

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

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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**.

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Role \neq 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 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
 - C.S. Horstmann, *Java for Everyone*, John Wiley and Sons, 2013
<http://osu.worldcat.org/title/java-for-everyone-late-objects/oclc/808511232>
 - J. Bloch, *Effective Java*, 3rd ed., Prentice Hall, 2018
<http://osu.worldcat.org/title/effective-java/oclc/1018480592>