CSE 2221 Software I: Software Components

and

CSE 2231 Software II: Software Development and Design
Restated Learning Outcomes

• Theme 1: **software engineering concepts**
  – Be familiar with sound software engineering principles for component-based object-oriented software design
Software Engineering Concepts

• Component-based software engineering
  – System thinking
    • Mathematical modeling
    • Design-by-contract
    • Client vs. implementer view
  – Object-oriented software building blocks
    • Components and their relationships
  – Discipline
    • Single-point control over change
    • Adherence to conventions
Restated Learning Outcomes

• Theme 2: *Java programming language*
  – Be competent with Java programming
Java Programming Language

• Core syntax and features
  – Variables, types, values, operators, expressions, control flow (selection, iteration)
  – Reference vs. value types
  – Interfaces, classes, methods, objects
  – Inheritance, polymorphism
  – Generics, exceptions

• Libraries
  – Input/output, Java’s Swing for GUIs
  – Collections (e.g., List, Map, Queue, Set, ...
Restated Learning Outcomes

• Theme 3: *industry-standard tools*
  – Be familiar with the use of industrial-strength software development tools
Industry-Standard Tools

• Eclipse
  – Industrial-strength open-source IDE
  – Many (free) plug-ins/extensions, including Checkstyle and SpotBugs

• JUnit
  – Industry-standard library for unit-testing software components

• Javadoc
  – Industry-standard documentation utility for Java programs
Restated Learning Outcomes

• Theme 4: *professional best practices*
  – Be familiar with Java programming “best practices”
Professional Best Practices

• Problem
  – Complex language mechanisms make it easy to produce code that is wrong, brittle, inextensible, and hard to maintain

• Solution
  – Discipline that helps (but does not guarantee) that developers write better code

• Examples
  – Naming conventions, coding conventions
  – Design-by-contract and programming-to-the-interface
Prerequisites

- Previous programming experience
  - Syntax, compilation, execution
  - Variables, types, expressions
  - Control flow (if, if-else, while, etc.)
  - Procedures/functions/methods
- Math maturity (introductory calculus)
- Ability/willingness to learn on your own
  - Goal: develop “life-long learning” capabilities
Resources

• Class meetings
  – Ask questions!
  – Answer questions!

• Instructor and grader
  – Make sure they know you by name
  – Visit during office hours or make appointment
  – Ask questions!
  – Answer questions!
Resources

• Course web site
  – http://cse.osu.edu/software/
  – All materials and links

• Class discussion group on Piazza
  – http://piazza.com/
  – A non-threatening forum for “anytime” Q&A

• Class website on Carmen
  – http://carmen.osu.edu/
  – Assignment submissions
  – Grades
Resources

• Online Java tutorials
  – http://docs.oracle.com/javase/tutorial/index.html

• Online OSU CSE components API
  – http://cse.osu.edu/software/common/doc/

• Online Java libraries API
  – http://docs.oracle.com/javase/8/docs/api/

• Many other Java resources available on the web!
Resources

• Many Java books available for free to OSU students via Safari Books Online
  http://proquest.safaribooksonline.com.proxy.lib.ohio-state.edu/

• Recommended books
    http://osu.worldcat.org/title/java-for-everyone-late-objects/oclc/808511232
    http://osu.worldcat.org/title/effective-java/oclc/1018480592