CSCI 305 – Concepts of Programming Languages – Spring 2018

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Class meeting time: Monday–Friday, 0800-0850, Roberts 101

Office Hours: Monday/Wednesday/Friday, 13:45–16:05, EPS 254

Required Textbook: Goodrich, Tamassia, and Goldwasser, *Data Structures and Algorithms in Java,* 6th Edition, Wiley, 2014.

Optional Textbook: Tate, *Seven Languages in Seven Weeks*, Pragmatic Press.

Required Software:

- Java Development Kit (JDK 1.7 or greater). http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html
- A Java IDE.
  - Eclipse
  - JetBrains IntelliJ IDEA
  - NetBeans
- An internet browser (i.e., Google Chrome, Mozilla FireFox, Opera, etc.)
- PDF Viewer (i.e., Adobe Acrobat Reader) https://get.adobe.com/reader/otherversions/

Course Description

From the catalog: An examination of several programming paradigms, and languages, as well as their application and underlying execution model. Paradigms examined include imperative, object-oriented, functional, logic and string based. Students will gain exposure to a variety of languages such as C, C++, Scheme, Prolog and Perl.

Course Dates

Monday May 16, 2016 through Friday June 24, 2016

Pre-requisites

- M 151Q Precalculus
- CSCI 111 Programming with Java I

Course Objectives

At the end of this course, the student will be able to:

- Design solutions to problems that involve searching, sorting, and other algorithms while utilizing arrays, linked-lists, queues, and stacks.
- Implement solutions in Java using advanced techniques including recursion, exception handling, and class libraries.
- Comment on the time complexity of simple algorithms by way of abstract analysis and experimentation.

Course Schedule

Week	Date	Lecture Topic	Reading
1	5/16	Course Intro and IIAC	2.1 – 2.6
	5/17	Lists	3.1
	5/18	Lists	3.2 – 3.3
	5/19	Lists	3.2 – 3.3
	5/20	Lists	3.3 – 3.4
2	5/23	Stacks and Queues	6.1
	5/24	Stacks and Queues	6.2 – 6.3
	5/25	Priority Queues	9.1 – 9.2
	5/26	Recursion	5.1 – 5.2
	5/27	Recursion	5.3 – 5.6
3	5/30	No Class – Memorial Day	
	5/31	Big-O	4.1 – 4.3
	6/1	Big-O	4.3 – 4.4
	6/2	Midterm Exam Review	
	6/3	Midterm Exam	
4	6/6	Return Exams and Trees	8.1 – 8.2
	6/7	Trees	8.3 – 8.4
	6/8	Trees	11.1
	6/9	Quick Sort	12.1
	6/10	Tree Sort	12.2
5	6/13	Merge Sort	12.3 – 12.5
	6/14	Insertion Sort	
	6/15	Selection Sort	
	6/16	Iterators & Custom Comparators	7.4
	6/17	Graphs	14.1–14.2
6	6/20	Graphs	14.3 – 14.5
	6/21	Graphs	14.6 – 14.7
	6/22	Heaps	9.3
	6/23	Exam Review	
	6/24	Final Exam	

Course Assignments

The following table contains the dates when assignments are assigned, marked with "(A)", and when they are due, marked with "(D)". All assignments are due no latter than 12:30 pm of the due date. For further information see the section regarding the policy on late assignments.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1			In Lab 1 (A) Out Lab 1 (A)		In Lab 2 (A) In Lab 1 (D)
2	In Lab 3 (A) In Lab 2 (D)		In Lab 4 (A) In Lab 3 (D)		Out Lab 1 (D) In Lab 4 (D) In Lab 5 (A)
3	Out Lab 2 (A)		In Lab 6 (A) In Lab 5 (D)		Midterm Exam In Lab 6 (D)
4	Out Lab 3 (A)	Out Lab 2 (D)	In Lab 7 (A)		In Lab 8 (A) In Lab 7 (D) Out Lab 3 (D) Out Lab 4 (A)
5	In Lab 9 (A) In Lab 8 (D)		In Lab 10 (A) In Lab 9 (D)		In Lab 11 (A) In Lab 10 (D) Out Lab 4 (D) Out Lab 5 (A)
6	In Lab 12 (A) In Lab 11 (D)		In Lab 12 (D)		Final Exam Out Lab 5 (D)

