Báo cáo Lab 4 – oop

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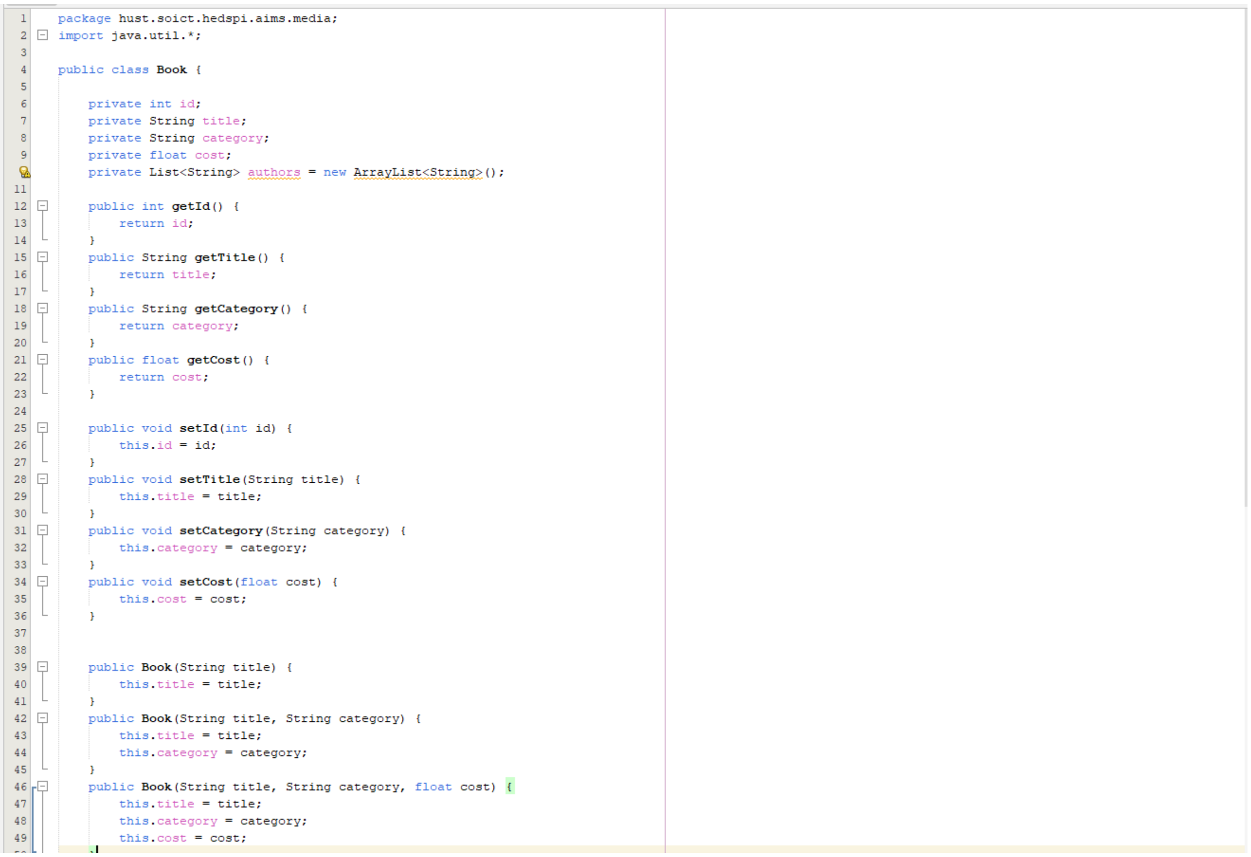
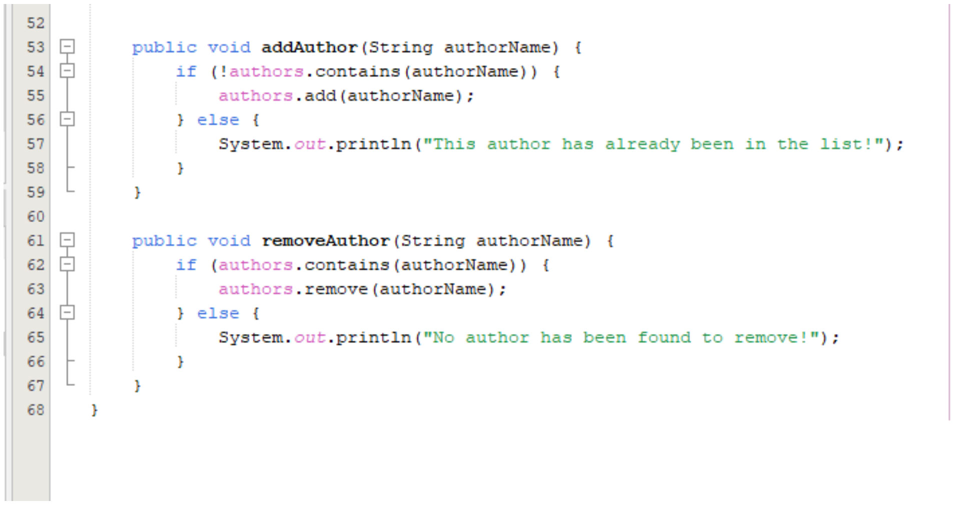
1.Import the existing project into the workspace of Eclipse

2. Additional requirements of AIMS

3. Tạo lớp Book

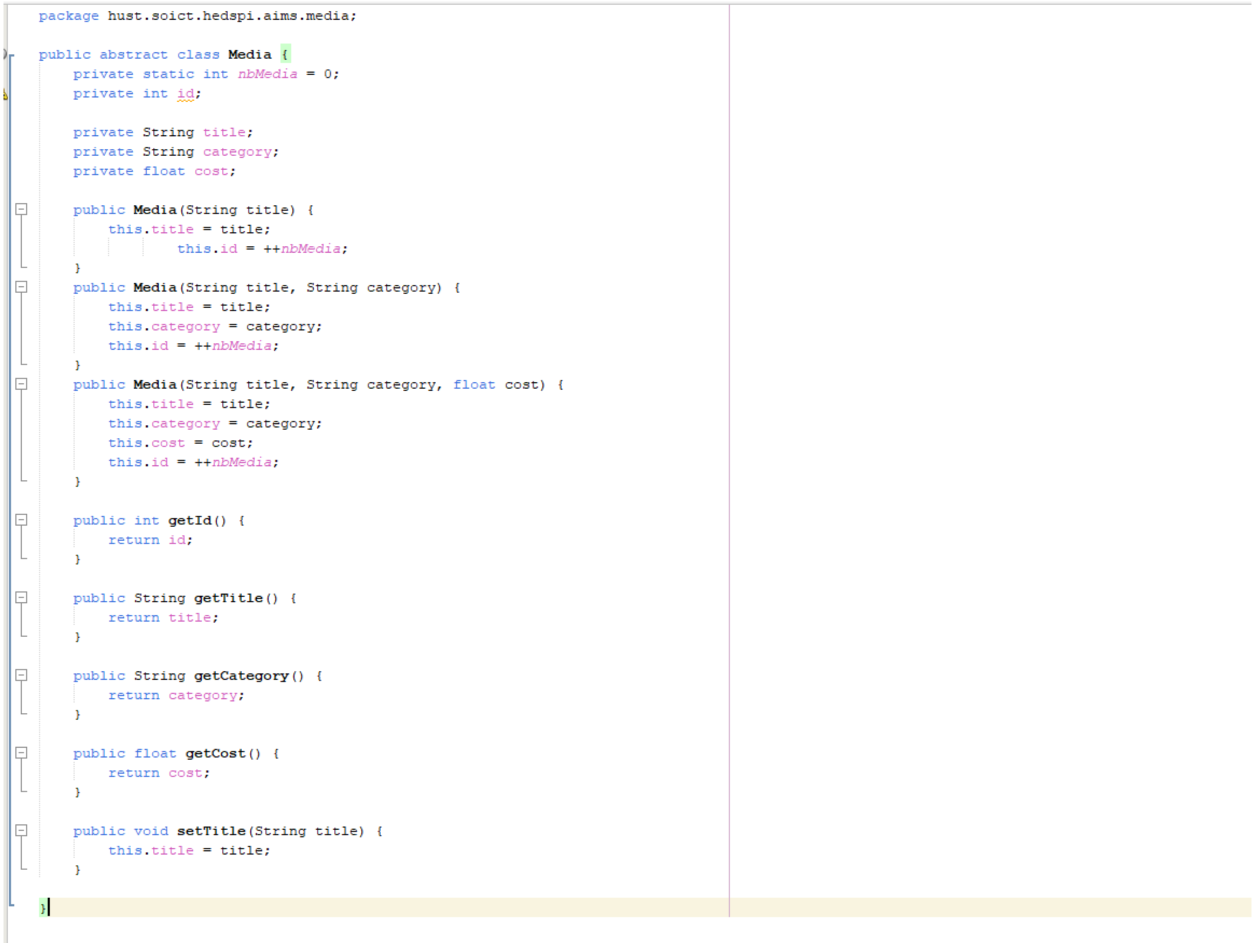


```java
package hust.soict.hedspi.aims.media;
import java.util.*;

public class Book {

    private int id;
    private String title;
    private String category;
    private float cost;
    private List<String> authors = new ArrayList<String>();

    public int getId() {
        return id;
    }
    public String getTitle() {
        return title;
    }
    public String getCategory() {
        return category;
    }
    public float getCost() {
        return cost;
    }

    public void setId(int id) {
        this.id = id;
    }
    public void setTitle(String title) {
        this.title = title;
    }
    public void setCategory(String category) {
        this.category = category;
    }
    public void setCost(float cost) {
        this.cost = cost;
    }


    public Book(String title) {
        this.title = title;
    }
    public Book(String title, String category) {
        this.title = title;
        this.category = category;
    }
    public Book(String title, String category, float cost) {
        this.title = title;
        this.category = category;
        this.cost = cost;
    }
```



