CSCI 135 – Fundamentals of Computer Science I
Exam II Study Outline

I. Software Development Life Cycle
- A. Understand the Problem – Specification
- B. Work out the Logic – Design
- C. Convert it to Code – Programming
- D. Test / Debug
- E. Maintenance

II. Functions
- A. Library Functions
- B. User Defined Functions
  1. Parameters
     a. Pass by Value
  2. Return Values
  4. Variable Scope
- C. Flow of Control
- D. Calling a Method

III. Object Oriented Programming
- A. Classes
  1. Classes vs Objects
  2. Constructors
  3. Attributes (state)
  4. Methods (behavior)
     a. Important Methods to consider
        1. Constructors
        2. Getters and Setters (Accessors and Mutators)
        3. Equality Checking: equals()
        4. Printable Representation: toString()
        5. All other behaviors
  5. Lists of objects
  6. self
- B. Inheritance
  1. Advantages
  2. Subclasses and Superclasses
     a. super() keyword
     b. self keyword
     c. Method Overriding
     d. Which method executes?
- C. Client Programs

IV. Object Oriented Design
- A. Data Encapsulation Model
  1. Classes
  2. Client(s)
  3. API (Application Programming Interface)

- B. Data Encapsulation
    1. Getters (Accessors)
    2. Setters (Mutators)
- C. Immutability
- D. Object Oriented Analysis
    1. Find the nouns
    2. Determine attributes
    3. Determine methods (verbs + CRUD)
    4. UML Diagrams
    5. Refine until code-able

IV. Exceptions
- A. Defending against bad input
- B. Handling unexpected events

V. Testing and Debugging
- A. Preventing Bugs
    1. Write pseudocode (English-like) first
    2. Comment the tricky parts
    3. Good coding style
        a. Variable names
        b. Break into manageable steps
        c. Indentation
        d. Watch loop bounds
        e. Listen to Idle/compiler feedback
    4. Incremental development
- B. Finding Bugs
    1. Add debug print statements
    2. Talk through the logic
- C. Testing
    1. Software Quality
    2. Levels of Testing
    3. Black Box vs. White Box Testing
    4. Equivalence Classes of Test Data
    5. Regression Testing