C S1450–Data Structures and Algorithms
FALL 2013

Instructor: Al Brouillette (*pronounced* brew-YET)

Time/Place: **Sec. 01:** M-W 3:05PM - 4:20PM, OSBORNE B216 **FINAL:** 1:40-4:10 Wed 12/18/2013
Sec. 02: T-TH 1:40-2:55, ENGR 101 **FINAL:** 1:40-4:10 Tues 12/17/2013

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Text: *Designing Data Structures in Java,* Brouillette, ISBN#978-1481894364

Prereq.: Successful completion of CS1150, proficiency in Java programming basics. Ability to use the *Netbeans* programming environment. If the student did poorly in CS1150 (C-grade or below), they **must** go back on their own, and master that material quickly, within the first 2 weeks of CS1450, to expect success.

Course Description:
Concepts of data type, data abstraction, and data structure. Internal representations of fundamental data types. Linear data structures: stack, queue. Linked data structures and dynamic data types. Search table data abstraction, linear search in arrays and lists, binary search in arrays and trees. Binary trees, non-binary trees, binary search trees.

Course Objectives:
To understand how object-oriented programming is used to enhance program design; to comprehend the fundamental data structures which form the building blocks for all advanced programming; to program using essential data structures in an OOP environment.

Student contact:
The class website will be located at: **www.eas.uccs.edu/abrouill/CS145**. **NOTE: All assignments for the semester will be posted on the website. There will be approximately 1 assignment due per week, due on the 2nd class session of the week (Wednesday or Thursday) unless otherwise announced.** I am purposely reducing my email loads, and emphasizing **face to face contact** rather than electronic contact, so plan ahead, and ask questions on assignments in class or during office hours. It is the student's responsibility to keep up with class by their physical presence during class time.

Grading Policy:
Final course grades will be determined based on the following approximate percentages:

Programming and other assignments:	~35%
Participation/attendance	~5%
2 Exams and Final Exam (1.5 hour):	60% (15/20/25, worst/mid/best)

Cheating on homework occurs whenever students do not solve the programming problem on their own, by designing and programming their own independent program. Evidence of collaboration is recognizable, and will result in an 'F' for the class, without warnings. Cheat once, get an 'F', it is that simple. **This is the only warning you will receive.** Acceptable group work includes: helping each other understand what the problem is asking, with the details of the Java language (getting it to compile), and broader discussions of approach to solving the problem, and comparing final output results. When in doubt, ask the instructor. Students who do not actually do the homework themselves in this class get 'D's and 'F's on the exams– the homework must be done in order to learn the programming.

No makeup exams or quizzes will be given. If the student is unable to take an exam due to **extreme** circumstances, the student may, at the instructor's discretion, take the exam early. In addition, on-time completion of assignments will be critical to the student's success in the class; therefore, late homework will ONLY be accepted up to the NEXT CLASS PERIOD after the due date, with a 20% penalty. You are expected to actually deliver **hardcopy** of your program and results, as specified in each assignment. **Do not email any of your homework to me.** You should treat your homework assignments with the same pride and respect as you would treat a product for a programming customer. **Homework must be submitted in a basic 2-pocket folder; not an envelope, nor a 3-ring binder. Homework not meeting this standard may not be accepted or graded.** Assignments are due at the class **start time** on the given due date– don't wait until the last minute, or skip class to finish!!

Attendance:

Roll will be taken in 100-level classes. Students are expected to read the assigned material before class, to come to class on time, and to be prepared to participate in class discussions. **The use of cell phones, electronics, and notebook PCs will not be permitted in class due to their distracting nature.** Disruptive or distracting behavior will not be permitted. Class notes should be obtained from another student if a class is missed. **Some important material covered in the lectures will not be contained in the text**, and selected material from the text will be augmented and emphasized in the lectures. Roll will be taken as the instructor deems appropriate.

Late Drops, Incompletes:

A drop after the normal deadline date is **rarely** allowed by the college, and will be approved by the EAS dean only if there is documented evidence that the student was prevented from attending a significant number of classes by circumstances clearly beyond his/her control (e.g., illness). If the instructor approves the drop, the Computer Science Department Chairman and the EAS Dean have final authority in carrying out the EAS college policy and granting approval. A grade of 'Incomplete' is rare, and allowed only when the student has already completed the majority of the course work, but has insurmountable problems with completing a small part of it *due to circumstances clearly beyond their control.* An 'Incomplete' is not justified in the case of a student who has simply chosen not to do the work on time. It is incumbent on the student to notify the instructor as quickly as possible when they are experiencing problems with their class involvement or ability to complete assignments.

Logistics:
In the event of a class cancellation on an exam or assignment due date, students should assume that the exam will be taken, or the assignment will be submitted the **following** regular class time. The instructor will make every attempt to send an email to the addresses registered on the course roster in the event of a class cancellation.

Responsibilities:
Students should expect to work hard to keep up with the class material early on in the semester to avoid falling hopelessly behind. The material builds progressively on each concept, and missing prerequisite material will result in great difficulty in catching up.

Lost data or failed computers generally are not valid excuses for late assignments. The lab computers are provided as a resource, and are always an alternative to your own personal computer usage. **Always back up all program or document materials to a memory stick to prevent loss. Save data frequently, and under different names so you have multiple copies. Don't risk losing hours of work when (not 'if') a hard drive fails, or the computer crashes. Ask yourself:** ***How much work am I willing to lose and have to redo, and how much time will I have to do it all again?***

DATE (Sunday)	**Week #**	**TOPICS**	**ASSIGNMENTS Programming assignments posted 1 week before due**
8/25	**1**	Problem solving, Software Engineering practices and terminology, Abstraction	Chapter 1, 2
9/1	**2**	**NO CLASSES AT UCCS Mon 9/2, Tues 9/3!** Data basics (review), Arrays	Chapter 3, 4
9/8	**3**	Arrays, Abstract Data Types (ADTs), Interfaces, Indexed List ADT	Chapter 4, 5, 6
9/15	**4**	Sorted and Unsorted List ADTs, Sorting, Algorithms	Chapter 7, 8, 9
9/22	**5**	Binary Search, **EXAM #1**	Chapter 10
9/29	**6**	Stack ADT, Queue ADT	Chapter 11, 12
10/6	**7**	Linked lists, Double-ended list	Chapter 13, 14
10/13	**8**	Dynamic Stack, Queue, and Ordered List	Chapter 15, 16
10/20	**9**	**EXAM #2**	
10/27	**10**	Recursion, Doubly-linked lists *** 11/1 is last day to drop w/o special permission!**	Chapter 17, 18
11/3	**11**	Binary Trees, BSTs	Chapter 19, 20
11/10	**12**	Tree traversal, BST deletion	Chapter 21, 22
11/17	**13**	Heaps	Chapter 23, 24
11/24	**14**	Heaps **NO CLASSES AT UCCS Wed 11/27-Fri 11/29**	
12/1		GUI programming styles, components	
12/8	**15**	GUI programs	
12/15	**17**	**Finals Week Special Schedule**- note day and time!	