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 FindBugs

• 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
What’s New in Software II?

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• **Implementer**: a software engineer who designs a Java **class** that implements an interface
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With respect to *kernel components*, this is the focus of *Software I*. 
What’s New in Software II?

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Role ≠ Person

• It is typical for a given software engineer to play both roles at the same time, as he/she designs and codes a new class by programming to the interfaces of existing classes
  – As you will do throughout Software II for implementations of kernel interfaces as well as others...
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 website on Carmen
  – http://carmen.osu.edu/
  – Announcements
  – Discussions
  – 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 O’Reilly Online Learning
  https://learning.oreilly.com/home/

• Recommended books
    https://library.ohio-state.edu/record=b9159294~S8
    https://library.ohio-state.edu/record=b9151525~S7