Midterm Exam Review Topics

C++ Basics

1. Properties of C++.
2. C++ file types.
3. Stages of a program creation. Kinds of errors that can be discovered at each stage. Compilation and linking. What does each do? What files are needed? What files are produced?
5. C++ types: primitive (built-in) value types, class types, enum types, typedef, reference types, and pointer types.

Classes and objects

1. The roles of a class.
2. Class elements and class structure. Class visibility.
3. Differences between a class declaration and a class implementation. Importance of a class interface.
5. Different kinds and roles of constructors: ctors, copy constructors, default constructors.
6. Initialization, assignment, copying of objects (and variables in general).

I/O

1. Streams: cin, cout, cerr, and clog.
2. Handling files.
3. Manipulators.
4. Kinds of I/O errors and ways to handle them.
5. Error flags, their meaning and how they are set.

Functions and methods

1. Passing data to a function. What’s are the different ways to pass data to a function? Advantages of each method.
2. Receiving data from a function. How data can be passed back from a function? Can more than one value be returned?

Pointers and references

1. L-values and R-values.
2. References vs. pointers.
3. Relationship between a reference and a pointer.
Derivation

1. What is derivation?
2. When to use and when not to use class derivation.
3. Structure of an object.
4. Referencing composed and base objects.

Errors

1. Five kinds of failures. When different errors can occur?
2. Memory leaks - what they are, how they arise, how they can be detected and design patterns for avoiding them.
3. Memory management paradigms.

C++ Standard Library

1. What is the C++ Standard Library and how can it be used?
2. Two classes: stringstream and vector.

Class dependencies

1. Tightly coupled classes.
2. Circular dependencies.

Visualization

1. UML (Unified Modeling Language).
2. Elementary design principles.