MiniDraw--Second Design Iteration

- Objective: Add a control panel to the bottom of the canvas
- Control panel has:
  - a “clear” button to clear the drawing canvas.
  - A menu to select drawing pen colors: black, blue, green, red.

MiniDraw Second Design Iteration--Java/Swing Issues

- Control Panel will be a JPanel.
- Clear Button will be a JButton.
  - Clicking on a JButton generates an ActionEvent.
  - Listener must implement the ActionListener interface.
- Pen Color Selection Menu will be a JComboBox.
  - Selecting an item from the drop down menu will generate an ItemEvent with state ItemEvent.SELECTED.
  - Listener must implement the EventListener interface.
**ActionListener and ItemEventListener Interfaces**

<table>
<thead>
<tr>
<th>ActionListener &gt;&gt;</th>
<th>ItemListener &gt;&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>actionPerformed(e:ActionEvent)</code></td>
<td><code>itemStateChanged(e:ItemEvent)</code></td>
</tr>
</tbody>
</table>

**ItemEvent**

- `getStateChange():int`
- `getItem():Object`

Possible return values:
- `ItemEvent.DESELECTED`
- `ItemEvent.SELECTED`
- ...  
  
Returns Item affected by event

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**MiniDraw--Second Iteration**

- IComponent
- IApplet
- ControlPanel
- DrawingCanvas
- MiniDraw
- EventListener
- MouseMotionListener
- MouseListener
- DrawingCanvasListener
- ActionListener
- ItemListener
- ControlPanelListener

New classes

Modified classes
ControlPanel--Additional Details

JPanel

ControlPanel

JButton

JComboBox

Collaboration Diagram--Handling an ActionEvent from Clear Button

actionPerformed(e) : ControlPanelListener

"original" pen color

1: clearCanvas()

penColor: Color

1.1: setColor(Color.white)

1.2: fillRect(0,0,canvasWidth, canvasHeight)

1.3 setColor(penColor)

1.4 repaint()

Current imageBuffer size.

canvasWidth: int

canvasHeight: int

: DrawingCanvas

imageBufferGraphics: Graphics
Collaboration Diagram--Handling an ItemEvent

ItemEvent Handling Scenario--Continued
ControlPanel--Registering a Listener

```java
addControlPanelListener(listener)
```

Second Design Iteration--A Practical Issue

- For this iteration we must modify the `DrawingCanvas` class.
- Probably want to give the modified class a new name--e.g. `DrawingCanvas2`--to differentiate it from the previous iteration.
- But, then we will have to find and change all references to the class `DrawingCanvas`.
- For instance, we will have to modify the class `DrawingCanvasListener`, even though nothing has changed in it other than the name of the `DrawingCanvas` class.
One More Detail: Need to modify original MiniDraw class so that associated components--DrawingCanvas, DrawingCanvasListener--are instantiated by a *factory method*.

This will permit future design iterations to instantiate the proper types of components.

E.g. MiniDraw2 can override the `createDrawingCanvas()` factory method of MiniDraw to instantiate a `DrawingCanvas2` class instead of a `DrawingCanvas` class.
Factory Methods in MiniDraw Class

MiniDraw

createDrawingCanvas( ):DrawingCanvas
createDrawingCanvasListener(canvas:DrawingCanvas):EventListener

MiniDraw2

createDrawingCanvas( ):DrawingCanvas
createControlPanel( ):ControlPanel
createControlPanelListener( DrawingCanvas2:canvas):EventListener

Overrides superclass’ factory method to instantiate a DrawingCanvas2

Second Iteration--New Classes

DrawingCanvas

DrawingCanvas2

canvasWidth: int
canvasHeight: int
penColor: Color

DrawingCanvas2()
setPenColor(Color:c)
clearCanvas( )
setBounds(x:int, y:int, width:int, height:int)
super();
super.setBounds(x, y, width, height);
canvasWidth = width;
canvasHeight = height;
Second Iteration--NewClasses
(continued)

ControlPanel

<table>
<thead>
<tr>
<th>clearButton: JButton</th>
</tr>
</thead>
<tbody>
<tr>
<td>comboBox: JComboBox</td>
</tr>
</tbody>
</table>

ControlPanel( )
addControlPanelListener(listener: EventListener)

Create clearButton, create and initialize comboBox

See earlier collaboration diagram

Second Iteration--NewClasses
(continued)

ControlPanelListener

| canvas: DrawingCanvas2 |

ControlPanelListener(canvas: DrawingCanvas2)
actionPerformed(e: ActionEvent)
itemStateChanged(e: ItemEvent)
-itemToColor(item: Item)

this.canvas = canvas;

See earlier collaboration diagrams
MiniDraw2( )
MiniDraw2(isApplet:boolean)
createControlPanel():ControlPanel
createControlPanelListener( canvas:DrawingCanvas2):EventListener
createDrawingCanvas():canvas
main(args[] string) {static}

Identical to main() of MiniDraw except it
instantiates a MiniDraw2 object. Unfortunately,
we can’t use a factory here
due to the static nature of
main()