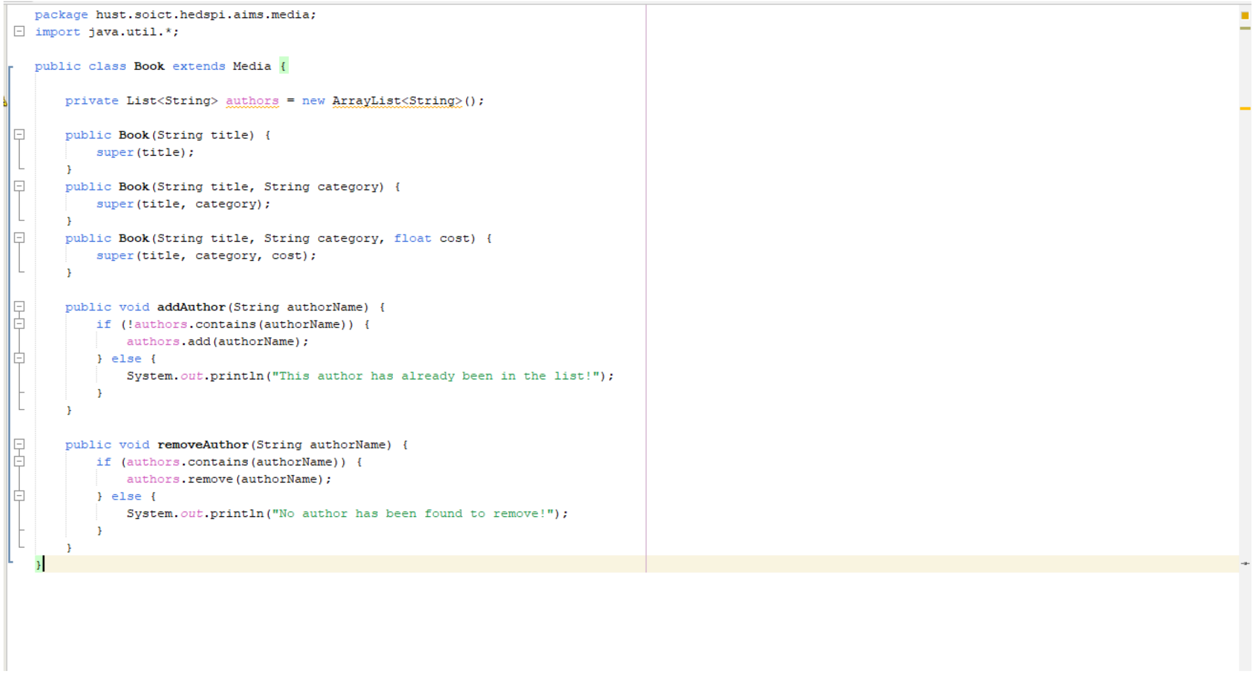
```java

    public void addAuthor(String authorName) {
        if (!authors.contains(authorName)) {
            authors.add(authorName);
        } else {
            System.out.println("This author has already been in the list!");
        }
    }

    public void removeAuthor(String authorName) {
        if (authors.contains(authorName)) {
            authors.remove(authorName);
        } else {
            System.out.println("No author has been found to remove!");
        }
    }
}
```

4. Tạo lớp trừu tượng Media



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

public abstract class Media {
    private static int nbMedia = 0;
    private int id;

    private String title;
    private String category;
    private float cost;

    public Media(String title) {
        this.title = title;
                this.id = ++nbMedia;
    }
    public Media(String title, String category) {
        this.title = title;
        this.category = category;
        this.id = ++nbMedia;
    }
    public Media(String title, String category, float cost) {
        this.title = title;
        this.category = category;
        this.cost = cost;
        this.id = ++nbMedia;
    }

    public int getId() {
        return id;
    }

    public String getTitle() {
        return title;
    }

    public String getCategory() {
        return category;
    }

    public float getCost() {
        return cost;
    }

    public void setTitle(String title) {
        this.title = title;
    }

}
```

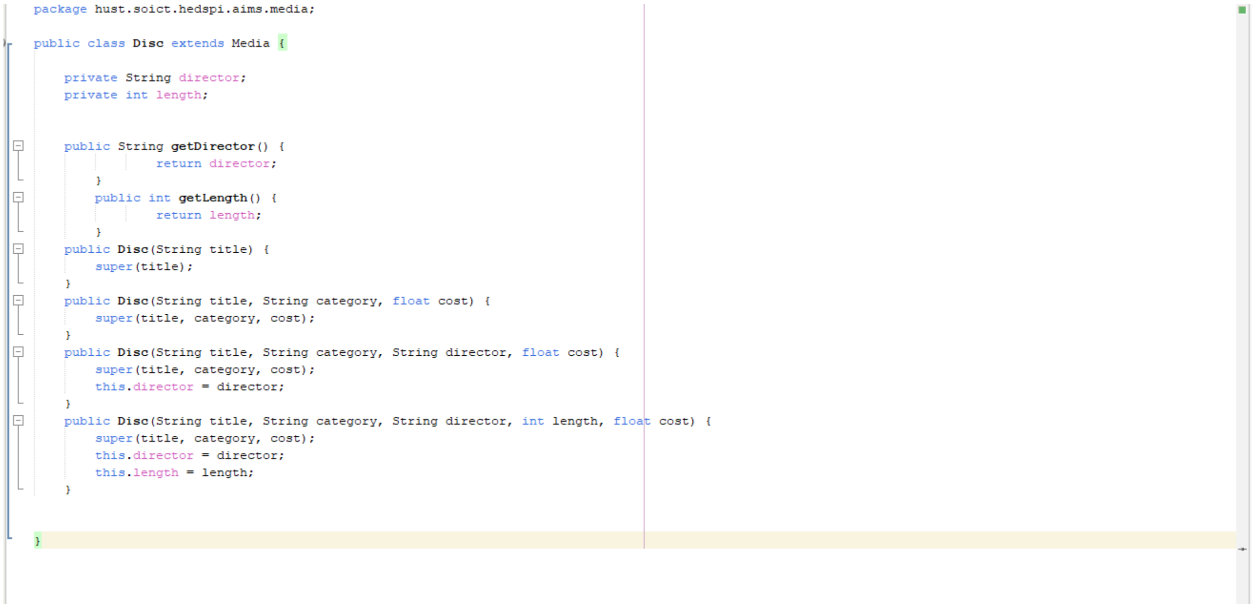
4.1 Lớp book kế thừa Media



```
package hust.soict.hedspi.aims.media;
import java.util.*;

public class Book extends Media {

    private List<String> authors = new ArrayList<String>();

    public Book(String title) {
        super(title);
    }
    public Book(String title, String category) {
        super(title, category);
    }
    public Book(String title, String category, float cost) {
        super(title, category, cost);
    }

    public void addAuthor(String authorName) {
        if (!authors.contains(authorName)) {
            authors.add(authorName);
        } else {
            System.out.println("This author has already been in the list!");
        }
    }

    public void removeAuthor(String authorName) {
        if (authors.contains(authorName)) {
            authors.remove(authorName);
        } else {
            System.out.println("No author has been found to remove!");
        }
    }
}
```

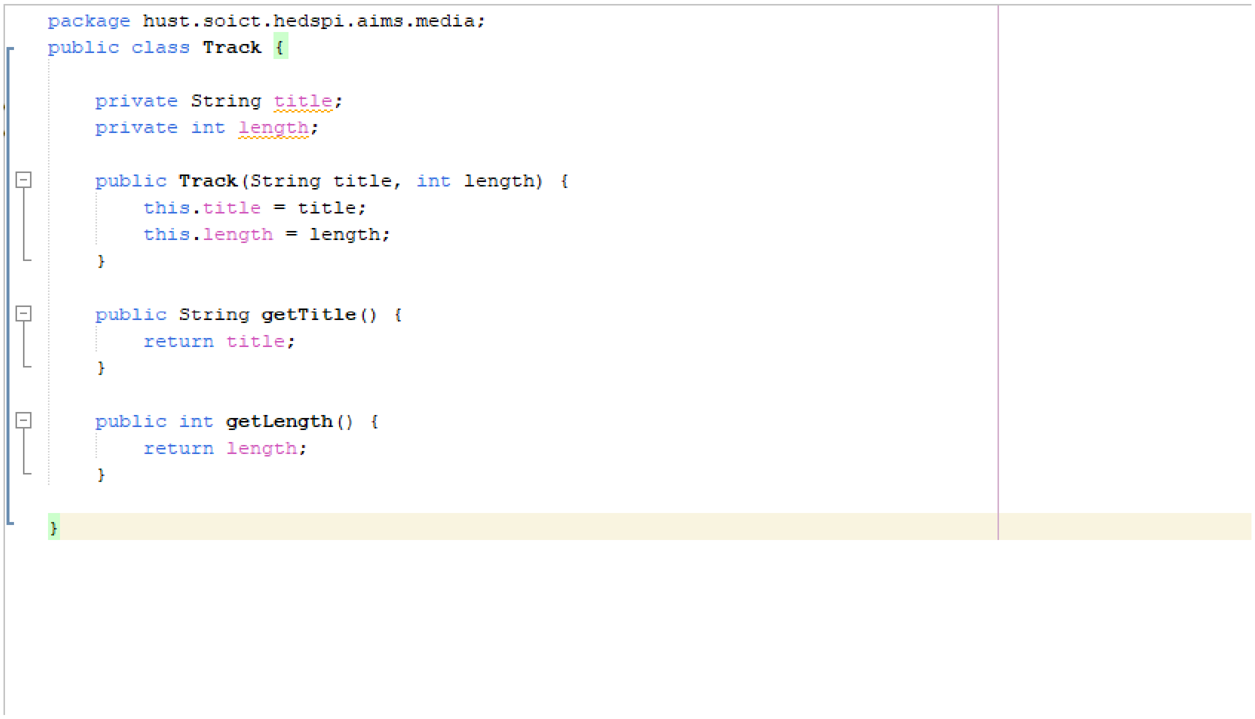
5. Tạo lớp CompactDisc

5.1 Tạo lớp Disc kế thừa Media



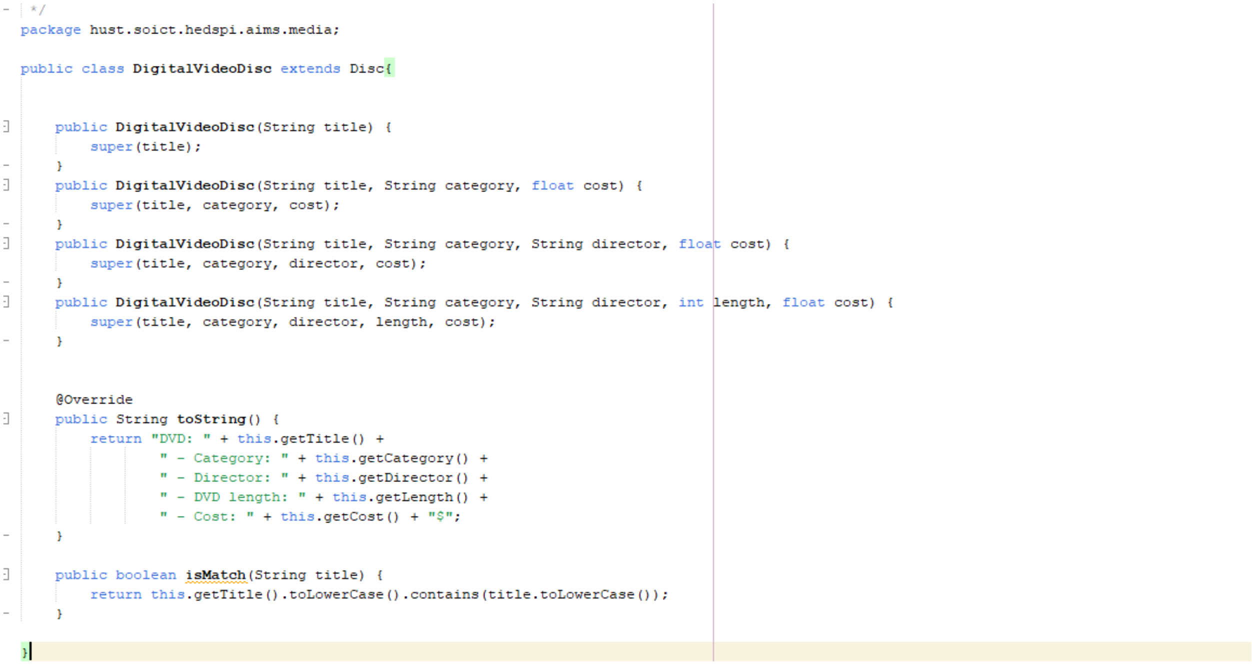
```java
package hust.soict.hedspi.aims.media;

public class Disc extends Media {

    private String director;
    private int length;


    public String getDirector() {
                return director;
        }
        public int getLength() {
                return length;
        }
    public Disc(String title) {
        super(title);
    }
    public Disc(String title, String category, float cost) {
        super(title, category, cost);
    }
    public Disc(String title, String category, String director, float cost) {
        super(title, category, cost);
        this.director = director;
    }
    public Disc(String title, String category, String director, int length, float cost) {
        super(title, category, cost);
        this.director = director;
        this.length = length;
    }


