Computer Science 2413

Section 001, Spring 2011

General Information

Class Time: 3-4:15 TR
Class Location: Devon 130
Prerequisites: CS 2334 Programming Structures and Abstractions and (CS 2813 Discrete Structures or Math 2513 Discrete Mathematics (either as a prerequisite or co-requisite)).
Instructor: Dr. Deborah A. Trytten
  Office: 234 Devon
  Office Phone: 325-4299 (voice mail available, but email is much better)
  Class home page: http://learn.ou.edu
  Personal URL: http://www.cs.ou.edu/~trytten
  Email: dtrytten@ou.edu

My office hours sometimes have to be changed during the semester. My current office hours are located on the course web site and are posted on my door. These are the initial ones this semester.
  Monday: 1-2, Tuesday: 9-10, Friday: 4-5.
  Appointments for additional office hours are available and best scheduled through email.

Teaching assistant: Zhaowen Xing
  Office: 155 Devon
  Email: zhaowenxing@ou.edu
  Office Hours: Wednesday 10-11, Thursday 11-12, or by apointment.

Required Materials:

- Data Structures and Algorithms in C++, Adam Drozdek, Third Edition, Thompson Learning, Inc., Boston, MA, 2005. I do not follow the textbook closely. I do not assign homework from the textbook or refer to it much in class. While I can't imagine studying a topic without a textbook, if you can, you do not need to purchase the textbook.
- Working laptop computer with wireless network access, and at least 1.5 hours of battery life on a recharge.
• Microsoft Windows operating system and Microsoft Visual Studio 2010, including debugging tools.
• Doxygen, a language independent documentation system that is similar to Javadoc.
• Tortoise SVN, a Subversion client for source control.

Topical Coverage
I expect to cover material in Chapters 1, 3-10 in Drozdek during the course of the semester.
Topics: C++, STL, complexity analysis, linked lists, stacks, queues, recursion, binary trees, multi-way trees, graphs, sorting, hashing, string matching.
I will also cover Chapters 6 and 7 in Tavani: computer crime and abuse and security.
We’ll also cover the more technical aspects of computer security from my class notes.
This course requires technical writing in some project and homework assignments.

ABET Outcomes Developed
A: An ability to apply knowledge of computing and mathematics appropriate to the discipline.

B: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.

C: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

E: An understanding of professional, ethical, legal, security and social issues and responsibilities.

H: Recognition of the need for and an ability to engage in continuing professional development.

I: An ability to use current techniques, skills, and tools necessary for computing practice.

J: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

K: An ability to apply design and development principles in the construction of software systems of varying complexity.
Course Policies

Class Attendance: Class attendance is important because we will discuss concepts and examples that are not in the text book. You are responsible for everything that is announced in class, independent of whether you chose to attend or not.

Independence: This class is the place where students transition from being beginners to being beginning professionals. This means that I’ll do a lot less hand holding than what you’re accustomed to. In particular, you’ll be expected to download, install, and learn to use software development tools on your own. Learning to use new tools is an essential element of being a successful software engineer.

Class Home Page: This class will use Desire2Learn software for our home page. The URL for the home page is http://learn.ou.edu. Login with your 4+4 (first four letters of your last name followed by the last four digits of your student number), using your standard OU password. If you have difficulty logging in, call 325-HELP. This software provides a number of useful features, including a list of assignments and announcements, an electronic mailing list, newsgroups, and grade book. I update this web site several times a week. You should check the site daily. When I update the site, I will post an announcement telling you what has been added and where it is located. You are responsible for things posted on the site with a 24 hour delay.

Class Email Alias: Urgent announcements will be sent through email. It is your responsibility to:

• Have your university supplied email account forwarded to the location where you read email.
• Make sure that your email address on the course home page is correct, and forwards email to the place where you read it. I’ll send out a test message during the first week of class. If you do not receive this message, it is your responsibility to get the problem resolved.
• Have your email program set up so that replying to your email will work correctly. You can send email to yourself and reply to yourself to test this.

If you need assistance in accomplishing any of these tasks, contact 325-HELP. You are responsible for reading emails within 24 hours.

