BÁO CÁO THỰC HÀNH

LAB 05: GUI Programming

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1. Swing Components

- AWTAccumulator Class:

```
package hust.soict.dsai.swing;
import java.awt.Frame;
import java.awt.GridLayout;
import java.awt.Label;
import java.awt.TextField;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class AWTAccumulator extends Frame{
    private final TextField tfInput;
    private final TextField tfOutput;
    private int sum = 0;
    public AWTAccumulator() {
        setLayout(new GridLayout(2, 2));
        add(new Label("Enter an Integer: "));
        tfInput = new TextField(10);
        add(tfInput);
        tfInput.addActionListener(new TFInputListener());
        add(new Label("The Accumulated Sum is: "));
        tfOutput = new TextField(10);
        tfOutput.setEditable(false);
        add(tfOutput);
        setTitle("AWT Accumulator");
        setSize(350, 120);
        setVisible(true);
    }

    public static void main(String[] args) {
        new AWTAccumulator();
    }

    private class TFInputListener implements ActionListener {
        @Override
        public void actionPerformed(ActionEvent evt) {
            int numberIn = Integer.parseInt(tfInput.getText());
            sum += numberIn;
            tfInput.setText("");
            tfOutput.setText(sum + "");
        }
    }
}
```

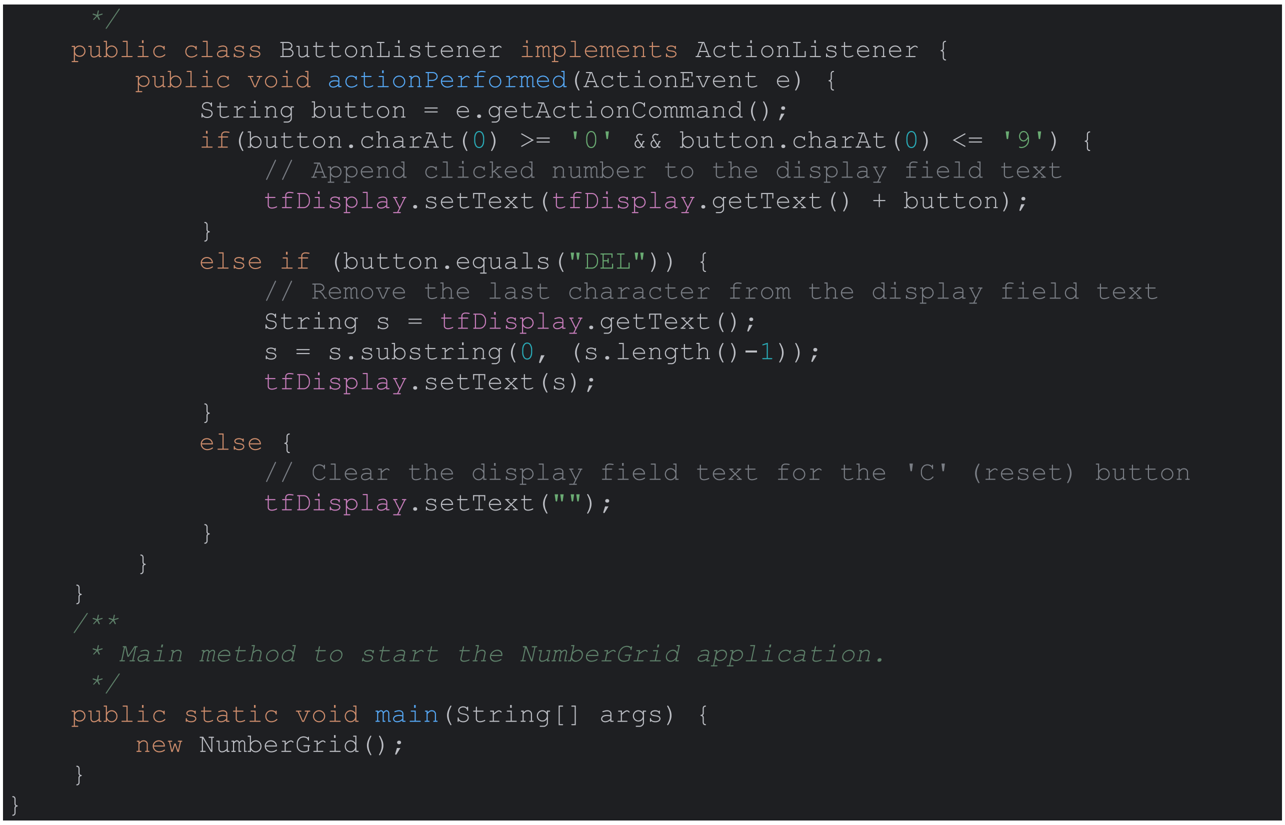
- SwingAccumulator Class:

```
package hust.soict.dsai.swing;

import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

import static com.sun.glass.ui.Cursor.setVisible;

public class SwingAccumulator extends JFrame {
    private final JTextField tfInput;
    private final JTextField tfOutput;
    private int sum = 0;    //Accumulated sum, init to 0

    //Constructor to setup theGui components and events handlers
    public SwingAccumulator(){
        Container cp = getContentPane();
        cp.setLayout(new GridLayout(2, 2));

        cp.add(new JLabel("Enter an Integer: "));

        tfInput = new JTextField(10);
        cp.add(tfInput);
        tfInput.addActionListener(new TFInputListener());

        cp.add(new JLabel("The Accumulated Sum is:"));

        tfOutput = new JTextField(10);
        tfOutput.setEditable(false);
        cp.add(tfOutput);

        setTitle();
        setSize();
        setVisible(true);
    }

    private void setTitle() {
    }

    private void setSize() {
    }

    public static void main(String[] args){
        new SwingAccumulator();
    }

    private class TFInputListener implements ActionListener {
        @Override
        public void actionPerformed(ActionEvent evt){
            int numberIn = Integer.parseInt(tfInput.getText());
            sum += numberIn;
            tfInput.setText("");
            tfOutput.setText(sum + "");
        }
    }
}
```