}
```

5.2 Tạo lớp Track



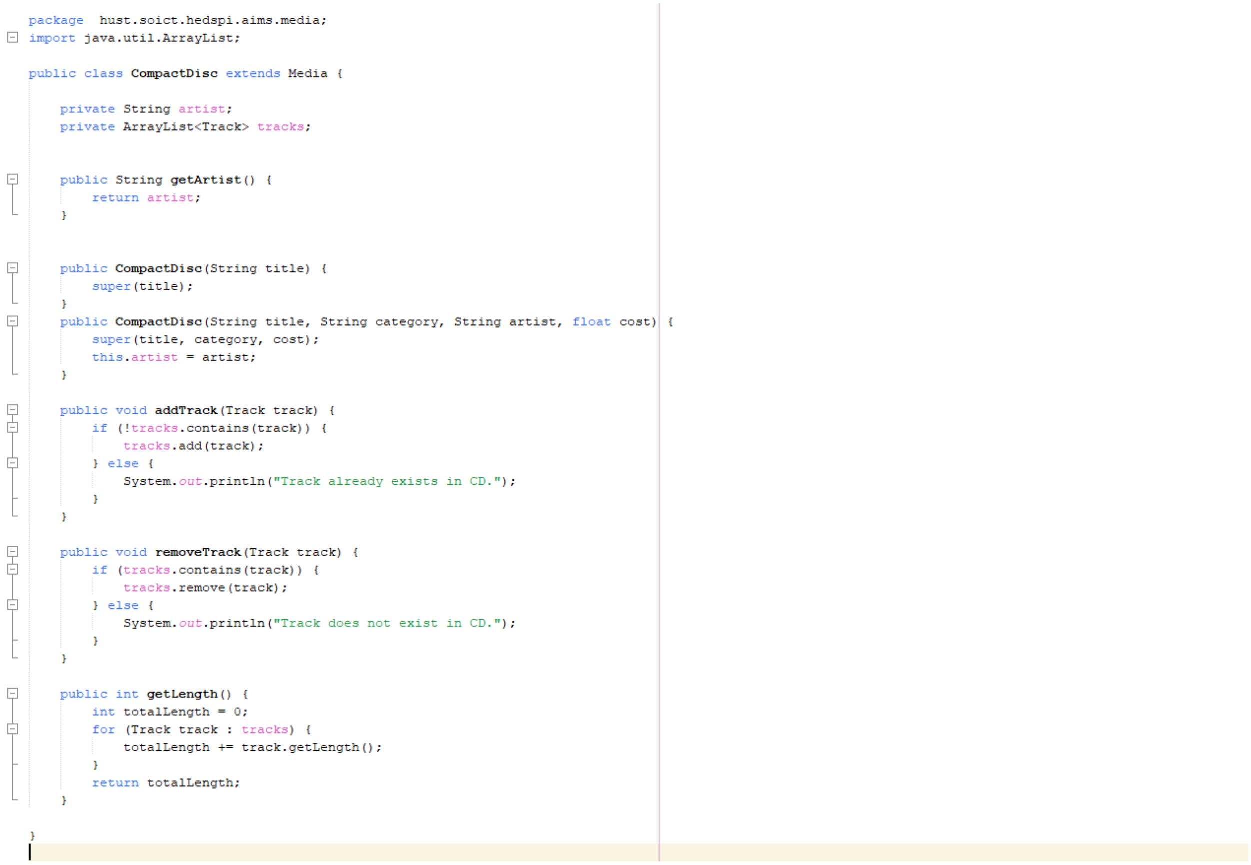
```java
package hust.soict.hedspi.aims.media;
public class Track {

    private String title;
    private int length;

    public Track(String title, int length) {
        this.title = title;
        this.length = length;
    }

    public String getTitle() {
        return title;
    }

    public int getLength() {
        return length;
    }

}
```

5.3 Sửa lớp DigitalVideoDisc



```
*/
package hust.soict.hedspi.aims.media;

public class DigitalVideoDisc extends Disc{


    public DigitalVideoDisc(String title) {
        super(title);
    }
    public DigitalVideoDisc(String title, String category, float cost) {
        super(title, category, cost);
    }
    public DigitalVideoDisc(String title, String category, String director, float cost) {
        super(title, category, director, cost);
    }
    public DigitalVideoDisc(String title, String category, String director, int length, float cost) {
        super(title, category, director, length, cost);
    }


    @Override
    public String toString() {
        return "DVD: " + this.getTitle() +
                " - Category: " + this.getCategory() +
                " - Director: " + this.getDirector() +
                " - DVD length: " + this.getLength() +
                " - Cost: " + this.getCost() + "$";
    }

    public boolean isMatch(String title) {
        return this.getTitle().toLowerCase().contains(title.toLowerCase());
    }

}
```

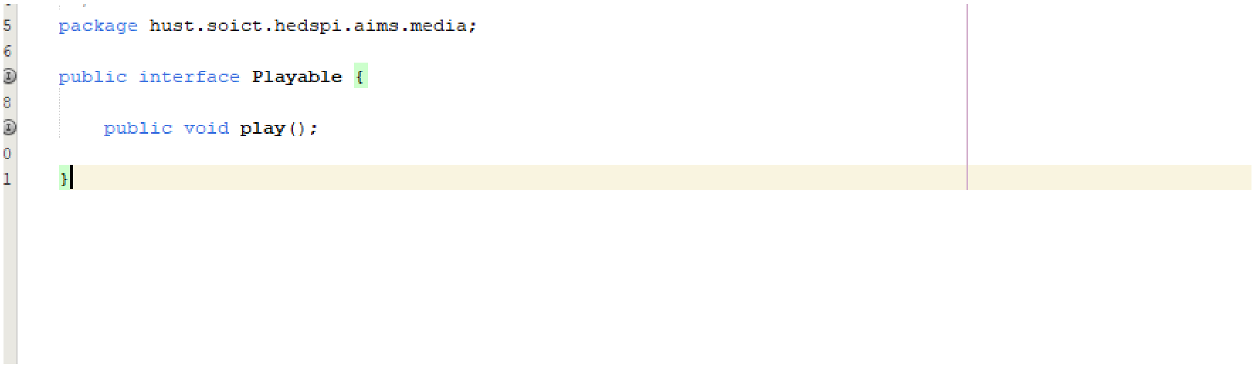
5.4 CompactDisc kế thừa Media



```java
package  hust.soict.hedspi.aims.media;
import java.util.ArrayList;

public class CompactDisc extends Media {

    private String artist;
    private ArrayList<Track> tracks;


    public String getArtist() {
        return artist;
    }


    public CompactDisc(String title) {
        super(title);
    }
    public CompactDisc(String title, String category, String artist, float cost) {
        super(title, category, cost);
        this.artist = artist;
    }

    public void addTrack(Track track) {
        if (!tracks.contains(track)) {
            tracks.add(track);
        } else {
            System.out.println("Track already exists in CD.");
        }
    }

    public void removeTrack(Track track) {
        if (tracks.contains(track)) {
            tracks.remove(track);
        } else {
            System.out.println("Track does not exist in CD.");
        }
    }

    public int getLength() {
        int totalLength = 0;
        for (Track track : tracks) {
            totalLength += track.getLength();
        }
        return totalLength;
    }

}
```

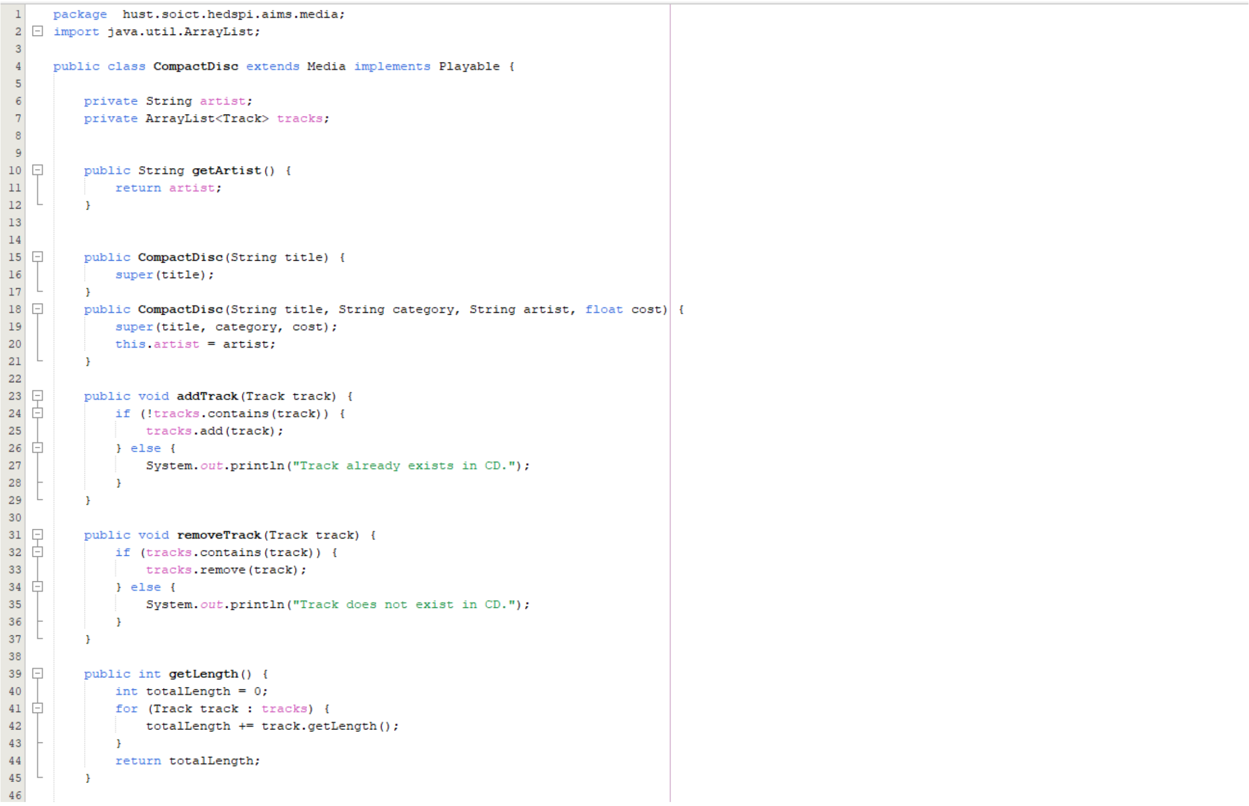
6. Tạo playable interface

6.1 Tạo playable interface

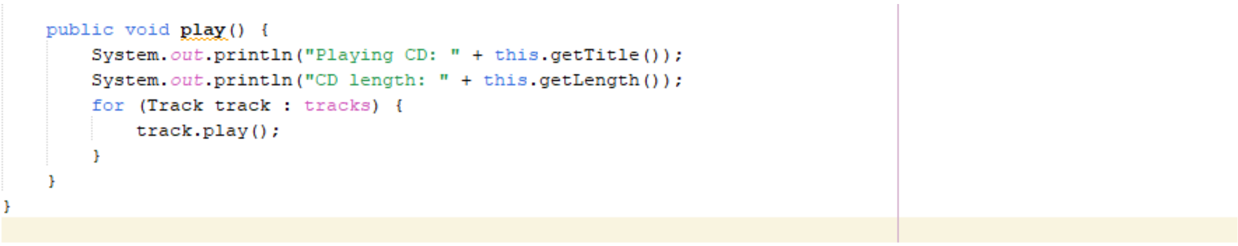


