CSE 3318: Algorithms and Data Structures

Spring 2021

Last updated 2/6/2021

Instructor Information

Instructor(s):
Alexandra Stefan

Office Number:
ERB 625 - *Due to the COVID-19 I will be available online, not in person in the office.*

Office Telephone Number:
817-272-3785 (CSE Department phone number)

Email Address:
astefan@uta.edu

Faculty Profile:
http://ranger.uta.edu/~alex/

Office Hours:
MoWe 2:30pm-3pm, TuTh 12:30-1:30, and by appointment. Office hours will be online, using Teams chat: please send a chat message to contact me.

Course Information

Section Information, Time and Place of Class Meetings:
CSE 3318-001, TuTh 9:30am - 10:50am, online using Microsoft Teams meetings
CSE 3318-900, TuTh 9:30am - 10:50am, online using Microsoft Teams meetings
CSE 3318-002, TuTh 11am - 12:20pm, online using Microsoft Teams meetings

Course Webpage:
http://ranger.uta.edu/~alex/courses/3318/

Description of Course Content:
Design and analysis of algorithms with an emphasis on data structures. Approaches to analyzing lower bounds on problems and upper bounds on algorithms. Classical algorithm design techniques including algorithms for sorting, searching, and other operations on data structures such as hash tables, trees, graphs, strings, and advanced data structures, dynamic programming and greedy approaches.

Student Learning Outcomes:

- Understanding of classic approaches to algorithm design (e.g. dynamic programming, greedy methods).
- Understanding of particular algorithms and data structures that have wide applicability.
- Being able to compare and choose the best algorithm that solves the problem under specific constraints (e.g. space or time limitation).
- Understanding of basic algorithm analysis concepts by applying math skills to worst-case and expected time using recurrences and asymptotic notation.
- Constructing counterexamples (both the data and 'running' the algorithm on that data) that show that an algorithm does not have a certain property (e.g. stable sort).
- Improved programming skills - especially on pointers, data structures, recursion, and graphs.
    - In particular, I require code with no memory errors. We will use Valgrind (already available on the Omega server) to check for these errors.

Textbooks and Other Course Materials:
Textbook: ***Introduction to Algorithms****, by Thomas H. Cormen, Charles E. Leiserson, Ronald E. Rivest, Clifford Stein,3rd edition (CLRS). The 2nd edition is also fine. The textbook is not required.*

Additional reference (not an easy read): Algorithms in C, Parts 1-5, by Robert Sedgewick. 3rd Edition, 2001, Addison-Wesley. ISBN-10: 0201756080. ISBN-13: 978-0201756081. NOTE: this textbook is usually sold as two volumes, one for parts 1-4, and one for part 5. Most of the topics covered in class are from parts 1-4.

Prerequisites:
All students are expected to have passed the courses *Intermediate Programming* (CSE 1320), and *Discrete Structures* (CSE 2315).

Lectures and Communication:
The lectures will be delivered in a mix of synchronous and asynchronous: videos or materials on new topics will be available before class in Canvas and during the online synchronous meeting (during the lecture official time) we will discuss them.
Microsoft Teams will be used for the online synchronous meetings. (We may switch to Canvas Conferences if it will fit the course needs better.)

Technology Requirements
The following online teaching tools will be used:
- Website - homework content, slides,
- Canvas – course announcements, online exams, homework submission, video recordings
- Teams – online lectures and office hours (for both instructor and TA).
- **Respondus Lockdown** - software that will block your browser when taking an exam
- Piazza – for class discussions and questions regarding homework or course concepts. Piazza will be accessed from Canvas. Instructions for joining Piazza will be provided in Canvas.
- **A webcam (integrated in the laptop or external)** – will be needed during exams (for video recording and monitoring of the student taking the exam) and possibly for some assignments where students may need to record a video as part of the assignment.
- Headphones with microphone are encouraged, but not required.

You can access tutorials on these tools by clicking on the “Get Started” Box on your Canvas Homepage.

