

# CSCI 135 – Fundamentals of Computer Science I

## Exam III Study Outline

### I. Object-Oriented Problem Decomposition

- A. Identifying Classes
- B. Identifying Information the Class Needs
  - 1. Instance Variables
- C. Identifying Class Behaviors
  - 1. Instance Methods
  - 2. Important Methods:
    - a. Constructors
    - b. Getters and Setters
    - c. equals()
    - d. toString
    - e. All other behaviors

### II. Designing Data Types

- A. Data Encapsulation Model
  - 1. Classes
  - 2. Client(s)
  - 3. API (Application Programming Interface)
- B. Data Encapsulation
  - 1. Access Modifiers
  - 2. Getters (Accessors)
  - 3. Setters (Mutators)
- C. Immutability
  - 1. final Access Modifier
- B. Checking for Equality
  - 1. Primitive Data Types
  - 2. Reference Data Types

### III. Inheritance

- A. Sharing Code
  - 1. Instance Variable Access (child access to parent variables)
  - 2. Accessing Parent Methods (super)
  - 3. Overriding vs. Overloading Methods
    - a. Which Method Runs
- B. UML (Unified Modeling Language) Diagrams
- C. Similar Objects in the same Container
  - 1. Polymorphism
  - 2. Arrays of Objects
    - a. Instantiating the Array
    - b. Instantiating the Objects in the Array
    - c. Holding Objects of Different Types (but same inheritance hierarchy)

#### IV. Object-Oriented Design Principles

- A. Simplicity
- B. Abstraction
- C. Encapsulation
- D. Modularity
- E. Abstraction Hierarchy
- F. Strong Data Typing
- G. Concurrency
- H. Object State, Behavior, and Identity
- I. Inheritance
- J. Measures of Good Design
  - 1. Low Coupling
  - 2. High Cohesion
  - 3. Sufficiency
  - 4. Completeness
  - 5. Primitiveness