Data Structures and Algorithms in Java

Syllabus

UC San Diego
EXTENSION

Course Number: CSE-41321
Section ID: 141714
Quarter: Winter 2020
Course Dates: 1/14/2020 – 3/14/2020

Instructor Information

Name: Raymond Mitchell III
Email: ray@raymondmitchell.com

Communication Policy

You may contact me by email (ray@raymondmitchell.com) or via the Blackboard email feature. My goal is to **respond within 24-48 hours**. If you do not receive a response during this period, please follow-up to ensure that your email was received.

Please communicate with me early and often if you are experiencing challenges in completing course assignments on time.

Course Description (Goals and Objectives)

Gain an understanding of fundamental algorithms and data structures. Learn to write code that scales well with large data sets and how to identify hidden performance bottlenecks. Topics covered apply to all programming languages and software development domains. Learn the fundamentals needed to answer algorithm and data structures questions commonly asked of job candidates in programming interviews. Course highlights:

- Data structure and algorithm design and implementation
- Performance analysis of algorithms
- Time-space trade offs
- Working with abstract data types
- Recursion

Course Materials and Textbooks

The course materials and textbooks listed here can be acquired through the UCSD bookstore.

Required Texts

- Data Structures and Algorithms Lecture Notes in Java, Version 1.0, Raymond Mitchell III, ISBN 978-1007-3096-0

Course Prerequisites

CSE-40480 Java Programming II or equivalent knowledge and experience.

Student Learning Outcomes

By the end of this course, students will be able to:

- Write code that scales well in real-world situations
- Identify and resolve performance bottlenecks in existing software
- Learn standard libraries across all programming languages
- Respond appropriately to algorithm questions commonly asked in job interviews
- Implement custom containers using generics

Course Schedule

Session	*Topic & Reading*	*Assignments w/due dates*
1	**Fundamentals** • Mitchell section 1	*Homework #1 (due 1/21/2020 11:59pm)*
2	**Linked lists** • Mitchell section 2	*Homework #2 (due 1/28/2020 11:59pm)*
3	**Sorting, searching** • Mitchell section 3	*Homework #3 (due 2/4/2020 11:59pm)*
4	**Stacks, queues, sets** • Mitchell section 4	*Homework #4 (due 2/11/2020 11:59pm)*
5	**Hash tables** • Mitchell section 5	*Homework #5 (due 2/18/2020 11:59pm)*
6	**Trees** • Mitchell section 6	*Homework #6 (due 2/25/2020 11:59pm)*
7	**Heaps, priority queues** • Mitchell section 7	*Homework #7 (due 3/4/2020 11:59pm)*
8	**Graphs** • Mitchell section 8	*Homework #8 (due 3/11/2020 11:59pm)*
9	**Graph algorithms** • Mitchell section 9	*None*

Grading and Assignment Information

Grading Scale

Your final course grade is based on the percentage of points you have earned.

Grades	
A	85-100%
B	65-84%
C	50-64%
F	<50%

Weighted Grading Criteria

Your course grade is determined entirely by the grades you receive on the homework. All homework assignments are weighted equally, and you may drop the lowest grade. This means your grade is determined by taking the average of your top 7 homework assignment grades.

You can check your point total through the Course Menu in Blackboard at any time by clicking **Tools>My Grades**.

Grading Policies

This course can be taken as part of the C/C++ Programming certificate. In order for the class to count towards your certificate it must be taken for a letter grade or as pass/no pass. Classes that are taken as NFC cannot count towards a certificate. You can change your grading option any time BEFORE the last day of class through My Extension.

Late Policy

Assignments are due on the dates listed in the Course Schedule and are submitted via blackboard. Late homework will be accepted **only on the day after the due date (by midnight)** for only 50% max credit, unless e-mail confirmation from the instructor prior to the start of the class allows for another arrangement.

Expect and plan for contingencies and technical problems (they WILL happen!). Remember that you can drop the lowest assignment so plan accordingly.

Assignments

Assignments are submitted via blackboard. For each assignment you should submit a single PDF file. This file should contain your source code and a screenshot of your program's output.

The PDF file you submit should be named as follows:

- <your name>HW<homework #>.pdf (e.g. "RayMitchellHW1.pdf")

Assignment Feedback

Assignment grades and solutions will be posted within 1 week of the assignment due date.