Other Requirements:
Students are expected to know how *to use the omega server and to write C programs that run on this server or the VM from cse13xx. Familiarity with a user-friendly C-debugger is required: students will need to, and should use a good debugger when coding.*

Grading Information

Make-up Exams:
Make-up exams or any other additional work towards "improving ones grade" *will not be offered*.

Grading and major Assignments and examinations:
Students are expected to keep track of their performance throughout the semester which Canvas facilitates, and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels; see “Student Support Services,” below.
See the Final Grade Reports Schedule for dates and deadlines related to grades.

40%	Online Exam-Quizzes in Canvas. 1 exam-quiz will be approximately every 2 weeks. (1 online exam-quiz with the lowest score will be dropped) The quizzes will be open for 48 hours, but once started they will have a time limit. **They WILL require a video camera and the Lockdown Browser.** Quizzes will mainly be focused on the current content, but they will be cumulative. (They may include a few **high-level** questions on previous topics.) They may vary in length (some may be shorter, some may be longer).

55%	Homework (about 800 points total from assignments) Do not plagiarize or collude in the homework. A grade of 0 will be given for all that assignment and with the large homework weight it may cause you to fail the class or to receive a lower letter grade.
5%	Class participation and engagement with the material. Students will have to ask 3 questions and provide 3 answers throughout the class and participate in the posted participation quizzes/surveys and other class activities. The details for this activity will be finalized in the first 2 weeks of class, after which they will be communicated during lecture, and as an announcement in Canvas and the Syllabus will be updated as well. Students in section 900 can receive full participation credit by completing the participation activities asynchronously.
100%	Total class score (sum of above assessments)

The final grade will be assigned based on the scheme: ≤90(A), ≤80(B), ≤65(C), ≤55(D).

The participation score will be calculated as follows. All the points from all the participation activities (all quizzes and the discussion board for the 6 question/answer) will be added together and will make the full score for participation. The grade for participation will be proportional to how many of those points were earned. For example if the total participation points are 1000, a student who earned all the 1000 points gets 5 points towards the final class score, and a student who earned 600 points, gets 3 points towards the final class score. Formula used is: 5*(earnedPoints/1000). Updated 1/28/2021

Homework and Quiz grading policy:

- Each exam answer must be justified, unless otherwise specified or a multiple choice question. (Note that even some multiple choice questions may have an explicit request for a justification)
- *A completely wrong justification may result in a negative score*. For example, if a question is worth 8 points and the justification is wrong, the grade for that question may be -1 meaning that not only you do not get any points for that question, but you lost one extra point. (This policy is intended to prevent students from guessing, or just 'writing stuff' when they have no idea about the topic. It is NOT intended to penalize partially correct answers.)
- *Problems (in homework and exam) must be solved with the specific methods covered in class*, unless prior permission from the instructor is granted to use a different method. The reason is that I may be testing on the method, not on the problem.

Any request for re-grading (for an assignment or midterm exam) must be made within 5 days of receipt of that grade. In case of regrading, the instructor reserves the right to regrade the whole assignment or exam.

IMPORTANT: It should be clear to every student that course grades will depend EXCLUSIVELY on the above grading criteria. Students should not request nor expect any other factor to be considered in computing the course grade. For example, factors that will NOT be considered are: need of a better grade to keep financial aid, to stay in the program, or to graduate. Students are expected to carefully monitor their own performance throughout the semester and seek guidance from available sources (including the instructor) if they are concerned about their performance and the course grade that they will earn.

Coding requirements:
Global, external or static variables are NOT allowed in any code (in homework, quiz or exam) in this class. Using such variables will result in losing 50%-100% of the credit for that problem.

Submitted homework programs must run on omega or the VM from cse13xx. Note that your program may run on your machine, and still CRASH on omega or the VM. Programs that do not compile receive 0 credit. Programs that crash receive a penalty of 20%-100%. We will test your programs with the data provided as an example AND WITH OTHER test files. You are responsible for testing your programs thoroughly. Simpler/smaller programs may not receive partial credit.

Expectations for Out-of-Class Study:
Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend an additional **12 hours** per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

Before coming to class, students should have reviewed and understood the previous lecture especially in cases where the same topic is continued or the topics are related.

