Have you started PSA6?
A. I haven’t looked at it at all
B. I’ve started: I’ve read over the assignment and started thinking about it
C. I’ve read over the assignment AND THE CODE and started thinking about it
D. I’ve started writing some code
E. I’m done (moving on to extra credit)

START early! Sorry but not a lot of tutor hours Tuesday/Wednesday (labs are full)

MORE TIPS for PSA6 (from discussion)
+ APPLETS
Making our GUI more interesting

Each oval represents a “space” in a 3-position “board”

Yellow indicates that no one has played.

1. If it is ‘X’s turn, clicks should turn the ovals blue
2. If it is ‘O’s turn, clicks should turn the ovals green
3. Turns will switch only when the user clicks “Switch turns”

Idea: We create a new instance variable “board” and the Panels will paint based on the contents of the “board” variable.

WE WANT SOME CONNECTION between what happens in some Components and what is shown in other Components
I could pass a LOT of parameters to the constructor... instead of just public MyPanel( int pos ) BUT ... THERE IS A BETTER SOLUTION
ConnectFourSimpleDemo object

<table>
<thead>
<tr>
<th>turn</th>
<th>‘X’</th>
</tr>
</thead>
<tbody>
<tr>
<td>status</td>
<td>Address of the JLabel object</td>
</tr>
<tr>
<td>board</td>
<td>⋮</td>
</tr>
</tbody>
</table>

MyPanel object

| position |  |

Now if Java can’t find a variable in the MyPanel object, it will look for it in the CFSD object!

**Do not confuse this with subclasses!**
The MyPanel object exists within the scope of the CFSD object, but there is no subclass relation. The board variable is still in the CFSD object, NOT the MyPanel object.
ConnectFourInnerDemo object

- turn: ‘X’
- status: Address of the JLabel object
- board: 

MyPanel object

- position: 0
- PanelClickListener

public void mouseClicked( ... )

// WRITES data to board

// method from MyPanel object
protected void paintComponent( Graphics g )
{
    super.paintComponent(g);
    if (board[position] == 'X')
        g.setColor( Color.blue);
    else if (board[position] == 'O')
        g.setColor( Color.green);
    else
        g.setColor( Color.yellow);
    g.fillOval(0, 0, getWidth(), getHeight());
}

// READS data from board

How many “inner” levels??

???
public class ConnectFourInnerDemo extends JFrame {
    // CFID defined here
    
    class MyPanel extends JPanel {
        private int position;  // A new variable in MyPanel
        // MyPanel methods defined here
    }

    class PanelClickListener implements MouseListener {
        public void mouseClicked(MouseEvent e) {
            ________________________________;
            repaint();
        }
        // We will register this listener
        // with the MyPanel objects
        
        What should go in the blank to make the panel turn blue when the user clicks on it and it’s X’s turn?
        A. board[position] = turn;
        B. g.setColor( Color.blue );
        C. if ( turn == 'X' ) g.setColor( Color.blue );
        D. Something else
    }
}
protected void paintComponent(Graphics g) {
    super.paintComponent(g);
    if (board[position] == 'X')
        g.setColor(Color.blue);
    else if (board[position] == 'O')
        g.setColor(Color.green);
    else
        g.setColor(Color.yellow);
    g.fillOval(0, 0, getWidth(), getHeight());
}

public void mouseClicked(MouseEvent e) {
    board[position] = turn;
    repaint();
}
public class ConnectFourInnerDemo extends JFrame {
    // CFID defined here
    
    class MyPanel extends JPanel {
        private int position; // A new variable in MyPanel
        // MyPanel methods defined here
    }

    class PanelClickListener implements MouseListener {
        public void mouseClicked( MouseEvent e )
        {
            board[position] = turn;
            repaint();
            // HINT: repaint calls to paintComponent
        }
    }

    // WARNING: We need to register this listener
    // with the MyPanel objects !!
Adding the PanelClickListener

**ConnectFourInnerDemo object (extends JFrame)**

- turn: ‘X’
- status: Address of the JLabel object
- board: Address of the board array

**MyPanel object (extends JPanel)**

- position: 0

**PanelClickListener object (implements MouseListener)**

- public void mouseClicked( ... )

**1st step: CREATE CODE ...**

- public ConnectFourInnerDemo()
  - {
    - ...
    - JPanel displayBoard = new JPanel();
    - JPanel p1 = new MyPanel();
    - p1.addMouseListener(new PanelClickListener());
    - ...
  - }

**2nd step: CREATE ONE INSTANCE of our “LISTENER”**

**3rd step: add the listener to the component**

**Why won’t this code work?**

- A. The PanelClickListener must be instantiated inside a MyPanel object
- B. A PanelClickListener is not a MouseListener
- C. PanelClickListener objects cannot be instantiated using new because PanelClickListener is an interface
public class ConnectFourInnerDemo extends JFrame {
    // CFID defined here
    class MyPanel extends Jpanel //inner class of CFIDemo
    { // MyPanel defined here } //END OF MYPANEL

    // We will register this listener with the reset button
    class ResetListener implements ActionListener
    { // ANOTHER inner class of CFIDemo
        public void actionPerformed( ActionEvent e )
        {
            // You will implement
        }
    }

    // We will register this listener with the Switch turns button
    class SwitchListener implements ActionListener
    { // ANOTHER inner class of CFIDemo
        public void actionPerformed( ActionEvent e )
        {
            // You will implement
        }
    }
}
class ResetListener implements ActionListener {
    public void actionPerformed(ActionEvent e) {

    }
}

class SwitchListener implements ActionListener {
    public void actionPerformed(ActionEvent e) {

    }
}

NOTES: ActionListener How many methods do I need to implement?
http://docs.oracle.com/javase/7/docs/api/java/awt/event/ActionListener.html

class SwitchListener implements ActionListener {
    public void actionPerformed(ActionEvent e) {

    }

    Because both are INNER class of CFIDemo, I have available:

    In CFID:
    private char turn;
    private char[] board;
    private JLabel status;
public class ConnectFourInnerDemo extends JFrame {
    // CFID defined here

    // registering the listener ...
    // COULD I USE ANONYMOUS CLASS INSTEAD?
    jbtSwitch.addActionListener(
        new SwitchListener()
    );

    class MyPanel extends JPanel //inner class of CFIDemo
    { // MyPanel defined here } //END OF MYPANEL

    // We will register this listener with the reset button
    class ResetListener implements ActionListener
    { // ANOTHER inner class of CFIDemo

        public void actionPerformed(ActionEvent e)
        {
            // You will implement
        }

        // We will register this listener with the Switch turns button
        class SwitchListener implements ActionListener
        { // ANOTHER inner class of CFIDemo

            public void actionPerformed(ActionEvent e)
            {
                // You will implement
            }

            IN PSA6, BEFORE IMPLEMENTING ANYTHING THINK if IT’s ALREADY DONE IN ANY OF YOUR PSA4 (ConnectFourBoard) CLASS!
            Remember you’ll use a ConnectFourBoard NOT the char[] in these examples
Only one new method with regard to PSA4 (returns the char in that position of the board) – THIS IS INCLUDED in our solution .class

```
char getContents (int row, int column)
```

The MAIN elements are “similar” to the example in class
- ConnectFour extends JFrame: it’s your “canvas”, where you’ll add everything
- BoardCell
  - extends JPanel: it’ll represent one of the “cells” (ovals/circles...)
  - it’s an inner class of ConnectFour
- PlayListener
  - implements MouseListener: manages what happens when you click in a BoardCell
  - it’s an inner class of BoardCell