```java
package hust.soict.hedspi.aims.media;

public interface Playable {

    public void play();

}
```

6.2 Triển khai interface cho CompactDisc

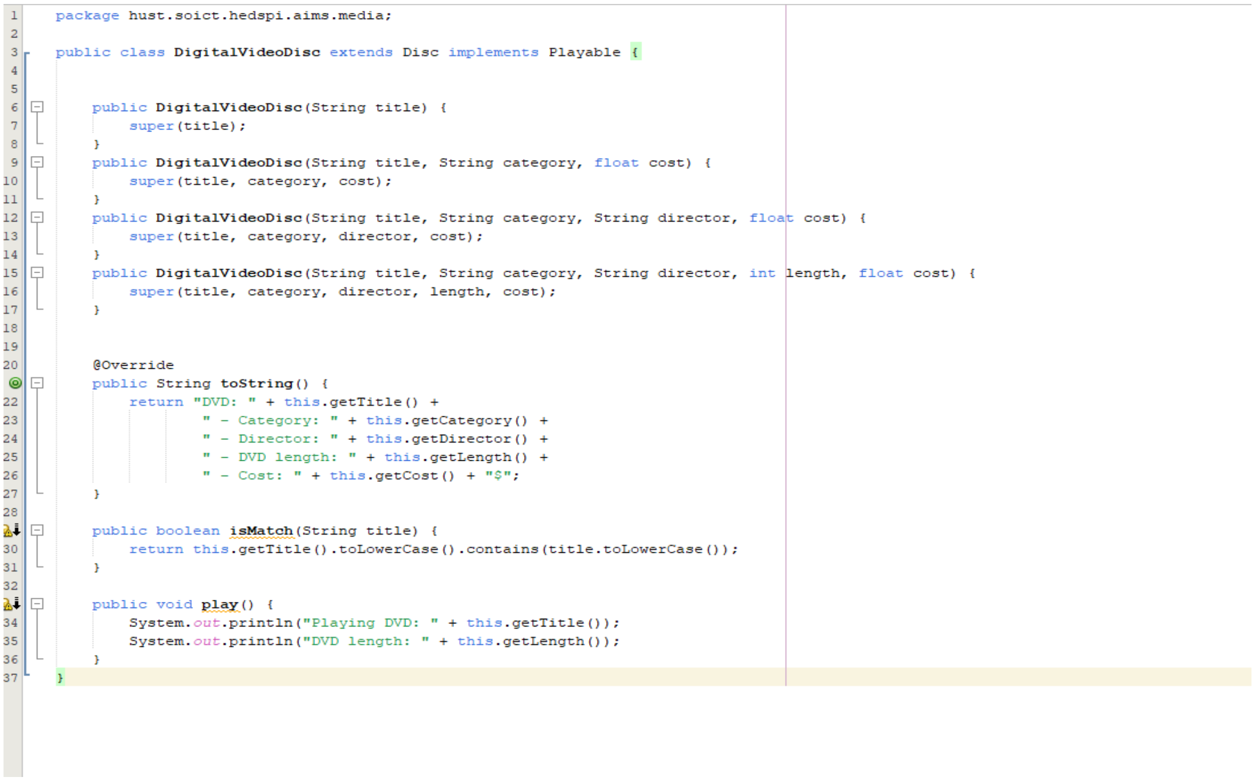


```
package  hust.soict.hedspi.aims.media;
import java.util.ArrayList;

public class CompactDisc extends Media implements Playable {

    private String artist;
    private ArrayList<Track> tracks;


    public String getArtist() {
        return artist;
    }


    public CompactDisc(String title) {
        super(title);
    }
    public CompactDisc(String title, String category, String artist, float cost) {
        super(title, category, cost);
        this.artist = artist;
    }

    public void addTrack(Track track) {
        if (!tracks.contains(track)) {
            tracks.add(track);
        } else {
            System.out.println("Track already exists in CD.");
        }
    }

    public void removeTrack(Track track) {
        if (tracks.contains(track)) {
            tracks.remove(track);
        } else {
            System.out.println("Track does not exist in CD.");
        }
    }

    public int getLength() {
        int totalLength = 0;
        for (Track track : tracks) {
            totalLength += track.getLength();
        }
        return totalLength;
    }

```



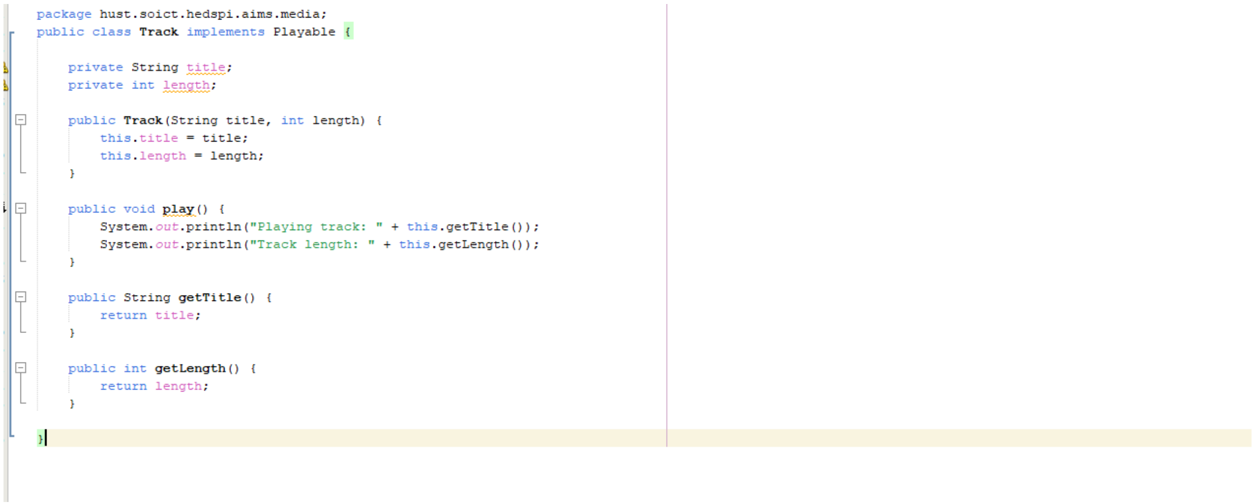
```
    public void play() {
        System.out.println("Playing CD: " + this.getTitle());
        System.out.println("CD length: " + this.getLength());
        for (Track track : tracks) {
            track.play();
        }
    }
}
```

6.3 Triển khai interface với DigitalVideoDisc



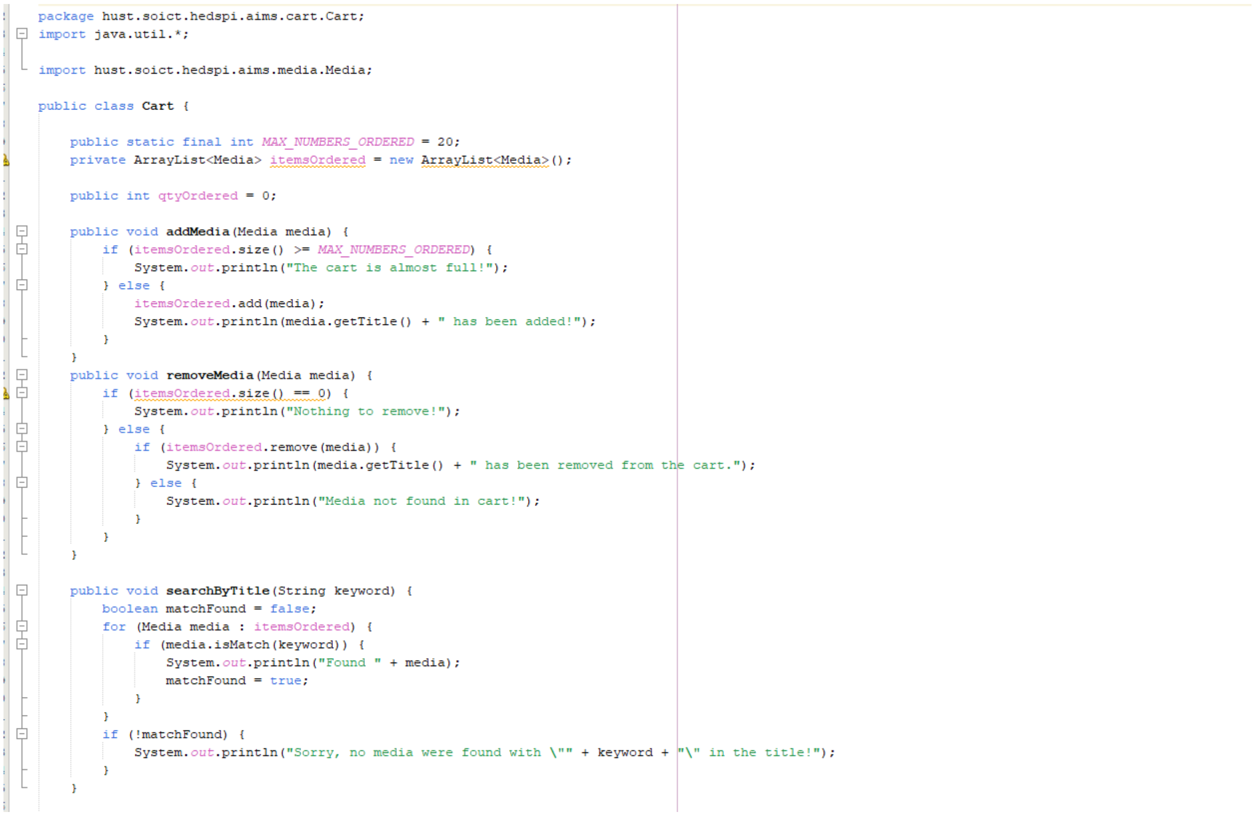
```java
package hust.soict.hedspi.aims.media;

public class DigitalVideoDisc extends Disc implements Playable {


    public DigitalVideoDisc(String title) {
        super(title);
    }
    public DigitalVideoDisc(String title, String category, float cost) {
        super(title, category, cost);
    }
    public DigitalVideoDisc(String title, String category, String director, float cost) {
        super(title, category, director, cost);
    }
    public DigitalVideoDisc(String title, String category, String director, int length, float cost) {
        super(title, category, director, length, cost);
    }


