DE ANZA COLLEGE **Winter, 2016**

33380/34027 **CIS-22C-02Y/YH- DATA ABSTRACTION AND STRUCTURES** (4.5 units)
Syllabus

Instructor: Delia Gârbacea

Office Location	**:** F51c
Phone	**:** (408) 864-8308
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Office Hours :	MW	3:25 – 4:15 p.m.	AT203/203B
	TTh	3:25 – 4:15 p.m.	AT311

Class meetings: Tue, Thu 1:30 – 3:40p.m., Lecture AT311
The instructor will be available **Online:** Thu, 10:45a.m. – 12 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).

Communication: Ask questions in class and/or during office hours. To spend our time in a more efficient way please post homework related questions on Catalyst. There will be a discussion forum for each assignment. Post answers to other students' questions. Email me if needed. Please begin each email's subject with "CIS22C: <add your subject here>".

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.
- There are lab assistants and volunteer tutors available in the CIS laboratory: http://deanza.edu/cis/tutoring.html.
- The Student Success 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/

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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.
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 read the relevant pages of the textbook before coming to class. The
course covers quite a bit of material, not all of which will be reviewed during class. The lectures
and class activities are designed to build upon your preparation, not to replace it. Class
participation makes the class interactive and much more valuable. 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.

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Tests: There will be two midterm exams (100 points each) and a comprehensive final (100 points). All 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 exams, emphasizing the material learned after the second 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.

Programming assignments (homework): You will be given 5 programming assignments (100 points each) and a team project (2x100 points). They are to be run using the computer.

- 2 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 first three programming assignments are satisfactory 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: To pass the class you have to do the following:
1. complete **80%** of the class assignments
2. labavg = average of 5 programming assignments and the team project should be **70** or greater
3. mtavg = average of the midterm exams 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 = (labavg + mtavg + 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            Pass        [97, 103] → A+
                                                        [93, 97)  → A
Programming Assignments: 5 at 100 pts. Each             [90, 93)  → A-
Team Project           : 1 at 2x100 pts.               [87, 90)  → B+
            AVERAGE: 700 / 7 =             100          [83, 87)  → B
Midterm Exams          : 2 at 100 pts. each            [80, 83)  → B-
            AVERAGE:                       100          [77, 80)  → C+
Final Exam             : 1 at 100 pts.     100          [70, 77)  → C
Extra Credit           :                     9          [67, 70)  → D+
     SCORE: (100 + 100  + 100 + 9)/3 = 103             [63, 67)  → D
                                                       [60, 63)  → D-
                                                       [ 0, 60)  → F
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Tentative Schedule

	Chapters	Mon	Tuesday	Wed	Thursday	Fri	**Important Dates** *All dates are enforced!*
JAN Week 1	Pseudocode Algorithm Efficiency: Big O Linked Lists	**4**	**5**	**6**	**7**	**8**	**Saturday, Jan. 9** Last day to drop for a refund for out-of-state or foreign students
Week 2	Complex Linked Lists Stacks	**11**	**12**	**13**	**14** Hw 1	**15**	**Saturday, Jan. 16** Last day to add quarter-length classes, drop for refund **Sunday, Jan. 17** Last day to drop a class with no record of grade
Week 3	Queues Recursion	**18** Martin Luther King	**19**	**20**	**21** Hw 2	**22**	
Week 4	Trees	**25**	**26**	**27**	**28** Exam 1	**29**	**Friday, Jan. 29** Last day to request pass/no pass grade
FEB Week 5	BST	**1**	**2** Read and understand team project requirements. Create teams	**3**	**4** Hw 3	**5**	
Week 6	Hashing	**8**	**9** Team Project: Report 1 – due	**10**	**11**	**12**	
Week 7	Graphs	**15** Presidents' Day	**16** Team Project: Report 2 – due.	**17**	**18** Hw 4	**19**	
Week 8	Heaps	**22**	**23**	**24**	**25** Exam 2	**26**	**Friday, Feb. 26** Last day to drop with a "W"
MAR Week 9	AVL Trees	**29**	**1** Team Project: Report 3 – due.	**2**	**3** Hw 5	**4**	
Week 10	Sorting - ShellSort - QuickSort - External Sorts	**7**	**8** Team Project: Report 4 – due.	**9**	**10** *Hw 6 Honors only*	**11**	
Week 11	Project Presentations	**14**	**15** Project	**16**	**17** Project *Final Exam Review*	**18**	
Week 12	Final Exam	**21**	**22**	**23**	**24** Final EXAM: 1:45–3:45p.m.	**25**	

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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 www.deanza.edu/honors

The cohort entails additional work in order to earn an Honors designation for this class on your transcript. You must commit to participating in the Honors cohort by the end of the first week of the quarter. Once you commit to the Honors portion, you will be expected to complete the extra work. Failure to complete the Honors work will result in a lowering of your Honors course grade. A student may not simply decide at the end of the quarter to switch back to the regular course if s/he isn't doing well in honors.

> **Additional Work** (at least 10 extra hours per quarter and more rigorous study beyond the normal coursework)**:** You will have to submit a 6th programming assignment. It will be assigned during Week 4 and it is due on March 10(week 10).

The procedure for Honors students remains the same: 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 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).