CSCE 3110.002 Data Structures
Fall 2016

Meets at: NTDP B185, MoWe 2:30 pm - 3:50 pm

Instructor

Fahmida Hamid
Email: FahmidaHamid@my.unt.edu
Office: F214, Office Hours: Tue 12:00–2:00 pm.

Textbook

Data Structures and Algorithm Analysis in C++. Mark Allen Weiss. 4th edition

Prerequisites

CSCE2100 and CSCE2110 or equivalent (CSCE2050 and MATH2000)

Course Description

To give the students a solid understanding of the design and analysis of fundamental data structures and algorithms. A special emphasis will be placed on programming and hands-on experience that will reinforce the theoretical aspects covered in lectures. The expected outcomes for this course are:

- Understand time complexity of algorithms.
- Be able to solve recurrence relations.
- Understand and be able to analyze the performance of data structures for searching, including balanced trees, hash tables, and priority queues.
- Apply graphs in the context of data structures, including different representations, and analyze the usage of different data structures in the implementation of elementary graph algorithms including depth-first search, breadth-first search, topological ordering, Prim’s algorithm, and Kruskal’s algorithm.
- Be able to code the above-listed algorithms.

Course Webpage

All the course related material will be posted on the course webpage which is available through blackboard (https://learn.unt.edu).
Evaluation

Homework: 20%
Programs: 25%
Midterm: 25%
Final Exam: 30%

Topics

1. Time and Space analysis (Asymptotic notation)
2. Recursion and Recurrence relations
3. Review of Basic Data Structures (Lists, Stacks, Queues)
4. Tree based data structure, including Heaps, BST’s, union/find data structures, AVL trees.
5. Hashes
6. Data structures for storing graphs
7. Graph traversal algorithms and their applications (BFS, DFS)
8. Graph algorithms for solving minimum spanning tree (Prim’s and Kruskal’s) and their implementations

Policies

All homework assignments and projects must be turned in by their respective due date. Late assignments will be accepted with a 25% penalty per day. Assignments that are submitted more than two days past their deadline will not be accepted and not graded. All assignment submissions must be typed. Cheating will not be tolerated. Anyone found guilty of cheating on a test or assignment will be awarded an ‘F’ grade for the course. Discussions of problems and assignment with your classmates is welcome and encouraged, however, sharing of solutions is not. If you need help, you should ask the TA or the instructor. Cheating includes, but is not limited to, all forms of plagiarism and misrepresentation. There will be no make up exams. In case of verifiable emergencies, arrangements must be made with the instructor.

Cheating Policy

When cheating is deemed to have occurred, appropriate disciplinary action will be taken. A notice will be placed in the student’s permanent computer science record outlining the behavior and the subsequent disciplinary action. The instructor may impose a penalty of failure in the course and may deny the student permission to drop the course. It is also possible that the student may be barred from subsequent registration in any computer science and engineering courses at the University of North Texas. The matter may be referred to the appropriate dean for further university action.

Disability Policy

The Computer Science Department and this instructor cooperate with the Office of Disability Accommodation to make reasonable accommodations for qualified students (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act) with disabilities. If you have not registered with ODA, we encourage you to do so. If you have a disability for which you will require accommodation please discuss with me after class and present a written accommodation request on or before the 2nd week of class.
Email

Any email communication must come from an UNT account and include your name, a subject, and the brief reason for the email. In some cases, it may not be possible to answer questions requiring lengthy explanations through an email.

Assignments

All homework assignments are due at the beginning of class on the due date. If you are absent on the day the assignment is due, you are still responsible for getting the assignment turned in on time. All programming assignments are due at 11:55 pm on the due date and must be submitted using the project command on the CSE servers. Late assignments, assignments submitted by email, and assignments submitted directly to a TA will not be graded unless approved by the instructor. It is your responsibility to turn in assignments on time even if you are not in class. There are no make-up assignments/quizzes/exams.

Programming assignments will consist of coded programs using C/C++. All programs submitted for grading must compile and execute using the assigned compiler (the CSE servers) and submitted as a source file with the filename extension .cpp. This will be discussed and demonstrated in class.

Exams

There will be two exams (Midterm and Final). Exams are not explicitly comprehensive; however, cumulative knowledge will be necessary to answer questions concerning new material. Failure to take the final exam will result in an ‘F’ in the course. You must be present in class on exam day to take the exam. There are no make-up exams. If there is a time conflict with another course, please inform me as soon as possible.

