

CMPT243
Algorithms and Data Structures

Course Syllabus

Spring 2014

Instructor: Rob Horner

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Office: Fisher 111

Office Hours: Mondays 10am – 12pm and Wednesdays 12pm – 2pm

Classroom: Fisher 112

Class Hours: 12:15pm – 1:40pm Tuesdays and Thursdays

Description:

This course will introduce students to the fundamental aspects of data structure and algorithms in computer programming. Students will learn how to effectively organize data and evaluate software solutions to process the data. The course is intended to fulfill requirements for computer science academic concentrations; however, the material covered can be applicable to many other fields of study.

Text and Required Supplies:

- 1) Data Structures and Algorithm Analysis in JAVA (3rd Edition)
By: Mark Allen Weiss
ISBN: 9780132835091
- 2) A personally owned laptop or desktop will be helpful but is not required.

Organization:

The course will be conducted as a lecture-lab. Most classes will begin with a brief lecture/class-discussion to introduce new topics, then students will move to an in-class exercise. The instructor will also conduct an in-class quiz at the end of every 3 chapters, a mid-term exam after the first 6 chapters, and a final exam at the end of the course. Students will also be required to perform reading, assignments and projects outside of the classroom. Peer-teaching will also be used in the class, so be prepared to participate and help each other learn!

Objectives:

- 1) To introduce students to the terms, concepts and theories of data structures.
- 2) To introduce students to the terms, concepts and theories of algorithms.
- 3) To introduce students to the formulas for evaluating the estimated run-times of algorithms.
- 4) To provide the opportunity for students to evaluate the timing of algorithms.
- 5) To introduce students to best practices of computer programming.
- 6) To introduce students to the real-life applications of custom computer code.

Course Topics:

- 1) Module 1
 - Pseudo-Code
 - Introduction
 - Algorithm Analysis
- 2) Module 2
 - Lists, Stacks, and Queues
 - Trees
- 3) Module 3
 - Hashing
 - Priority Queues
- 4) Module 4
 - Sorting
 - The Disjoint Set Class
- 5) Module 5
 - Graph Algorithms
 - Algorithm Design Techniques
- 6) Module 6
 - Amortized Analysis
 - Advanced Data Structures and Implementation

Grading Plan:

- 1) In-class Projects – 25%
- 2) Quizzes (4) – 25%
- 3) Participation – 10%
- 4) Mid-term Exam – 20%
- 5) Final Exam – 20%

In-class Projects:

In-class projects will consist of evaluating, writing and testing of various algorithms. The algorithms will come from the reading material and from student submissions via research.

Quizzes:

Quizzes will be given at the end of every 3rd chapter (approximately every 3 weeks). These quizzes will pertain to the last 3 chapters covered in class. Quizzes will be given at the beginning of class and cannot be made up if missed. Quiz formats will vary from quiz to quiz, but they will either be programming on paper and/or short answer format.

Participation:

Students will be expected to attend and participate in class. Participation will include class-discussions, peer-teaching sessions and general attendance. Students are not permitted to miss more than 2 classes for valid reasons (illness, family emergency, religious holiday). If you must miss a class for a valid reason, contact me **before** that class.

Peer-teaching will consist of students leading a part of the lecture/discussion. Students will be placed in pairs and assigned a class date and subject that they will be responsible for teaching their fellow students. The pair of the day must have their material prepared prior to the start of the class that they are to peer-teach. A lack of preparedness will result in the loss of participation points. An absence on your peer-teaching day will result in your participation points for that class being awarded to your partner.

Mid-term Exam:

The mid-term exam will be a comprehensive exam of everything covered up to the middle of the semester and will all be done on paper. There will not be any programming on a computer. The mid-term exam will take place approximately 6 or 7 weeks into the semester.

Final Exam:

The final exam will be a comprehensive exam and will all be done on paper, there will not be any programming on a computer. The actual date and time of the exam will be determined later in the semester.

Late work:

Every effort should be made to turn in work on time. In the event that an assignment is turned in late, there will be a 5% deduction from total possible points earned per day for late work.

Incomplete work:

A grade of Incomplete for a course should only be given if the student has requested it by the last day of class for the semester, and that the revised grade must be submitted by the deadline for incompletes on the calendar of dates and deadlines. No grade change will be processed after that date.

Classroom Rules of Conduct:

- 1) Cell phones, tablets and laptops are permitted for use in the classroom as long as they are being used for class purposes (ie. note taking, programming, browsing the web for references). Any student using these devices for non-classroom purposes (ie. Texting, playing games, surfing sites not related to class) will have the choice of giving up the device for the remainder of class or leaving the classroom and losing participation points for the class period.
- 2) During lecture/class discussions students will be expected to be fully engaged in the lecture/discussion. Programming and web surfing will not be permitted during lectures/class discussions unless explicitly stated by the instructor.
- 3) Class lab time is expected to be spent in lab work. Lab time is not free time. Attendance and concerted work on assignments are required. Work outside of class will be required *in addition to* work during lab times (work outside of class should not *substitute for* work during lab periods). Students that finish early with lab assignments will be encouraged to assist other students that may still be working.

Academic honesty:

Academic dishonesty is, in most cases, intellectual theft. It includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for evaluation. This standard applies to all work ranging from lab assignments to major exams. It is unacceptable to copy work from other students, past or present. It is also unacceptable for a student to submit a report that was previously submitted/presented for a different class. Students must clearly cite any sources consulted—not only for quoted phrases but also for ideas and information that are not common knowledge. **Neither ignorance nor carelessness is an acceptable defense in cases of plagiarism.** It is the student's responsibility to follow the appropriate format for citations.

Copying answers or work from other students will result in a zero for that exam or assignment, and possible disciplinary action from the administration.

For further information, see: <http://www.simons-rock.edu/campus-resources/college-offices/academic-affairs/academic-policies/>

Disability statement:

Any student who feels he or she may need an accommodation based on the impact of a disability should contact me privately as soon as possible to discuss his or her specific needs. Please make sure you have filed the appropriate paperwork with WIN Commons (<http://www.simons-rock.edu/academics/academic-resources/win-commons/disability-services>); I rely on this to verify the need for reasonable accommodations based on documentation on file in that office.

Schedule:

At this time there is not a set schedule for how the class will progress. The progress of the average student will set the pace of what is covered. The modules above are listed in the order of importance. I will begin to make a calendar as the class continues and I am able to assess everyone's capabilities.