

CS 325 - Class 19

- Today
 - Java's Swing library
 - Panels
 - Colors
 - Layout managers
- Announcements
 - Continue working on Project 4

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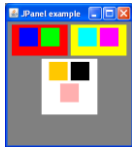
JPanels

- Swing has a grouping construct called a JPanel that can be used to compose multiple components into a single box-shaped unit
- JPanels can contain other JPanels, as well as labels, textfields, buttons and other GUI components
- You can also draw graphics on JPanels
- Each JFrame has a Container called a *content pane*, which is where all its GUI components are placed

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Example: panels, colors

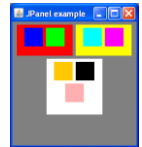
```
public class ExampleJPanel {  
  
    public static void main(String[] args) {  
        JFrame frame = new JFrame("JPanel example");  
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);  
  
        JPanel p0 = new JPanel();  
        p0.setBackground(Color.blue);  
        p0.setPreferredSize(new Dimension(30,30));  
        JPanel p1 = new JPanel();  
        p1.setBackground(Color.green);  
        p1.setPreferredSize(new Dimension(30,30));  
        JPanel p2 = new JPanel();  
        p2.setPreferredSize(new Dimension(90,50));  
        p2.setBackground(Color.red);  
        p2.add(p0);  
        p2.add(p1);  
    }  
}
```



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Example: panels, colors (cont.)

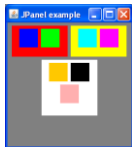
```
JPanel p3 = new JPanel();  
p3.setBackground(Color.cyan);  
p3.setPreferredSize(new Dimension(30,30));  
  
JPanel p4 = new JPanel();  
p4.setBackground(Color.magenta);  
p4.setPreferredSize(new Dimension(30,30));  
  
JPanel p5 = new JPanel();  
p5.setPreferredSize(new Dimension(90,50));  
p5.setBackground(Color.yellow);  
p5.add(p3);  
p5.add(p4);
```



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Example: panels, colors (cont.)

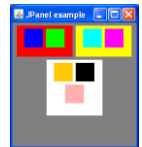
```
JPanel p6 = new JPanel();  
p6.setBackground(Color.orange);  
p6.setPreferredSize(new Dimension(30,30));  
JPanel p7 = new JPanel();  
p7.setBackground(Color.black);  
p7.setPreferredSize(new Dimension(30,30));  
JPanel p8 = new JPanel();  
p8.setBackground(Color.pink);  
p8.setPreferredSize(new Dimension(30,30));  
  
JPanel p9 = new JPanel();  
p9.setPreferredSize(new Dimension(90,90));  
p9.setBackground(Color.white);  
p9.add(p6);  
p9.add(p7);  
p9.add(p8);
```



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Example: panels, colors (cont.)

```
Container c = frame.getContentPane();  
c.setLayout(new FlowLayout());  
c.setPreferredSize(new Dimension(200,200));  
c.setBackground(Color.gray);  
c.add(p2);  
c.add(p5);  
c.add(p9);  
  
frame.pack();  
frame.setVisible(true);  
}
```



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Class Exercise

- Download from <http://cs.ua.edu/325/Summer2007/examples/ExampleJPanel.java>
- Compile and run
- Add another panel or subpanel
- Add a JLabel or JButton or JTextField
 - See previous class notes

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Layout managers

- The layout manager determines how GUI components are arranged
- Swing provides five main kinds of layouts
 - FlowLayout
 - GridLayout
 - BorderLayout
 - BoxLayout
 - GridBagLayout
- These are best understood by looking at examples

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Example: Layouts

```
public class ExampleLayout {
    static int startx = 50;
    static int starty = 30;

    public static void main(String[] args) {
        initFlow(); initGrid(); initBorder(); initBox(); initGridBag();
    }

    private static JPanel jPanelFactory(Color c) { // helper method
        JPanel p = new JPanel();
        p.setBackground(c);
        p.setMinimumSize(new Dimension(30,30));
        p.setPreferredSize(new Dimension(30,30));
        p.setBorder(BorderFactory.createEmptyBorder(5,5,5,5));
        return p;
    }
}
```