    @Override
    public String toString() {
        return "DVD: " + this.getTitle() +
                " - Category: " + this.getCategory() +
                " - Director: " + this.getDirector() +
                " - DVD length: " + this.getLength() +
                " - Cost: " + this.getCost() + "$";
    }

    public boolean isMatch(String title) {
        return this.getTitle().toLowerCase().contains(title.toLowerCase());
    }

    public void play() {
        System.out.println("Playing DVD: " + this.getTitle());
        System.out.println("DVD length: " + this.getLength());
    }
}
```

6.4 Triển khai interface với Track

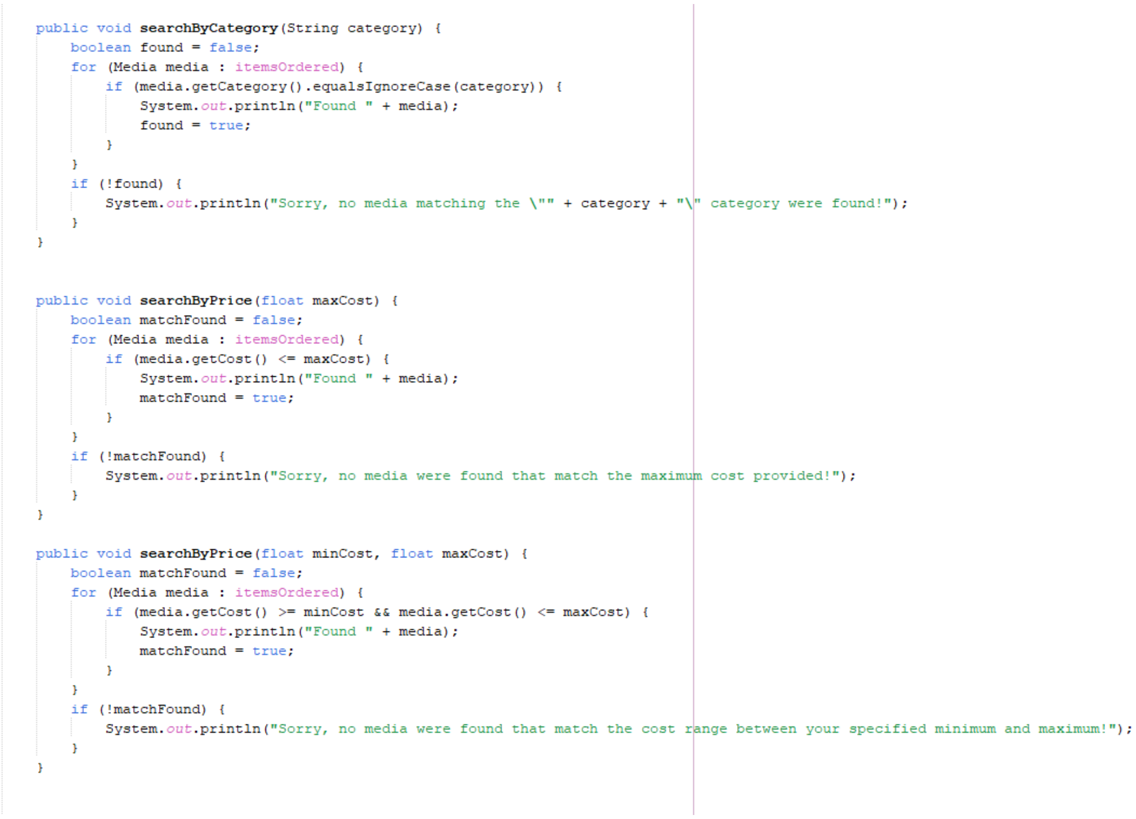


```java
package hust.soict.hedspi.aims.media;
public class Track implements Playable {

    private String title;
    private int length;

    public Track(String title, int length) {
        this.title = title;
        this.length = length;
    }

    public void play() {
        System.out.println("Playing track: " + this.getTitle());
        System.out.println("Track length: " + this.getLength());
    }

    public String getTitle() {
        return title;
    }

    public int getLength() {
        return length;
    }

}
```

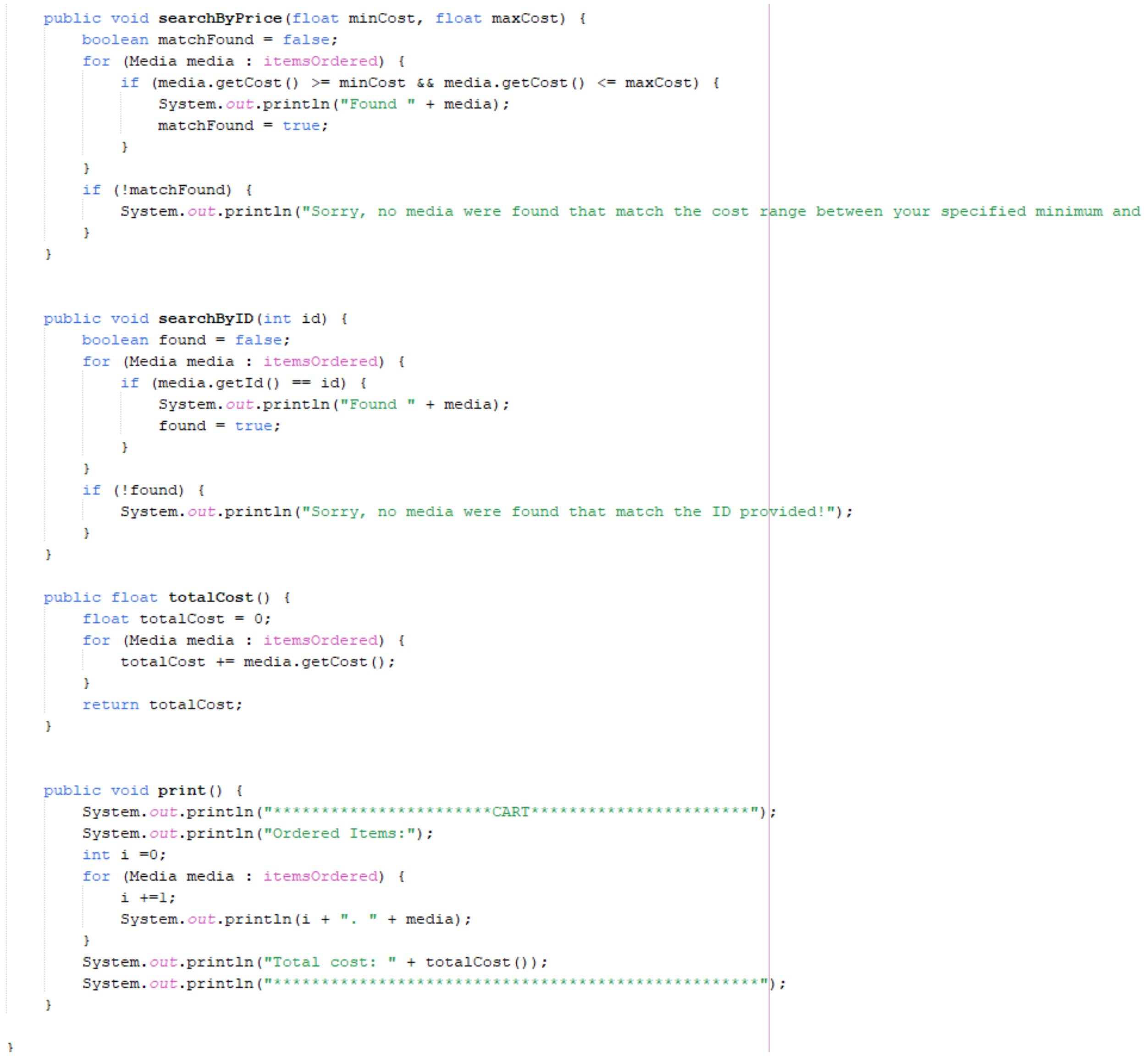
7. Cập nhật cart để hoạt động với Media



```java
package hust.soict.hedspi.aims.cart.Cart;
import java.util.*;

import hust.soict.hedspi.aims.media.Media;

public class Cart {

    public static final int MAX_NUMBERS_ORDERED = 20;
    private ArrayList<Media> itemsOrdered = new ArrayList<Media>();

    public int qtyOrdered = 0;

    public void addMedia(Media media) {
        if (itemsOrdered.size() >= MAX_NUMBERS_ORDERED) {
            System.out.println("The cart is almost full!");
        } else {
            itemsOrdered.add(media);
            System.out.println(media.getTitle() + " has been added!");
        }
    }
    public void removeMedia(Media media) {
        if (itemsOrdered.size() == 0) {
            System.out.println("Nothing to remove!");
        } else {
            if (itemsOrdered.remove(media)) {
                System.out.println(media.getTitle() + " has been removed from the cart.");
            } else {
                System.out.println("Media not found in cart!");
            }
        }
    }

    public void searchByTitle(String keyword) {
        boolean matchFound = false;
        for (Media media : itemsOrdered) {
            if (media.isMatch(keyword)) {
                System.out.println("Found " + media);
                matchFound = true;
            }
        }
        if (!matchFound) {
            System.out.println("Sorry, no media were found with \"" + keyword + "\" in the title!");
        }
    }
```

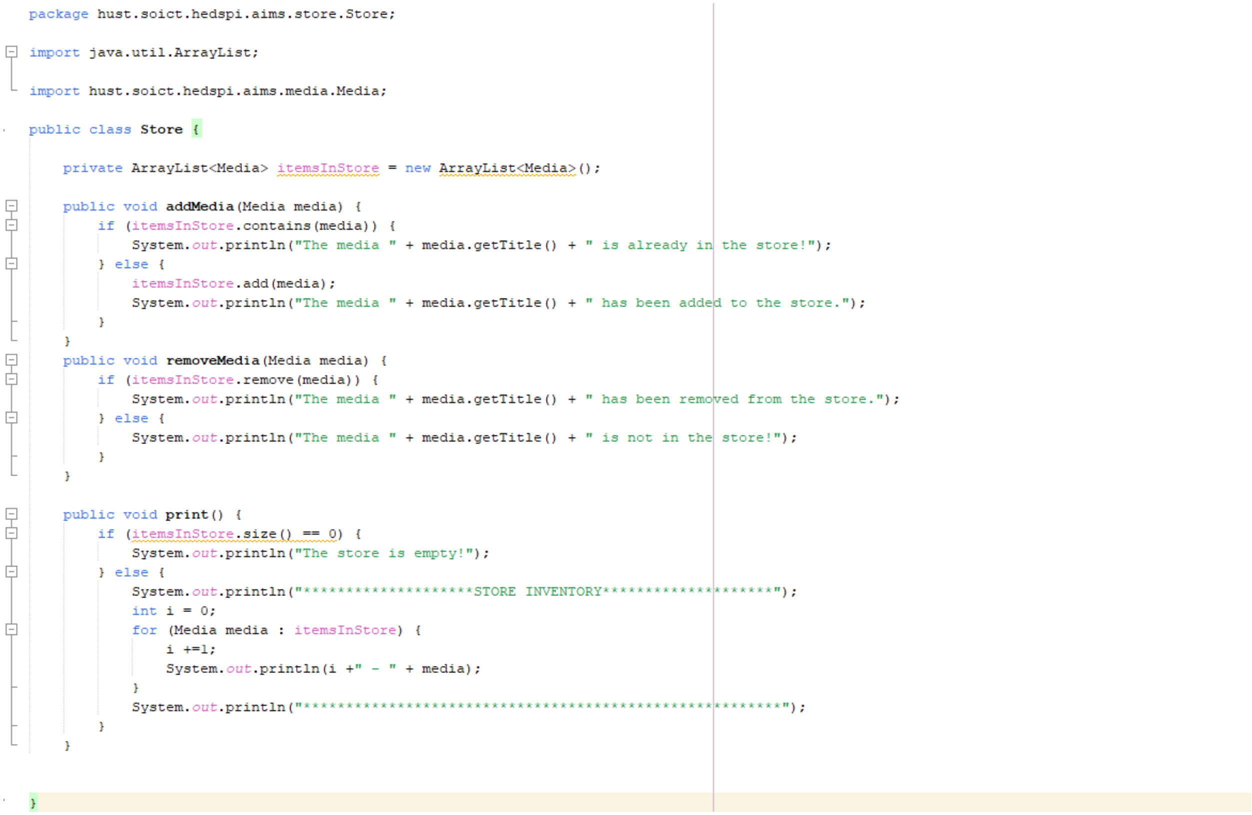


