CS 112 : Data Structures

Fall 2016

SAME syllabus, SAME assignments, SAME exams for all lectures

Sesh Venugopal (Course coordinator)
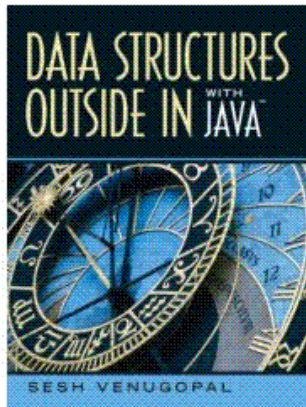venugopa@cs.rutgers.edu
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Resources

Sakai@Rutgers

http://sakai.rutgers.edu
(CS112 – Fall 2016)

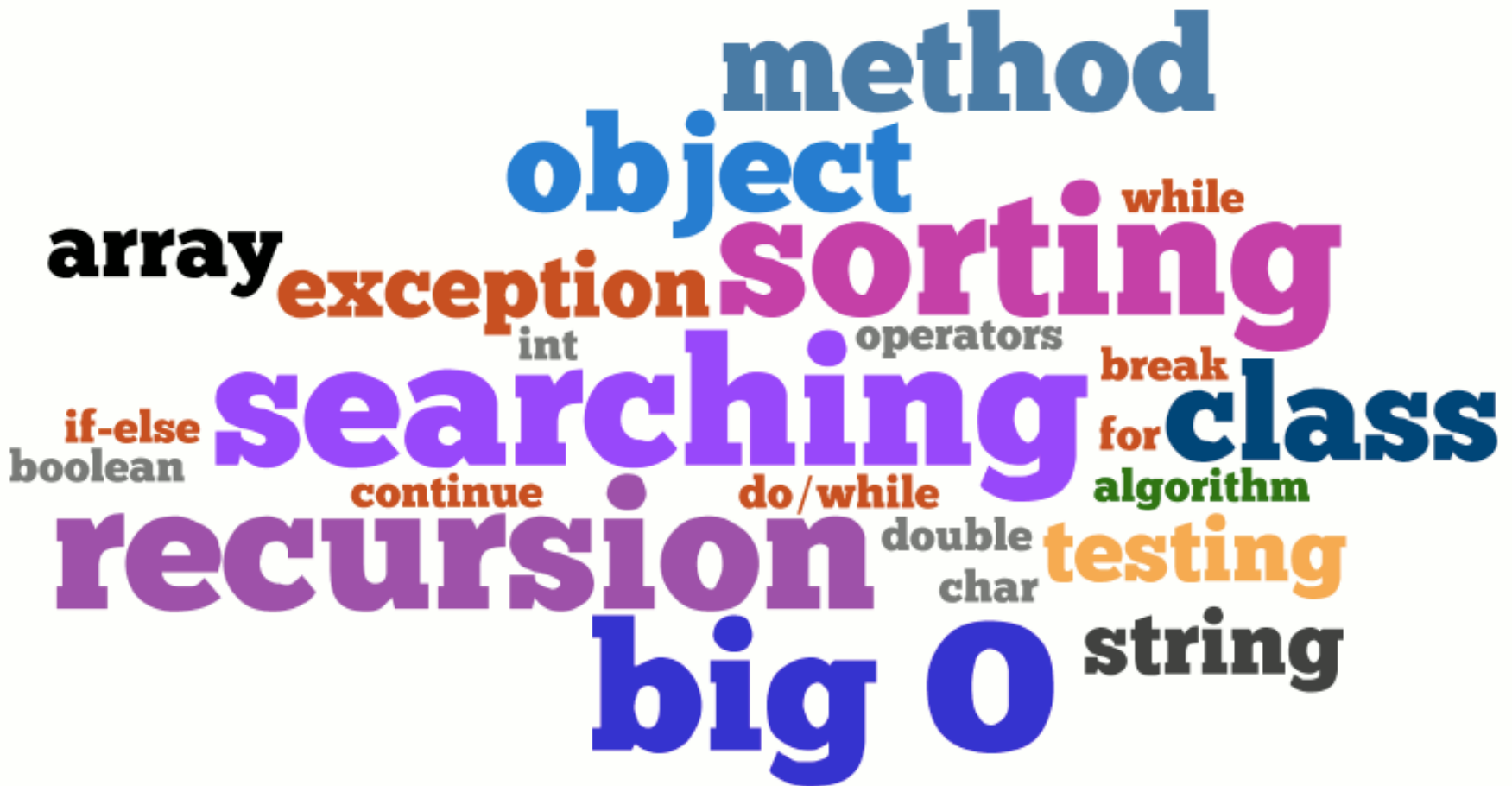Textbook: Data Structures Outside In with Java

