CS 112 : Data Structures
Spring 2020

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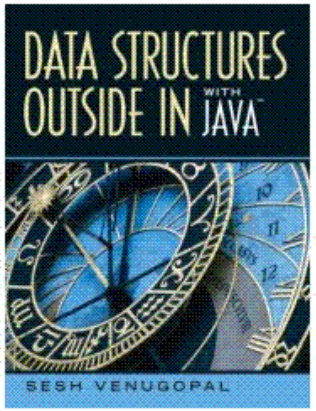
Lecture 1: Jan 21

Resources

Sakai @ Rutgers

http://sakai.rutgers.edu
(CS112 – Spring 2020)



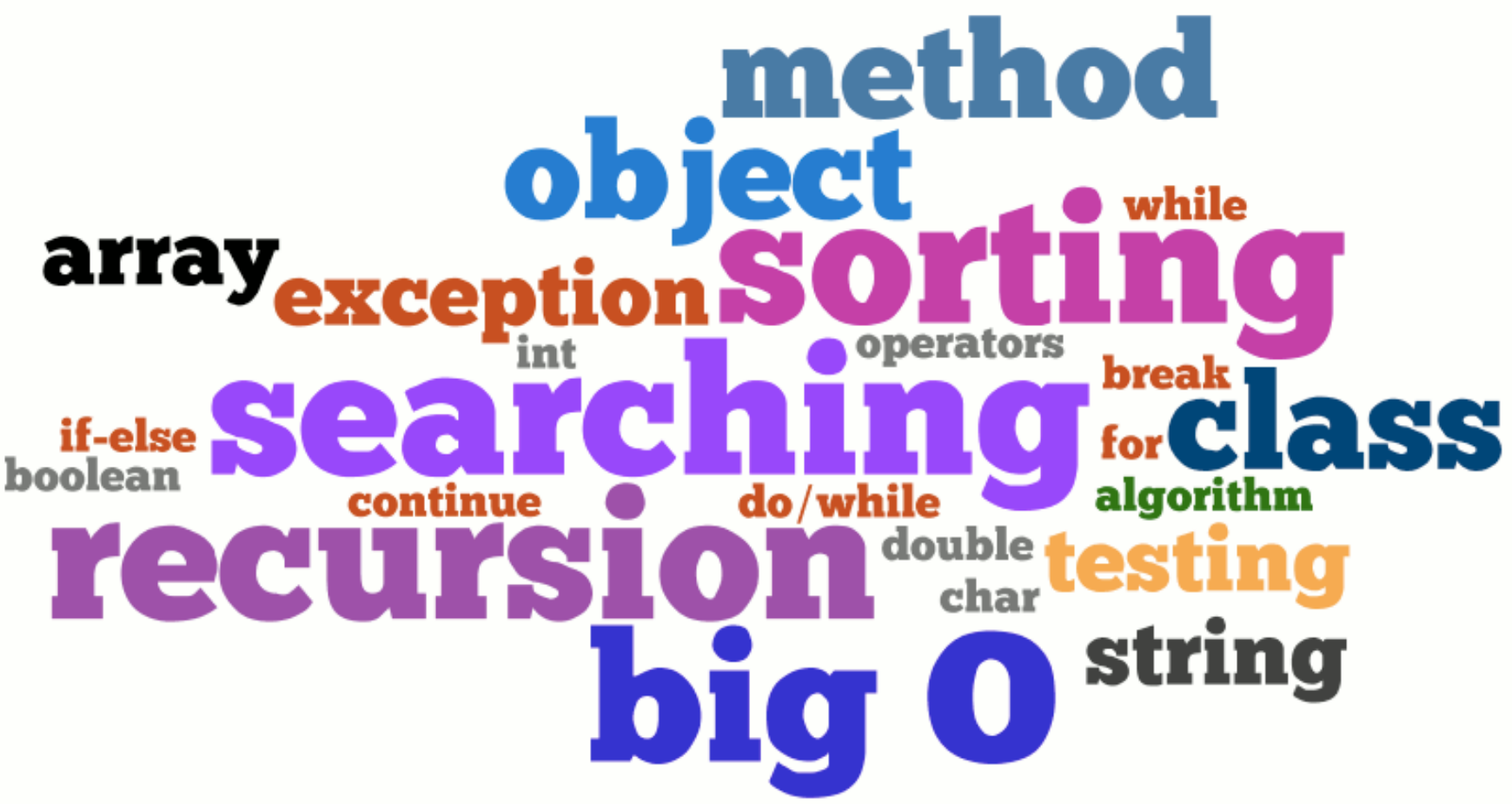
Textbook: Data Structures Outside In with Java

Text programs + documentation
with syllabus in Sakai

Grading

- Assignments (4): 30%
- Midterm 1 (Written): 15%
  - Sun Mar 1, 6:10-7:30pm
- Midterm 2 (Written): 20%
  - Sun Apr 5, 12:00-1:20 pm
- Final (Written): 35%
  - Monday, May 11, 4pm-7pm

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 only get you so far

How to succeed in 112

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.

