

MusicShop Program (ComponentListener Example)

File: MusicShop.java

```
/*
 * File: MusicShop.java
 * -----
 * This program handles the data management for a music
 * shop, showing which albums are carried and how many copies
 * are in stock. The program handles dynamic resizing of
 * the program window.
 */

import acm.program.*;
import acm.util.*;
import java.awt.event.*;
import java.io.*;
import java.util.*;
import javax.swing.*;

public class MusicShop extends Program {

    // Set up initial display with interactors and canvas
    public void init() {
        label = new JLabel("Album Name");
        albumName = new JTextField(20);
        add(label, SOUTH);
        add(albumName, SOUTH);

        canvas = new MusicShopDisplay();
        add(canvas);
        loadInventory();

        addActionListeners();
        albumName.addActionListener(this);
    }

    // Read file to get inventory information on all albums
    private void loadInventory() {
        try {
            BufferedReader rd = new BufferedReader(
                new FileReader("music-data.txt"));

            String line;
            do {
                line = rd.readLine();
                if (line != null) {
                    Album album = parseLine(line);
                    inventory.put(album.getAlbumName(), album);
                }
            } while (line != null);
            rd.close();
        } catch (IOException ex) {
            throw new RuntimeException(ex);
        }
    }
}
```

```

// Parse a single line from inventory file and returns an Album
// object that contains the information from the line
private Album parseLine(String line) {
    int albumNameStart = line.indexOf("[") + 1;
    int albumNameEnd = line.indexOf("]");
    String albumName = line.substring(albumNameStart, albumNameEnd);

    int bandNameStart = line.indexOf("[", albumNameEnd + 1) + 1;
    int bandNameEnd = line.indexOf("]", albumNameEnd + 1);
    String bandName = line.substring(bandNameStart, bandNameEnd);

    int numStockedStart = line.indexOf(" ", bandNameEnd + 1) + 1;
    int numStocked = Integer.parseInt(
        line.substring(numStockedStart));

    return (new Album(albumName, bandName, numStocked));
}

// Update the display whenever the user enters a new album name
public void actionPerformed(ActionEvent e) {
    if (e.getSource() == albumName) {
        canvas.displayInventory(inventory.get(albumName.getText()));
    }
}

/* Private instance variables */
private JLabel label;
private JTextField albumName;
private MusicShopDisplay canvas;
private Map<String,Album> inventory = new HashMap<String,Album>();
}

```

File: MusicShopDisplay.java

```

/*
 * File: MusicShopDisplay
 * -----
 * This file handles the display of album inventory for the music shop.
 * It provides dynamic redrawing of window contents when display is
 * resized.
 */

import acm.graphics.*;
import java.awt.event.*;

public class MusicShopDisplay extends GCanvas
    implements ComponentListener {

    // Constructor
    public MusicShopDisplay() {
        addComponentListener(this);
        lastAlbum = null;
    }
}

```

```

// Display the album name, band name, and number in stock
// for a single album if it is in our inventory. Otherwise,
// just clear the display.
public void displayInventory(Album album) {
    removeAll();
    lastAlbum = album;
    if (album != null) {
        int numStocked = album.getNumStocked();
        add(new GLabel("Album [" + album.getAlbumName() + "] by ["
            + album.getBandName() + "]",
            10, (getHeight() - BAR_HEIGHT) / 2 - SPACER);

        // Display squares indicating how many inventory
        double nextX = SPACER;
        for(int i = 0; i < numStocked; i++) {
            double barLength = (getWidth() / (double)MAX_INVENTORY)
                - SPACER;
            GRect rect = new GRect(nextX,
                (getHeight() - BAR_HEIGHT) / 2,
                barLength, BAR_HEIGHT);
            rect.setFilled(true);
            add(rect);
            nextX += barLength + SPACER;
        }

        GLabel label = new GLabel(numStocked + " in stock");
        add(label, 10, (getHeight() + BAR_HEIGHT) / 2 +
            SPACER + label.getAscent());
    }
}

// Whenever we need to update the display, continue to
// display the last album shown
public void update() {
    displayInventory(lastAlbum);
}

public void componentHidden(ComponentEvent e) { }
public void componentMoved(ComponentEvent e) { }
public void componentResized(ComponentEvent e) { update(); }
public void componentShown(ComponentEvent e) { }

/* constants */
private static final double BAR_HEIGHT = 20;
private static final double SPACER = 10;
private static final int MAX_INVENTORY = 20;

/* private instance variables */
private Album lastAlbum;
}

```

File: Album.java

```
/*
 * File: Album.java
 * -----
 * Keeps track of all the information for one album
 * in the music shop, including its name, the number
 * in stock, and the band that its by.
 */

public class Album {

    // Constructor
    public Album(String album, String band, int stock) {
        albumName = album;
        bandName = band;
        numStocked = stock;
    }

    public String getAlbumName() {
        return albumName;
    }

    public String getBandName() {
        return bandName;
    }

    public int getNumStocked() {
        return numStocked;
    }

    // Returns a string representation of an album, listing
    // the album name, the band name, and the number in stock
    public String toString() {
        return ("\\" + albumName +
                "\\" by " + bandName +
                ": " + numStocked + " in stock");
    }

    /* private instance variables */
    private String albumName;
    private String bandName;
    private int numStocked;
}
```

File: music-data.txt

```
[Snakes and Arrows] [Rush] 10
[Synchronicity] [The Police] 12
[Piece of Mind] [Iron Maiden] 2
[Plans] [Death Cab For Cutie] 10
[So] [Peter Gabriel] 20
```