

Course Information

Course Information

Course Number: CSCE221

Course Title: Data Structures and Algorithms

Section: 517 - 520

Time: Lec - MWF 12:40 pm to 1:30 pm/ Labs - MW 8:00 am to 12:20 pm

Location: ZACH 244/ZACH 596

Credit Hours: 3

Instructor Details

Instructor: Harpreet Singh Chawla

Office: L.F. Peterson Building, 2nd Floor

Phone:

E-Mail: harpreetsc@tamu.edu

Office Hours: Friday 2:00 pm - 4:00 pm or appointment by email

Course Description

Specification, analysis and implementation of abstract data types for lists, stacks, queues, trees, hash tables, graphs, and their associated algorithms. Performance trade-offs of different implementations; asymptotic analysis of running time and memory usage. Includes the execution of students programs written in C++; emphasis on adherence to good software engineering principles.

Course Prerequisites

- CSCE 121 "Introduction to Program Design and Concepts"
- CSCE 222 "Discrete Structures" or MATH 302 "Discrete Mathematics" (at-least co-requisite)

Course Learning Outcomes

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

1. Design and implement diverse data structures that allow easy access and manipulation of data using C++ programming language.
2. Use the data structures to implement algorithms.
3. Apply the Big-O asymptotic notation to analyse and select an efficient algorithm for solving a given problem with respect to runtime and memory usage.

Textbook and/or Resource Materials

- **Recommended Textbooks:**
 - "Data Structures and Algorithm Analysis in C++", 4th Edition, Mark A. Weiss, 2014, Pearson, ISBN-13: 978-0132847377 or ISBN-10: 013284737X.

- “Data Structures and Algorithms in C++ 2nd Edition”, 2nd Edition, Michael T. Goodrich, Roberto Tamassia, David M. Mount, ISBN-13: 978-0470383278 or ISBN-10: 0470383275.
 - You may need a textbook on C++ language from the previous semester, or any good C++ reference book(s).
- Slides used in the class/lectures.

Grading Policy

- Grading Scale: 90-100 – A; 80- <90 – B; 70- <80 – C; 60- <70 – D; Below 60 – F.
- There will be
 - 4 Assignments, each building upon the previous one. The 4 assignments together will make one course project.
 - Labs every week, managed by the TA(s) – Coding questions to solve in 50 minutes. Take home if incomplete and submit for 20% of the points by the end of the day.
 - There will be two exams, a midterm and a final, both conceptual, multi-choice.
 - A quiz every week (1 hour, 10 points), based on the materials covered in the week.
 - Peer reviews of the pseudocode/algorithm question of assignments.
- 4 Assignments – 35%; 15% Labs; 10% Peer Reviews; 25% - exams (10% midterm and 15% final); 15% Quizzes.

<i>Rubrics</i>	<i>Weightage (%)</i>	<i>Range of Marks</i>	<i>Grade</i>
<i>Assignments</i>	<i>35</i>	<i>90 – 100</i>	<i>A</i>
<i>Labs</i>	<i>15</i>	<i>80 – <90</i>	<i>B</i>
<i>Midterm</i>	<i>10</i>	<i>70 – <80</i>	<i>C</i>
<i>Final</i>	<i>15</i>	<i>60 – <70</i>	<i>D</i>
<i>Quiz</i>	<i>15</i>	<i>< 60</i>	<i>F</i>
<i>Peer Reviews</i>	<i>10</i>		

Note about graded materials:

- **Assignments** – The first question will be about writing the pseudocode for the assignment (30%) (Unless stated otherwise). The next question will be about writing the corresponding code (50%), and an analysis of the time complexity of an algorithm (20%).
 - You ARE ALLOWED to discuss with your peers, but those discussions should be limited to logic and the concepts.
 - You ARE NOT ALLOWED to copy their solutions. We have tools that detect plagiarism, including similar code logic and program flow.
 - You MUST MENTION the names of the students you discussed the concepts with. There will be at least one name always there – of the student you did the peer review with. If there are other students with whom you discuss the logic, mention them. **Note:** Your code will be checked for plagiarism against your peers and github repos we can locate that have similar codes on them.

- The pseudocode aspect of the assignment will be submitted and peer reviewed **one week** from the doling out of the assignment. The submission date will be mentioned in the assignment. Changes can be made to the pseudocode based on peer reviews (if deemed appropriate by the student themselves) for final submission.
- The code should have comments explaining the logic of the code. If there is any block of code that is doing something logical, briefly explain the logic for doing so, briefly (ideally in 2 – 3 sentences). Not doing so will lead to a 5% deduction from the coding section of the assignment.
- **Labs** – A coding assignment in the lab directed by the TA. If not completed in the lab, complete it by the end of the day to receive partial credit (20%). If you collaborate with anyone (both in and out of the lab), mention it in the comments above the submitted code. All labs carry equal weightage.
- **Quiz** – A weekly quiz to evaluate the understanding of the concepts, code and complexity analysis of the algorithms or data structures taught in the week.
- **Midterm/Final** – Questions testing the understanding of concepts. All multi-choice. One-third of the final will be based on material covered before midterm.
- **Peer Review** – Students will be reviewing each other's pseudocode for each assignment (groups of 2, different for each assignment). An advice is to consult each other about the review that the students submit. They will comment on:
 - The correctness of the pseudocode/algorithm.
 - How the pseudocode/algorithm could be improved.
 - And how the reviewee's own pseudocode/algorithm either dealt with what the reviewer got wrong, and/or how the reviewee can fix mistakes in their pseudocode/algorithm.

