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CS-230 Data Structures

Professor: Zane Harvey Email: zwharvey@captechu.edu Phone: (412) 709-2184	Office Hours: Friday 1:00 PM – 3:00 PM ET Dates/Times: Tues/Thurs 9:45 AM – 11:00 AM ET Location: Laurel Campus - McGowan Academic Center (M102)

Fall 2020

Course Description:

This course will cover data structures and algorithms used in computer programming. Data structures are the ways in which data is arranged in computer memory (or disk). Algorithms are the software routines used to manipulate data in the data structures. Concepts of object-oriented design and programming. Includes classes, methods, objects, interfaces, operator overloading, polymorphism, inheritance, exception handling, containers, iterators and the standard template library. Applications involve the use of data structures such as stacks, queues, linked lists and binary trees. Applications involve common algorithms such as recursion, insertion, deletion, searching and sorting. The concepts are implemented through a series of hands-on programming projects, all of which are completed as part of the project/homework requirements. Time and space complexity for common operations and algorithms will be discussed. Java will be the primary programming language for the course, with supplemental instruction involving the Python programming language. Visualization of the data structures and algorithms discussed in the course is achieved via a set of corresponding Java applets.

A review of the mathematical concepts necessary for this course will be provided during the lectures.

List of Data Structures Discussed:

Arrays/Lists

Ordered Arrays

Stacks

Queues

Priority Queues

Linked Lists

Binary Trees

Red-Black Trees

2-3-4 Trees

Hash Tables

Heaps

Unweighted and Weighted Graphs

Sets

Frozen Sets

Strings

Tuples

Dictionaries

Series

Dataframes

Time and Locations

Classes will be held on ground at the McGowan Academic Center (M102) on Tuesday and Thursday from 9:45 AM – 11:00 AM ET.

Course Materials/Books:

- Data Structures and Algorithms in Java, 2nd Edition, Robert Lafore
- Course Notes

Course Schedule

The schedule will follow a weekly format with three exams on the dates provided below. The provided required readings are subject to change and additional readings will be assigned throughout the semester. You are responsible for reading the assigned reading prior to class.

Week	Main Topic/Event	Other Notes
1	Chapter 1 and Java Review	
2	Chapter 2	
3	Chapter 3	
4	Chapter 4	
5	Chapter 5	
6	Chapter 6	Exam 1
7	Chapter 7	
8	Chapter 8	
9	Chapter 9	
10	Chapter 10	
11	Chapter 11	Exam 2
12	Chapter 12	
13	Chapter 13	**Fall Reading Week**
14	Chapter 14	
15	Chapter 15	
16	Review/Final Examination	Final Examination

Three Exams:

Week of October 5th – Take Home Exam 1

Week of November 9th - Timed Exam in Canvas

Week of December 14th - Take Home Final

Software

- Java (version 8 or above) – The example programs in the course will compile and execute in Java 8 and above. The applet files will only execute with Java 8.
- Python Anaconda Distribution (version 3+)

Grading

Grading Components:

       Projects: 40%

       Exam 1: 10%

       Exam 2: 10%

       Final: 20%

       HW: 15%

       Attendance: 5%

Late homework and assignments will be accepted with a 50% penalty for up to one week after due date. After one week from due date, the student will receive a score of 0.

Course Requirements

Prerequisites: CS-225 or CS-200 or CS-150

Participation

Attendance for class is tracked in Canvas.

Homework

Homework and projects will be due on the indicated due date in Canvas. Late homework and projects will receive 50% credit.

Communication

Emails, phone calls, text. Canvas Appointments are suggested. Course announcements will be used frequently to communicate with the class.

Academic Integrity

Every Student is expected to be familiar with Capitol Technology University's Code of Academic Conduct including (but not limited to) the issues of cheating, plagiarism, etc. All cases of suspected academic dishonesty will be reported to the appropriate school officials, and disciplinary action may result, following investigation by a judiciary committee. Some of the core concepts are given here:
DEFINITION AND EXPECTATIONS OF ACADEMIC INTEGRITY:
Cheating – intentionally using or attempting to use unauthorized materials, information or study aids in any academic exercise. Examples include, but are not limited to, submitting another student's work as your own, using books or notes during closed book tests.

Fabrication – intentional and unauthorized falsification or invention of any information or citation in an academic exercise. Examples include, but are not limited to, changing collected data to meet the hypothesis, listing a research source that does not exist, listing a quote that does not exist.

Facilitating academic dishonesty – intentionally or knowingly helping or attempting to help another to violate any provision of this code. Examples include, but are not limited to, giving any individual other than the professor your completed assignment, suggesting ways to cheat or plagiarize.

Plagiarism – The Technology University plagiarism policy may be found online at http://www.captechu.edu/resources/lib/writingguide/plagarism.html

Self-Plagiarism – submitting the same paper or assignment for more than one class for a grade without the professor's knowledge or permission.

Complicity – failing to report the incidents of academic dishonesty to the professor, department chair, Dean of Academic Affairs, or the Vice President for Academic Affairs.

Code of Conduct – the academic integrity code is incorporated into the Capitol Technology University's Code of Conduct Standards.

Judicial Process

Any incidents should be reported to the appropriate Department Chair with written documentation. The Department Chair will forward academic integrity cases to the Academic Affairs Council for review and all other incidents to the Dean of Students. Once the case is reviewed, the Judicial Facilitator, Dean of Students or designee, will meet with the student to discuss the allegations. The student will have the opportunity to accept responsibility and sanctions or to have the case heard by a Conduct Review Panel (CRP). If a CRP is needed, the student and all other faculty, staff or students who have direct knowledge of the incident will be asked to participate in a hearing. The CRP is composed of three members who are selected by the Judicial Facilitator from a pool of faculty, staff, or students. In cases of potential violations of the Academic Integrity Code, the CRP is generally composed of faculty members. The CRP will determine if it is more likely than not that the campus policies have been violated. If the CRP finds that the policies have been violated, they will recommend sanctions. The Judicial Facilitator will notify the student in writing of the CRP's findings. The student has the opportunity to appeal to the VP for Academic Affairs.

To learn more about the official policies of the university on this issue, please read "Code of Academic Integrity" beginning on page 18 and "Sanctions for Violations of Regulations" beginning on page 63 of the Student Handbook. The Student Handbook can be downloaded from: http://www.captechu.edu/current-students/undergraduate/academic-resources
The contents of this syllabus or the scheduled contained herein can be modified at any time without notice.by the Professor.