2. Organizing Swing components with Layout Managers

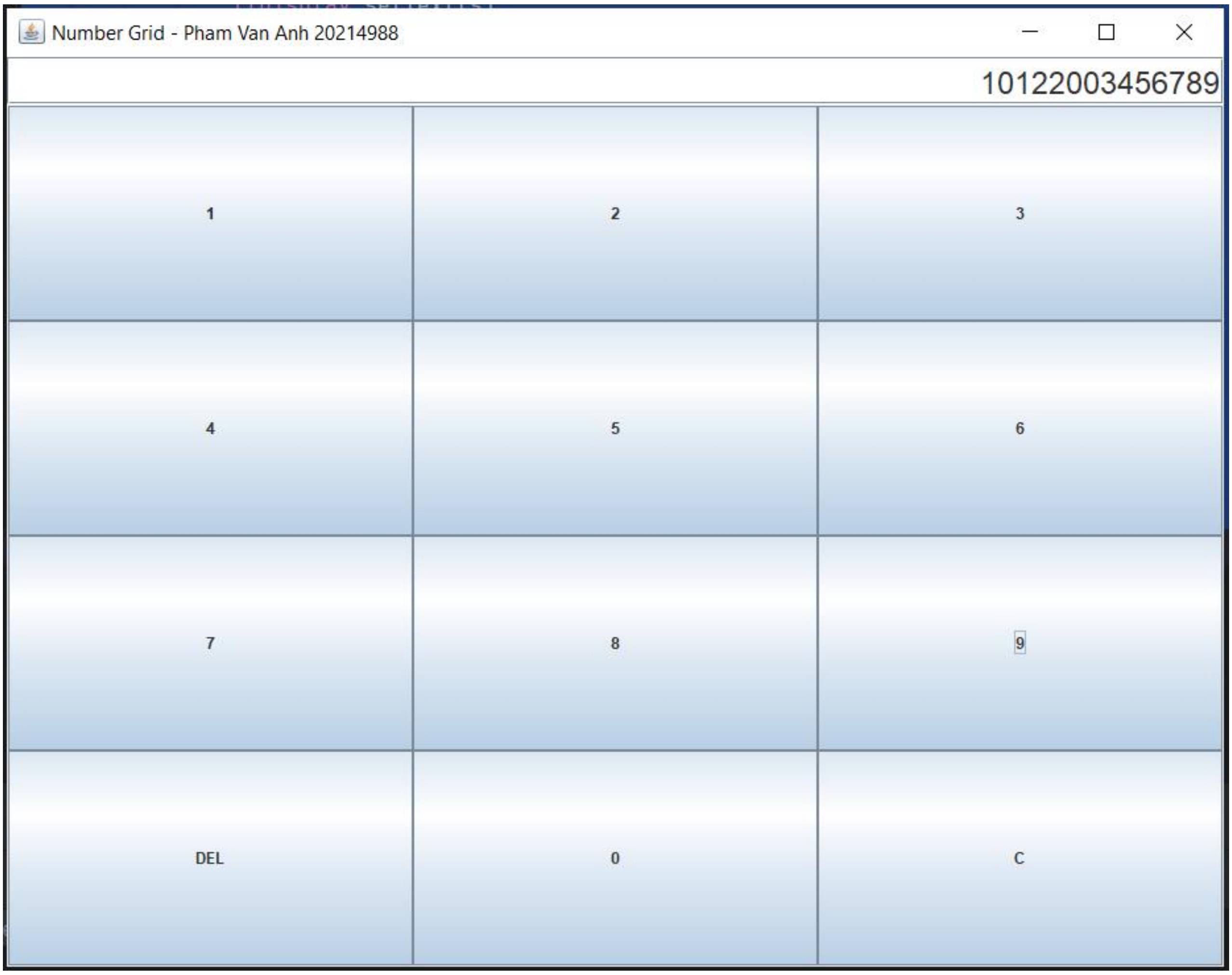
- NumberGrid Class:

```
package hust.soict.dsai.swing;
import java.awt.BorderLayout;
import java.awt.ComponentOrientation;
import java.awt.Container;
import java.awt.GridLayout;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.JTextField;
/**
 * A simple Swing application that creates a number grid with a display field.
 */
public class NumberGrid extends JFrame {
    private JButton[] btnNumbers = new JButton[10];
    private JButton btnDelete, btnReset;
    private JTextField tfDisplay;
    /**
     * Constructs the NumberGrid frame with a display field and number buttons.
     */
    public NumberGrid() {
        // Create and configure the display field
        tfDisplay = new JTextField();
        tfDisplay.setComponentOrientation(ComponentOrientation.RIGHT_TO_LEFT);
        // Create the panel for number buttons arranged in a 4x3 grid
        JPanel panelButtons = new JPanel(new GridLayout(4, 3));
        addButtons(panelButtons);
        // Get the content pane of the frame and set its layout to BorderLayout
        Container cp = getContentPane();
        cp.setLayout(new BorderLayout());
        // Add the display field to the top (North) of the content pane
        cp.add(tfDisplay, BorderLayout.NORTH);
        // Add the panel with number buttons to the center of the content pane
        cp.add(panelButtons, BorderLayout.CENTER);
        // Set the font size of the display field and configure the frame
        tfDisplay.setFont(tfDisplay.getFont().deriveFont(24.0f));
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setTitle("Number Grid - Pham Van Anh 20214988");
        setSize(500, 400);
        setVisible(true);
    }
    /**
     * Adds number buttons, delete button, and reset button to the specified
panel.
     *
     * @param panelButtons The panel to which buttons will be added.
     */
    void addButtons(JPanel panelButtons) {
        ButtonListener btnListener = new ButtonListener();
        // Add number buttons (1 to 9) to the panel
        for (int i = 1; i <= 9; i++) {
            btnNumbers[i] = new JButton("" + i);
            panelButtons.add(btnNumbers[i]);
            btnNumbers[i].addActionListener(btnListener);
        }
        // Add delete button to the panel
        btnDelete = new JButton("DEL");
        panelButtons.add(btnDelete);
        btnDelete.addActionListener(btnListener);
        // Add '0' button to the panel
        btnNumbers[0] = new JButton("0");
        panelButtons.add(btnNumbers[0]);
        btnNumbers[0].addActionListener(btnListener);
        // Add reset button to the panel
        btnReset = new JButton("C");
        panelButtons.add(btnReset);
        btnReset.addActionListener(btnListener);
    }
    /**
     * ActionListener implementation for handling button clicks.
```



```
     */
    public class ButtonListener implements ActionListener {
        public void actionPerformed(ActionEvent e) {
            String button = e.getActionCommand();
            if(button.charAt(0) >= '0' && button.charAt(0) <= '9') {
                // Append clicked number to the display field text
                tfDisplay.setText(tfDisplay.getText() + button);
            }
            else if (button.equals("DEL")) {
                // Remove the last character from the display field text
                String s = tfDisplay.getText();
                s = s.substring(0, (s.length()-1));
                tfDisplay.setText(s);
            }
            else {
                // Clear the display field text for the 'C' (reset) button
                tfDisplay.setText("");
            }
        }
    }
    /**
     * Main method to start the NumberGrid application.
     */
    public static void main(String[] args) {
        new NumberGrid();
    }
}
```

- Kết quả:



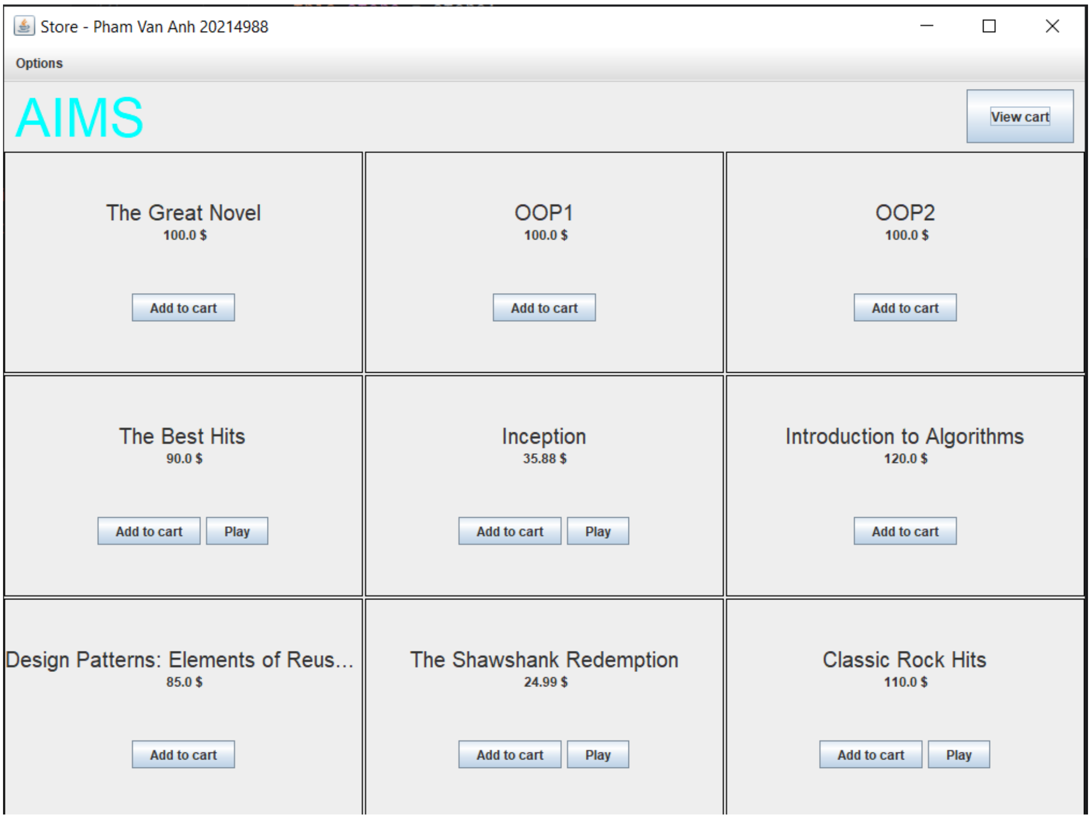
3. Create a graphical user interface for AIMS with Swing

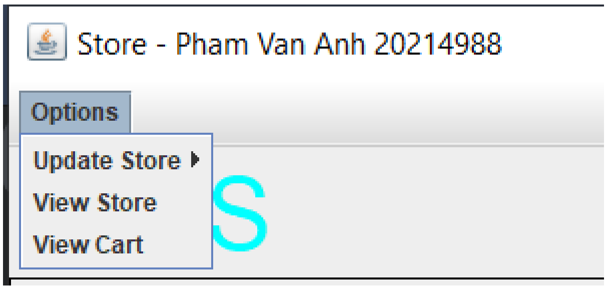
3.1 View Store Screen

- StoreScreen Class:

