DE ANZA COLLEGE   **Spring, 2015**
   42519/43727 **CIS-22C-02Y/02YH- DATA ABSTRACTION AND STRUCTURES** (4.5 units)
                                        Syllabus

Instructor: Delia Gârbacea

Office Location   **:** F51c
   Phone   **:** (408) 864-8308
   Email   **:** GarbaceaDelia@DeAnza.edu

   Office Hours: MTWTh 3:320 – 4:10p.m, AT203B

   Class meetings: Tue, Thu   1:30 – 3:20p.m., Lecture   AT205
   The instructor will be available **Online:** Tue, 10:45a.m. – 12:00 noon.

Prerequisites: Computer Information Systems 22B or equivalent. Advisory: Mathematics 212 or equivalent.

Course Description: Application of software engineering techniques to the design and development of large programs; data abstraction and structures and associated algorithms: stacks, queues, linked lists, trees, graphs, and hash tables; internal and external sorting; use of recursion; team project.

Text required: Frank M. Carrano, "Data Abstraction & Problem Solving with C++", sixth edition, Walls and Mirrors, 2013.

Attendance policy: This 4.5 Units course consists of 4 lecture hours (4x50min = 200min) and 1.5 lab hours (75min) per week. You are expected to attend all lecture and lab sessions. If you must be absent from class, arrange with another student to share class notes for that session. You should plan on spending approximately 12 to 15 hours per week to study and do your homework. If you wish to drop the class, it is your responsibility to do so. An unauthorized withdrawal from class without following official procedures will result in you being assigned a grade of "F" (or "NC" if you have selected the Credit /No Credit option).

Academic support: Remember, there is no such thing as a dumb question: you want to understand before you get lost. In addition, please be assured that I'm ready to assist you in any way possible as you meet the challenges ahead. The Tutorial Center provides free academic support and free workshops open to all De Anza students, and Adjunct Skills and Self-Paced Skills courses: http://deanza.edu/studentsuccess/

Student Learning Outcomes: By the end of the course, students will:
   • Read, analyze and explain advanced data structures programs.
   • Design solutions for advanced problems using appropriate design methodology incorporating advanced data structures programming constructs.
   • Create and analyze efficiency of advanced level data structures algorithms, code, document, debug, and test advanced data structures programs using multiple source and header files.

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Course objectives: Upon completion of the course, the student will:
*   Create programs which implement the stack data structure.
*   Create programs which implement the queue data structure.
*   Create programs which implement complex linear lists.
*   Create recursive algorithms and relate efficiency to uses of recursion.
*   Create programs which implement the binary tree, binary search tree, AVL tree, priority queues, and binary heaps data structures.
*   Create programs which implement hashed tables.
*   Demonstrate knowledge of advanced sorting algorithms and discuss the usage and relative advantages of various sorts and their efficiency.
*   Demonstrate knowledge of external sorting algorithms.
*   Create programs which implement the graph data structure.
*   Apply software engineering principles including structured programming and abstract data types.
*   Design and implement a team project with multiple source and header files.

Scholarly conduct: In order to be successful in this class you will have to make a commitment to studying, reading the text, doing your homework, writing your lab assignments, attending class, and taking notes. Worthwhile contribution and regular attendance can positively affect the grades. You are expected to do your own work. Cheating or plagiarism in any form will not be tolerated. Copying or cheating during a test will result in a zero being assigned for that test and may result in a failing grade for the entire course. Any copied assignments will result in a zero grade for all parties, and may result in a failing grade for the entire course. It may also result in dismissal from class, college disciplinary action, and/or notation in their permanent records. The Business Division Dean will also be notified by letter. Please check the current Schedule of Classes to learn more about academic integrity, other policies, and Student Standards of Conduct (http://www.deanza.edu/schedule/).

Reading assignments and recommended Review Questions, Exercises, and Problems (see Catalyst) The exercises and problems are not to be run on the computer (unless you wish to). The purpose of these exercises and problems is to help clarify the material for you as we proceed and to prepare you for tests, therefore, although you do not have to turn them in, you are strongly encouraged to solve them.
Tests: There will be one midterm exam (100 points) and a comprehensive final (100 points). Both tests are open book, open notes. Test dates are shown on the calendar. Final exams papers will be retained for a period of 90 days from the exam date. The final exam will be similar to the midterm exam, emphasizing the material learned after the midterm but covering the rest of the quarter as well.

Class and online assignments: There will be given between 12 to 24 assignments to be completed in class or on line, such as group work, quizzes, etc. They are open book, open notes. There is no make up for any such assignment. These are pass/no pass type of assignments.

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Programming assignments (homework): You will be given 5 <u>programming assignments</u> (100 points each) and a team project (100 points). They are to be run using the computer.