Text programs + documentation
with syllabus in Sakai

Copy of text on reserve in SEC reading room

Grading

- Assignments (5): 35%
- Midterm 1 (Written): 15%
- Midterm 2 (Written): 15%
- Final (Written): 30%
- Recitation problem hw (1 per recitation): 5%

What You (Should Have) Learned in 111

(Graphic Art from wordle.net)

Coming out of 111…

You are expected to hit the ground running with all the topics you learned in 111 - strings, arrays, searching, sorting, recursion, Big O, objects. In order to review objects and Big O in particular, you are urged to read the following from the text:

- Chapter 1: Object-oriented Programming in Java – Sections 1.1 and 1.2

- Chapter 3: Efficiency of Algorithms – Entire chapter, all sections

How to succeed in 112

- Come to lecture and PAY attention – our job is to distill and explain material with emphasis on the most important concepts. If you don't show up, or phase out for most of the lecture, you will LOSE out – studying by yourself will be very ineffective

- Spend TIME outside class reviewing concepts and practicing problems. TIME is the most important factor, and it has to be QUALITY time. There's a lot of thinking involved in this course, it's not just Java.

- THINK through the problem sets BEFORE going to recitation. And if you can work out the problems for yourself, even better. That way when you come to recitation you can ask questions and fill the holes in your knowledge. (In all recitations except the first, you WILL be asked to turn in one solved problem.)

- Supplement your lecture attendance by reading from the text, and watching my videos on YouTube (see http://www.cs.rutgers.edu/~venugopa for complete list)

- WORK with a friend, if possible. It's a great way to stay motivated, and learn from each other – often if one of you doesn't know something, the other probably does. (I find that talking about stuff with someone else makes me think better.)

You Already Know Some Data Structures

Array

What You Will Learn in 112

Specialized Data Structures

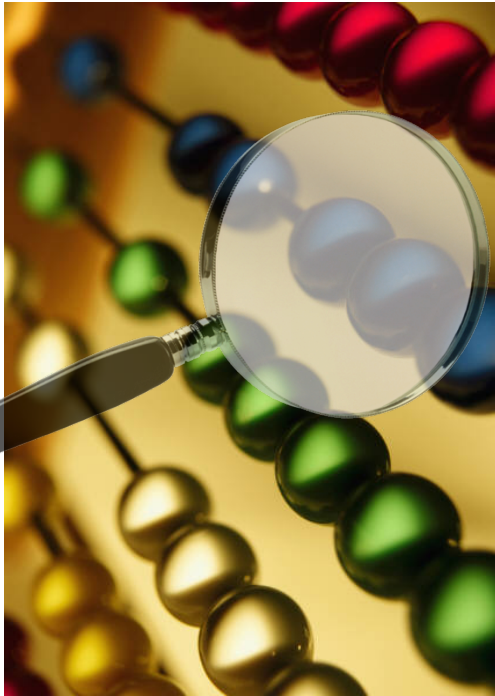| Linear	Trees	Graphs	Hash Table
• Array • Linked List • Stack • Queue	• Binary Tree • Binary Search Tree • AVL Tree • Heap	• Undirected • Directed • Weighted	

