

# CSCI 135 – Fundamentals of Computer Science I

## Exam II Study Outline

### I. Input/Output

#### A. Screen Output

1. println
2. print
3. printf – formatted printing

#### B. Keyboard Input

1. Scanner class

### II. Graphics and Audio

#### A. File Input

1. Scanner class
2. try/catch
3. Exceptions

#### B. StdDraw

1. Drawing simple shapes
2. Drawing images
3. Manipulating the output window
4. Animation
5. Keyboard input

#### C. StdAudio

1. Playing sounds
2. Manipulating sound files

### III. Problem Decomposition

#### A. Understand the Problem – Specification

1. Looking at input and output first

#### B. Work out the Logic – Design

#### C. Convert it to Code - Programming

### IV. Methods

#### A. Static Methods

1. Parameters
  - a. Pass by Value
2. Return type
3. Signature
4. Variable Scope

#### B. Flow of Control

#### C. Calling a Method

### VII. 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 Eclipse feedback

#### 4. Incremental development

### B. Finding Bugs

- 1. Add debug print statements
- 2. Talk through the logic

## V. Test Driven Development

### A. Write test first

### B. Write code to pass test

### C. Refactor / clean up code

### D. Repeat until done, trying all tests to make sure you didn't break something

### E. What to test:

- 1. Valid inputs
- 2. Invalid inputs
- 3. Errors, exceptions and events
- 4. Boundary conditions

## VI. Classes

### A. Creating your own data types

- 1. Classes
- 2. Objects
- 3. Instance variables (state)
- 4. Instance methods (behavior)
- 5. Constructors
  - a. Default
  - b. Regular constructor
  - c. Overloading constructors
  - d. Copy constructors
- 6. Arrays of objects

### B. this

### C. main methods for testing

## VII. Objects, Primitives and References

### A. Primitive type vs. reference type

- 1. null
- 2. Orphaned objects
- 3. Aliases

### B. Figuring out objects in a problem

- 1. First pass, instance variables
- 2. First pass, instance methods