```java
public void searchByCategory(String category) {
    boolean found = false;
    for (Media media : itemsOrdered) {
        if (media.getCategory().equalsIgnoreCase(category)) {
            System.out.println("Found " + media);
            found = true;
        }
    }
    if (!found) {
        System.out.println("Sorry, no media matching the \"" + category + "\" category were found!");
    }
}


public void searchByPrice(float maxCost) {
    boolean matchFound = false;
    for (Media media : itemsOrdered) {
        if (media.getCost() <= maxCost) {
            System.out.println("Found " + media);
            matchFound = true;
        }
    }
    if (!matchFound) {
        System.out.println("Sorry, no media were found that match the maximum cost provided!");
    }
}

public void searchByPrice(float minCost, float maxCost) {
    boolean matchFound = false;
    for (Media media : itemsOrdered) {
        if (media.getCost() >= minCost && media.getCost() <= maxCost) {
            System.out.println("Found " + media);
            matchFound = true;
        }
    }
    if (!matchFound) {
        System.out.println("Sorry, no media were found that match the cost range between your specified minimum and maximum!");
    }
}
```



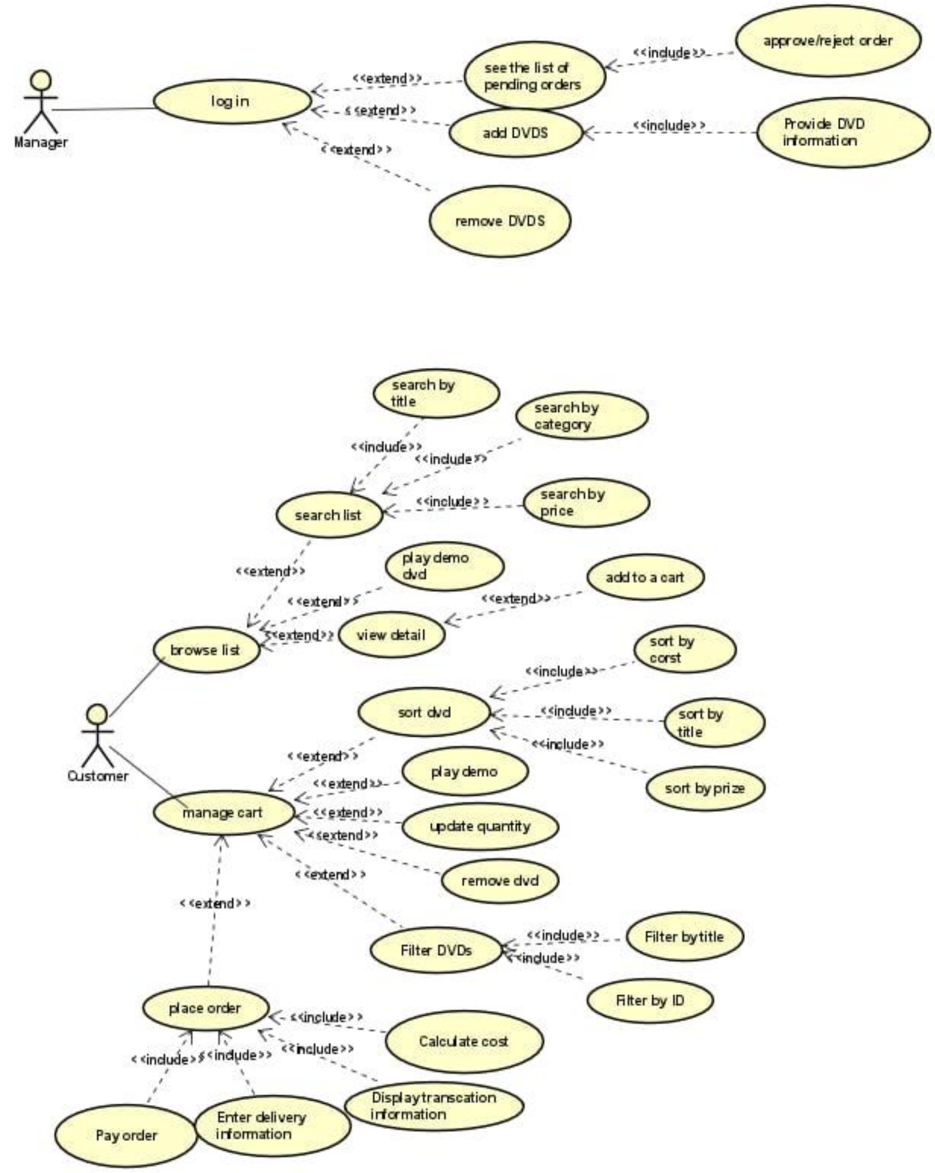
```java
    public void searchByPrice(float minCost, float maxCost) {
        boolean matchFound = false;
        for (Media media : itemsOrdered) {
            if (media.getCost() >= minCost && media.getCost() <= maxCost) {
                System.out.println("Found " + media);
                matchFound = true;
            }
        }
        if (!matchFound) {
            System.out.println("Sorry, no media were found that match the cost range between your specified minimum and
        }
    }


    public void searchByID(int id) {
        boolean found = false;
        for (Media media : itemsOrdered) {
            if (media.getId() == id) {
                System.out.println("Found " + media);
                found = true;
            }
        }
        if (!found) {
            System.out.println("Sorry, no media were found that match the ID provided!");
        }
    }

    public float totalCost() {
        float totalCost = 0;
        for (Media media : itemsOrdered) {
            totalCost += media.getCost();
        }
        return totalCost;
    }


    public void print() {
        System.out.println("***********************CART***********************");
        System.out.println("Ordered Items:");
        int i =0;
        for (Media media : itemsOrdered) {
            i +=1;
            System.out.println(i + ". " + media);
        }
        System.out.println("Total cost: " + totalCost());
        System.out.println("***************************************************");
    }

}
```

8. Cập nhật Store để hoạt động với Media

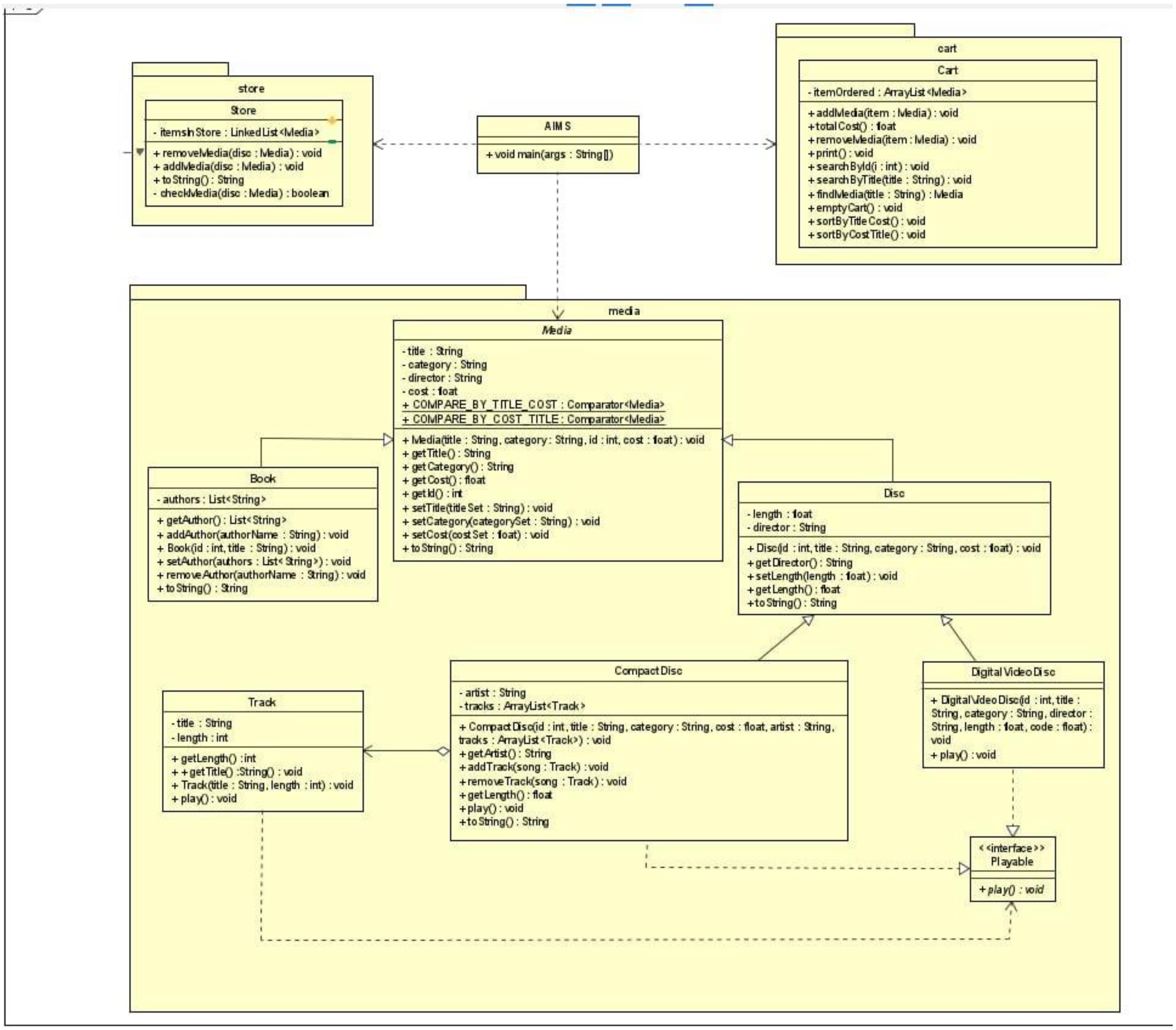


