CIS 251 (C++ Programming) Exam 4 Study Guide
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Format

- Twelve multiple-choice questions, including terminology, concepts, and syntax
- A hand-tracing problem: given a complete program, indicate the output the program generates (focus: creating objects, calling member functions)
- Coding: write the code to solve a specific problem (focus: writing prototypes and definitions for member functions in a class)

Source Material: Chapters 10 – 12 (not including all sections) in the textbook, with emphasis on concepts in the lectures (these chapters depend on material from the earlier chapters)

Exam aides: **Two** double-sided or **four** single-sided printed pages up to letter-sized (8 ½" x 11") with any material (notes, sample code) that would be helpful for any section of the exam. You may use a basic or scientific calculator (standalone, not as an app), but otherwise **no interaction with computers, cell phones, or other electronic devices is allowed.**

Key Elements to Study

Chapter 10

- Structure
  - Terms
    - Structure tag
    - Member names
    - Structure variables
    - Member variables
    - Structure value
    - Member values
  - Defining a structure (key word, header, brackets, semicolon)
  - Hierarchical structures
  - Declaring and using a structure variable
    - The dot operator
    - Using an initialization list
- Class
  - Terms
    - Object
    - Attribute / field / member variable
    - Method / member function
    - Encapsulation
  - Defining a class (`public` and `private` members)
  - Defining member functions outside the class
    - Type qualifier
    - Scope resolution operator
  - Accessors
    - Names
    - Return Type
    - Body

    - Mutators
        - Names
        - Parameter
        - Return type
        - Body
    - Constructors
        - Prototype / header
        - Body
        - The default constructor
        - Initialization section
    - Declaring an object
        - Using a default or no-argument constructor
        - Using a constructor with parameters
        - Assigning a new object to an existing variable using a constructor
    - Using an object
        - Accessing `public` members with the dot operator
        - As an argument to a function
        - As a return value
- Abstract Data Type
    - What it is
    - How to define a class as an ADT
    - The difference between interface and implementation
- Inheritance
    - Terminology, concepts
    - The basic syntax to define a derived class

Chapter 11 (sections 11.1 and 11.2 only)

- Friend functions
    - When a friend function should be used
    - How to declare a friend function
    - How the object access differs
- Constant reference parameters
- Constant calling objects
- Overloading operators
    - Basic syntax
        - Return type for each category
        - Parameter types for each category
    - Binary arithmetic
    - Unary arithmetic
    - The use of a constructor for data type conversion
    - Comparison
    - Input and output

Chapter 12 (minor details from section 12.1 only)

- The contents of the interface file, the implementation file, and the application file / driver file
- The syntax to link the implementation file and the application file to the interface file