

CS 200 Midterm 2 Preparation Guide

Exam Date: **Friday, March 30, 2012**

Location & Time: In-class, **2:00 ~ 2:50 PM**

In this exam, you will have a mix of multiple-choice questions, some short answer questions and some questions that require you to read Java code and perform algebraic calculations. You should attempt the examples and exercises at the end of indicated textbook sections/ chapters. Many of the exam questions will have a similar form. Also review the in-class quizzes and worksheet.

Key concepts

The problems in this exam will be about the concepts covered in the lectures (week 1 through week 5). Please review your lecture notes (<http://www.cs.colostate.edu/~cs200/Spring12/Schedule.html>)

The following textbook exercises and examples can help you prepare for the exam.

Binary Tree, Binary Search Tree

Lecture Notes: part. 6-(1)

Textbook : Chapter 11 Trees from Prichard

1. What are the Binary Tree and Binary Search Tree?
2. Search and Traversal algorithms.
3. Insertion and Deletion algorithms.
4. Implementation of BSTs.
5. Efficiency of Binary Search Tree.
6. Know how to sort a list using a BST (treesort)
7. Know how to prove the properties of BST and binary tree with mathematical induction.
8. What is the complexity of treesort?
9. Algorithms for storing/restoring BST
10. Understand psuedocode for BST operations.

Balanced Trees: 2-3 tree, 2-3-4 tree, Red-black tree and AVL tree

Lecture Notes: part 6-(2).

Textbook: Chapter 13, Section 1. Balanced Search Trees From Prichard

1. What are 2-3,2-3-4, Red-black, and AVL trees?
2. Search/Traversal/Inserting/Deleting algorithm for 2-3 tree
3. Search/Traversal/Inserting/Deleting algorithm for 2-3-4 tree
4. Know how to convert a 2-3-4 tree to a Red-black tree
5. Know how to convert a Red-Black tree to a 2-3-4 tree.
6. What is the advantage of using 2-3 trees when compared with the BST?

7. What is the advantage of using 2-3-4 trees when compared with the 2-3 trees?
8. What is the advantage of using Red-black tree when compared with the 2-3-4 trees?
9. How do AVL trees keep the balance?

External Methods: B-tree

Lecture Notes: part 6-(3)

Text book: Chapter 15-1, 3(pp.845~856) from Prichard

1. What is the advantage of an external storage to maintain a data structure?
2. What is the B-tree?
3. Know how to use B-tree to organize data blocks
4. Deleting/Inserting/Traversals algorithms