Midterm Review

Data Structures

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Introductory Concepts

- Abstraction
- Functional decomposition vs. object-oriented design
- ADT
- Different views of ADT
  - Application level
  - Logical level
  - Implementation level
  - Detail abstraction levels over an example of ADT

Introductory Concepts (cont.)

- ADT operations
- C++ Data Types
- Unstructured vs. structured data types
- Pass-by-value vs. pass-by-reference
- Typedef definition
- Namespaces
- Scope of variables
- Structs/records

Arrays

- One-dimensional array
- Two-dimensional array
- Passing arrays as function parameters
- Element address calculation based on a given base address

Object-Oriented Programming

- Abstraction
- Inheritance
- Polymorphism
- Composition
- Templates

Errors & Exception Management

- Define your own exception
- Try/throw/catch
- Employ pre-defined exception classes/functions

Algorithm Analysis

- Comparison of algorithms
- Analysis of algorithms
- Focus on the Big O

Pointers

- Declaration
- Manipulation, e.g., initialization, copy, etc.

Dynamic Memory Allocation

- Static vs. dynamic memory allocation
- Use cases
- Static vs. dynamic arrays
- Initialization
- Memory leak issue

Lists

- Sorted vs. unsorted lists
- Sorted list implementations:
  - Array-based (static & dynamic)
  - Linked list-based
- Unsorted list implementations:
  - Array-based (static & dynamic)
  - Linked list-based
- Time complexity/order of magnitude

Stacks

- Properties
- Implementations:
  - Array-based (static & dynamic)
  - Linked list-based

Queues

- Focus on Floating Queues
- Properties
- Implementations:
  - Array-based (static & dynamic)
  - Linked list-based