Midterm Exam 2 Topics

In general, you are responsible for the material that was covered in class since the class preceding the first midterm exam. You are not responsible for material from the chapters that was skipped. The rule to follow is this: The exam will cover nothing but the material covered in the lecture notes that I wrote and posted on the course website. If the lecture notes refer to material from the book, then that material may also be tested on the exam. Following is a breakdown of the major topic areas that may be tested.

Inheritance and Class Hierarchies

- Overriding functions
- Extending the base class
- Dynamic binding of functions: virtual functions
- Pure virtual functions
- Abstract classes

Lists

- Array-based implementation
- Pointers and dynamic allocation
  - new and delete operators
  - pitfalls and safe programming: memory leaks, dangling pointers, out-of-memory errors
- Linked lists
  - Single-linked list implementation of list ADT
  - Variations on linked lists:
    - lists with dummy nodes,
    - circularly linked lists
- Sorted linked lists
  - Implementation
  - Difference between sorted and unsorted lists
- Doubly-linked lists
  - Implementation of insertion and deletion

Exceptions and Exception Handling

- Concepts: throwing exceptions, handling exceptions
- Support in C++: try, throw, and catch
- Standard exceptions and the exception hierarchy
- Deriving exceptions by inheritance

Algorithm Efficiency and Analysis

- The meaning of best, average, expected, and worst case running times
- Big-O notation
- Asymptotic rates of growth of functions
- Analyzing the running time of algorithms
- Search algorithms: binary search, linear search

Stacks

- The stack ADT
- Array implementation
- Linked list implementation
- Applications of stacks
  - Recognizing a bracket language
  - Evaluating postfix expressions
  - Converting infix to postfix