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Example: Flow layout

```
public static void initFlow() {
    JFrame frame = new JFrame("FlowLayout");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JPanel content = (JPanel)frame.getContentPane();
    content.setLayout(new FlowLayout());
    JPanel p1 = jPanelFactory(Color.yellow);
    JPanel p2 = jPanelFactory(Color.red);
    JPanel p3 = jPanelFactory(Color.blue);
    JPanel p4 = jPanelFactory(Color.green);
    content.add(p1);
    content.add(p2);
    content.add(p3);
    content.add(p4);
    content.setPreferredSize(new Dimension(200,100));
    frame.pack();
    frame.setLocation(startx, starty);
    starty += frame.getSize().height+10;
    frame.setVisible(true);
}
```



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Example: Grid layout

```
public static void initGrid() {
    JFrame frame = new JFrame("GridLayout");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JPanel content = (JPanel)frame.getContentPane();
    content.setLayout(new GridLayout(4, 3));

    JPanel p1 = jPanelFactory(Color.black);
    JPanel p2 = jPanelFactory(Color.red);
    JPanel p3 = jPanelFactory(Color.blue);
    JPanel p4 = jPanelFactory(Color.green);
    JPanel p5 = jPanelFactory(Color.cyan);
    JPanel p6 = jPanelFactory(Color.darkGray);
    JPanel p7 = jPanelFactory(Color.lightGray);
    JPanel p8 = jPanelFactory(Color.magenta);
    JPanel p9 = jPanelFactory(Color.gray);
    JPanel p10 = jPanelFactory(Color.orange);
    JPanel p11 = jPanelFactory(Color.pink);
    JPanel p12 = jPanelFactory(Color.yellow);
}
```



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Example: Grid layout (cont.)

```
content.add(p1);
content.add(p2);
content.add(p3);
...
content.add(p12);

content.setMinimumSize(new Dimension(200,100));
content.setPreferredSize(new Dimension(200,100));
content.setMaximumSize(new Dimension(200,100));
frame.pack();
frame.setLocation(startx, starty);
starty += frame.getSize().height+10;
frame.setVisible(true);
}
```



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Example: Border layout

```
public static void initBorder() {
    JFrame frame = new JFrame("BorderLayout");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JPanel content = (JPanel)frame.getContentPane();
    content.setLayout(new BorderLayout());

    JPanel p1 = JPanelFactory(Color.yellow);
    JPanel p2 = JPanelFactory(Color.red);
    JPanel p3 = JPanelFactory(Color.blue);
    JPanel p4 = JPanelFactory(Color.green);
    JPanel p5 = JPanelFactory(Color.cyan);

    content.add(p1, BorderLayout.NORTH);
    content.add(p2, BorderLayout.EAST);
    content.add(p3, BorderLayout.SOUTH);
    content.add(p4, BorderLayout.WEST);
    content.add(p5, BorderLayout.CENTER);
}
```



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Example: Border layout (cont.)

```
content.setMinimumSize(new Dimension(200,100));
content.setPreferredSize(new Dimension(200,100));
content.setMaximumSize(new Dimension(200,100));
frame.pack();
frame.setLocation(startx, starty);
starty += frame.getSize().height+10;
frame.setVisible(true);
}
```



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Example: Box layout

```
public static void initBox() {
    JFrame frame = new JFrame("BoxLayout");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JPanel content = (JPanel)frame.getContentPane();
    content.setLayout(new BoxLayout(content, BoxLayout.X_AXIS));

    JPanel p1 = JPanelFactory(Color.black);
    JPanel p2 = JPanelFactory(Color.red);
    JPanel p3 = JPanelFactory(Color.blue);
    JPanel p4 = JPanelFactory(Color.green);

    p1.setLayout(new BoxLayout(p1, BoxLayout.Y_AXIS));
    p1.add(p2);
    p1.add(p3);
    p1.add(p4);
}
```