How to succeed in 112

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.

How to succeed in 112

STUDY with a friend.

It's a great way to stay motivated, and learn from each other. (I find that talking about stuff with someone else makes me think and understand stuff better.)

ONWARD!

You Already Know Some Data Structures

Array

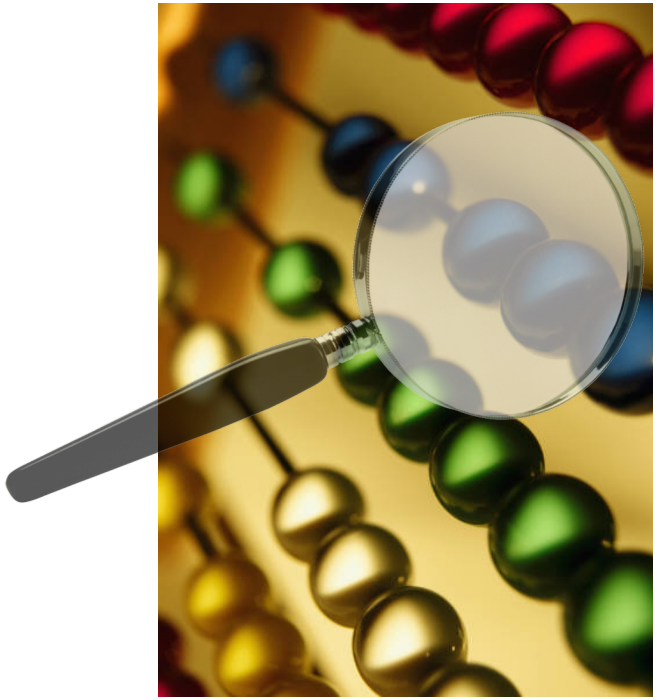
What You Will Learn in 112

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

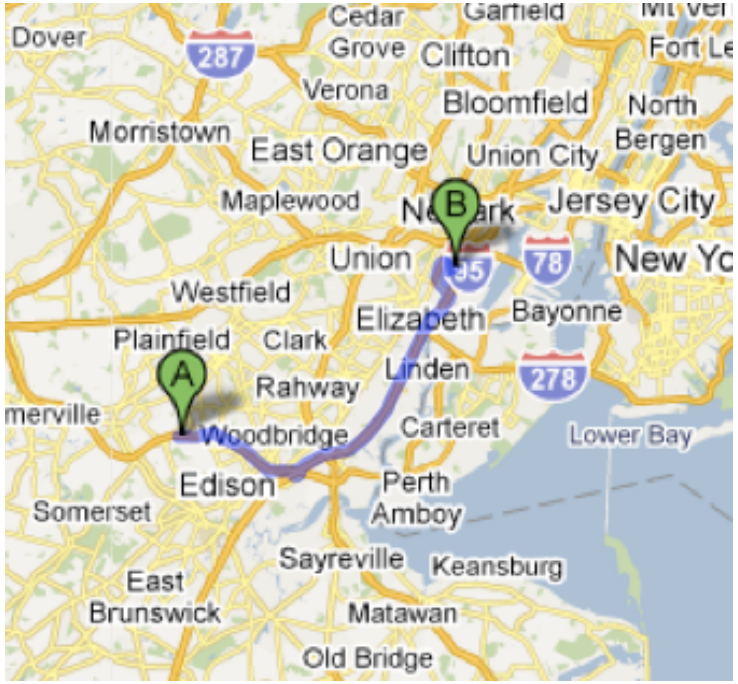
Searching



- Array
- Linked List
- Sorted Array
- Binary Search Tree
- AVL Tree
- Hash Table

What You Will Learn in 112

Graph Algorithms

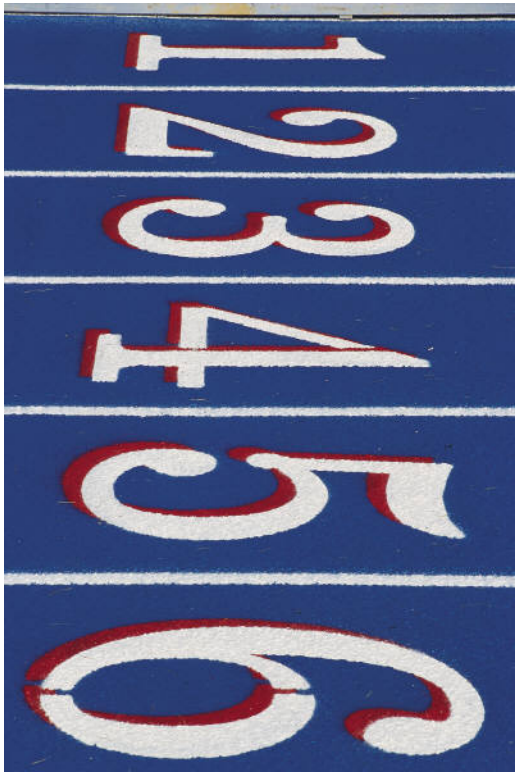


(maps.google.com)

- 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