement ADTs and associated algorithms.
• Problem-Solving Skills: Train problem-solving skills by solving tasks related to data searching, sorting, and other computational challenges.
• Algorithmic Complexity Awareness: Gain insight into the theoretical complexities of basic algorithms, enabling informed algorithm selection for optimal computational efficiency.

Learning Outcomes:

• Demonstrate Competence with ADTs: Exhibit mastery in utilizing various abstract data types to solve a range of computational problems.
• Apply JAVA Programming Concepts: Effectively implement ADTs and algorithms using the JAVA programming language, showcasing practical programming skills.
• Execute Efficient Problem-Solving: Skillfully address tasks such as data searching and sorting through systematic problem-solving approaches.
• Evaluate Algorithmic Complexity: Analyze and comprehend the theoretical complexities of basic algorithms, enabling informed decisions in selecting suitable algorithms or ADTs for specific computational tasks.

Prerequisites:

A grade of C or better in CMPINF 0401 Intermediate Programming is required.
Basic JAVA programming.

Assessment:

Attendance, Assignments	30%
Coursework	20%
Final exam	50%

Tentative Outline:

Introduction, JAVA Basics, Asymptotic Analysis, Arrays, Lists, Sets, Linked Lists, Recursion, Stacks, Queues, Sorting, Heaps, Maps, Hash Tables, Trees.

Textbook:

Data Structures and Abstractions with Java (5th Edition). Frank M. Carrano and Timothy M. Henry. 2018. We suggest focusing on lecture slides and course materials.

Communication and Assistance:

The instructor and TAs may periodically post announcements to the Blackboard website, or email enrolled students with announcements. You should regularly check these announcements.

When contacting the course staff via email, messages must be addressed to (or CC) both the instructor and the TAs. Email subject should be prefaced with the appropriate prefix (e.g., CS0445).

Regarding providing assistance, we can not assure instant respond to emails. Hence, we suggest bring your questions to face-to-face sessions, e.g., the lab hours.

More importantly, please check the following options, if you are getting an error in your program, what should you first do?

A. Email your instructor or your TAs every 5 minutes until someone responds.

B. Bring your errors or questions to face-to-face sessions.

C. Throw your laptop on the floor and swear to never program again.

D. Google the error, find a solution quickly from online websites such as StackOverflow.

E. Use ChatGPT to analyze the error and find a solution.

We recommend option D, i.e., Google your error first. When you contact us for help, probably we will also Google your error and get some help from StackOverflow. Hence, why not try it yourself before contacting the course staff? In this case, you will learn a skill for problem-solving, i.e., the Google skill, which is one of the most essential skills in Computer Science study.

Regarding option E, we know that ChatGPT has become a powerful tool even for solving programming issues. However, it is not a very good option because ChatGPT outputs words and sentences as the answer that has the highest likelihood to address your question, meaning that ChatGPT will never actually run either the code in your question or the code in the answer. Also, the reliance on ChatGPT is not a good idea because during exams you will not be able to use ChatGPT anymore.

Plagiarism:

Since this module does not contain any group works, students are expected to complete their works independently. Discussions with other students on the assignments or the coursework should be limited to understanding the statement of the problems. Plagiarism will not be tolerated and substantial penalties

will be given on both two persons involved in the activity.

Late Submissions:

All submissions should be on time. Late submissions beyond the deadline will not be tolerated and penalties will be given, unless the students' late submissions are due to mitigating circumstances and the late submission has been approval by the instructor, prior to the deadline.

Make-Up Exams:

Students are expected to take the final exam. Make-up exams will only be given in the event of a medical situation or an emergency, and only if this is documented and the instructor is notified immediately. Missing an exam will result in a failure for the exam.

Mitigating Circumstances:

If you have a disability or any personal circumstances that substantially affect your study or exam. You are encouraged to contact the department or the instructor as soon as possible. With valid proof, mitigation may be applied when assessing your assignments, coursework or exam sheets.

Audio or Video Recording:

Students may record lectures, discussions or activities by audio or video. However, any such recordings should be solely for personal use.