

## Lab 04 – Vu Minh Dung – 20205179

### 1. Swing components

#### 1.1. AWTAccumulator

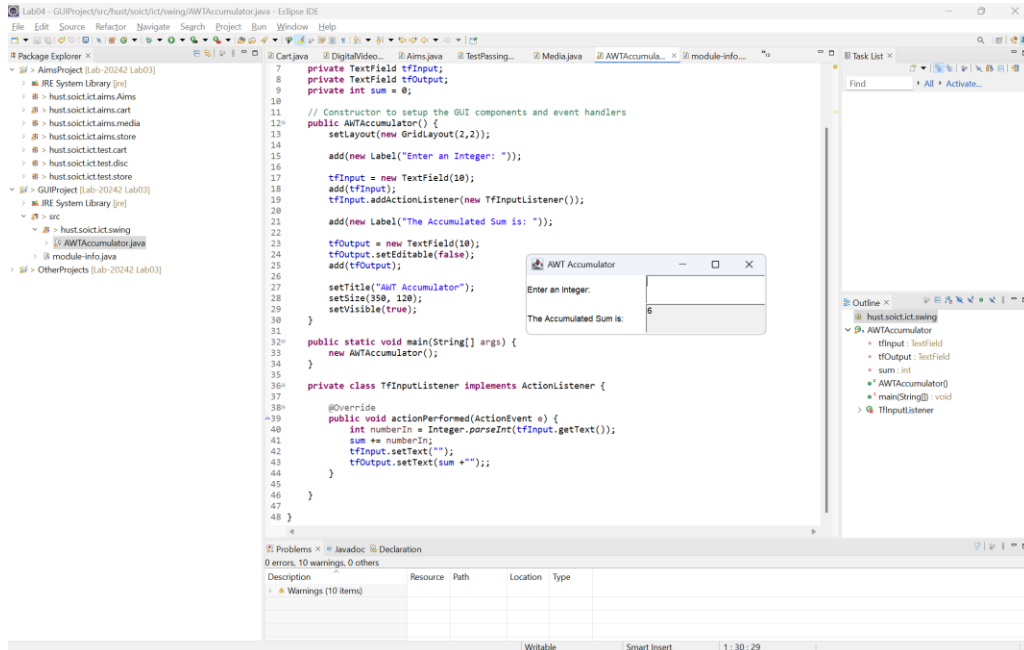


Figure 1: Accumulator class

#### 1.2. SwingAccumulator

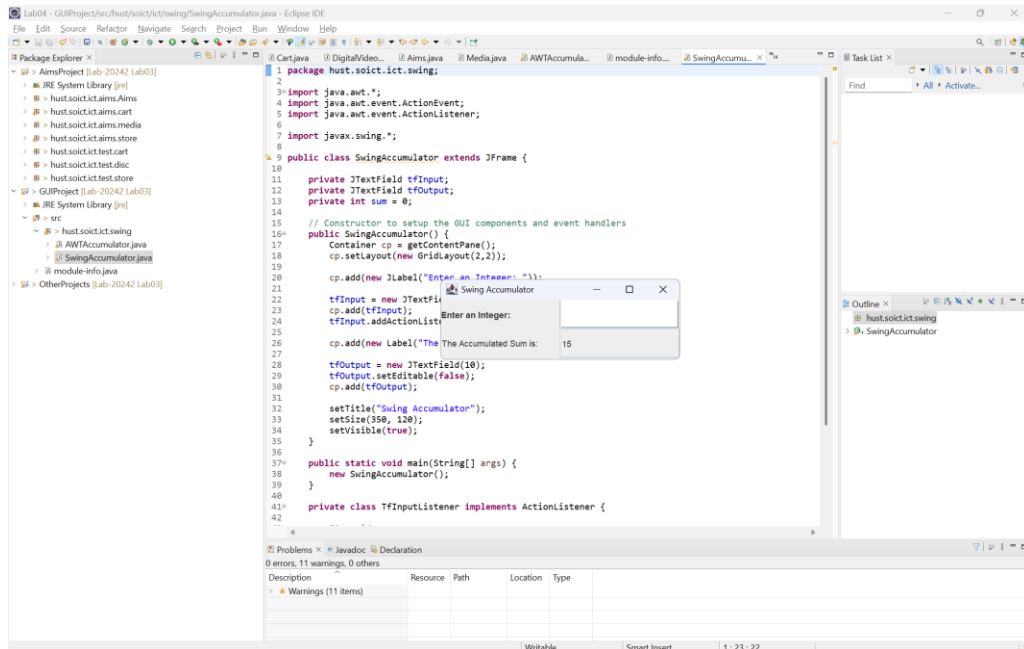


Figure 2: SwingAccumulator class

### 1.3. Compare Swing and AWT elements

#### ◆ 1. Top-Level Containers

Feature	AWT	Swing
Top-level container	<code>Frame</code>	<code>JFrame</code>
Part of module	<code>java.awt</code>	<code>javax.swing</code>
Lightweight or heavyweight	Heavyweight (uses native OS components)	Lightweight (built on top of AWT but renders via Java)
Flexibility & customization	Limited	More flexible (e.g., supports look and feel, better UI controls)