Note: The review should be about the logic, rather than focused on the syntax. Sound, good faith critiquing (even if incorrect) will receive full grade.

Class Participation – Peer-review and allowing discussions over the assignments and labs will test your interaction skills in the course. Peer-review will substitute for your class participation.

Attendance – Attendance is highly recommended, but not a graded component.

Late Work Policy

Unless a student has taken permission for submitting late, the following rules will apply:

- We will follow a cumulative grading system. You can submit assignments late, but all the late days for each assignment will be tallied at the end of the semester. This also means that if you submit your assignment before the deadline, those number of days will be subtracted from your late days tally. This is to keep you motivated and not give up mid-way through the semester if you fall behind in any assignment, giving you room to make up for the lost time.
- If in-spite of submitting any initial assignments late, **ALL** assignments are submitted before or on the deadline day of the 4th Assignment, no late penalty will be incurred.
- Late day penalty: We will deduct 1.25 per every late day **from the final score of the assignments**. That means, if the cumulative total of all assignments was 450/500 (90%), for example, with a total of 10 late days, 12.5 will be deducted from 90

(totaling 77.5). In the final score, 77.5 will be considered for the 35% component of the grading scale instead of 90.

Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy. To understand the circumstances under which makeup work or excused absences are allowed, please read [Student Rule 7](#).

Course Schedule

Google Drive link is shared with the class.

Course Information Items

Technology Support – We will be using:

- Canvas - For Quizzes and uploading of assignments documents
- Github - Push your submissions to your private repositories
- Piazza - Join the Piazza course page for discussions regarding anything pertaining to the class. <https://piazza.com/tamu/spring2022/csce221517520/home>

University Policies

This section outlines the university level policies. The TAMU Faculty Senate established the wording of these policies.

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to 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](#)).

Texas A&M at College Station

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

Texas A&M at Galveston

You can learn more about the Honor Council Rules and Procedures as well as your rights and responsibilities at tamug.edu/HonorSystem.

Texas A&M at Qatar

You can learn more about academic integrity and your rights and responsibilities at Texas A&M University at Qatar by visiting the [Aggie Honor System](#) website.

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 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.

Texas A&M at College Station

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

Texas A&M at Galveston

Disability Resources is located in the Student Services Building or at (409) 740-4587 or visit tamug.edu/counsel/Disabilities.

Texas A&M at Qatar

Disability Services is located in the Engineering Building, room 318C or at +974.4423.0316 or visit <https://www.qatar.tamu.edu/students/student-affairs/disability-services>.

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.

Texas A&M at College Station

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](#).

Texas A&M at Galveston

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with the Counseling Office in the Seibel Student Center, or call (409)740-4587. For additional information, visit tamug.edu/counsel.

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the Galveston Campus' [Title IX webpage](#).

Texas A&M at Qatar

Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the [Health and Wellness](#) website for more information.

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.

Texas A&M College Station

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](#).

Texas A&M at Galveston

Students who need someone to talk to can call (409) 740-4736 from 8:00 a.m. to 5:00 p.m. weekdays or visit tamug.edu/counsel for more information. For 24-hour emergency assistance during nights and weekends, contact the TAMUG Police Dept at (409) 740-4545. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at [suicidepreventionlifeline.org](#).

Texas A&M at Qatar

Texas A&M University at Qatar students wishing to discuss concerns in a confidential setting are encouraged to visit the [Health and Wellness](#) website for more information.

Campus Specific Policies

Texas A&M at Galveston

Classroom Access and Inclusion Statement

Texas A&M University is committed to engaged student participation in all of its programs and courses and provides an accessible academic environment for all students. This means that our classrooms, our virtual spaces, our practices and our interactions are as inclusive as possible and we work to provide a welcoming instructional climate and equal learning opportunities for everyone. If you have an instructional need, please notify me as soon as possible.

The Aggie Core values of respect, excellence, leadership, loyalty, integrity and selfless service in addition to civility, and the ability to listen and to observe others are the foundation

of a welcoming instructional climate. Active, thoughtful and respectful participation in all aspects of the course supports a more inclusive classroom environment as well as [our mutual](#) responsibilities to the campus community.

Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to howdy.tamu.edu and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete [FERPA Notice to Students](#) and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.