COSC2436: Programming and Data Structures

Instructor: Arjun Mukherjee

1 Course information

Available at official course webpage: http://www2.cs.uh.edu/~arjun/courses/ds/

2 Learning Objectives and Course Contents

This is an introductory level course on data structures and algorithms, as well as how to program them in C++. This course assumes basic computer science knowledge, programming experience with the C/C++ languages and basic background on mathematics.

Topics include the following. Basics of OOP: pointers, encapsulation, abstract data types, inheritance, methods, overloading. Fundamentals of programming and OOP design: proving program correctness, evaluating program speed; testing, debugging, and control flow. Fundamental data structures: linked lists, queues, stacks, trees, heaps, maps, hash tables. Sorting and search algorithms: selection, heap, quick, merge sort; linear, binary, tree-based, hash-based search. Graphs: storage, search, traversal, shortest path, search and spanning trees. Theory: recursion, time complexity analysis, algorithm design and analysis techniques.

3 Assignments and Grading

- 75%: 5 programming assignments each with a 15% weight.
- 30%: Exam 1
- 10%: Classwork/Lab attendance and working out assignments in lab.
- 5%: Lab attendance

The above is a tentative breakdown. There may be minor changes (e.g., an additional exam or a homework as an extra credit or redistribute existing weights depending upon overall student performance) Programming assignments are a fundamental component of learning for this course. All programming homeworks must be turned in and the student is required to obtain the passing score in Exam 1 for passing the course. All components add to 120%, however students will be evaluated on 100% allowing some leeway to account for the student to makeup if the performance declines. Programs will be evaluated in the Linux environment. Programming assignments are individual. Some examples input and output will be posted together with each HW, but the programs will be tested with different test cases. Programs are thoroughly tested by the TAs, and graded on a [0-100] scale: A non-submitted program grade is ZERO, a non-working program (i.e. compiles, but does not run, or produced incorrect output) will be dealt on a case by case basis and may be eligible for partial credits.

4 Instructions concerning COVID19 Accommodations and Policies

COVID-19 Information

If you are experiencing any COVID-19 symptoms that are not clearly related to a pre-existing medical condition, do not come to class. Please see Student Protocols for what to do if you experience symptoms and Potential Exposure to Coronavirus for what to do if you have potentially been exposed to COVID-19.

Consult the (select: Undergraduate Excused Absence Policy or Graduate Excused Absence Policy) for information regarding excused absences due to medical reasons.

Students are encouraged to visit the University's COVID-19 website for important information including on-campus testing, vaccines, diagnosis and symptom protocols, campus cleaning and safety practices, report forms, and positive cases on campus. Please check the website throughout the semester for updates.

Vaccinations

Data suggests that vaccination remains the best intervention for reliable protection against COVID-19. Students are asked to familiarize themselves with pertinent vaccine information, consult with their health care provider. The University strongly encourages all students, faculty and staff to be vaccinated.

Reasonable Academic Adjustments/Auxiliary Aids

The University of Houston complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, pertaining to the provision of reasonable academic adjustments/auxiliary aids for disabled students. In accordance with Section 504 and ADA guidelines, UH strives to provide reasonable academic adjustments/auxiliary aids to students who request and require them. If you believe that you have a disability requiring an academic adjustments/auxiliary aid, please contact the Justin Dart Jr. Student Accessibility Center (formerly the Justin Dart, Jr. Center for Students with Disabilities).

Excused Absence Policy

Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston Undergraduate Excused Absence Policy and Graduate Excused Absence Policy for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to military service, religious holy days, pregnancy and related conditions, and disability.

Recording of Class

Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the Justin Dart, Jr. Student Accessibility Center. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with ***anyone*** without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

Syllabus Changes

Due to the changing nature of the COVID-19 pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible via email and or during lectures.

Resources for Online Learning

The University of Houston is committed to student success, and provides information to optimize the online learning experience through our PowerOn website. Please visit this website for a comprehensive set of resources, tools, and tips including: obtaining access to the internet, AccessUH, and Blackboard; requesting a laptop through the Laptop Loaner Program; using your smartphone as a webcam; and downloading Microsoft Office 365 at no cost. For questions or assistance contact UHOnline@uh.edu.

UH Email

Please check and use your Cougarnet email for communications related to this course. To access this email, login to your Microsoft 365 account with your Cougarnet credentials.

Webcams

Access to a webcam is recommended for students participating remotely in this course. Webcams must be turned on (*Example: Webcams must be turned on during exams to ensure the academic integrity of exam administration.*)

Honor Code Statement

Students may be asked to sign an honor code statement as part of their submission of any graded work including but not limited to projects, quizzes, and exams: " *I understand and agree to abide by the provisions in the (select: University of Houston Undergraduate Academic Honesty Policy , University of Houston Graduate Academic Honesty Policy). I understand that academic honesty is taken very seriously and, in the cases of violations, penalties may include suspension or expulsion from the University of Houston."*

References

[1] Goodrich, M. T., Tamassia, R., Goldwasser, M. H. *Data Structures and Algorithms in C++*. Wiley, 2nd edition..