#### ◆ 2. Component Class Names

Component Role	AWT Class	Swing Class
Window Frame	<code>Frame</code>	<code>JFrame</code>
Label	<code>Label</code>	<code>JLabel</code>
Text Field (editable)	<code>TextField</code>	<code>JTextField</code>
Button	<code>Button</code>	<code>JButton</code>
Container	<code>Container</code>	<code>Container</code> (shared from AWT)

Swing components are prefixed with `J`, and are more feature-rich and modern.

### ◆ 3. Event Handling

Aspect	AWT	Swing
Event listener interfaces	Same ( <code>ActionListener</code> , etc.)	Same
Event dispatch thread	Not enforced	Strictly uses <b>Event Dispatch Thread (EDT)</b> for GUI updates
Thread safety	Less enforced	Strongly recommended (e.g., use <code>SwingUtilities.invokeLater()</code> )
Example usage	<code>TextField.addActionListener(...)</code>	<code>JTextField.addActionListener(...)</code>

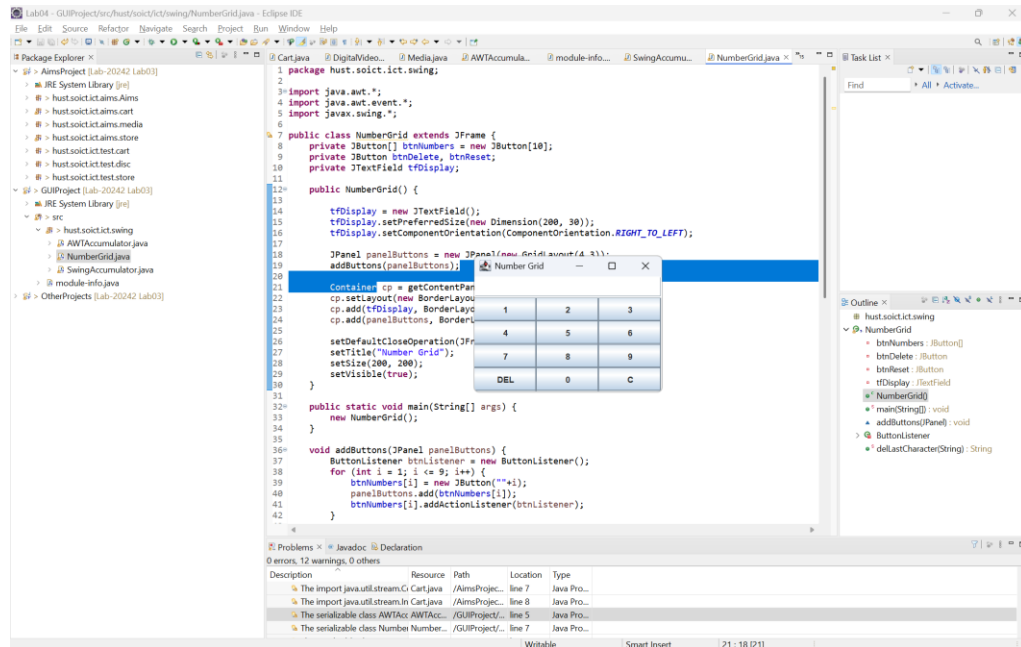
Core concept is the same, but Swing enforces better thread handling conventions.