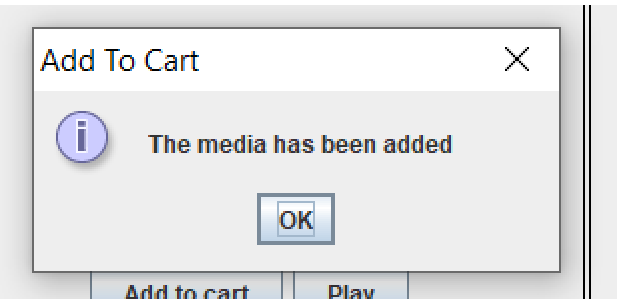
```
package hust.soict.dsai.aims.screen;

import hust.soict.dsai.aims.media.*;
import hust.soict.dsai.aims.store.Store;
import javafx.collections.ObservableList;
import javafx.scene.media.Media;

import javax.naming.LimitExceededException;
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.util.ArrayList;
import java.util.Arrays;

public class StoreScreen extends JFrame{
    private Store store;
    private JButton btnAddToCart, btnPlay;
    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");

        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);
        menu.add(new JMenuItem("View Store"));
        menu.add(new JMenuItem("View Cart"));

        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);

        JButton cart = new JButton("View cart");
        cart.setPreferredSize(new Dimension(100, 50));
        cart.setMaximumSize(new Dimension(100, 50));

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

        return header;
    }

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

        ObservableList<Media> mediaInStore = store.getItemsInStore();
        for(Media m: mediaInStore) {
            MediaStore cell = new MediaStore(m);
            center.add(cell);
        }

        return center;
    }

    public class MediaStore extends JPanel {
        private Media media;
        ButtonListener btnListener = new ButtonListener();

        public MediaStore(Media media) {
            this.media = media;
            this.setLayout(new BoxLayout(this, BoxLayout.Y_AXIS));

            JLabel title = new JLabel(media.getTitle());
            title.setFont(new Font(title.getFont().getName(), Font.PLAIN, 20));
            title.setAlignmentX(CENTER_ALIGNMENT);

            JLabel cost = new JLabel("" + media.getCost() + " $");
            cost.setAlignmentX(CENTER_ALIGNMENT);

            JPanel container = new JPanel();
            container.setLayout(new FlowLayout(FlowLayout.CENTER));

            btnAddToCart = new JButton("Add to cart");
            container.add(btnAddToCart);
            btnAddToCart.addActionListener(btnListener);
            if(media instanceof Playable) {
                btnPlay = new JButton("Play");
                container.add(btnPlay);
                btnPlay.addActionListener(btnListener);
            }

            this.add(Box.createVerticalGlue());
            this.add(title);
            this.add(cost);
            this.add(Box.createVerticalGlue());
            this.add(container);

            this.setBorder(BorderFactory.createLineBorder(Color.BLACK));
        }
    }

    public class ButtonListener implements ActionListener {
        public void actionPerformed(ActionEvent e) {
            String button = e.getActionCommand();
            if(button.charAt(0) == 'A') {
                JFrame frame = new JFrame("JOptionPane ");
                JOptionPane.showMessageDialog(frame,
                        "The media has been added",
                        "Add To Cart",
                        JOptionPane.INFORMATION_MESSAGE);
            }
            else if (button.charAt(0) == 'P') {
                JFrame frame = new JFrame("JOptionPane ");
                JOptionPane.showMessageDialog(frame,
                        "Play The Media",
                        "Play",
                        JOptionPane.INFORMATION_MESSAGE);
            }
        }
    }

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

        cp.add(createNorth(), BorderLayout.NORTH);
        cp.add(createCenter(), BorderLayout.CENTER);
        setVisible(true);
        setTitle("Store");
        setSize(1024, 768);
    }

    public static void main(String[] args) throws LimitExceededException {
        Store store = new Store();
        // Book
        Book initBook = new Book("The Great Novel", "Book", 100.00f,
                Arrays.asList("John Doe", "Jane Smith"));

        // Book
        Book initBook2 = new Book("OOP1", "Book", 100.00f,
                Arrays.asList("xyz", "abc"));

        // Book
        Book initBook3 = new Book("OOP2", "Book", 100.00f,
                Arrays.asList("ghf", "sak"));

        // DVD
        DigitalVideoDisc initDVD = new DigitalVideoDisc("Inception", "DVD",
                "Christopher Nolan", 150, 35.88f);

        // CD
        ArrayList<Track> tracks = new ArrayList<>();
        tracks.add(new Track("Song 1", 3));
        tracks.add(new Track("Song 2", 4));
        CompactDisc initCD = new CompactDisc("The Best Hits", "CD", 90.00f,
                "Various Artists", tracks);

        store.addMedia(initBook);
        store.addMedia(initBook2);
        store.addMedia(initBook3);
        store.addMedia(initCD);
        store.addMedia(initDVD);

        // Additional Books
        Book additionalBook1 = new Book("Introduction to Algorithms", "Book",
120.00f,
                Arrays.asList("Thomas H. Cormen", "Charles E. Leiserson",
"Ronald L. Rivest", "Clifford Stein"));

        Book additionalBook2 = new Book("Design Patterns: Elements of Reusable
Object-Oriented Software", "Book", 85.00f,
                Arrays.asList("Erich Gamma", "Richard Helm", "Ralph Johnson",
"John Vlissides"));

        // Additional DVD
        DigitalVideoDisc additionalDVD = new DigitalVideoDisc("The Shawshank
Redemption", "DVD",
                "Frank Darabont", 142, 24.99f);

        // Additional CD
        ArrayList<Track> additionalTracks = new ArrayList<>();
        additionalTracks.add(new Track("Bohemian Rhapsody", 6));
        additionalTracks.add(new Track("Hotel California", 5));
        CompactDisc additionalCD = new CompactDisc("Classic Rock Hits", "CD",
110.00f,
                "Various Artists", additionalTracks);

        store.addMedia(additionalBook1);
        store.addMedia(additionalBook2);
        store.addMedia(additionalDVD);
        store.addMedia(additionalCD);

        new StoreScreen(store);
    }
}
```

- Kết quả:

