Announcements

• Lab 5 due this week
• Exam 3 Review Wednesday 3/17
• Exam 3 Friday 3/19
  – There will be lecture after the exam
• Lab 6 begins week of 3/22
Before/After Exam

• MovingChosenGraphic example in Lecture Code repository

• Pick a graphic on the screen and move the selected graphic.

Notable Points (alphabetical by filename)

• IBoardConstants
  – Use of interface to create constants that can then be used by classes by implementing the interface
  – Note the syntax for creating a constant
Movement.java

- Movement is an enumeration
- An enumeration is a part of Java that we will not be officially covering, so it is an extra for those interested
- An enumeration creates enumerands that can be used a lot like instances of objects

MovingRectangle.java

- Extends graphics.Rectangle – means that it uses the inheritance or generalization relationship.
Inheritance

• Superclass/subclass relationship
• The source is the subclass and the target is the superclass.
• Subclass “extends” superclass
  – Java keyword extends appears in the class header to signify this relationship.

Implications of Inheritance

• When a class extends another, the subclass inherits all of the public methods of the superclass and they remain public in the subclass.
Generalization - UML

Generalization - Code

```java
public class Sub extends Super
{
    public Sub()
    {
        // code here
    }
}
```
Generalization - Use

• Used in two ways:
  – Want to create a specialization of a particular class that already exists
  – Want to factor out commonality of many classes into one main superclass

MovingRectangle.java (continued)

• MovingRectangle.java adds a method to the list of already defined graphics.Rectangle methods that allows to set the location by using a Position.
Position.java

- Class that represents a row/column position on a board
- This class is available in the utilities package of book-libs, but is not useful in that form.
- To be useful, it needs to be copied to a current project (so constants can be properly defined)
- Contains methods to convert java.awt.Point <-> Position

SelectionListener.java

- Listener for graphics so that when a graphic is clicked, the holder is notified of the currently selected shape.
ShapeHolder.java

- Another example of a holder.
- This one holds an IColorableGraphic.
- IColorableGraphic is an interface implemented by many of the things we can put on a DrawingCanvas.
- Note that it is used as the type of the instance variable, and parameter, and return type in this class.

TopLevel.java

- The top-level object for this program.
- It coordinates the other parts of the program.
- Note the order of the following lines in the constructor:
  
  ```java
  _ellipse = new graphics.Ellipse();
  _holder = new ShapeHolder(_ellipse);
  ```
- What would happen if those lines were reversed?
Extension to Example

• Take a look at MovingChosenGraphicWithButtonsUsingEnum project in lecture code to see how enumerations can be used for moving the shape

Friday’s Exam Review

• See other set of posted slides.