

CS 331 Syllabus

1 Course Objectives

By the time the course is finished, you should be able to:

- Explain, implement, and apply the following data-structures:
 - lists (unordered and ordered),
 - stacks,
 - queues,
 - expression trees,
 - binary search trees,
 - up-trees,
 - hash tables, and
 - heaps.
- Analyze the time and space complexity of algorithms using asymptotic upper bounds (big-O notation).
- Explain and use references and linked structures.
- Outline basic object-oriented design concepts: composition, inheritance, polymorphism.
- Write and test recursive procedures, and explain the run-time stack concept.
- Analyze searching and sorting algorithms, and explain their relationship to data-structures.
- Choose and implement appropriate data-structures to solve an application problem.
- Understand techniques of software development, such as unit testing and version control.

2 Contact Information

Office: 110 SB

Hours: W,F 10:30–11:30

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Course Web Page: <http://dijkstra.cs.iit.edu/cs331>

3 Grades

3.1 Assignments

Assignment	Number	Each	Total
Labs	8	2.5%	20%
Project	1	10%	10%
Midterm	2	20%	40%
Final	1	30%	30%

(The first lab only counts for half, and the total number of labs may change.)

3.2 Exams

- Midterms: September 24, October 29
- Final: December 9, 08:00–10:00.

Letter	Minimum Score
A	85
B	70
C	55
D	40

3.3 Schedule

2010-08-25	Course Introduction
2010-08-27	Abstraction
2010-08-30	Linux Lab
2010-09-01	Array Lists
2010-09-03	Iterative Linked Lists
2010-09-06	Linked List Lab
2010-09-08	Recursive Linked Lists
2010-09-10	Stacks and Queues
2010-09-13	Stacks and Queues Lab
2010-09-15	Doubly Linked Lists
2010-09-17	Iterators
2010-09-22	First Review Session
2010-09-24	Midterm 1
2010-09-27	Doubly Linked List Lab
2010-09-29	Locality
2010-10-01	Binary Search Trees
2010-10-04	Binary Search Tree Lab
2010-10-06	Traversal Patterns
2010-10-08	Expression Trees
2010-10-11	Traversal Lab
2010-10-13	AVL Trees
2010-10-15	Quadratic Sorting
2010-10-18	AVL Tree Lab
2010-10-20	Fast Sorting
2010-10-22	Heaps
2010-10-27	Second Review Session
2010-10-29	Midterm 2
2010-11-01	Heap Lab
2010-11-03	Up Trees
2010-11-05	Tries
2010-11-08	Up Tree Lab
2010-11-10	Skip Lists
2010-11-12	Virtual Data Structures
2010-11-15	Skip List Lab
2010-11-17	Hash Tables
2010-11-19	Hashing Functions and Cryptography
2010-11-22	Hash Table Lab
2010-11-24	Thanksgiving Break
2010-11-26	Thanksgiving Break
2010-12-01	Oct Trees
2010-12-03	Final Review Session
2010-12-09	Final Exam

4 Problems

Try the following problems. In a few minutes the instructor will go over the solutions. Feel free to work with the person next to you!

1. Suppose you are DJ for a local radio station. The manager has put all the songs on the computer in Ogg Vorbis format so that the radio broadcasts can be done from the computer. (The manager assures you that the files are legal.) You are given the task of organizing the collection.
 - (a) What kinds of data will you need to associate with each of the songs?
 - (b) What kinds of questions will you need to ask in the course of the day?
 - (c) What impact will each of these questions have on the way you organize the music?