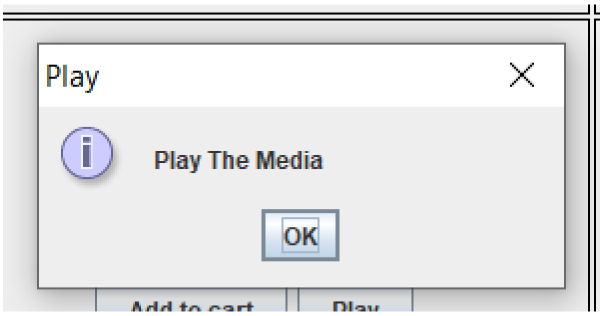




3.2 Adding more user interaction



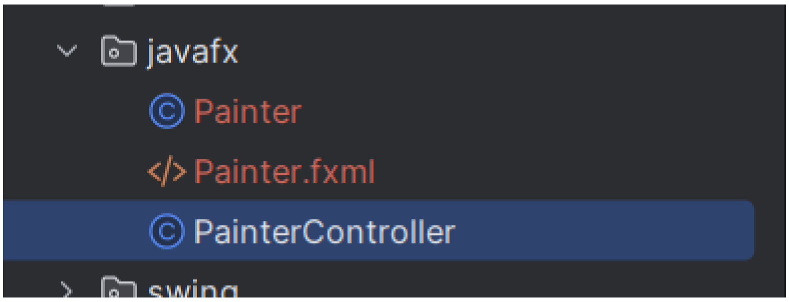
The media has been added



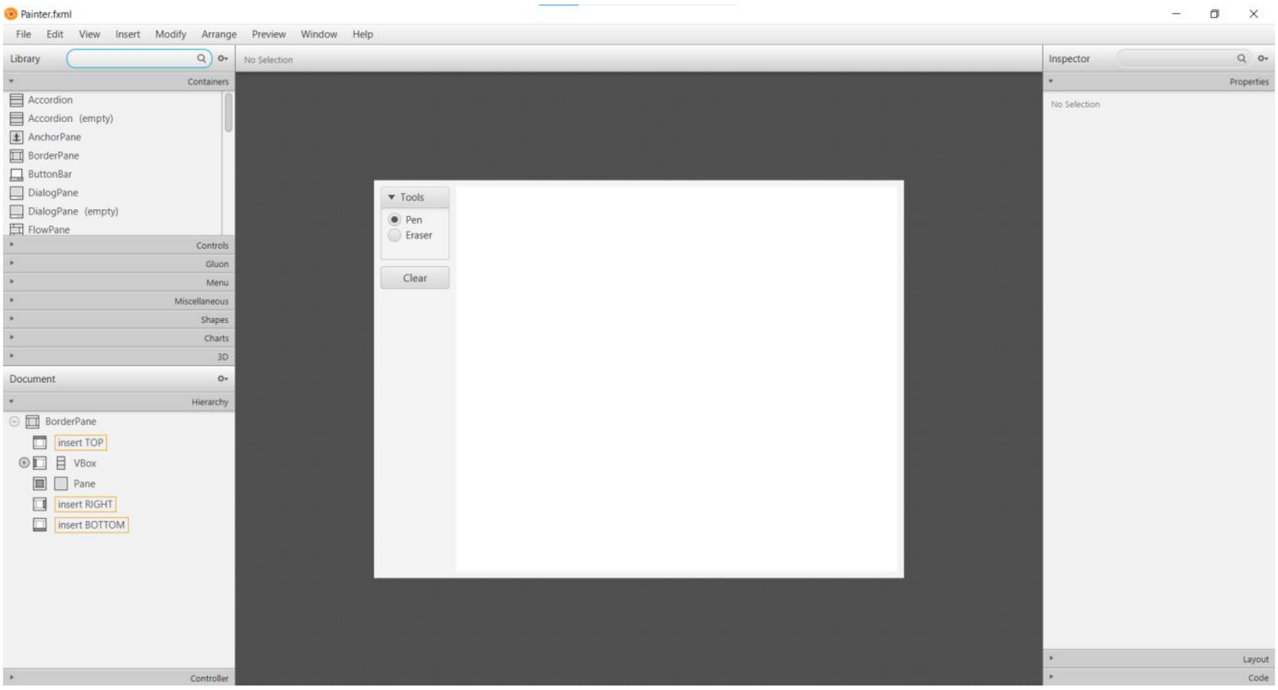
Play

Play The Media

4. JavaFX API



4.1 Create FXML file



4.2 Create the Controller class

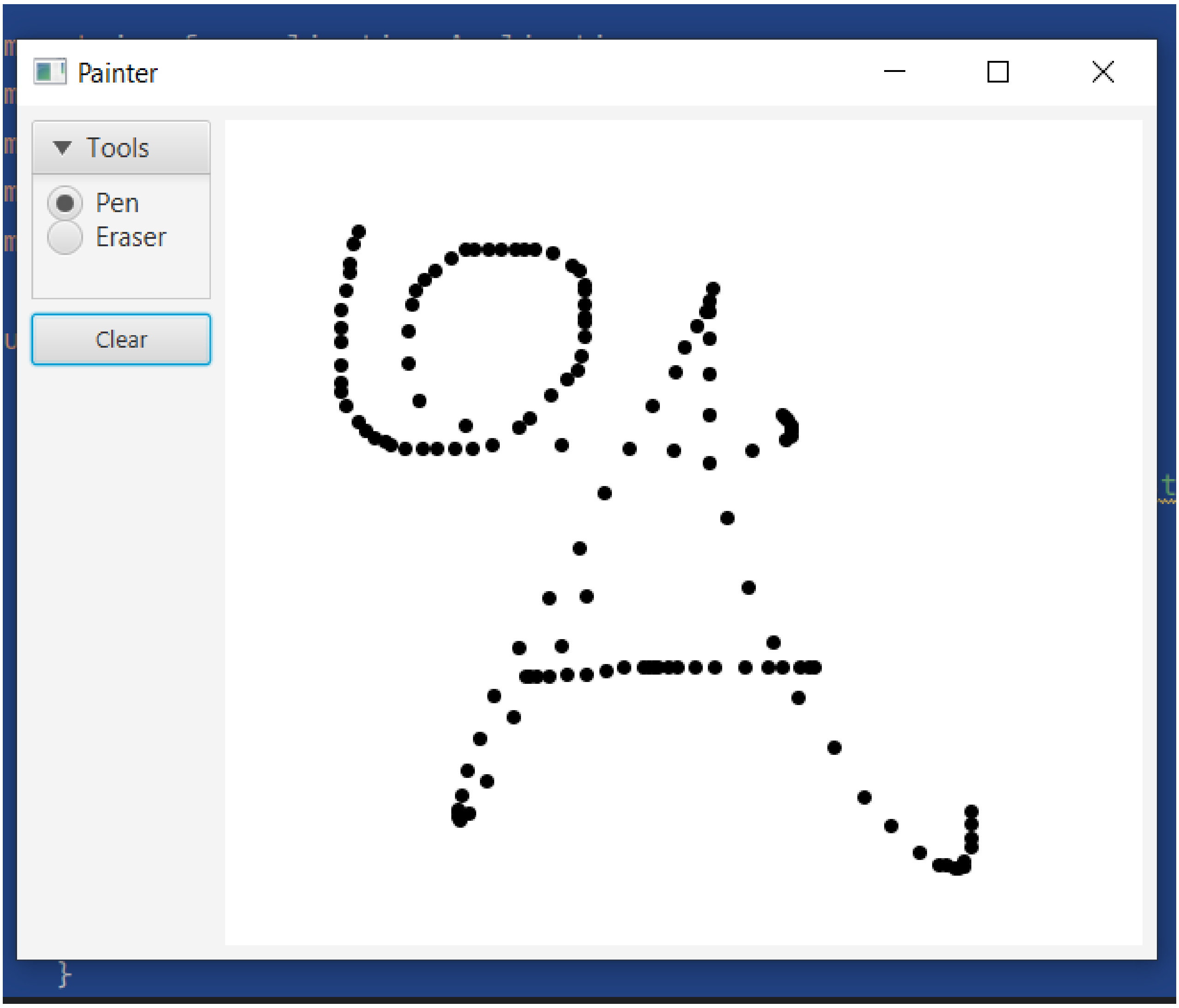
```
package hust.soict.dsai.javafx;

import javafx.event.ActionEvent;
import javafx.fxml.FXML;
import javafx.scene.control.RadioButton;
import javafx.scene.control.ToggleGroup;
import javafx.scene.input.MouseEvent;
import javafx.scene.layout.Pane;
import javafx.scene.paint.Color;
import javafx.scene.shape.Circle;

public class PainterController {
    @FXML
    private RadioButton ButtonPressed1;

    @FXML
    private RadioButton ButtonPressed2;

    @FXML
    private Pane drawingAreaPane;

    @FXML
    void Selected(ActionEvent event) {
        ToggleGroup question= new ToggleGroup();
        ButtonPressed1.setToggleGroup(question);
        ButtonPressed2.setToggleGroup(question);
        if(ButtonPressed1.isSelected()) {
            ButtonPressed2.setSelected(false);
        }
        else {
            ButtonPressed1.setSelected(false);
        }
    }

    @FXML
    void ClearButtonPressed(ActionEvent event) {
        drawingAreaPane.getChildren().clear();
    }

    @FXML
    void drawingAreaMouseDragged(MouseEvent event) {
        if(ButtonPressed1.isSelected()) {
            Circle newCircle = new Circle(event.getX(), event.getY(), 4,
Color.BLACK);
            drawingAreaPane.getChildren().add(newCircle);
        }
        else {
            Circle newCircle = new Circle(event.getX(), event.getY(), 4,
Color.WHITE);
            drawingAreaPane.getChildren().add(newCircle);
        }
    }

}
```

4.3 Create the application

Painter class:

```
package hust.soict.dsai.javafx;

import javafx.application.Application;
import javafx.fxml.FXMLLoader;
import javafx.scene.Parent;
import javafx.scene.Scene;
import javafx.stage.Stage;

public class Painter extends Application {
    @Override
    public void start(Stage stage) throws Exception {
        Parent root = FXMLLoader.load(getClass().getResource("/hust/soict/dsai/javafx/Painter.fxml"));

        Scene scene = new Scene(root);
        stage.setTitle("Painter");
        stage.setScene(scene);
        stage.show();
    }

    public static void main(String[] args) {
        launch(args);
    }
}
```

