COSC 201 - Algorithms and Data Structures

Fall 2015

Syllabus

What? What? Structures? Data doesn't have structure (unless we're talking about the android)! It's not even real! It's just some sort of ephemeral concept, here when we want it, gone when we don't. Right?

Just the Facts

Course Number: COSC 201
Title: Algorithms and Data Structures
Semester: Fall 2015
Meeting Time: MWF 12:00-1:10 pm
Locale: Goodpaster 195
Instructor: Alan Jamieson
Office: Schaefer 154
Office Hours: MW 1:30-2:30pm, 5-6pm
Email: acjamieson@smcm.edu
Google Messenger: acjamieson@smcm.edu
Facebook: via COSC201 Group **Online Office Hours:** Most evenings and weekends
Textbook: *Weiss, M A. Data Structures and Problem Solving Using Java. Fourth Edition, Pearson Press.*
Website: http://ripark.github.io/f15/cosc201.html
TA: Cody Forrest (crforrest@smcm.edu), Nick Mouriski (nmouriski@smcm.edu), Ryland Newman (rtnewman@smcm.edu), Luke Skinker (laskinker@smcm.edu)

Catalog Description: This course examines the representation (data structures) and manipulation (algorithms) of information. The emphasis is on choosing the most memory and/or time efficient implementation for a particular application. Topics: common implementation of lists, sets, maps, stacks, queues, trees and graphs, and a survey of some common algorithms for processing these data structures. Students will compare implementations of the data structures commonly provided by language-specific libraries. Prerequisite: COSC 130.

Overview: In this course you will be learning how to use the knowledge you obtained in previous COSC courses to help create the building blocks that are necessary as you start to think about more complex programs. We will discuss several fundamental data structures, namely stacks, queues, lists, trees, hashes and heaps as well as algorithmic basics like sorting, searching and walks. We will discuss some concepts as it relates to the Object Oriented paradigm and algorithm analysis for complexity in both space and time. You will become familiar and comfortable with many of these data structures and be able to implement and use them correctly without the use of any reference materials. You will utilize JAVA for most of this course.

Purpose: When you look at a complex program (read: lots and lots of lines of code) certain patterns emerge. Certain techniques are used over and over again. The core of this is the idea of data structures or concepts that you can reuse time and time again to save time and minimize mistakes in your programming. Object-oriented programming and modular programming are extensions of this basic concept. The data structures you are exposed to during this course will continue to follow you around as you continue your academic careers and into your industry careers.

Grade Distribution:

Exams (2) - 15% each
Assignments (3) - 10% each
Quizzes, Homework and Labs - 20%
Final Exam - 20%

The class will be run fairly informally. While there will be some amount of a traditional lecture involved with each class period, I expect there will be a less traditional discussion also involved in

each class period involving questions and concepts being batted back and forth amongst you, your peers and myself. Please participate in these discussions, I can almost guarantee that you'll get more out of the class in general if you do.

Final Information: The final will be held Wednesday, December 16th at 2pm in Goodpaster 195. Except in emergency situations, you will be required to attend the final exam period.

Assignments: There will be three out-of-class assignments during this course. Unless otherwise specified, these are to be done individually. You may ask for help from your instructor on specific problems, and you may discuss general concepts with your fellow students. You may not debug code for someone else, or have someone else debug code for you. Under no circumstances should you have any other student looking at your code (unless I'm instructing you to do so). Publicly available code is allowed, but must be appropriately attributed. Note that use of substantial amounts of publicly available code will most likely mean a deduction on the grade for that assignment. Any publicly available code must be well documented and you will need to be able to explain what each line of said code does. Each assignment will tie directly into concepts that we are discussing in class and will include one or more implementations of certain data structures.

Labs: Each week we will take time out of the schedule class time to do some hands-on, in-class assignments. Each lab will be short and sweet and go over some major topic presented in the last week. Each lab is graded on a binary system, it is either completed or it is not. If it is not you will receive a 0, if it is you will receive a 10. If you miss a lab due to an unexcused absence, you will not have a chance to make up that lab. Due to space and computer restraints, you may be paired for each lab.

