Course Time and Office Hours

- Course Time & Place:
  - 13:10 ~ 16:00, Thursday, C310
- Office Hours & Place:
  - 08:50 ~ 11:50, Monday, C101
  - 13:30 ~ 16:30, Tuesday, C101
Grading

- Homeworks: 30% (Assignments & Programming)
- Mid-term Test: 30%
- Final Test: 40%
- Attendance: -15% ~ 5%

Teaching on Web

http://www.nhu.edu.tw/~chun

Chambord castle, located on La Loire river, France, June 2010

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What The Course Is About

- Data structure is concerned with the representation and manipulation of data.
- All programs manipulate data.
- So, all programs represent data in some way.
- Data manipulation requires an algorithm.
- We shall study ways to represent data and algorithms to manipulate these representations.
- The study of data structures is fundamental to Computer Science & Engineering.

Prerequisites

- Introduction to Computer Science
- Programming Language C (or C++)
Contents for Data Structure (I)

Ch1. Basic Concepts:
- Overview, pointers and dynamic memory allocation, data abstraction, algorithm specification, performance analysis, performance measurement

Ch2. Arrays and Structures:
- Array, dynamically allocated arrays, structures and unions, polynomial, sparse matrix, multidimensional arrays, string

Ch3. Stacks and Queues:
- Stack, queue, a mazing problem, evaluation of expressions, multiple stacks and queues

Ch4. Linked Lists:
- Singly linked lists, linked stacks and queues, polynomials, additional list operations, sparse matrices, doubly linked lists

Contents (Cont’d)

Midterm Test

Ch5. Trees:
- Binary trees, binary tree traversals, additional binary tree operations, threaded binary trees, heaps, binary search trees, selection trees, forests, set representation, counting binary trees

Ch6. Graphs:
- ADT graph, elementary graph operations, minimum cost spanning trees, shortest paths and transitive closure, activity networks

Ch7. Sorting:
- Insertion sort, quick sort, optimal sorting time, merge sort, heap sort, radix sort, list and table sorts, External Sorting

Final Test
Contents for Data Structure (II)

- Ch8. Hashing:
  - Static hashing, dynamic hashing, Bloom Filters
- Ch9. Priority Queues:
  - Leftist trees, binomial heaps, Fibonacci heaps, Pairing Heaps, Interval Heaps
- Ch10. Efficient Binary Search Trees:
  - Optimal binary search trees, AVL trees, 2-3 trees, 2-3-4-trees, red-black trees, splay trees
- Ch11. Multiway Search Trees:
  - m-way search tree, B-Trees, B+-Trees
- Ch12. Digital Search Structures:
  - Digital search trees, Binary Tries, multiway tries, Suffix Trees