Data Structures

Instructor: Phil Tayco
Course Number: CIS-055
Sec: 101
Reg: 108906
Class Hours: Online, optional Zoom discussions Thursdays, 6pm
Website: http://randomlyphilled.org/
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Recommended Text:

- **Data Structures and Algorithms in Java** 2nd Edition, Lafore. ISBN: 0672324539

Class Overview
Students learn a language-independent treatment of topics including computer organization, data formats, recursion, and abstract data types. Data structures covered include abstract data types, arrays, pointers, link lists, stacks, queues, trees, heaps, hash tables, and graphs. Applications of recursion are discussed in detail. Techniques for sorting and searching, as well as measuring algorithm performance and data structure efficiency using Big-O notation, are presented

Prerequisites
The prerequisites for this class are either CIS054 (C++ Programming) or CIS84 (Java Programming). You can still gain approval from me for this class if you have not taken these classes if you can demonstrate proficiency in programming fundamentals. Academically, however, you may need to consult with school counseling to gain official registration. Please reach out to me individually so I can assess your programming knowledge and we can determine next steps from there for registration.

Goals and Objectives
At the end of this course, you should be able to able to do/know the following:

- Demonstrate an understanding of essential data structures including arrays, linked lists, stacks and queues, binary and advanced trees, graphs and hash tables
- Demonstrate an understanding of well-known algorithms including searches (linear and binary), sorting (selection, insertion, bubble, merge, quick and heap), and recursion (factorial, Fibonacci and Towers of Hanoi)
- Compare and contrast data structure and algorithm performance using Big-O terminology and evaluate best choices for software problems
- Apply data structure theory and algorithm development techniques to design programming solutions and measure their effectiveness.
- Explain fundamental and advanced data structure concepts and use to apply higher level data analysis.

Class Format
This class will be conducted through online material managed on the student's own time. You will manage reviewing the material and submitting exercises at your own pace. We will have weekly zoom calls for material discussion, answering questions, and reviewing exercises on Thursday evenings at 6pm. Attendance for these sessions is optional. The course is designed such that you can go through the online material on your own and meet the objectives of the course as long as you complete the exercises. This is to support students that are taking the course online managing other classes and personal activities.

Having said that, I do encourage students to review the material posted and use the Zoom times as often as possible to ask questions and participate in discussions. I will let you know the topic of the week and which material on the website that should be reviewed. I will use the Zoom calls to go over the main points of that topic as well so the guidance for you is to review the material before the Zoom call.

The course material is posted on the class web site (http://randomlyphilled.org/cis55.html). All material you are required to understand in this class will be through the site. Course communications will also be through this site as well as via email with me. This course does not use Canvas so it is important to keep an eye on updates from me via email and on the class website. Supporting material is available in the text and is recommended to review for additional reinforcement of information.

Grading
Grade percentages are as follows:

- Homework and programming exercises - 80%
- Final Exam - 20%

We will have exercises during the semester that are designed for you to practice and apply the concepts discussed in class. All exercises will be posted on the class web site with expected due dates that will generally be due 2-3 weeks after they are posted. Late exercises will be accepted up to one week after their due date with a 20% penalty. No extra credit will be allowed for the class.

Exercises are submitted to me via email and may also be presented at the Thursday Zoom after the discussions. You are welcome and encouraged to complete and present your solutions ahead of the due date. If anything is missed with your exercises, you will be able to update your work and resubmit to improve your grade. You may also work in teams of up to 3 people for your exercises. The final exam, though, will be an individual exercise so understanding all concepts on your own is important.

For exercises that require programming, you may choose to use any programming language you like. Material for the class will generally be presented in Java, so some exercises may require translating some of the given code to the language you choose for your exercises.

The final exam will be posted on the last week of the semester and is a comprehensive test covering all material discussed in class. Due date and time of the final will be provided when posted.

Office Hours and Miscellaneous
Office hours are by request only. I reserve 5pm Thursdays to be available as needed. Extra time outside Thursdays is by appointment, which I am happy to do. However, I am limited in time as I am a full-time employee for another company. Please let me know in advance if you want to meet during or outside of office hours and we will find ways to make it work.

Student Accessibility Services

The Americans with Disabilities Act (ADA) is a civil rights statute that prohibits discrimination against people with disabilities. The Student Accessibility Services Program at San Jose City College is designed to allow students with disabilities to fully access and benefit from the general offerings and services of San Jose City College. The SAS office is located in the Student Center, room SC106. Contact Information is as follows:

Phone: 408-288-3746
TTY: 408-294-3447
V-Phone: 408-565-8640
Website: SAS Website
(http://www.sjcc.edu/current-students/support-programs/sas or see Chapter 5 of the SJCC catalog)

Student Conduct

Please review the following document for information regarding Student Code of Conduct guidelines, principles of discipline, standards of conduct, academic and classroom disciplinary procedures, student grievance procedures, and suspension and expulsion.

Please click here to access the Student Code of Conduct:

http://www.sjcc.edu/StudentAffairs/Documents/Student%20Code%20of%20Conduct.pdf

Or see Chapter 5 of the SJCC catalog

Sexual Harassment/Discrimination Policy

It is the policy of the San Jose/Evergreen Community College District to provide an educational environment in which no person shall be unlawfully denied in whole or in part full and equal access to, the benefits of, or be subjected to discrimination in any program or activity of the District. This policy prohibits discrimination on the basis of legally protected categories which include ethnic group identification, race, color, language, accent, immigration status, ancestry, national origin, age, sex, religion, sexual orientation, gender identity, marital status, medical condition, veteran status, physical or mental disability, or on the basis of these perceived characteristics or based on association with a person or group with one or more of these actual or perceived characteristics.

Please click here for further information regarding the district's Nondiscrimination Policy and Procedure:

SJECCD Sexual Harassment/Discrimination Policy & Procedure

http://www.sjeccd.edu/Chancellor/Documents/Chapter-3_BP3410_Nondiscrimination.pdf

Or see Chapter 5 of the SJCC