Examinations: There will be two midterm examinations and a final examination. Missing an examination without a previously approved excuse will result in a grade of zero for that examination. If an examination is missed for a verifiable, documented, and approved reason the percentage of the grade coming from the final examination will be increased to 35 or 40% (depending on whether the first or second examination was missed). Makeup examinations are never available, except as required by University policy. During examinations students may be required to sit in assigned seats.

Final Examination: The final examination is on Thursday, May 12 from 4:30-6:30 in our regular classroom. The final is comprehensive, as required by College of Engineering policy. No final examinations can be given early, except as required by University policy.

Discussion Groups and Email: The discussion group on the course home page should be the primary method of communication outside of class. This allows everyone in the class to benefit from the answer to your question, and provides students with more timely answers since the TA and I check the discussion group regularly. Matters of personal interest should be directed to
email instead of to the newsgroup, e.g. informing me of an extended personal illness. Posting guidelines for the newsgroup are linked on the home page.

**Laptop Computers:** It is the responsibility of each student in this class to have a working laptop computer with ample battery and wireless internet connectivity available for every class. If your computer requires repair during the semester, it is your responsibility to make arrangements to have another computer available. A student without a fully usable laptop computer will be at a disadvantage in this class.

**Academic Misconduct:** All work submitted for an individual grade, such as homework, quizzes and projects, should be the work of that single individual: not their friends, the TA, nor their tutor.

1. Do not show another student a copy of your homework or projects before the submission deadline. The penalties for permitting your work to be copied are the same as the penalties for copying someone else’s work.
2. If you choose to do your work on your computer, make sure that your computer account is properly protected. Use a good password, and do not give your friends access to your account or your computer system. Do not leave printouts or thumb drives around a laboratory where others might access them.

Upon the first documented occurrence of collaborative work, I will report the academic misconduct to the Campus Judicial Coordinator. The procedure to be followed is documented in the University of Oklahoma Academic Misconduct Code (http://www.ou.edu/studentcode). In the event that I elect to admonish the student, the appeals process is described in http://www.ou.edu/provost/integrity-rights/.

**Tutors:** Tutors can be an excellent source of support for students who are having difficulty in the class, but only if the tutor is aware of the distinction between teaching students the material so that they can do their own work, and doing work for students. Tutors who do work for students are not only failing to help the students learn, they are abetting academic misconduct.

- If your tutor is methodically telling you what to write, he or she is abetting academic misconduct.
- If you tutor is emailing files containing partial or complete assignments to you, you will commit academic misconduct if you turn them in.

A more effective use of tutoring services is to do problems that are similar to the assigned work, instead of doing assigned work. For example, it would be fine to work unassigned problems from the textbook with a tutor. This requires significant discipline, both on the part of the tutor and the part of the student. Copying from a tutor is as unacceptable as copying from another student. If your tutor doesn’t know how to teach properly, please ask them to call or visit me and I will provide training and guidance. If you are tutoring someone else in the class, you can be accused of academic misconduct if this person copies your work.

**Incompletes:** The grade of I is intended for the rare circumstance when a student who has been successful in a class has an unexpected event occur shortly before the end of the class. I will generally not consider giving a student a grade of I unless the following three conditions have been met.

1. It is within three weeks of the end of the semester.
2. The student has a grade of C or better in the class.
3. The reason that the student cannot complete the class is properly documented and compelling.

**Accommodation of Disabilities:** The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173.

**Faculty Evaluation:** The College of Engineering utilizes student ratings as one of the bases for evaluating the teaching effectiveness of each of its faculty members. The results of these forms are important data used in the process of awarding tenure, making promotions, and giving salary increases. In addition, the faculty uses these forms to improve their own teaching effectiveness. The original request for the use of these forms came from students, and it is students who eventually benefit most from their use. Please take this task seriously and respond as honestly and precisely as possible, both to the machine-scored items and to the open-ended questions.

