Other Events

Slides adapted from slides of Marty Stepp based on materials by M. Ernst, S. Reges, D. Notkin, R. Mercer, Wikipedia
http://www.cs.washington.edu/331/
And Bob Myers Florida State University https://www.cs.fsu.edu/~myers/cgs3416/

Window events

```
public interface WindowListener {
    //Invoked when the Window is set to be the active Window.
    public void windowActivated(WindowEvent event);
    //Invoked when a window has been closed as a result of calling dispose on the Window.
    public void windowClosed(WindowEvent event);
    //Invoked when the user attempts to close the Window from the Window's system menu.
    public void windowClosing(WindowEvent event);
    //Invoked when a Window is no longer the active Window.
    public void windowDeactivated(WindowEvent event);
    //Invoked when a Window is changed from a minimized to a normal state.
    public void windowDeiconified(WindowEvent event);
    //Invoked when a Window is changed from a normal to a minimized state.
    public void windowIconified(WindowEvent event);
    //Invoked the first time a Window is made visible.
    public void windowOpened(WindowEvent event);
}
```

- A `JFrame` object has this method:
    - `public void addWindowListener(WindowListener wl)`
- The abstract class `WindowAdapter` implements all `WindowListener` methods with empty bodies.

KeyListener interface

```
public interface KeyListener {
    public void keyPressed(KeyEvent event);
    public void keyReleased(KeyEvent event);
    public void keyTyped(KeyEvent event);
}
```

- Many AWT/Swing components have this method:
  - `public void addKeyListener(KeyListener kl)`

- The abstract class `KeyAdapter` implements all `KeyListener` methods with empty bodies.

KeyEvent objects

-
  ```
  // what key code was pressed?
  public static int VK_A, VK_B, ..., VK_Z,
     VK_0, ... VK_9,
     VK_F1, ... VK_F10,
     VK_UP, VK_LEFT, ...,
     VK_TAB, VK_SPACE, VK_ENTER, ...
  ```
  (one for almost every key)

-
  ```
  // Were any modifier keys held down?
  public static int CTRL_MASK, ALT_MASK, SHIFT_MASK
  ```

-
  ```
  public char getKeyChar()
  ```

-
  ```
  public int getKeyCode()     // use VK_* with this
  ```

-
  ```
  public Object getSource()
  ```

-
  ```
  public int getModifiers()   // use *_MASK with this
  ```

Key event example

```
public class PacManKeyListener extends KeyAdapter {
    public void keyPressed(KeyEvent event) {
        char keyChar = event.getKeyChar();
        int keyCode  = event.getKeyCode();

        if (keyCode == KeyEvent.VK_RIGHT) {
            pacman.setX(pacman.getX() + 1);
        } else if (keyChar == 'Q') {
            quit();
        }
    }
}

// elsewhere,
myJFrame.addKeyListener(new PacKeyListener());
```

Key event example 2

```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;

public class KeyDemo extends JFrame implements KeyListener {

   private String line1 = "", line2 = "", line3 = "";

   private JTextArea textArea;


   // set up GUI

    public KeyDemo() {

         super( "Demonstrating Keystroke Events" );

         // set up JTextArea

         textArea = new JTextArea( 10, 15 );

         textArea.setText( "Press any key on the keyboard..." );

         textArea.setEnabled( false );

         textArea.setDisabledTextColor( Color.BLACK );

         getContentPane().add( textArea );

         addKeyListener( this );  // allow frame to process Key events

        setSize( 350, 100 );

        setVisible( true );

    } // end KeyDemo constructor
```

```
// handle press of any action key
   public void keyPressed( KeyEvent event )
   {
     line1 = "Key pressed: " + event.getKeyText( event.getKeyCode() );
     setLines2and3( event );
   }

   // handle release of any key
   public void keyReleased( KeyEvent event )
   {
     line1 = "Key released: " + event.getKeyText( event.getKeyCode() );
     setLines2and3( event );
   }

  // handle press of any non-action key
  public void keyTyped( KeyEvent event )
  {
     line1 = "Key typed: " + event.getKeyChar();
     setLines2and3( event );
  }
```

Key event example 2 (cont.)

```
     // set second and third lines of output
     private void setLines2and3( KeyEvent event )
     {
         line2 = "This key is " + ( event.isActionKey() ? "" : "not " )
     + "an action key";

         String temp = event.getKeyModifiersText( event.getModifiers()
     );

         line3 = "Modifier keys pressed: " + ( temp.equals( "" ) ?
     "none" : temp );

         textArea.setText( line1 + "\n" + line2 + "\n" + line3 + "\n" );
     }

     public static void main( String args[] )
     {
         KeyDemo application = new KeyDemo();
         application.setDefaultCloseOperation( JFrame.EXIT_ON_CLOSE );
     }
} // end class KeyDemo
```