MidTerm: October 17, 2016
Final: UNT CALENDER

Letter Grade

Keep all of your graded assignments, homework, and tests for study and review. You should track your own progress using Blackboard, and be aware of current grades throughout the term. Final grading will be done as follows.

<table>
<thead>
<tr>
<th>Total Marks</th>
<th>Letter Grade</th>
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</thead>
<tbody>
<tr>
<td>90% - 100%</td>
<td>A</td>
</tr>
<tr>
<td>80% - 89%</td>
<td>B</td>
</tr>
<tr>
<td>70% - 79%</td>
<td>C</td>
</tr>
<tr>
<td>60% - 69%</td>
<td>D</td>
</tr>
<tr>
<td>0% - 59%</td>
<td>F</td>
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</tbody>
</table>

Grades cannot be changed after they have been electronically entered into the university’s system except for instructor error. Any extenuating circumstances that may adversely affect your grade must be brought to my attention before the final course grades are recorded. To be considered, such circumstances must be unusual, unavoidable, and verifiable.
The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized undergraduate classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class.

Attendance

Attendance is taken every day, but I will not directly reduce your grade due to attendance. If you are absent from class, you are still responsible for all materials discussed. You must attend class on exam day. There are no make-ups for missed worked except those covered by the make-up policy below.

Make-up Policy

There will be no make-up exams, quizzes, programs, or other assignments, given in this class. However, for documented excused absences or emergencies on a day of an exam, the exam grade will be replaced by an average of the other exam and assignment scores. There is one exception to this rule. Under NO circumstances will more than one exam score be replaced by an average of the other scores. For a second (and subsequent) missed exam, even if all are excused, students will receive a 0 for the missed work.

Excused Absences: Students are expected to schedule routine appointments and activities so as not to conflict with attending class. However, some absences cannot be prevented. In the event of a medical emergency or family death, students must request an excused absence as quickly as feasible following the emergency. Students must provide documentation that verifies an emergency arose by receiving an excused absence from the Dean of Students. Once the absence(s) have been verified the decision to allow a student to make up course work is left to the discretion of the instructor.

Emergencies: By definition, emergencies cannot be planned for. Your instructor attempts to make accommodations in these instances that allow for making up missed work and completion of the course in a timely manner. Among these emergencies are: a death in your immediate family or an accident or illness requiring immediate medical treatment and where a doctor has indicated attending class is impossible or inadvisable.

Employees who are on call 24/7 fall in this category but must document that they were called during a scheduled class.

TA and Grader

- Somayeh Ghanbar Zadeh
  Email: SomayehGhanbarZadeh@my.unt.edu
- Harshitha Yalamanchili
  Email: HarshithaYalamanchili@my.unt.edu
## Tentative Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Assignments/Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/29 - 9/11</td>
<td>Introduction &amp; Recurrence Relations</td>
<td>Homework 01</td>
</tr>
<tr>
<td>9/12 - 9/18</td>
<td>Algorithm Analysis</td>
<td>Programming 01</td>
</tr>
<tr>
<td>9/19 - 9/25</td>
<td>List, Stack, Queue</td>
<td>Programming 02</td>
</tr>
<tr>
<td>9/26 - 10/2</td>
<td>Hashing</td>
<td>Homework 02</td>
</tr>
<tr>
<td>10/3 - 10/16</td>
<td>Trees</td>
<td>Programming 03</td>
</tr>
<tr>
<td>10/17-10/23</td>
<td>Priority Queue</td>
<td>Homework 03</td>
</tr>
<tr>
<td>10/24 - 11/13</td>
<td>Graphs, Topological Sorts, BFS, DFS, Dijkstra’s Algorithm</td>
<td>Programming 04</td>
</tr>
<tr>
<td>11/14 - 11/27</td>
<td>Graphs, MST, Prim’s, Kruskal, Network Flow</td>
<td>Homework 04</td>
</tr>
<tr>
<td>11/28 - 12/07</td>
<td>Dynamic Programming</td>
<td>Homework 05</td>
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<tr>
<td>12/10 - 12/15</td>
<td>Final Exam</td>
<td>(UNT Calendar)</td>
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### Tentative Class Schedule