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Example: Box layout (cont.)

```
JPanel p5 = JPanelFactory(Color.gray);
JPanel p6 = JPanelFactory(Color.cyan);
JPanel p7 = JPanelFactory(Color.magenta);
JPanel p8 = JPanelFactory(Color.yellow);

p5.setLayout(new BoxLayout(p5, BoxLayout.X_AXIS));
p5.add(p6);
p5.add(p7);
p5.add(p8);

JPanel p9 = JPanelFactory(Color.white);
JPanel p10 = JPanelFactory(Color.lightGray);

p9.setLayout(new BoxLayout(p9, BoxLayout.Y_AXIS));
p9.add(p10);
p9.add(p5);

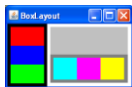
content.add(p1);
content.add(p9);
```



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Example: Box layout (cont.)

```
content.setMinimumSize(new Dimension(200,100));
content.setPreferredSize(new Dimension(200,100));
content.setMaximumSize(new Dimension(200,100));
frame.pack();
frame.setLocation(startx, starty);
starty += frame.getSize().height+10;
frame.setVisible(true);
}
```



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Example: GridBag layout

```
public static void initGridBag() {
    JFrame frame = new JFrame("GridBagLayout");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JPanel content = (JPanel)frame.getContentPane();

    GridBagLayout gb = new GridBagLayout();
    content.setLayout(gb);
    GridBagConstraints gbc = new GridBagConstraints();
    gbc.fill = GridBagConstraints.BOTH;
    gbc.weightx = 1.0;
    gbc.weighty = 1.0;

    JPanel p1 = JPanelFactory(Color.red);
    gbc.gridx = 0; gbc.gridy = 0;
    gbc.gridwidth = 2; gbc.gridheight = 1;
    gb.setConstraints(p1, gbc);
    content.add(p1);
}
```

GridBag uses a coordinate system as shown here:

	0	1	2	3
0				
1				
2				
3				



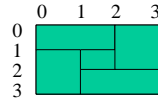
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Example: GridBag layout (cont.)

```
JPanel p2 = JPanelFactory(Color.green);
gbc.gridx = 2; gbc.gridy = 0;
gbc.gridwidth = 1; gbc.gridheight = 2;
gb.setConstraints(p2, gbc);
content.add(p2);
```

```
JPanel p3 = JPanelFactory(Color.blue);
gbc.gridx = 1; gbc.gridy = 2;
gbc.gridwidth = 2; gbc.gridheight = 1;
gb.setConstraints(p3, gbc);
content.add(p3);
```

```
JPanel p4 = JPanelFactory(Color.yellow);
gbc.gridx = 0; gbc.gridy = 1;
gbc.gridwidth = 1; gbc.gridheight = 2;
gb.setConstraints(p4, gbc);
content.add(p4);
```

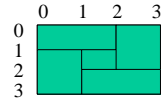


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Example: GridBag layout (cont.)

```
JPanel p5 = JPanelFactory(Color.black);
gbc.gridx = 1; gbc.gridy = 1;
gbc.gridwidth = 1; gbc.gridheight = 1;
gb.setConstraints(p5, gbc);
content.add(p5);
```

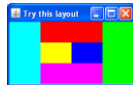
```
content.setMinimumSize(new Dimension(200,100));
content.setPreferredSize(new Dimension(200,100));
content.setMaximumSize(new Dimension(200,100));
frame.pack();
frame.setLocation(startx, starty);
starty += frame.getSize().height+10;
frame.setVisible(true);
}
```



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Class Exercise

- Download from <http://cs.ua.edu/325/Summer2007/examples/ExampleLayout.java>
- Compile and run
- Change some of the panel's colors in each layout
- Add an extra layout that appears as follows:



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