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import java.awt.AWTEvent;
import java.awt.BorderLayout;
import java.awt.event.*;
import javax.swing.*;

/**
 * Demo program to show many of the awt/swing events that
 * are generated/consumed. Illustrates XXXListeners for several
 * types of events including semantic events (e.g., ActionEvent)
 * and low-level events (e.g., FocusEvent)
 *
 * This code is meant to be fuctional rather than elegant, though
 * hopefully elegance is present to some degree.
 *
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 */

public class EventDemo extends JFrame
{
    private JButton    myButton;
    private JMenu      myMenu;
    private JTextField myTextField;
    private JTextArea  myTextArea;

    private ActionListener myActionListener;
    private KeyListener   myKeyListener;
    private MouseListener myMouseListener;
    private MouseMotionListener myMouseMotionListener;
    private FocusListener myFocusListener;

    public EventDemo()
    {
        makeListeners();
        JPanel top = new JPanel();
        myButton = makeButton();
        top.add(myButton);
        myTextField = makeTextField();
        top.add(myTextField);
        JButton clear = new JButton("clear");
        clear.addActionListener(new ActionListener(){
            public void actionPerformed(ActionEvent e)
            {
                myTextArea.setText("");
            }
        });
        top.add(clear);

        myTextArea = new JTextArea(30,40); // rows and columns
        myTextArea.addMouseMotionListener(myMouseMotionListener);
        myTextArea.addMouseListener(myMouseListener);
        JScrollPane scroller = new JScrollPane(myTextArea);

        getContentPane().add(top, BorderLayout.NORTH);
        getContentPane().add(scroller, BorderLayout.CENTER);

        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        pack();
        show();
    }

    private void makeListeners()
    {
        // create listeners using anonymous inner classes

        myActionListener = new ActionListener(){
            public void actionPerformed(ActionEvent e)
            {
                echoAction(e);
            }
        }
    }

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    };
    myKeyListener = new KeyListener(){
        public void keyPressed(KeyEvent e)
        {
            echoKey("press", e);
        }
        public void keyReleased(KeyEvent e)
        {
            echoKey("release", e);
        }
        public void keyTyped(KeyEvent e)
        {
            echoKey("typed", e);
        }
    };

    myMouseListener = new MouseListener(){
        public void mouseClicked(MouseEvent e)
        {
            echoMouse("mouse click", e);
        }
        public void mouseEntered(MouseEvent e)
        {
            echoMouse("mouse enter", e);
        }
        public void mouseExited(MouseEvent e)
        {
            echoMouse("mouse exit", e);
        }
        public void mousePressed(MouseEvent e)
        {
            echoMouse("mouse press", e);
        }
        public void mouseReleased(MouseEvent e)
        {
            echoMouse("mouse release", e);
        }
    };

    myMouseMotionListener = new MouseMotionListener(){
        public void mouseDragged(MouseEvent e)
        {
            echoMotion("drag", e);
        }
        public void mouseMoved(MouseEvent e)
        {
            echoMotion("move", e);
        }
    };

    myFocusListener = new FocusListener(){
        public void focusGained(FocusEvent e)
        {
            echoOther("gain focus", e);
        }
        public void focusLost(FocusEvent e)
        {
            echoOther("lose focus", e);
        }
    };

    private void showText(String s)
    {
        myTextArea.append(s+"\n");
        myTextArea.setCaretPosition(myTextArea.getText().length());
    }

    private JTextField makeTextField()

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{
    myTextField = new JTextField(30);
    myTextField.addActionListener(myActionListener);
    myTextField.addKeyListener(myKeyListener);
    // myTextField.addMouseListener(myMouseListener);
    myTextField.addFocusListener(myFocusListener);
    return myTextField;
}

private JButton makeButton()
{
    myButton = new JButton("clickme");
    myButton.addActionListener(myActionListener);
    myButton.addKeyListener(myKeyListener);
    myButton.addMouseListener(myMouseListener);
    return myButton;
}

/**
 * Echo key presses by showing important attributes
 */
void echoKey(String s, KeyEvent e)
{
    showText(s + " char:" + e.getKeyChar() + " mod: " +
        KeyEvent.getKeyModifiersText(e.getModifiers()) +
        " mod: " + KeyEvent.getKeyText(e.getKeyCode()));
}

/**
 * Echo action events including time event occurs and string
 */
void echoAction(ActionEvent e)
{
    showText("action = " + e.getActionCommand() + " " + e.getWhen());
}

/**
 * Echo mouse events (enter, leave, etc., including position and buttons
 */
void echoMouse(String s, MouseEvent e)
{
    showText(s + " x = " + e.getX() + " y = " + e.getY() + " mod: " +
        MouseEvent.getMouseModifiersText(e.getModifiers()) +
        " button: " + e.getButton() + " clicks " + e.getClickCount());
}

/**
 * Echo mouse motion events
 */
void echoMotion(String s, MouseEvent e)
{
    echoMouse(s, e);
}

/**
 * Echo other events (e.g., Focus)
 */
void echoOther(String s, AWTEvent e)
{
    showText(s + " " + e);
}

public static void main(String[] args)
{
    EventDemo demo = new EventDemo();
}
}

```