Lab Schedule

Week	Lab Period	In Lab Topic	Out Lab Topic
1	Mon.	No Lab	Phone Contact Db
	Wed.	Singly Linked Lists	
	Fri.	Doubly Linked Lists	
2	Mon.	Stacks	
	Wed.	Queues	Wait-Time Simulator
	Fri.	OutLab as InLab	
3	Mon.	No Lab	
	Wed.	Binary Search	
	Fri.	No Lab	
4	Mon.	No Lab	Algorithm Analysis
	Wed.	General Trees	
	Fri.	Binary Trees	
5	Mon.	Binary Search Trees	Learning Classification Tree
	Wed.	MergeSort	
	Fri.	QuickSort	
6	Mon.	Tree Sort	Algorithm Comparision
	Wed.	OutLab as InLab	
	Fri.	No Lab	

Course Evaluation and Expectations

This course will be fast paced and will require the students to manage their time effectively. The course evaluation is divided into three components: In Labs, Out Labs and Exams. The In Labs are small programming assignments designed to help the student learn concepts through experience. The Out Labs are meant to be a more extensive assignment to help the student learn and apply the concepts from class. Finally, the examinations are designed to help the students evaluate their level of knowledge and for the instructor to evaluate the class overall.

- In Lab Assignments (evenly weighted) – 20%
- Out Lab Assignments (evenly weighted) – 55%
- Exam 1 – 10%
- Exam 2 – 15%

To pass the course, you must average at least 50% on the exams. The final will not be given early. At the end of the session, grades will be determined (after any curving takes place) based on your class average as follows:

- 93+: A
- 90+: A-
- 87+: B+
- 83+: B
- 80+: B-
- 77+: C+
- 73+: C
- 70+: C-
- 67+: D+
- 63+: D
- 60+: D-
- <60: F

Late Policy

If you submit an assignment late (without approval from your instructor) you receive a 0.

Exams

There will be two 50 minute exams, one every 3 weeks, over this 6 week course. As the course proceeds the exams will be weighted more heavily. Note that the exams will focus more on the conceptual and theoretical knowledge from this class while the In Labs and Out Labs will focus on the evaluation of programming skill.

D2L

Desire 2 Learn (D2L), which can be accessed at http://ecat.montana.edu, is an online learning tool which we will be using to provide lectures, supplementary information, and for tracking student progress in the course. All assignments are to be submitted to D2L via an associated dropbox for the assignment.

Collaboration Policy

You *may* (unless otherwise noted)

- Share ideas with other people.
- Help other people debug their programs.

You may *NOT*

- Share code with other people.
- Submit code that you did not write.
- Modify someone else's solution and claim it as your own, excluding code derived from the book as directed by your instructor.
- Use any outside sources (books, notes, electronic devices, other people) on the midterm or final exam, unless otherwise noted.

Failure to abide by these rules will result in everyone involved being reported to the Dean of Students and receiving an F for the course.

Policy on Class Attendance

A large amount of material will be covered in a relatively limited amount of time. In addition, a fairly large amount of work will be done by the student. Consequently, class attendance is strongly recommended but is not required.

Policy on Cell Phones, Laptops, and Tablets

Bringing your personal phones, tables or laptops to class is fine. I do require that you set your phones to at least silent, and mute any sounds from either your tablet or laptop. Also refrain from replying or sending texts, social media, or phone calls during class, if you feel that you must do this then please leave the class and take care of it in the hallway. Further, playing games in class will also not be tolerated. The distractions that these actions cause both for your classmates as well as for your instructor are taxing on the limited time we have. If you are found to be performing any of these actions you will be asked to leave the classroom for the day.