**Cancelled Classes:** Class is cancelled on the following days.

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>January 17</td>
<td>MLK Holiday</td>
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<tr>
<td></td>
<td>March 14-18</td>
<td>Spring Break</td>
</tr>
</tbody>
</table>

**University Deadlines:** The table below summarizes important deadlines for students at the University of Oklahoma. It is the responsibility of the student to keep track of these deadlines if they may wish to withdraw from this class. Be warned that I follow university policy extremely literally. During the period when withdrawal can result in either a W or an F, I will give a W only if the student is receiving a D or better in the class.

<table>
<thead>
<tr>
<th>Event</th>
<th>Last Date</th>
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<tbody>
<tr>
<td>Last day to Add</td>
<td>Jan 21</td>
</tr>
<tr>
<td>Last day to Drop with refund</td>
<td>Jan 31</td>
</tr>
<tr>
<td>Last day to drop with automatic W</td>
<td>Feb 25</td>
</tr>
<tr>
<td>Last day to change to audit</td>
<td>April 1</td>
</tr>
<tr>
<td>Drop with grade of W/F without permission of the Dean</td>
<td>April 1</td>
</tr>
</tbody>
</table>
Classroom Conduct: Disruptions of class will not be permitted. Examples of disruptive behavior include:

- Allowing a cell phone or pager to repeatedly beep audibly.
- Playing music or computer games during class in such a way that they are visible or audible to other class members.
- Exhibiting erratic or irrational behavior.
- Behavior that distracts the class from the subject matter or discussion.
- Making physical or verbal threats to any member of our learning community.
- Refusal to comply with faculty direction.

In the case of disruptive behavior, I may ask that you leave the classroom and may charge you with a violation of the Student Code of Responsibilities and Conduct.

Projects and Homework

Language: We will be using the C++ programming language.

Sharing Resources: Immediately before a project or homework assignment is due, the TA and my office hours often become very busy. While we will make reasonable efforts to meet the needs of as many students as possible, it is often impossible to fully meet the needs of all students during this busy period of time. For example, if there are ten students in my office during a given office hour, each student could expect to receive about six minutes of help. This limited amount of help may not be sufficient, particularly since C++ debugging problems can be time consuming. Start your projects early and get help before the rush.

Projects: Incomplete projects may be turned in for partial credit.

- Projects which do not compile will receive no credit.
- Projects will receive credit only for objectives which can be executed.

Project Grading: Projects will be interactively graded by the teaching assistant. This means that you’ll sit with the teaching assistant and run your project on your computer and demonstrate any required skills interactively.

Software Tools: Using commercial software without proper licensing is illegal, unethical, and absolutely unacceptable in this class. Fortunately, all of the software tools used in this class are available free of charge.

Project Strategy: The grades for projects are determined by how well the material presented meets the objectives stated on the project handout. If you have to turn in an incomplete project, the way to maximize the points received is to meet as many objectives as possible. One effective strategy is to meet objectives one at a time. If you commit a copy of our current project to a separate directory when an objective is met, this can prevent many problems. Using Tortoise SVN will avoid many of these problems.

Project Submission: Projects are due by 11:59 p.m. on the selected due date by uploading the project files to the digital dropbox on the course homepage. The digital dropbox requires students to first upload the file and then submit it. If you forget to do the second step, we will have be able to grade your files. Late projects are not accepted, although incomplete ones are. Do
not wait for the last minute to submit a project. If the digital drop box fails, you may email the projects to me. Do not email me a project unless the submission is not successful.

**Backup Copies of Projects:** It is the student’s responsibility to backup their files appropriately. No extensions to deadlines will be given as a result of lost files, unless there is a massive, network wide problem which affects the entire class. Do not rely on anyone else to backup your important files. Buy a jump drive (or other media) and make backing up your work a routine part of computer usage. It is particularly important to save a backup copy of any project that is submitted. This backup version should not be opened or edited after submission in case something goes wrong with the submission system.

**Homework Submission:** Homework is submitted by the beginning of class either on paper, or before the start of class using the digital dropbox. Please be sure that electronically submitted copies are legible, particularly if they have been scanned.

