CSCE 221 – Data Structures and Algorithms
Spring 2024

Course Logistics

1. Time and Place
    a. **Lectures (Online Asynchronous)**: Canvas Modules
    b. **Labs (F2F)**: **Various** (See HOWDY)
2. Course Content: Canvas https://texasam.instructure.com/courses/286517
3. Course Discussion Forum: **MS TEAMS:** TEAM- CSCE-221 SP24 (LINK)
4. Teaching Staff:
    a. Names and Roles
        i. **Aakash Tyagi, tyagi@cse.tamu.edu**
            - **Role (Instructor):** Create Lecture Content for asynchronous deployment, Grade Knowledge Assessments, Support QnA on all lecture content (slides, videos, quizzes, practice questions).
        ii. **Sravan Sriram (ssravan360@tamu.edu), Anh Nguyen (anguyen2023@tamu.edu), Aakash Haran (ash3498@tamu.edu), Soham Nagawanshi (ndsoham@tamu.edu), Laith Bohsali (lbohsali@tamu.edu)**
            - **Role (Teaching Assistants):** Create Lab Content for Lab Demo, Lab Exercises (LE), Programming Assignments (PA), Conduct Lab Sessions, Grade Skill Assessments, Support QnA on all lab content.
        iii. **Harsh Sirolia (harshsurolia2609@tamu.edu)**
            - **Role (Support Staff)** PA and LE QnA over TEAMS.
    b. **Office Hours:** Will be posted on Canvas and TEAMS
5. **A baseline version of the Course Master Plan is made available on Canvas in Student Resources module. Although some amount of buffer planning has been built-in to the schedule, we will respond to situation 'on the ground' and respond as dictated by the over-arching goal of maximizing learning and assimilation.**

Prerequisites

- Familiarity with C/C++ programming (CSCE 121, CSCE 221)

Description

Specification and implementation of basic abstract data types and their associated algorithms including stacks, queues, lists, sorting and selection, searching, graphs, and hashing; performance tradeoffs of different implementations and asymptotic analysis of running time and memory usage; includes the execution of student programs written in C++.

Learning Objectives

1. Provide students with knowledge of basic abstract data types and associated algorithms for stacks, queues, lists, trees, graphs, hash tables, and priority queues.

2. Provide students with C++ programming practice by specifying and implementing data structures and algorithms.

3. Provide students with skills needed to understand and analyze complexity of algorithms focus on run time performance and memory usage.

Learning Outcomes

At the end of this course, students should be able to

1. Design and implement different data structures that allow easy access and manipulation of data using the C++ programming language.

2. Apply the Big-O asymptotic notation to analyze and select efficient algorithms for solving a given problem with respect to time and memory usage.

Books (NOT REQUIRED FOR PURCHASE)

There is no required textbook for this class: the course material is assembled from multiple sources (books, existing courses, conversation with experts, and published research). However, the following list of books are most referenced in the assembled material for those who'd like an additional source of material to supplement lectures.

- [Goodrich] Data Structures and Algorithms in C++, Second Edition, Goodrich et al, Wiley, 2011.
- [Weiss] Data Structures and Algorithms Analysis in C++, Third Edition, Weiss, Pearson, 2013.

Lectures

Lectures will be remote-asynchronous meaning the lecture content will be released on Canvas weekly according to the Master Schedule. During lectures we will be covering Data Structures and Algorithms from a conceptual stand. The material covered in the lectures will provide the background and foundation for you to appreciate the lab exercises designed to buttress lecture concepts and to prepare to succeed in programming assignments.

Labs

Labs will be in-person. Labs are where we will put into practice the material learned in the lectures, and where we will acquire a working knowledge of common data structures and algorithms. After an introductory session to familiarize you with the code development environment and basic C++ refresher, there will be a continuing series of lab exercises and programming assignments of moderate difficulty level, which will exercise different data structures and algorithms, and so on.

The 6 mainstream Programming Assignments (PA1-6) will be assigned on an average of roughly every three weeks. Graded take-home Lab Exercises (LE's) will be assigned roughly on a weekly basis with the objective of building basic skills to succeed in PA's and Skill Assessments.