### ◆ 4. Appearance (UI Rendering)

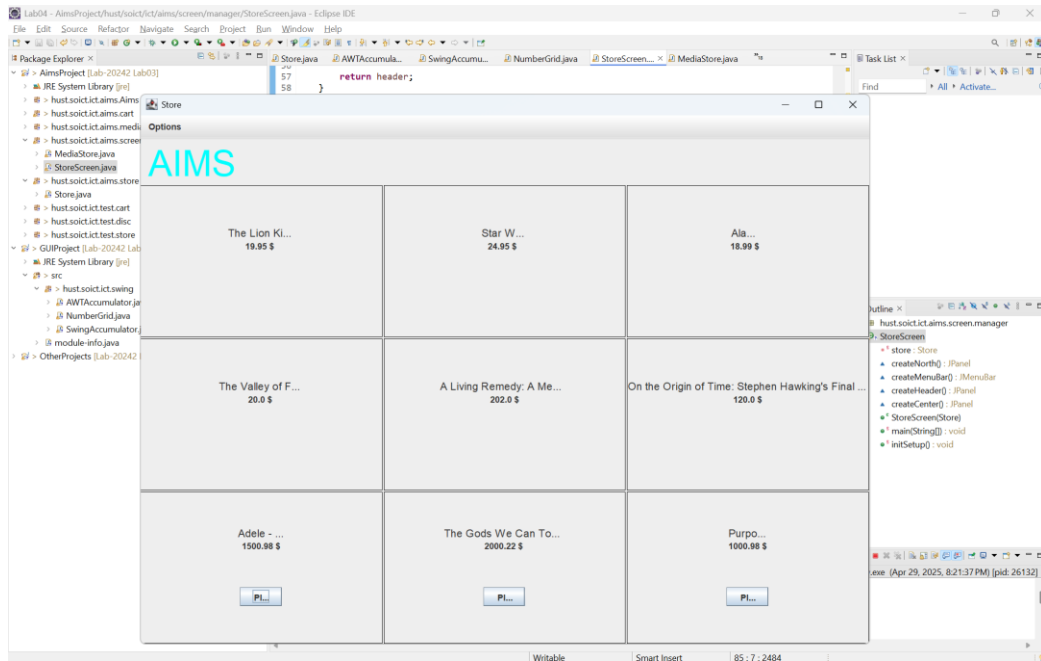
Feature	AWT	Swing
Look and feel	Native OS appearance only	Pluggable Look and Feel (e.g., Nimbus, Metal)
UI fidelity	Crude, outdated-looking	Modern, consistent across platforms
Custom drawing	Harder	Easier with <code>JPanel</code> and <code>paintComponent</code>

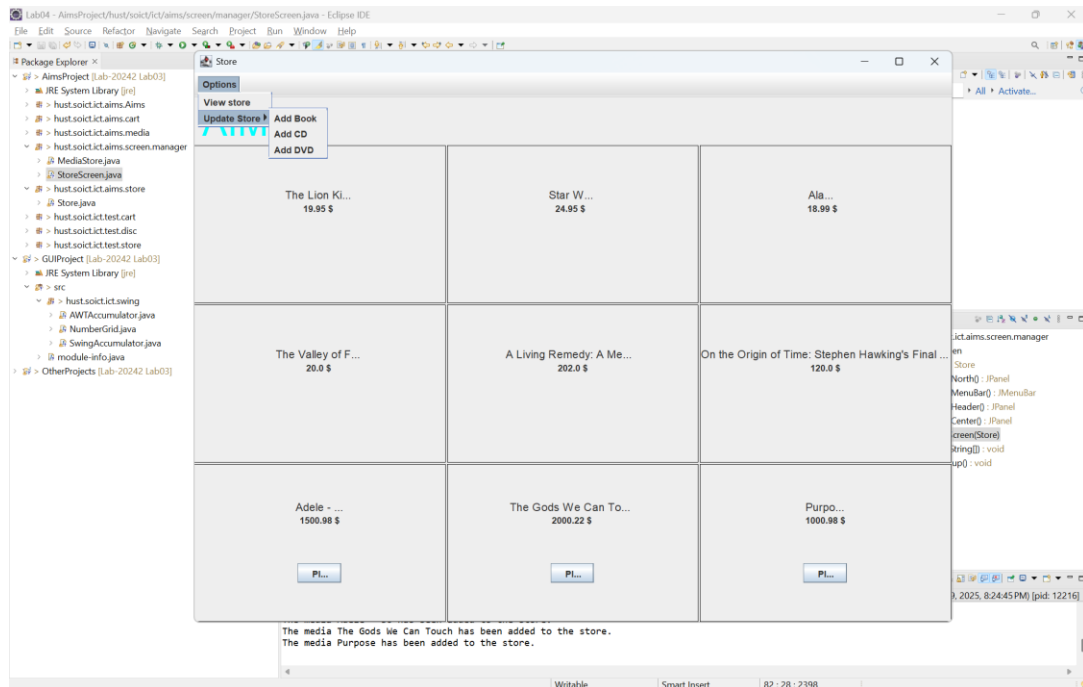
Swing UIs generally look cleaner and more modern. AWT looks outdated and varies by OS.

