Guideline for CSSE 250 Data Structures

250

Revised Catalog description: Abstract data types. Big-Oh notation. Heaps, Sorting (Quicksort, Mergesort, Heapsort), Binary search trees, tree balancing techniques, and hashing. Additional topics may include B trees. Pre-requisite: C (2.0) or better in CSSE 152 Foundations of Computer Science II

Course objective: Achievement of catalog description as well as the design, development and construction of large programs that involve the use of several different data structures and require the use of external libraries.

Pre-requisite knowledge:
C (2.0) or better in CSSE 152 Fundamentals of Computer Science II
programming skill in a high-level language, familiarity with simple data structures (arrays, stacks, queues, lists and trees), recursion, simple sorting and searching algorithms

Topics covered:

1) big-O notation
2) Sorting (insertion, Quicksort, Mergesort, Heapsort)
3) Heaps (ADT, priority Q)
4) Hashing (key, resolution, tables, functions)
5) Balanced trees (concepts, algorithms for rebalancing)
6) Binary Search trees (insertion, deletion, modification, degenerative form)
7) Iterators

Demonstrable Outcome:

1) select appropriate data structure & understand efficiency of such
2) distinguish between application program (driver) and data structure
3) define and use appropriately, heap, hash table, balanced trees
4) provide general purpose, flexible implementation
5) understand trade-offs (safety versus efficiency) & notion of side-effects

Notes on implementation goals:

1) Continued multiple file compilation with use of libraries
2) Strengthened understanding of ADT (interface versus implementation)
3) Notion of pre & post conditions
4) Able to tackle non-obvious design problems

Assessment: midterm and final
'weekly' programming assignments (exclude test week and final week)

Comments:

1) use of templates supports notion of ADT
2) No STL, until the end as an example of generic construction
3) Development environment to be Unix-based.
4) Learn Unix fundamentals, including makefiles
5) Time permitting, examine B trees