Assessment Method (Subject to Minor Changes!):

We will have **three knowledge assessments and three skill assessments** during the semester. The knowledge assessment (KA) will be a test of conceptual knowledge mostly derived from lecture content. The Skill Assessment (SA) will be a test of programming and problem-solving skills mostly derived from lab content (demos, exercises, PA's). Both KA and SA testing will be conducted in designated lab sessions as noted in the master schedule. KA testing will comprise of multiple-choice, T/F, matching, and short answer questions. SA Testing will typically comprise of one or more short coding exercises. Those with accommodations from the Department of Disability Resources (*disability.tamu.edu*) may arrange to take the assessment test at the center or in the lab. Any exceptions to the above must be obtained from the instructor well in advance with proper justification via e-mail. Sample KA and SA will be provided before each event to provide practice opportunities.

Grade Allocation and Scale (Subject to Minor Changes!):

The grade allocation is as follows:

1. Programming Assignments = **48%** (PA1..6 are 8% each)
2. Take-Home Lab Exercises = **20%** (LE1..10 are 2% each)
3. Knowledge Assessment = **15%** (KA1..3 are 5% each)
4. Skill Assessment = **15%** (SA1..3 are 5% each)
5. Online-take-home Quizzes = **2%**

The grading scale is as follows:

- 90-100: A
- 80-89: B
- 70 – 79: C
- 60 – 69: D
- 59 and below: F

Important Announcement

Course runs from Jan 16, 2024 – April 30, 2024.

- **Assessments:** Please note as follows -
    - **Knowledge Assessments: In-Lab (per your section timings)**
        - **KA1: Feb 19,20**
        - **KA2: Apr 1,2**
        - **KA3: Apr 24,25**
    - **Skills Assessments: In-Lab (per your section timings)**
        - **SA1: Feb 21,22**
        - **SA2: Apr 3,4**
        - **SA3: Apr 29,30**

Late Submission Policy – SUBJECT TO CHANGE

Quizzes, Knowledge, and Skill Assessments late policy is stringent and straightforward since they are akin to tests.

- No exception without prior e-mail approval from Instructor. Provide supporting documents accompanying the request. See University policy for details.

Programming Assignments (PA's): The master schedule lists two dates for each PA (incentive date and due date). Incentive date is the earlier of the two and carries a 3% bonus if project is submitted by that date. Due date is the submission deadline. Submissions made after the due date will receive a flat 50% penalty. No submissions will be accepted after May 3.

Lab Exercises (LE's): Due dates will be provided at the time of release of each lab exercise. Submissions made after the due date will receive a flat 50% penalty. No submissions will be accepted after May 3.

Communication Policy

Your teaching staff will do their best to communicate relevant administrative information (deadlines, information about posted material, details about projects, locations of tutorials, and so on) in an effective and timely manner. We will be using **Microsoft (MS) TEAMS** platform for all course communication.

Please refer to the document "CSCE221 How do I setup Microsoft TEAMS" **available on Canvas in Student Resources Module**. It contains simple steps to install TEAMS and sign on to our course TEAMS site.

At times, reinforcement messages may also be sent via Canvas, but our discussion forum is MS Teams. If you are not receiving TEAMS or CANVAS updates, please contact the instructor.

Teaching Staff Support

It is important to lay out broad expectations for support as follows based on the roles:

Your **instructor** will be on hand to answer queries on lectures and practice questions, offer mentoring, and provide quiz and knowledge assessment review sessions/support.

Your **TA's** will conduct labs (in-person), answer queries on PA's and Lab exercises, and provide skill assessment review sessions/support. Their time is best spent on providing clarifications on assignments and offer detailed feedback on coding quality and organization.

As a general policy, I am asking the teaching and support staff to not assist with debugging student code. It is both counter-productive to student learning and stressful for the teaching staff. They will expend much of the feedback in providing a clear understanding of the programming assignment expectations and common best practices.

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend labs and complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

Course Acknowledgments

Lecture Content: The course website and lecture notes have incorporated course materials developed by Dr. Scott Schaefer, Dr. Teresa Leyk, and Dr. Eduardo Nakamura.

Lab Content: The lab exercises were created by Rohan Gupta Kandikonda (MSCS'24) and extended and improved by Rishav Dokania (MSCS'23).