- Up to 5 points will be deducted for each day an assignment is late.
- No assignment will be accepted more than one week after the due date, unless there's an exceptional situation (email me or come and talk to me, preferable in advance).
- Partial credit will be given for incomplete assignments.
- There is no make up for any assignment.
- All assignments must be uploaded on Catalyst: all source and header files and any output generated by the program.
- If the <u>first three programming assignments are satisfactory</u> you will be given a **team project** (2-5 students in a team).

Extra-credit assignments may occasionally be given throughout the course (up to 9 points).

Grading: <u>To pass the class</u> you have to do the following:
1. complete **80%** of the class assignments
2. avg = average of the 5 programming assignments and the team project considered twice should be **70** or greater
3. mt = the midterm exam should be **60** or greater
4. final exam score should be **60** or greater

If all of the above are true, your final grade will be calculated as follows:

score = (avg + mt + final + extra credit) / 3

Your grade is based on the score you earn as shown below. Worthwhile contribution and regular attendance can positively affect the grades.

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Class Assignments      : 12 – 24              P/NP
Programming Assignments: 5 at 100 pts. Each
Team Project(twice)    : 1 at 100 pts.
            AVERAGE: 700 / 7 =              100
Midterm Exam           : 1 at 100 pts.       100
Final Exam             : 1 at 100 pts.       100
Extra Credit           :                       9
```
        SCORE: (100 + 100 + 100 + 9)/3 = 103

```
[97, 103]  → A+
[93, 97)   → A
[90, 93)   → A-
[87, 90)   → B+
[83, 87)   → B
[80, 83)   → B-
[77, 80)   → C+
[70, 77)   → C
[67, 70)   → D+
[63, 67)   → D
[60, 63)   → D-
[ 0, 60)   → F
```

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Tentative Schedule

	Chapters	Mon	Tue	Wed	Thu	Fri	**Important Dates** *All dates are enforced!*
APR Week 1	Review Lnk Lists Pseudocode Algorithm Efficiency	6	7	8	9	10	**Saturday, Apr. 11** Last day to drop for a refund for out-of-state or foreign students
Week 2	Stacks Queues	13	14	15	16 **Hw 1**	17	**Saturday, Apr 18** Last day to add quarter-length classes, drop for refund **Sunday, Apr. 20** Last day to drop a class with no record of grade
Week 3	Queues Linked Lists	20	21	22	23 **Hw 2**	24	
Week 4 **MAY**	Recursion Trees	27	28	29	30	1	**Friday, May. 1** Last day to request pass/no pass grade
Week 5	Trees BST	4	5 Read and understand team project requirements.	6	7 **Hw 3**	8	
Week 6	Hashing	11	12 Create teams	13	14 **MT Exam**	15	
Week 7	Hashing AVL Trees	18	19 Team Project: Report 1 – due	20	21 **Hw 4**	22	
Week 8	AVL Trees Heaps	25 **Memorial Day**	26 Team Project: Report 2 – due.	28	28	29	**Friday, May 29** Last day to drop with a "W"
JUNE Week 9	Graphs	1	2 Team Project: Report 3 – due.	3	4 **Hw 5**	5	
Week 10	Graphs Sorting - ShellSort - QuickSort - External Sorting	8	9 Team Project: Report 4 – due.	10	11 Last Lecture: Review	12	
Week 11	Project Presentations	15	16 **Project**	17	18 **Project**	19	
Week 12	Review Final Exam	22	23	24 **Final Exam**	25	26	**Wednesday, June 24** **Final Exam** **1:45 -3:45pm**

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Honors Cohort: An honors cohort allows students to pursue advanced study in a class (at least 10 extra hours per quarter and more rigorous study beyond the normal coursework). In exchange for extra work the student's transcript will be changed from a regular class to an honors class. Once a student commits to the honors cohort, s/he must complete the honors portion of the course.

An Honors cohort is being offered in this section. If you are in the Honors Program you are welcome to participate in the cohort, and if you are not in the Honors Program but are eligible for the program, you are also welcome to participate **as long as you have not taken an Honors class from De Anza previously**. Eligibility requirements can be found at http://faculty.deanza.fhda.edu/honors/ or you may contact the Honors Program Coordinator at dahonors@fhda.edu.

     Additional Work (at least 10 extra hours per quarter and more rigorous study beyond the normal coursework)**:**

     You must turn in an individual honors project in addition to the five homework assignments and the team project. The honors project will be assigned in class during the third week of the quarter and it is due at the end of the quarter, with weekly updates on the status of the project.

The procedure for Honors students: Drop the regular section and add the Honors section using the add code for the Honors section.

The procedure for non-Honors students: You must see Mehrdad Khosravi (the Honors Program Coordinator) in person during the first week of school to ensure that you have at least a 3.3 cumulative gpa and are eligible for EWRT1A (college-level reading and writing abilities). If you do not meet these two requirements, Mehrdad will talk more extensively with you to determine your situation.