Grade Grievances:
Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. See Undergraduate Grading Policies and Student Complaints.

Academic Integrity:
Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

The penalty for cheating or collusion in a homework or exam is a grade of 0 for the entire exam or homework.

In cases of collusion, ALL students involved are reported to the Office of Student Conduct (even if one admits that he copied after the other). . For example if one student wrote his/hers solution on his own, but shared it with a friend, BOTH students are reported and both are penalized with a grade of 0 for that assignment (even if one admits that he/she copied after the other student).

During exams, you must remain seated, have the camera on at all times and not exit the exam (in Canvas) until you finished it. You take a full 360 degrees video of the environment (including the space behind the screen and the floor around the chair and desk). To test that the sound is working for your system, record a verbal statement at the beginning of the exam. Do not read out loud exam questions or your answers. Respondus Monitor software will record the video of you taking the exam and flag your video if suspicious behavior is detected. If after inspection I also find the behavior to be suspicious, I will report the student to the Office of Student Conduct for cheating in an exam and apply a penalty of grade 0 for the entire exam. During an online exam quiz students must work on their own without any help from other classmates, friends and without using class materials, cheat sheets or web resources. They must remember the material and be able to answer questions and write code based on the knowledge they know.

By default, the homework for this class is individual (no group projects) unless otherwise stated in the assignment.

You are allowed (and encouraged) to discuss with classmates the homework requirements, but NOT specifics of the homework solution. You can practice and review concepts covered in class, programs covered in class, and other practice problems that are NOT part of the homework.

You are NOT allowed to work as a team and develop together the homework solution (or a significant/critical part of it), or let another classmate see or have access to your code.

You should reference all the resources you used in preparing for a homework solution especially if they may have influenced your solution. REFRENCING MATERIAL DOES NOT JUSTIFY SIMPLY COPYING THAT MATERIAL. If you reverenced a source, but mainly copied the code from there, that is still a violation of Academic Integrity and the same penalty is applied (grade 0). You must solve the homework and exam problems yourself, using only the materials covered in this class. You should not search and/or look at any solution (from the web, or from a friend or classmate) for homework or exam problems or part of those problems. If you need help, you should contact the instructor or a TA. You are not allowed to look at, and get inspiration from, an existing solution.

You should not store your code or homework solutions on any public, unsecure domain such as GitHub (I reported a case involving code posted on GitHub). You can use password protected cloud services

such as Google Drive. Note that if you make your solutions available to others in such a way, and another student copies your solution, you will be reported together with the student who used your solution.

Please do not hesitate to talk to me regarding any concerns you may have.

Course Schedule

See the course schedule at: http://vlm1.uta.edu/~alex/courses/3318/Schedule_CSE3318.pdf

Institution Information

Please review the UTA Syllabus Institutional Policies page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which covers the following policies and more. For questions, reach out to the specific office.

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey

Additional Information

Attendance:
As the instructor of this section, I may take attendance sporadically but I will not factor it into the grade. However attendance is encouraged and class participation will be factored in the course grade.

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Emergency Exit Procedures:
Not applicable. The class is online.

Student Success Programs:
UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring by appointment, drop-in tutoring, supplemental instruction, mentoring (time management, study skills, etc.), success coaching, TRIO Student Support Services, and student success workshops. For additional information, please email resources@uta.edu, or view the Maverick Resources website.

The IDEAS Center (https://www.uta.edu/ideas/) **(**2nd Floor of Central Library) offers **FREE** tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.
Supplemental Instruction (SI) leader – to be determined if there will be an SI leader for this class.

The English Writing Center (411LIBR):
The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the Writing Center (https://uta.mywconline.com). Classroom visits, workshops, and specialized services for graduate students and

faculty are also available. Please see Writing Center: OWL for detailed information on all our programs and services.

The Library's 2nd floor Academic Plaza (http://library.uta.edu/academic-plaza) offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the library's hours of operation.

Librarian to Contact:
Each academic unit has access to Librarians by Academic Subject that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Information

Research or General Library Help
Ask for Help

- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources

- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)
- Study Room Reservations (openroom.uta.edu/)

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