

## Final Review

- ❑ Exam: closed book, comprehensive, about 5 problems
- ❑ OO Concepts
- ❑ Design Principles
- ❑ Java Programming

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## OO Concepts (1)

- ❑ Objects and Classes
  - ❑ Object vs class
  - ❑ Fields/constructors/methods
  - ❑ Object state
  - ❑ Static vs instance fields/methods
- ❑ Object Interactions
  - ❑ How to communicate with other objects
  - ❑ Class and object diagrams

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## OO Concepts (2)

- ❑ Inheritance
  - ❑ Sub-/super-class: constructors, overriding, the super keyword
  - ❑ The substitution principle
  - ❑ Accessibility: private/protected/public
  - ❑ The Object principle
- ❑ Polymorphism
  - ❑ Variable/method polymorphism
  - ❑ Static and dynamic type
  - ❑ Dynamic method lookup

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## OO Concepts (3)

- ❑ Abstract class
  - ❑ Abstract vs regular class
  - ❑ Abstract method
  - ❑ Benefits
- ❑ Interface
  - ❑ Regular/abstract class vs interface
  - ❑ What can appear in an interface
  - ❑ Multiple inheritance
  - ❑ Benefits

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## Design Principles (1)

- What is it about?
  - How to discover classes, responsibilities, and interactions?
  - How to interconnect classes?
- What is a good design?
  - Cohesion and coupling
  - Readability, maintainability, extensibility

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## Design Principles (2)

- How to achieve a good design?
  - Abstraction and modularization
  - Responsibility-driven design: Noun/verb, scenario analysis, CRC cards
  - Iterative development
  - Use refactoring to improve code structure
  - How long should a method/class be?

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## Java Programming (1)

- ❑ Control structures
  - ❑ Control statements: if, while, for
- ❑ Data types
  - ❑ Boolean, Integer, String, and others
- ❑ Collections
  - ❑ ArrayList, HashMap, HashSet, Iterator
  - ❑ How to iterate through a collection
  - ❑ How to remove elements from a collection
- ❑ Other classes
  - ❑ StringBuffer, StringBuilder, Scanner, System, Enum and others

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## Java Programming (2)

- ❑ How to build GUIs
  - ❑ Basic components: JButton, JMenu, JMenuItem, JPanel, JOptionPane
  - ❑ Layout managers: BorderLayout, FlowLayout, GridLayout, BoxLayout
  - ❑ Event handling: Centralized handling, Handling based on inner classes and anonymous classes

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## Java Programming (3)

- Error Handling
  - Error reporting, error recovery, error avoidance
  - Checked and unchecked exceptions
  - Try-catch block, finally clause
  - How to create new exception classes

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## Java Programming (4)

- Testing and debugging
  - Main test strategies
  - Positive and negative testing
  - Regression testing
  - JUnit, Test class/method, test fixture

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Questions?

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