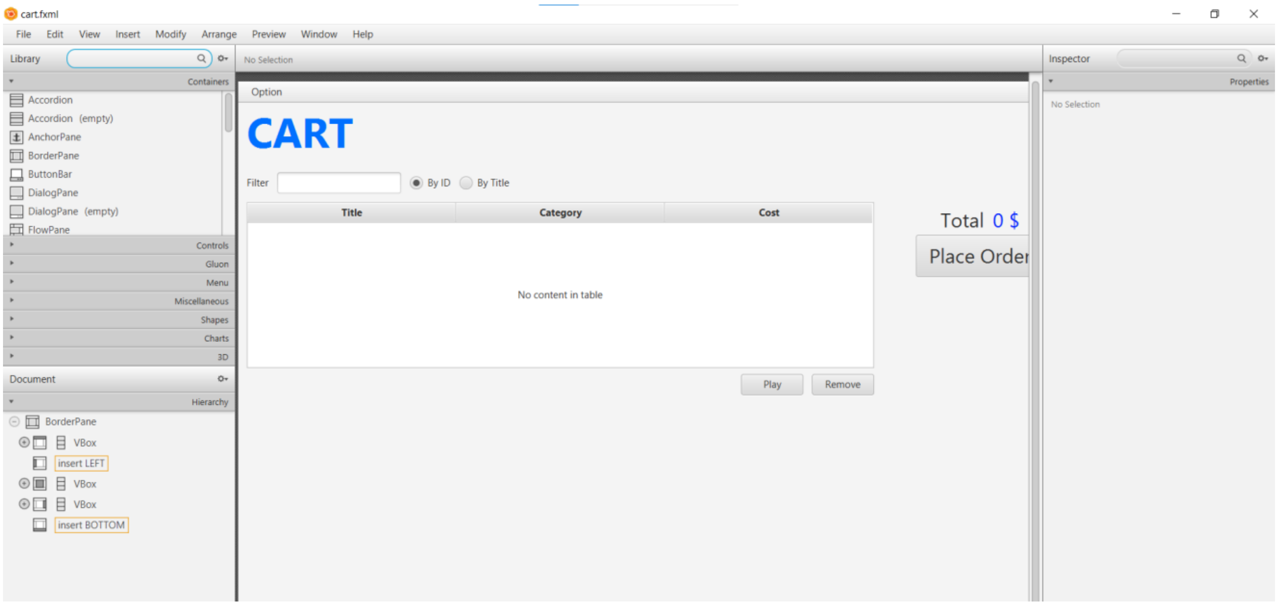
4.4 Practice exercise



5. Setting up the View Cart Screen with

ScreenBuilder

- Cart.fxml:



6. Setting up the View Cart Screen with ScreenBuilder

- CartScreen class:

```
- package hust.soict.dsai.aims.screen;

  import hust.soict.dsai.aims.cart.Cart;
  import javafx.application.Platform;
  import javafx.embed.swing.JFXPanel;
  import javafx.fxml.FXMLLoader;
  import javafx.scene.Parent;
  import javafx.scene.Scene;
  import javax.swing.*;
  import java.awt.*;
  import java.io.IOException;


  public class CartScreen extends JFrame {
      public CartScreen(Cart cart) {
          super();
          JFXPanel fxPanel = new JFXPanel();
          this.add(fxPanel);
          this.setTitle("Cart");
          this.setVisible(true);
          this.setSize(new Dimension(1024, 768));
          this.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

          Platform.runLater(new Runnable() {
              @Override
              public void run() {
                  // TODO Auto-generated method stub
```

```
                try {
                    FXMLLoader loader = new
FXMLLoader(getClass().getResource("/hust/soict/dsai/aims/screen/cart.
fxml"));
                    CartScreenController controller = new
CartScreenController(cart);
                    loader.setController(controller);
                    Parent root = loader.load();
                    Scene scene = new Scene(root);
                    fxPanel.setScene(scene);
                } catch (IOException e) {
                    e.printStackTrace();
                }
            }
        });
    }
}
```

7. View the items in cart – JavaFX’s data-driven UI

- CartScreenController class:

```
public class CartScreenController {
    private Cart cart;
    @FXML
    private TableView<Media> tblMedia;
    @FXML
    private TableColumn<Media, String> colMediaTitle;
    @FXML
    private TableColumn<Media, String> colMediacategory;
    @FXML
    private TableColumn<Media, Float> colMediaCost;
    public CartScreenController (Cart cart) { super();
        this.cart = cart;
    }
    @FXML
    private void initialize() {
        colMediaTitle.setCellValueFactory(
                new PropertyValueFactory<Media, String>("title"));
        colMediacategory.setCellValueFactory(
                new PropertyValueFactory<Media, String>("category"));
        colMediaCost.setCellValueFactory(
                new PropertyValueFactory<Media, Float>("cost"));
        tblMedia.setItems(this.cart.getItemsOrdered());
```

- Cart class:

```
public class Cart {
    public static final int MAX_NUMBERS_ORDERED = 20;
    private ObservableList<Media> itemsOrdered =
FXCollections.observableArrayList();

    public ObservableList<Media> getItemsOrdered() {
        // TODO Auto-generated method stub
        return itemsOrdered;
    }
}
```

8. Updating buttons based on selected item in TableView – ChangeListener

- CartScreenController Class

Initialize:

```
@FXML
private void initialize() {
    // Show Cart in the Table
    colMediaTitle.setCellValueFactory(new PropertyValueFactory<Media,
String>("title"));
    colMediacategory.setCellValueFactory(new PropertyValueFactory<Media,
String>("category"));
    colMediaCost.setCellValueFactory(new PropertyValueFactory<Media,
Float>("cost"));
    tblMedia.setItems(this.cart.getItemsOrdered());
    totalCost.setText(Float.toString(cart.totalCost()) + "$");

    // Set Default the button Play and Remove
    btnPlay.setVisible(false);
    btnRemove.setVisible(false);

    tblMedia.getSelectionModel().selectedItemProperty().addListener(new
ChangeListener<Media>() {

        @Override
        public void changed(ObservableValue<? extends Media> observable, Media
oldValue, Media newValue) {
            if (newValue != null) {
                updateButtonBar(newValue);
            }
            totalCost.setText(Float.toString(cart.totalCost()) + "$");
        }
    });
```

- updateBottonBar:

```
void updateButtonBar(Media media) {
    btnRemove.setVisible(true);
    if (media instanceof Playable) {
        btnPlay.setVisible(true);
    } else
        btnPlay.setVisible(false);
}
```

9. Deleting a media

- Remove Button:

```
@FXML
public void btnRemovePressed(ActionEvent actionEvent) {
    Media media = tblMedia.getSelectionModel().getSelectedItem();
    cart.removeMedia(media);
}
```