What You Will Learn in 112

Searching

Array

Linked List

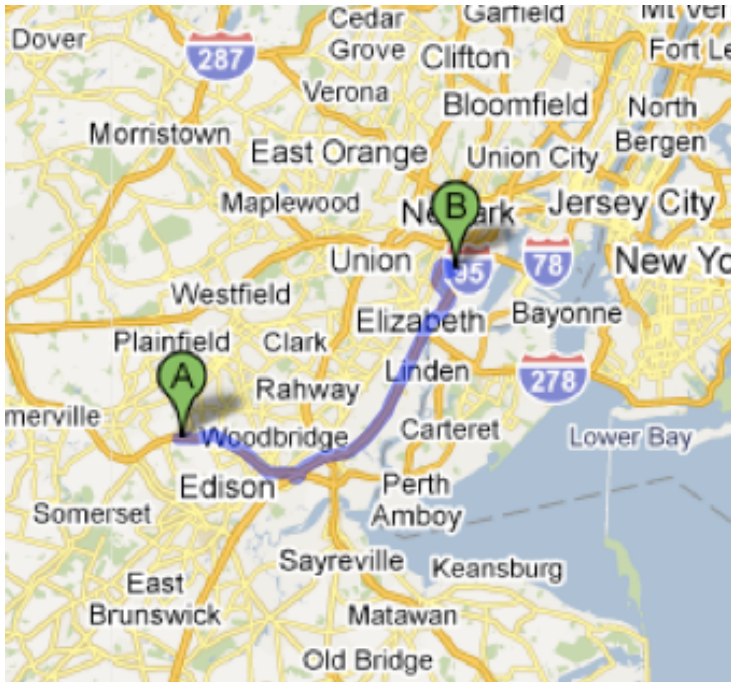Sorted Array

Binary Search Tree

AVL Tree

Hash Table

Sesh Venugopal

What You Will Learn in 112

Graph Algorithms

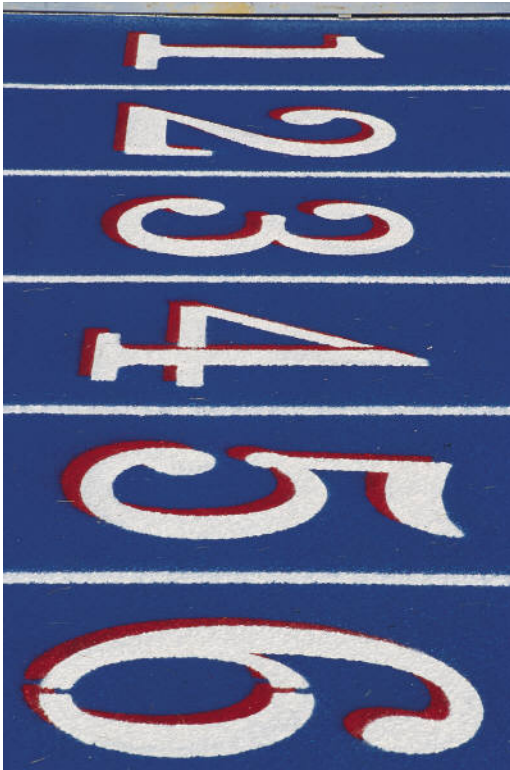(maps.google.com)

Depth first search (DFS)

Breadth first search (BFS)

Topological Sorting

Shortest Paths

What You Will Learn in 112

Sorting

Array

- Insertion Sort
- Quicksort

Linked List

- Mergesort
- Radixsort (Time permitting)

Heap

- Heapsort

What You Will Learn in 112

Running Time/Space Analysis

Big O

- Worst case
- Best case
- Average case

What You Will Learn in 112
Programming Data Structures and Algorithms

USING

Sesh Venugopal