```java
package hust.soict.hedspi.aims.store.Store;

import java.util.ArrayList;

import hust.soict.hedspi.aims.media.Media;

public class Store {

    private ArrayList<Media> itemsInStore = new ArrayList<Media>();

    public void addMedia(Media media) {
        if (itemsInStore.contains(media)) {
            System.out.println("The media " + media.getTitle() + " is already in the store!");
        } else {
            itemsInStore.add(media);
            System.out.println("The media " + media.getTitle() + " has been added to the store.");
        }
    }
    public void removeMedia(Media media) {
        if (itemsInStore.remove(media)) {
            System.out.println("The media " + media.getTitle() + " has been removed from the store.");
        } else {
            System.out.println("The media " + media.getTitle() + " is not in the store!");
        }
    }

    public void print() {
        if (itemsInStore.size() == 0) {
            System.out.println("The store is empty!");
        } else {
            System.out.println("********************STORE INVENTORY********************");
            int i = 0;
            for (Media media : itemsInStore) {
                i +=1;
                System.out.println(i +" - " + media);
            }
            System.out.println("********************************************************");
        }
    }


}
```

9. Các hàm tạo của toàn bộ lớp và lớp cha

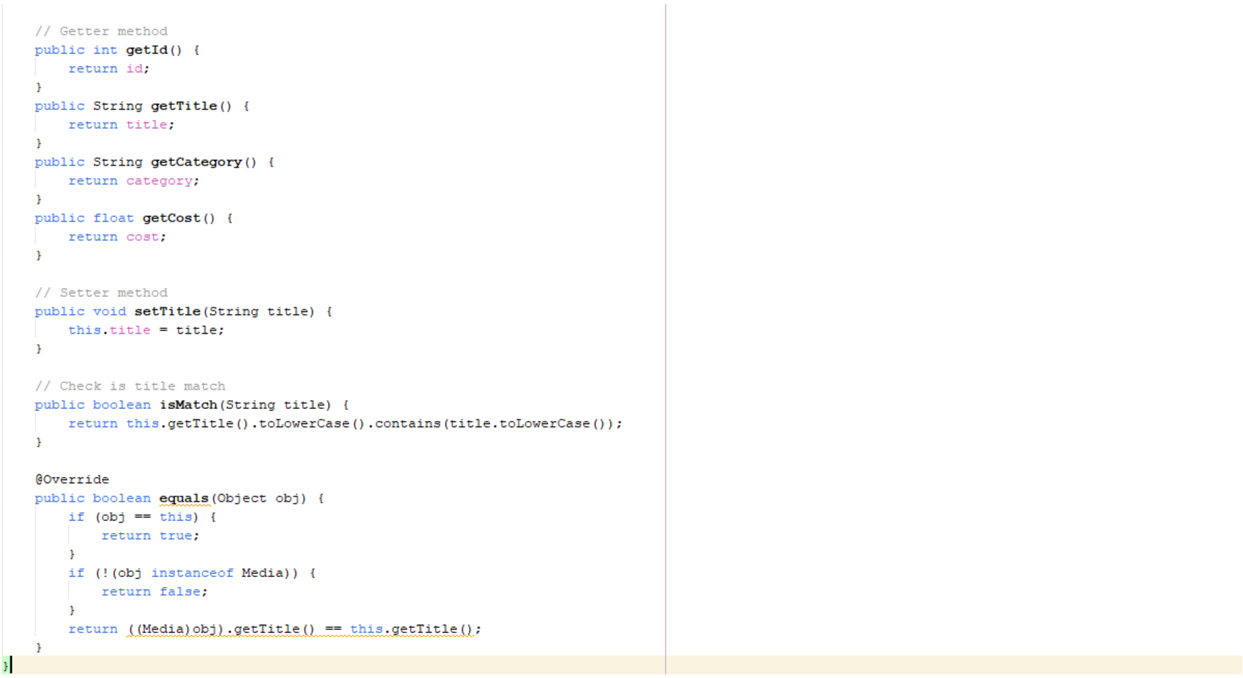


- Class Diagram


store
Store
- itemsInStore : LinkedList<Media>
+ removeMedia(disc : Media) : void
+ addMedia(disc : Media) : void
+ toString() : String
- checkMedia(disc : Media) : boolean
AIMS
+ void main(args : String[])
cart
Cart
- itemOrdered : ArrayList<Media>
+ addMedia(item : Media) : void
+ totalCost() : float
+ removeMedia(item : Media) : void
+ print() : void
+ searchById(i : int) : void
+ searchByTitle(title : String) : void
+ findMedia(title : String) : Media
+ emptyCart() : void
+ sortByTitleCost() : void
+ sortByCostTitle() : void
media
Media
- title : String
- category : String
- director : String
- cost : float
+ COMPARE_BY_TITLE_COST : Comparator<Media>
+ COMPARE_BY_COST_TITLE : Comparator<Media>
+ Media(title : String, category : String, id : int, cost : float) : void
+ getTitle() : String
+ getCategory() : String
+ getCost() : float
+ getId() : int
+ setTitle(titleSet : String) : void
+ setCategory(categorySet : String) : void
+ setCost(costSet : float) : void
+ toString() : String
Book
- authors : List<String>
+ getAuthor() : List<String>
+ addAuthor(authorName : String) : void
+ Book(id : int, title : String) : void
+ setAuthor(authors : List<String>) : void
+ removeAuthor(authorName : String) : void
+ toString() : String
Disc
- length : float
- director : String
+ Disc(id : int, title : String, category : String, cost : float) : void
+ getDirector() : String
+ setLength(length : float) : void
+ getLength() : float
+ toString() : String
CompactDisc
- artist : String
- tracks : ArrayList<Track>
+ CompactDisc(id : int, title : String, category : String, cost : float, artist : String, tracks : ArrayList<Track>) : void
+ getArtist() : String
+ addTrack(song : Track) : void
+ removeTrack(song : Track) : void
+ getLength() : float
+ play() : void
+ toString() : String
DigitalVideoDisc
+ DigitalVideoDisc(id : int, title : String, category : String, director : String, length : float, code : float) : void
+ play() : void
Track
- title : String
- length : int
+ getLength() : int
+ + getTitle() :String() : void
+ Track(title : String, length : int) : void
+ play() : void
<<interface>>
Playable
+ play() : void

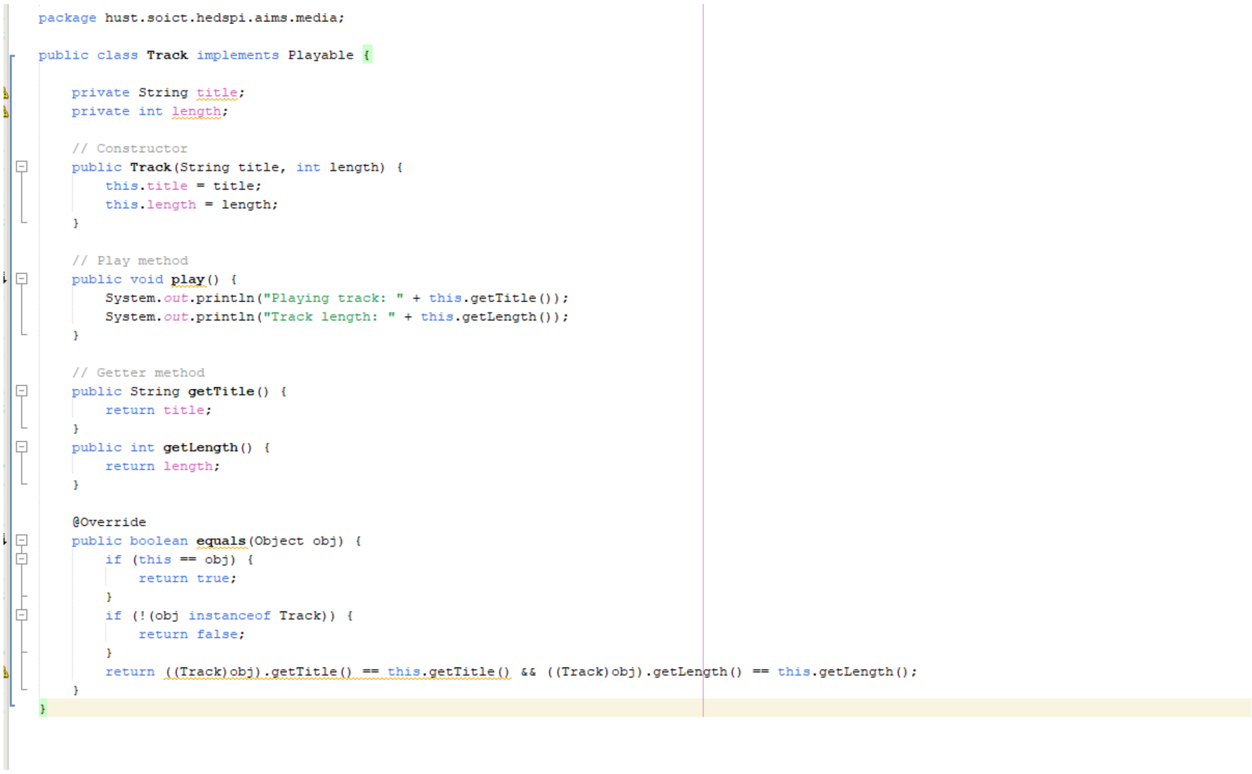
10. Unique item in a list

10.1 Thêm phương thức equals cho lớp Media



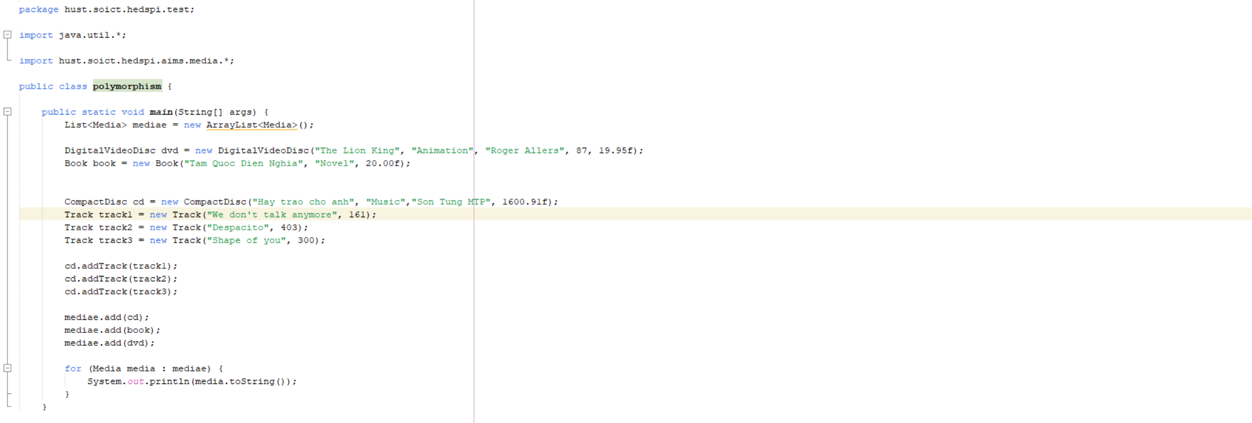
```java
    // Getter method
    public int getId() {
        return id;
    }
    public String getTitle() {
        return title;
    }
    public String getCategory() {
        return category;
    }
    public float getCost() {
        return cost;
    }