## 2. Create NumberGrid



## 3. Create a graphical user interface for AIMS with Swing





```
package hust.soict.ict.aims.screen.manager;
```

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

```
import hust.soict.ict.aims.store.Store;
import hust.soict.ict.aims.cart.Cart;
import hust.soict.ict.aims.media.*;
```

```
public class StoreScreen extends JFrame {
    private static Store store = new Store();
```

```
    JPanel createNorth() {
        JPanel north = new JPanel();
        north.setLayout(new BoxLayout(north, BoxLayout.Y_AXIS));
        north.add(createMenuBar());
        north.add(createHeader());
        return north;
    }
}
```

```

JMenuBar createMenuBar() {
    JMenu menu = new JMenu("Options");

    menu.add(new JMenuItem("View store"));

    JMenu smUpdateStore = new JMenu("Update Store");
    smUpdateStore.add(new JMenuItem("Add Book"));
    smUpdateStore.add(new JMenuItem("Add CD"));
    smUpdateStore.add(new JMenuItem("Add DVD"));
    menu.add(smUpdateStore);

    JMenuBar menuBar = new JMenuBar();
    menuBar.setLayout(new FlowLayout(FlowLayout.LEFT));
    menuBar.add(menu);

    return menuBar;
}

JPanel createHeader() {
    JPanel header = new JPanel();
    header.setLayout(new BoxLayout(header, BoxLayout.X_AXIS));

    JLabel title = new JLabel("AIMS");
    title.setFont(new Font(title.getFont().getName(), Font.PLAIN, 50));
    title.setForeground(Color.CYAN);

    header.add(Box.createRigidArea(new Dimension(10, 10)));
    header.add(title);
    header.add(Box.createHorizontalGlue());
    header.add(Box.createRigidArea(new Dimension(10, 10)));

    return header;
}

JPanel createCenter() {
    JPanel center = new JPanel();
    center.setLayout(new GridLayout(3, 3, 2, 2));

    ArrayList<Media> mediaInStore = store.getItemsInStore();
    for (int i = 0; i < 9; i++) {
        MediaStore cell = new MediaStore(mediaInStore.get(i));
        center.add(cell);
    }
}

```

```

    return center;
}

    public StoreScreen(Store store) {
        StoreScreen.store = store;
        Container cp = getContentPane();
        cp.setLayout(new BorderLayout());

        cp.add(createNorth(), BorderLayout.NORTH);
        cp.add(createCenter(), BorderLayout.CENTER);

        setTitle("Store");
        setSize(1024, 768);
        setVisible(true);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }

    public static void main(String[] args) {
        initSetup();
        new StoreScreen(store);
    }

    public static void initSetup() {

        DigitalVideoDisc dvd1 = new DigitalVideoDisc("The Lion King", "Animation", "Roger
Allers", 87, 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc("Star War", "Science Fiction",
"George Lucas", 87, 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc("Aladin", "Animation", null, 0,
18.99f);
        store.addMedia(dvd1);
        store.addMedia(dvd2);
        store.addMedia(dvd3);

        Book book = new Book("The Valley of Fear", "Detective", 20.00f);
        Book book1 = new Book("A Living Remedy: A Memoir", "Biography", 202.00f);
        Book book2 = new Book("On the Origin of Time: Stephen Hawking's Final Theory",
"Science", 120.00f);
        store.addMedia(book);
        store.addMedia(book1);
        store.addMedia(book2);
    }

```

```
CompactDisc cd1 = new CompactDisc("Adele - 30", "Music", "Adele", 1500.98f);
Track track1CD1 = new Track("All Night Parking (interlude)", 161);
Track track2CD1 = new Track("To Be Loved", 403);
Track track3CD1 = new Track("Woman Like Me", 300);
cd1.addTrack(track1CD1);
cd1.addTrack(track2CD1);
cd1.addTrack(track3CD1);
```

```
CompactDisc cd2 = new CompactDisc("The Gods We Can Touch", "Music", "Aurora",
2000.22f);
Track track1CD2 = new Track("Everything Matters", 180+34);
Track track2CD2 = new Track("Blood in the Wine", 180+30);
Track track3CD2 = new Track("Artemis", 60*2+39);
cd2.addTrack(track1CD2);
cd2.addTrack(track2CD2);
cd2.addTrack(track3CD2);
```

```
CompactDisc cd3 = new CompactDisc("Purpose", "Music", "Justin Bieber",
1000.98f);
Track track1CD3 = new Track("The Feeling", 4*60+5);
Track track2CD3 = new Track("No Sense", 0);
cd3.addTrack(track1CD3);
cd3.addTrack(track2CD3);
```

```
store.addMedia(cd1);
store.addMedia(cd2);
store.addMedia(cd3);
```

```
}
```

```
}
```