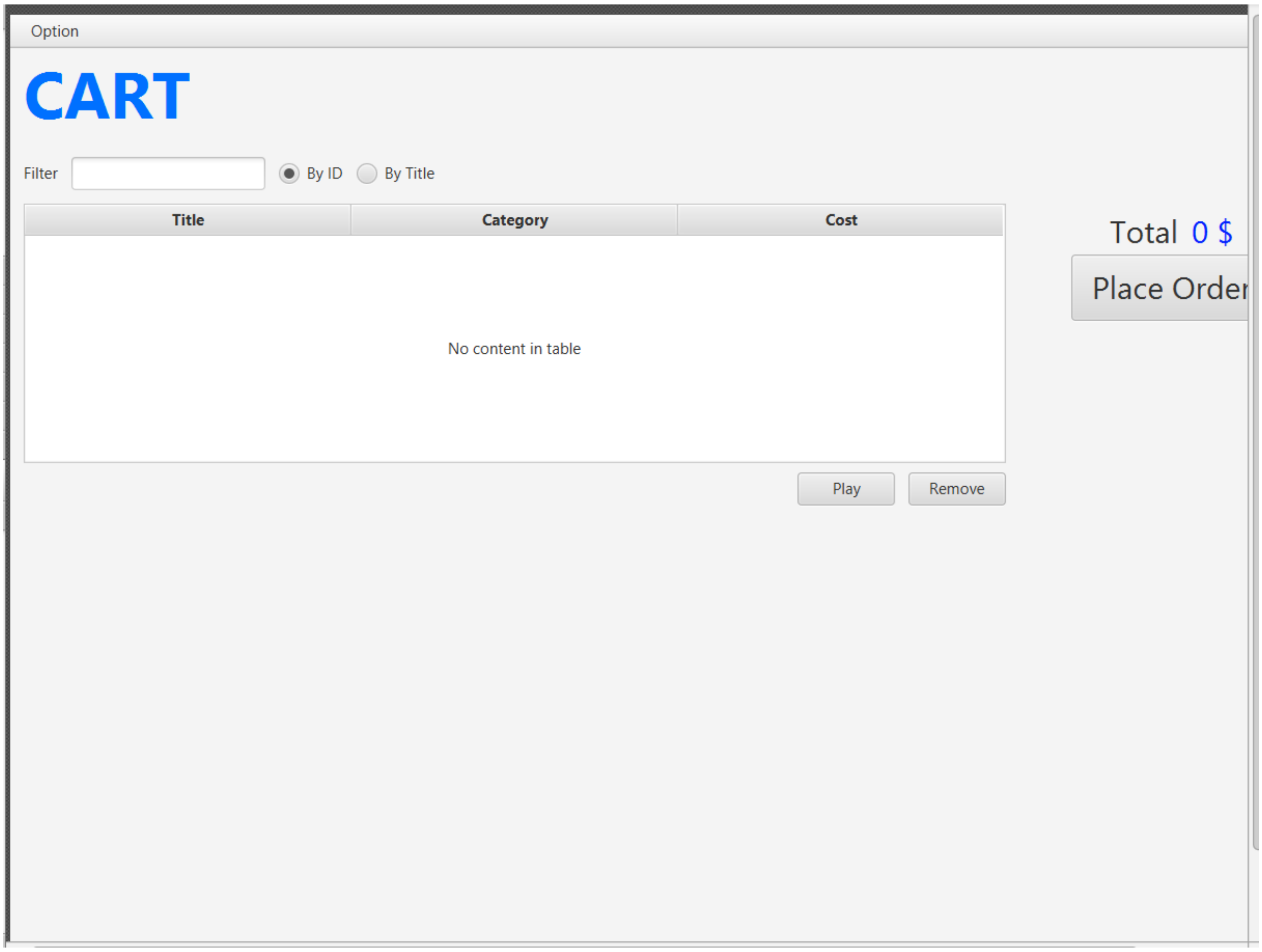
10. Filter items in cart – FilteredList

- Filter list:

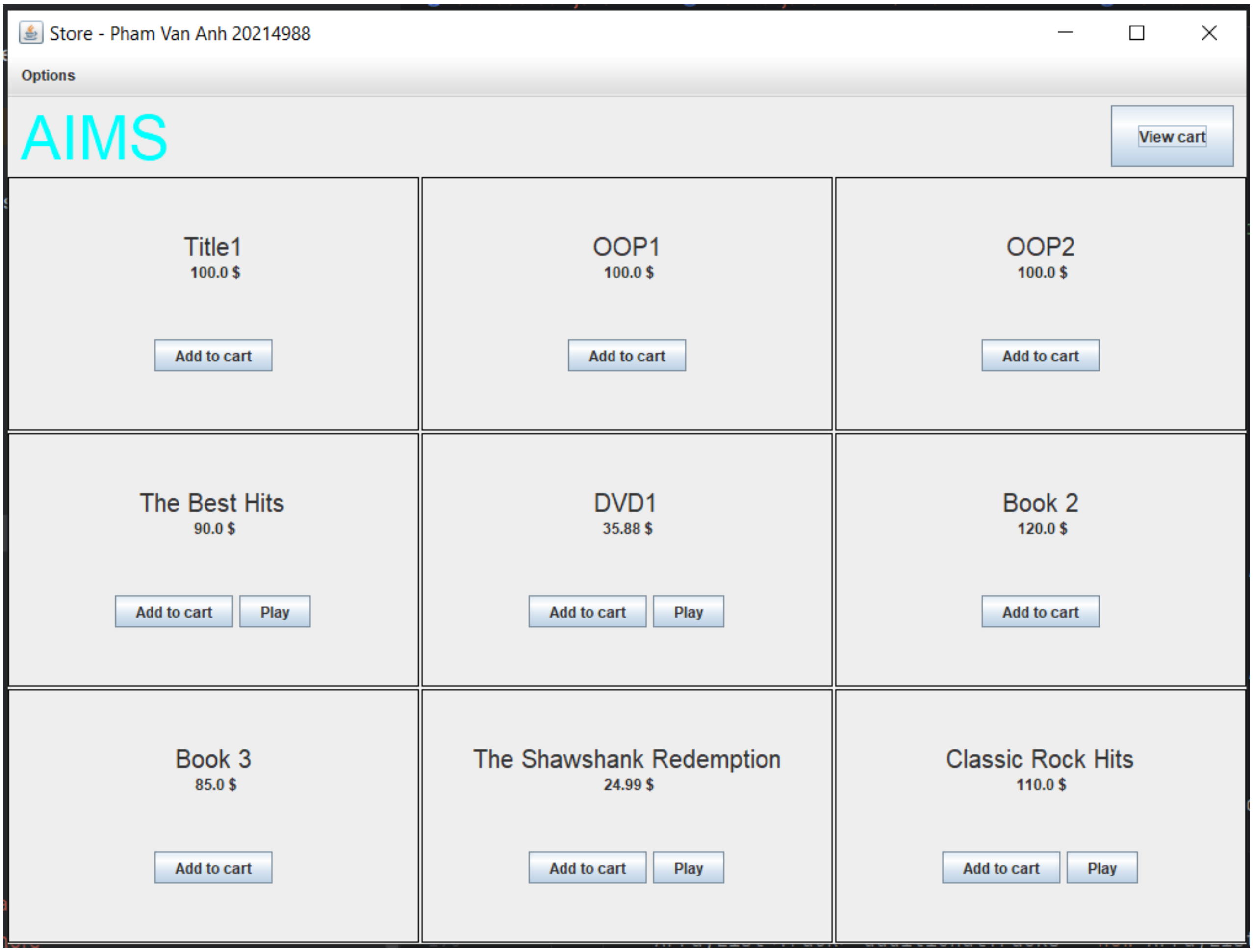
```
// Filter
tfFilter.textProperty().addListener(new ChangeListener<String>() {
    @Override
    public void changed(ObservableValue<? extends String> arg0, String
oldValue, String newValue) {
        showFilteredMedia(newValue);
    }
```

11. Complete the AIMS GUI application

- Cart Screen:



- Store Screen:



Store - Pham Van Anh 20214988

Title1
100.0 $

OOP1
100.0 $

OOP2
100.0 $

The Best Hits
90.0 $

DVD1
35.88 $

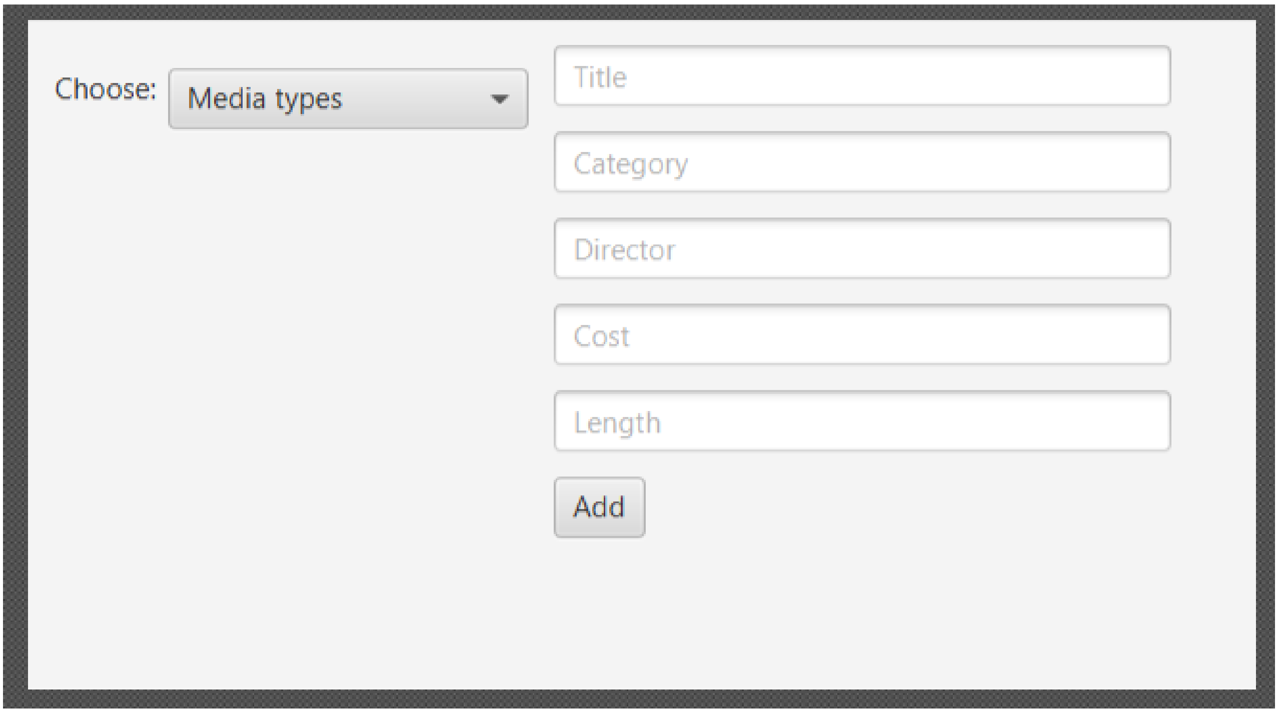
Book 2
120.0 $

Book 3
85.0 $

The Shawshank Redemption
24.99 $

Classic Rock Hits
110.0 $

- Update Store Screen:



Choose: Media types

12. Check all the previous source codes to catch/handle/delegate runtime exceptions

- Cart class:

```
// Add Media to Cart
public void addMedia(Media m) throws LimitExceededException {
    int size = itemsOrdered.size();
    if(size < MAX_NUMBERS_ORDERED) {
        itemsOrdered.add(m);
        System.out.println("The media has been added");
    }
    else {
        throw new LimitExceededException("ERROR: The number of media has
reached its limit");
    }
}
```

13. Create a class which inherits from Exception

13. 1 Create new class named PlayerException

- PlayException class:

```
package hust.soict.dsai.aims.exception;

public class PlayerException extends Exception {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
    }

    public PlayerException() {
        super();
        // TODO Auto-generated constructor stub
    }

    public PlayerException(String message, Throwable cause, boolean
enableSuppression, boolean writableStackTrace) {
        super(message, cause, enableSuppression, writableStackTrace);
        // TODO Auto-generated constructor stub
    }

    public PlayerException(String message, Throwable cause) {
        super(message, cause);
        // TODO Auto-generated constructor stub
    }

    public PlayerException(String message) {
        super(message);
        // TODO Auto-generated constructor stub
    }

    public PlayerException(Throwable cause) {
        super(cause);
        // TODO Auto-generated constructor stub
    }
}
```

13.2 Raise the PlayerException in the play() method

- Play trong DigitalVideoDisc Class

```
 @Override
    public void play() throws PlayerException {
        // TODO Auto-generated method stub
        if (this.getLength() > 0) {
            JDialog dialog = new JDialog();
            dialog.setSize(300, 200);

            // create Label
            JLabel text = new JLabel("DVD - Title : " + this.getTitle() + " 
Length : " + this.getLength());
            dialog.add(text);
            dialog.setTitle("Play DVD");
            dialog.setVisible(true);
        } else
            throw new PlayerException("ERROR : DVD length is non-positive");
    }
}
```

- Play trong Track

```
@Override
public void play() throws PlayerException {
    // TODO Auto-generated method stub
    if (this.getLength() > 0) {
        JDialog dialog = new JDialog();
        dialog.setSize(300, 200);

        // create Label
        JLabel text = new JLabel("Track - Title : " + this.getTitle() + " 
Length : " + this.getLength());
        dialog.add(text);
        dialog.setTitle("Play Track");
        dialog.setVisible(true);
    } else
        throw new PlayerException("ERROR : Track length is non-positive");
}
```

13.3 Update play() in the Playable interface

- Play trong Playable

```
package hust.soict.dsai.aims.media;

import hust.soict.dsai.aims.exception.PlayerException;

public interface Playable {
    public void play() throws PlayerException;
}
```

13.4 Update play() in CompactDisc

- Play trong CompactDisc

```
@Override
public void play() throws PlayerException {
    int size = tracks.size();
    JPanel layout = new JPanel(new GridLayout(size, 1));
    if (this.getLength() < 0) {
        throw new PlayerException("ERROR : CD length is non-positive");
    }
    for (Track track : tracks) {
        if (track.getLength() > 0) {
            // create Label
            JLabel text = new JLabel("CD - Title : " + track.getTitle() + "
Length : " + track.getLength());

            layout.add(text);
        } else
            throw new PlayerException("ERROR : Disc length is non-positive");
    }
    JDialog dialog = new JDialog();
    dialog.setSize(300, 200);
    dialog.add(layout);
    dialog.setTitle("Play CD");
    dialog.setVisible(true);
}
```

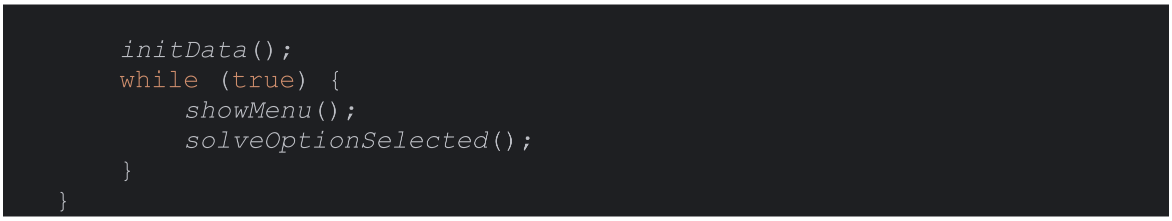
14. Update the Aims class

- Play media:

```
public static void playMedia(Media m) throws PlayerException {
    try {
        if (m instanceof DigitalVideoDisc) {
            System.out.println("\n%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%");
            ((DigitalVideoDisc) m).play();
            System.out.println("%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%\n");
        } else if (m instanceof CompactDisc) {
            System.out.println("\n%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%");
            ((CompactDisc) m).play();
            System.out.println("%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%\n");
        } else {

System.out.println("======================================================");
            System.out.println("===>>>This type of media does not have play
mode<<<===");

System.out.println("======================================================");
        }

    } catch (PlayerException e) {
        handleException(e);
    }
}
```

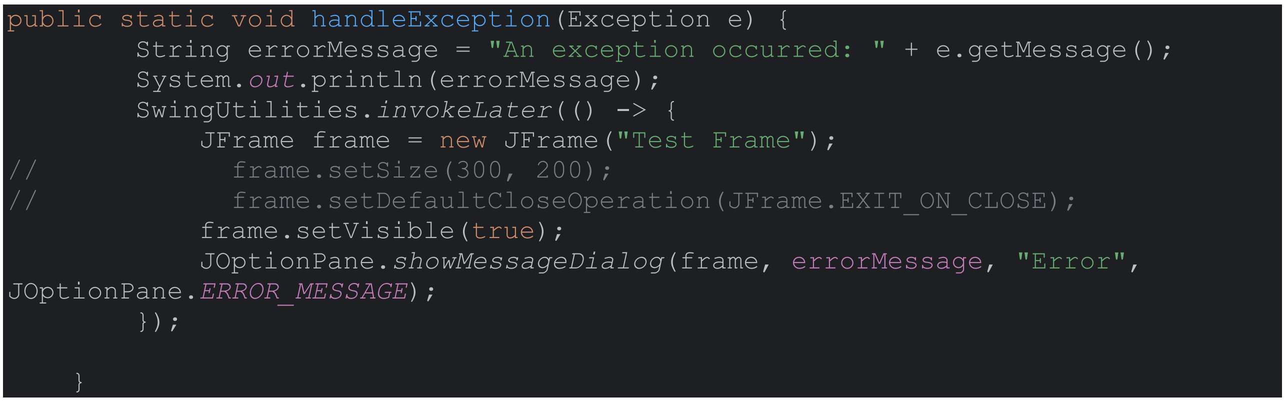
- Main:

```
- public static void main(String[] args) throws PlayerException,
  LimitExceededException {
```



