21:198:335:Q1
Data Structures and Algorithm Design
Fall 2014

Class meetings: MW 1–2:20, Smith 244

Instructor: John Randall
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Office hours: M 2:30–4, W 1–2:30, Th 11:30–1

Course web site: http://pegasus.rutgers.edu/~randall/335 and Rutgers Blackboard.


Prerequisites: 198:102 Computers & Programming II, Writing Proficiency

Course description
This course emphasizes writing effective programs in Java. Building on earlier courses, it focuses on dynamic data structures and their corresponding algorithms in an object-oriented context.

We will also cover techniques of successful software engineering. Many programs will be written from scratch in class, and the techniques will be illustrated in the programming assignments.

Topics

- Recursion: examples including string reversal, factorial, Fibonacci numbers, towers of Hanoi, and others below.
- Data structures: linked list, stack, queue, priority queue, binary tree, hash table, heap.
- Searching: linear search, binary search, using a hash table.
- Sorting: insertion sort, binary tree sort, mergesort, quicksort, heapsort. Efficiency of various algorithms.
- Binary tree algorithms: insertion, searching, traversal, representing ordered tree as binary tree.
- Evaluation of arithmetic expressions using a stack of binary trees.
- Advanced Java programming: dynamic binding, generics, iterators, streams.
Relevant chapters of the textbook

3. Recursion
4. Data abstraction
5. Linked lists
6. Recursion as a problem-solving technique
7. Stacks
8. Queues
9. Advanced Java topics
10. Algorithm efficiency and sorting
11. Trees
12. Heaps

Grades

Grades will be based on 2 midterm exams (20% each), projects (25% total), and a comprehensive final exam (35%).

Attendance

Students are expected to attend all classes and to complete all assignments on time. No makeups will be given for quizzes. No makeups will be given for exams except for absences due to the recognized grounds described in the catalog.

Important dates

Tue 09/02 Fall semester begins
Tue 09/02 Add/drop begins
Tue 09/09 Last day to drop a class
Wed 09/10 Last day to add a class
Thu 10/09 **EXAM #1**
Mon 11/03 Last day to drop a class with a W
Thu 11/20 **EXAM #2**
Tue 11/25 Thursday schedule
Wed 11/26 Friday schedule
Thu 11/27 Thanksgiving recess begins
Sun 11/30 Thanksgiving recess ends
Wed 12/10 Fall classes end
Thu 12/11 Reading period begins
Fri 12/12 Reading period ends
Mon 12/15 **FINAL EXAM, 3–6pm**
Mon 12/22 Final exams end
Tue 12/23 Winter recess begins