**Evaluation**

**Grading Questions on Homework, and Projects:** All homework and projects in this class are graded by the teaching assistant. If you have a question about the grading of these items, please see the teaching assistant during his office hours. If this does not resolve the problem, stop by my office during office hours and I will review the grading and make a final determination after consultation with the teaching assistant. All disagreements about the grading of projects or homework must be brought to the attention of the teaching assistant within one week of when the item was returned, whether the student picked it up then or not.

**Examination Grading Questions:** If there is a dispute about the grading of an examination problem, you may stay after class the day the tests are returned to discuss it. If you cannot stay at this time, return the paper to me and stop by during my office hours. Once a test has been removed from the classroom after it has been returned, the grade is final and will not be changed, even if it is found to be in error. All grade appeals for examinations must occur within two weeks.

**Desire2Learn Grade Summary:** Desire2Learn has a grade book that is used to store the raw data that is used to calculate your course grade. It is the responsibility of each student in this class to check their grades on Desire2Learn after each project or homework is returned. If an error is found, bring the grading document to me or the TA, and we will correct it. The grade book does not understand how grades are actually calculated in this class. It therefore may show things like percentages and total points that may be incorrect. The correct formulas for calculating grades are given in this document.

**Midterm Examinations:** In order to allow students ample time to complete the two midterm examinations, they will be given during the evening. I post a doodle poll to select the times. If the time selected is not feasible for you, I will find a way to accommodate your schedule.
Grading: There are six components to the course grade. They are weighted as follows.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm 1</td>
<td>15</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>20</td>
</tr>
<tr>
<td>Homework</td>
<td>20</td>
</tr>
<tr>
<td>Projects</td>
<td>20</td>
</tr>
<tr>
<td>Final Examination</td>
<td>25</td>
</tr>
</tbody>
</table>

Homework and project elements are more lightly weighted to allow students to make mistakes and learn from them with smaller penalties. Completing these exercises is how most students meet the learning objectives that make it possible to be successful on the midterms and final, which are heavily weighted. Failure to do the homework and projects usually results in failure of the course, not because they are so heavily weighted in the grading, but rather because the student doesn’t meet the learning objectives and does poorly on the examinations.

The grading scale will be no higher than the following. It may be lower at the discretion of the instructor.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90+</td>
</tr>
<tr>
<td>B</td>
<td>80-89</td>
</tr>
<tr>
<td>C</td>
<td>70-79</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>Otherwise</td>
</tr>
</tbody>
</table>

Borderline Grade Decisions: Grades are rounded to the nearest whole number. Although it would be preferable that all grades are cleanly decided, it is usually the case that a few final course grades are decided by only a few points. I have an algorithm for determining grades in these difficult cases.

A grade is a borderline grade if it is within two points of the next higher grade. Therefore, grades like 69 and 78 are borderline grades, but grades like 81 and 92 are not. The grade on the final examination will be used to determine borderline grades. If the grade on the final is below the threshold for the higher grade, the lower grade will be given. If the grade on the final is above the threshold for the higher grade, the higher grade will be given.
**Future Reference Materials**

C++ is a much more sophisticated language than Java. It’s more powerful and efficient. It’s also far less standardized by design. Everything is more complicated. The error conditions are more numerous and generally poorly described by the error messages, particularly in STL. All sorts of subtle errors and inefficiencies exist.

The books listed below are the current definitive references on C++. They are not designed for beginners. They are, however, the reference materials that I use daily when programming in C++. You can, and eventually should, learn to read these materials just as you learned to read the API in Java. I’m not recommending these as references for this class, but as the materials you’ll need for your professional development in the future.

*The best books to buy to take the next step in C++ programming:*


More Effective C++: 35 New Ways to Improve Your Programs and Designs, Scott Meyers, Addison Wesley, Reading, MA, 1996.


*The standard language references:*


*The best books to become a true expert:*

Design Patterns: Elements of Reusable Object-Oriented Software, Erich Gamma, Richard Helm, Ralph Johnson, and John M. Vlissides, Addison Wesley, Reading, MA, 1994.


*The books that I’ve used for security information in this class are:*