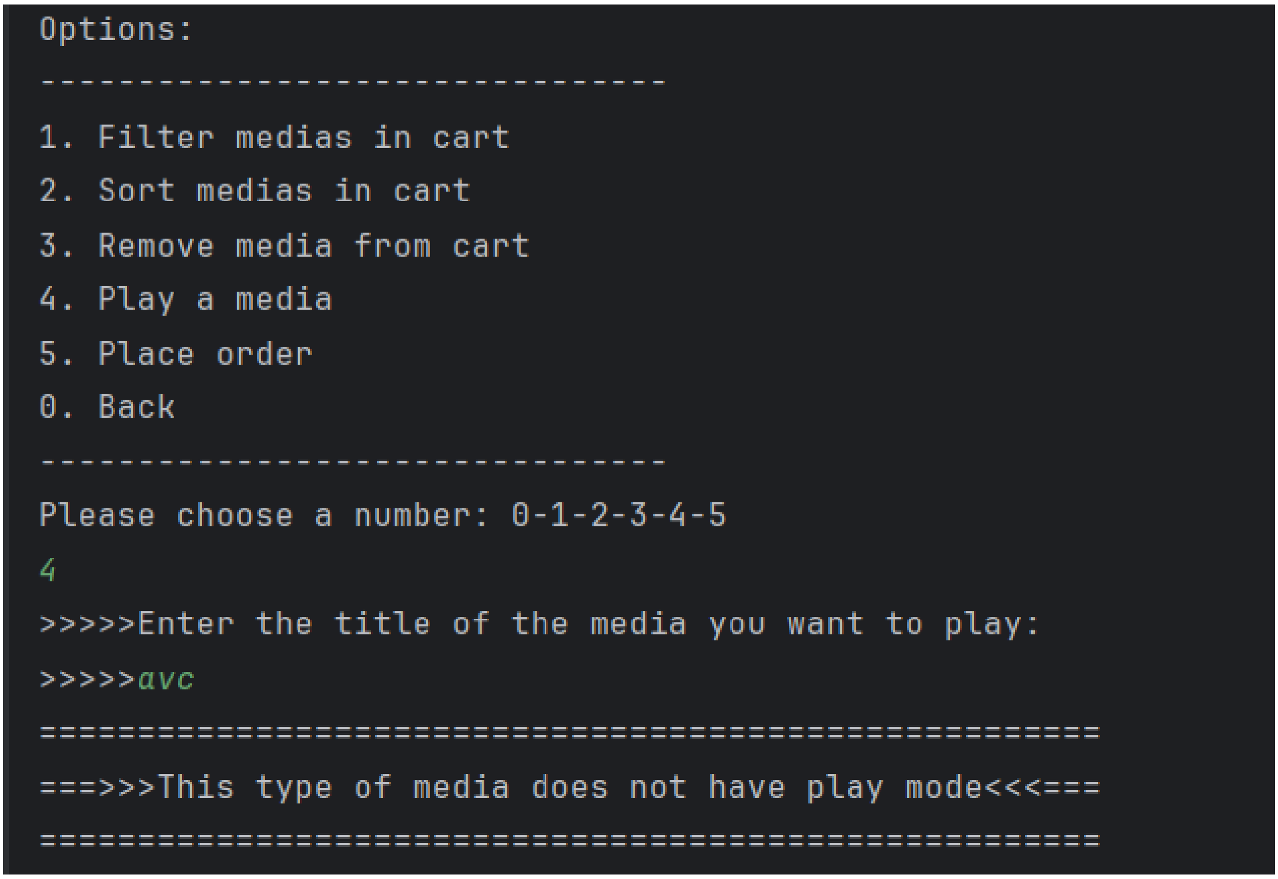
```
        initData();
        while (true) {
            showMenu();
            solveOptionSelected();
        }
    }
```

- Exception:



```
public static void handleException(Exception e) {
        String errorMessage = "An exception occurred: " + e.getMessage();
        System.out.println(errorMessage);
        SwingUtilities.invokeLater(() -> {
            JFrame frame = new JFrame("Test Frame");
//              frame.setSize(300, 200);
//              frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
            frame.setVisible(true);
            JOptionPane.showMessageDialog(frame, errorMessage, "Error",
JOptionPane.ERROR_MESSAGE);
        });

    }
```

- Kết quả:



```
Options:
--------------------------------
1. Filter medias in cart
2. Sort medias in cart
3. Remove media from cart
4. Play a media
5. Place order
0. Back
--------------------------------
Please choose a number: 0-1-2-3-4-5
4
>>>>>Enter the title of the media you want to play:
>>>>>avc
======================================================
===>>>This type of media does not have play mode<<<===
======================================================
```

15.Modify the equals() method of Media class

- Equals trong Media class:

```java
@Override
public boolean equals(Object obj) {
    // Check if the object is compared to itself
    if (this == obj) {
        return true;
    }

    // Check if the object is null
    if (obj == null) {
        return false;
    }

    // Check if the object is an instance of Media class
    if (!(obj instanceof Media)) {
        return false;
    }

    // Cast the object to Media type
    Media otherMedia = (Media) obj;

    // Check if the titles are equal
    if (this.getTitle() == null && otherMedia.getTitle() == null) {
        return true;
    } else if (this.getTitle() == null || otherMedia.getTitle() == null) {
        return false;
    } else {
        return this.getTitle().equals(otherMedia.getTitle());
    }
}
```

16.Reading Document

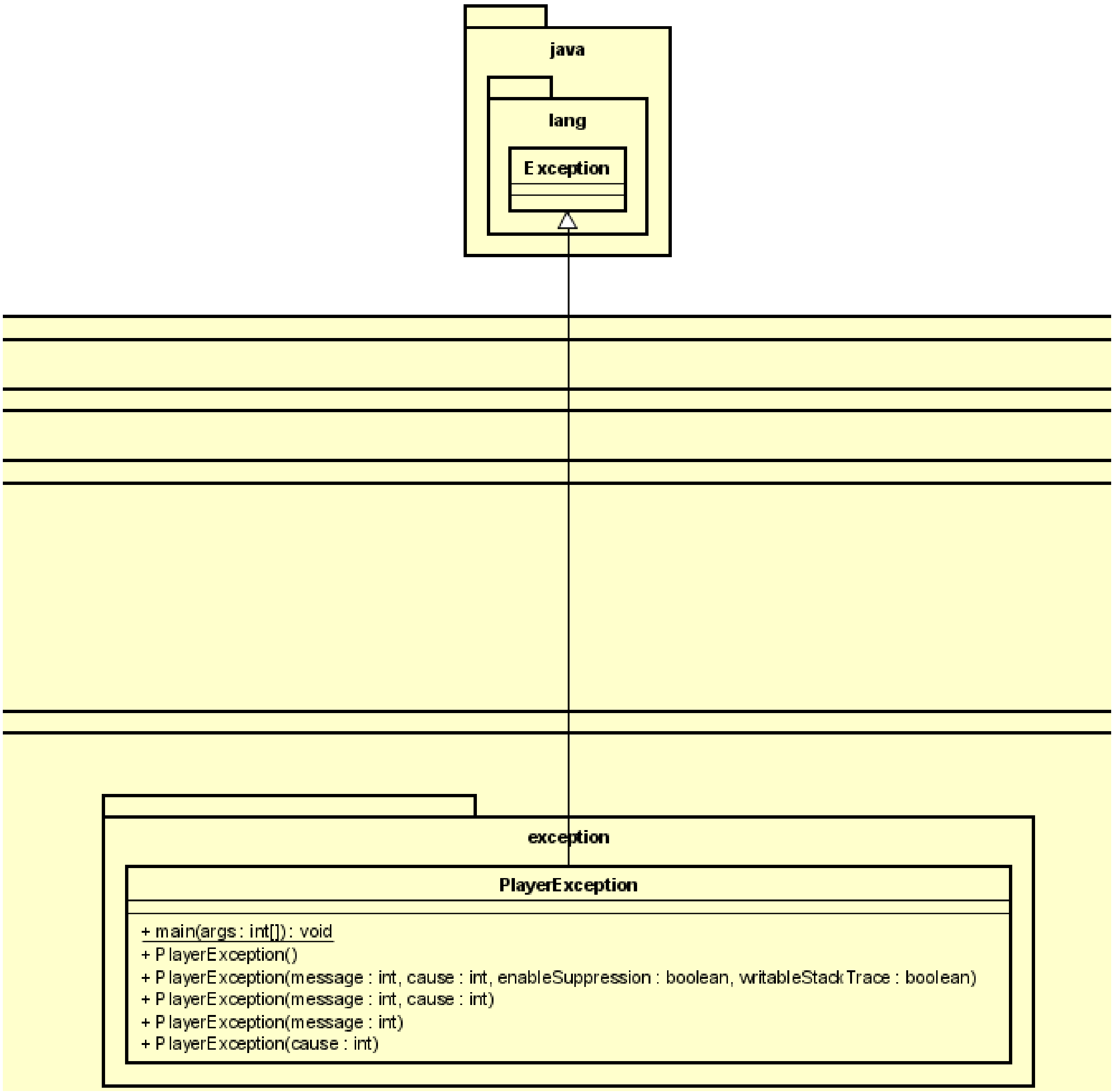
- Exception-handling basics:

https://developer.ibm.com/tutorials/j-perry-exceptions/

- Basic guidelines: Although the examples are in C++, the ideas are important.

https://docs.microsoft.com/en-us/cpp/cpp/errors-and-exception-handling-modern-cpp?view=vs-2019#basic-guidelines

17.Update AIMS class diagram


java
lang
Exception
exception
PlayerException
+ main(args : int[]) : void
+ PlayerException()
+ PlayerException(message : int, cause : int, enableSuppression : boolean, writableStackTrace : boolean)
+ PlayerException(message : int, cause : int)
+ PlayerException(message : int)
+ PlayerException(cause : int)