Blackboard Use: I will be utilizing Blackboard to post your grades. All other course documents will be posted to the course website. Please check there often as I will be updating grades as I get graded material evaluated.

Policies

Cell Phones: Please, turn off or turn to silent any cell phones prior to getting to class. If they go off in class they are distraction not only to myself, but to everyone else in the class as well. Habitual offenders will be excused from the class with a 0 for any quizzes that day.

Computer Use: Computer use in this lab is for academic use only. If you bring a laptop with you to this class I expect you to be only using it for purposes related to this class. The same goes for the computers in this lab.

Attendance and Tardiness: Attendance is highly recommended. Missing a class not only causes you to miss the information disseminated in that lecture, but can cause you to miss important information in regards to exams and assignments and the potential of receiving a 0 for a quiz that day. I start class promptly on the hour and expect the students to be in class at that time. If you have circumstances that can prevent you from being in class on time, please let me know as soon as possible. Habitual offenders will be excused from the class with a 0 for any quizzes that day.

Exams and Quizzes: Exams are scheduled well ahead of time. The current schedule shows what days I believe I will be issuing an exam. Any changes to this schedule will be noted and explained in class, well ahead (approx. 1 week) of the exam affected. Exams will not be rescheduled and I will not be offering make-up exams except under extraordinary and documented circumstances. Every class has the potential of having a quiz to reinforce the ideas from the lecture the previous class. These will not be announced ahead of time. They will be 1-3 question quizzes that can be easily done in 15 minutes either at the start or the end of the class period.

Assignments: Assignments and other outside of class work should be done on an individual basis unless otherwise specified in the description of the assignment. Assignments and other outside of class work will be taken late under the conditions listed under Late Policy.

Late Policy: You are allowed 3 "slip-days" throughout the semester. This means that you may turn in an assignment late, where each day it is late will reduce your number of slip-days by 1. So, you could turn in a project 3 days late, but then you wouldn't have any further slip-days left for the rest of the semester. Once you are out of slip-days, if you turn in the assignment late, you will earn a 0 for that assignment. As a further encouragement to turn in assignments on-time, each slip-day you have left at the end of the semester will add 0.5% to your final average.

Extra Credit: I may or may not be offering any extra credit opportunities in this class.

Final Exam: The final exam in this class is optional. You may take it if you wish in order to attempt to improve your grade. Regardless if you choose to take the final or not, every student is required to attend the final period

Communication: The simplest way to get in touch with me is by coming by my office during my office hours or contacting me via email. The easiest way to get in touch with me "after hours" is to send me an email. I habitually check my St. Mary's email account all hours of the day. If you come by my office and the door is open, feel free to stop in to chat. The open door indicates that I'm not working on anything that has to keep my undivided attention at that time so do not feel that you are interrupting me or anything like that. I do make appointments if you have a certain time that you'd like to meet with me. If it fits in my schedule (meaning I'm not teaching class during that time) I will be happy to meet with you.

Academic Honesty: Academic misconduct policies are covered in the Student Code and Student Rights and Responsibilities, Article III. Pay close attention to the definitions of academic misconduct noted in Section 1. This can be found in the Student Handbook.

Disability: If you have any kind of disability that can affect your performance in this class, please let me know privately through email or stopping by my office.

Schedule: The schedule for the class will be posted to the class website and a pdf version will be located on Blackboard in the course documents section. The schedule is subject to change (multiple times).

Closing: The most important thing in any of my classes is that you are learning and expanding your horizons. If you are having any undue difficulty with your work as it pertains to this class, please contact me as soon as possible. Always remember that professors win when you don't need us any longer. I want you to be bouncing ideas off of each other throughout the class and it is my hope that by the end of the semester that you are driving the class session rather than me.