    // Setter method
    public void setTitle(String title) {
        this.title = title;
    }

    // Check is title match
    public boolean isMatch(String title) {
        return this.getTitle().toLowerCase().contains(title.toLowerCase());
    }

    @Override
    public boolean equals(Object obj) {
        if (obj == this) {
            return true;
        }
        if (!(obj instanceof Media)) {
            return false;
        }
        return ((Media)obj).getTitle() == this.getTitle();
    }
}
```

10.2 Thêm phương thức equals cho lớp Track



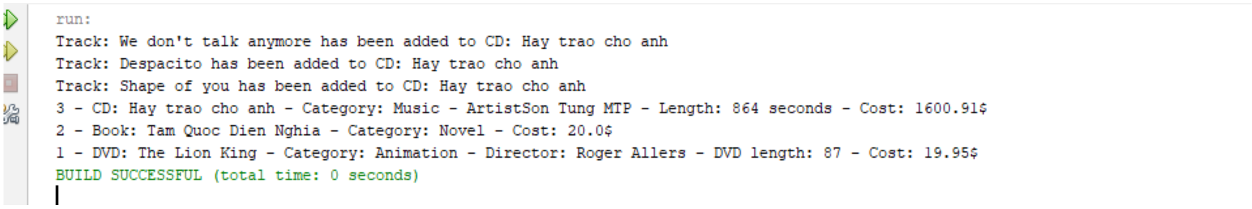
```java
package hust.soict.hedspi.aims.media;

public class Track implements Playable {

    private String title;
    private int length;

    // Constructor
    public Track(String title, int length) {
        this.title = title;
        this.length = length;
    }

    // Play method
    public void play() {
        System.out.println("Playing track: " + this.getTitle());
        System.out.println("Track length: " + this.getLength());
    }

    // Getter method
    public String getTitle() {
        return title;
    }
    public int getLength() {
        return length;
    }

    @Override
    public boolean equals(Object obj) {
        if (this == obj) {
            return true;
        }
        if (!(obj instanceof Track)) {
            return false;
        }
        return ((Track)obj).getTitle() == this.getTitle() && ((Track)obj).getLength() == this.getLength();
    }
}
```

11. Đa hình với phương thức toString()



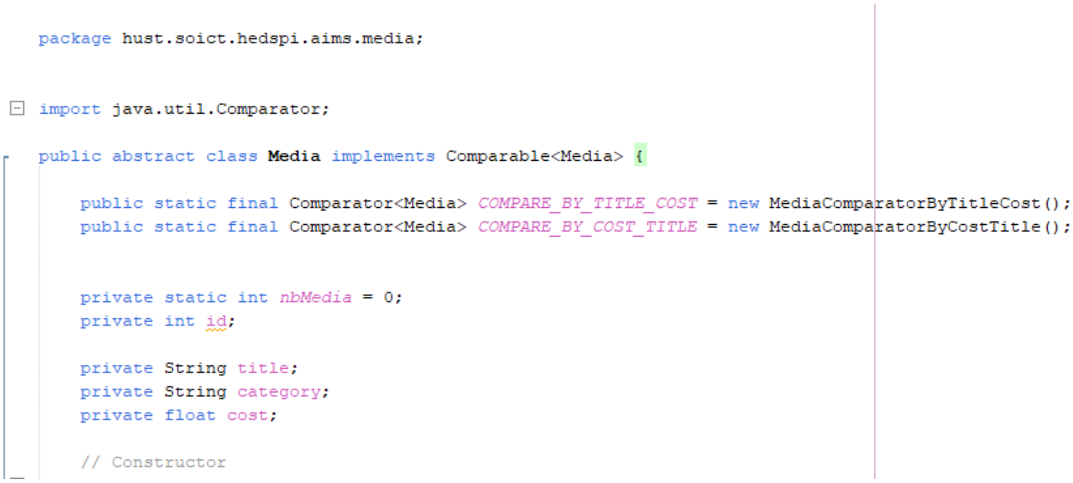
```
package hust.soict.hedspi.test;

import java.util.*;

import hust.soict.hedspi.aims.media.*;

public class polymorphism {

    public static void main(String[] args) {
        List<Media> mediae = new ArrayList<Media>();

        DigitalVideoDisc dvd = new DigitalVideoDisc("The Lion King", "Animation", "Roger Allers", 87, 19.95f);
        Book book = new Book("Tam Quoc Dien Nghia", "Novel", 20.00f);


        CompactDisc cd = new CompactDisc("Hay trao cho anh", "Music","Son Tung MTP", 1600.91f);
        Track track1 = new Track("We don't talk anymore", 161);
        Track track2 = new Track("Despacito", 403);
        Track track3 = new Track("Shape of you", 300);

        cd.addTrack(track1);
        cd.addTrack(track2);
        cd.addTrack(track3);

        mediae.add(cd);
        mediae.add(book);
        mediae.add(dvd);

        for (Media media : mediae) {
            System.out.println(media.toString());
        }
    }
```

- Kết quả :

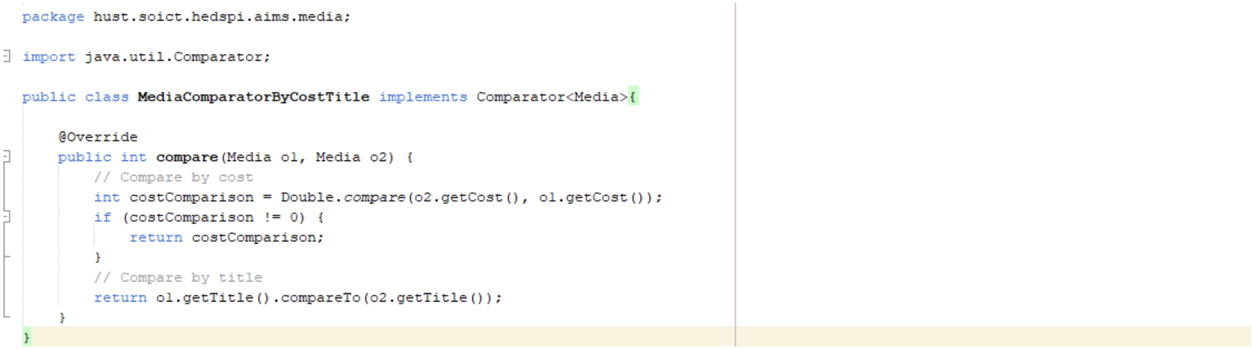


```
run:
Track: We don't talk anymore has been added to CD: Hay trao cho anh
Track: Despacito has been added to CD: Hay trao cho anh
Track: Shape of you has been added to CD: Hay trao cho anh
3 - CD: Hay trao cho anh - Category: Music - ArtistSon Tung MTP - Length: 864 seconds - Cost: 1600.91$
2 - Book: Tam Quoc Dien Nghia - Category: Novel - Cost: 20.0$
1 - DVD: The Lion King - Category: Animation - Director: Roger Allers - DVD length: 87 - Cost: 19.95$
BUILD SUCCESSFUL (total time: 0 seconds)
```

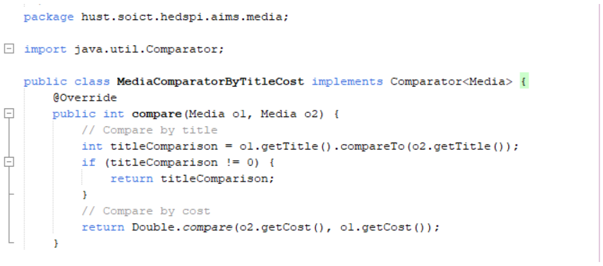
12. Sort media in the cart



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


import java.util.Comparator;

public abstract class Media implements Comparable<Media> {

    public static final Comparator<Media> COMPARE_BY_TITLE_COST = new MediaComparatorByTitleCost();
    public static final Comparator<Media> COMPARE_BY_COST_TITLE = new MediaComparatorByCostTitle();


    private static int nbMedia = 0;
    private int id;

    private String title;
    private String category;
    private float cost;

    // Constructor
```

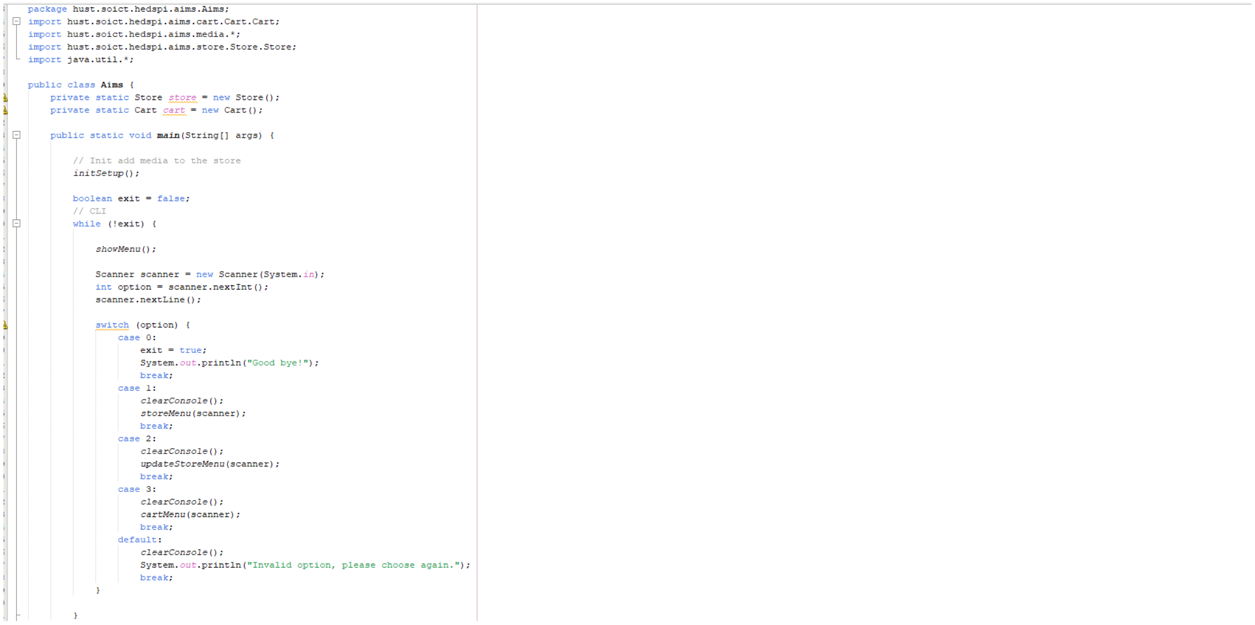


```java
package hust.soict.hedspi.aims.media;

import java.util.Comparator;

public class MediaComparatorByCostTitle implements Comparator<Media>{

    @Override
    public int compare(Media o1, Media o2) {
        // Compare by cost
        int costComparison = Double.compare(o2.getCost(), o1.getCost());
        if (costComparison != 0) {
            return costComparison;
        }
        // Compare by title
        return o1.getTitle().compareTo(o2.getTitle());
    }
}
```

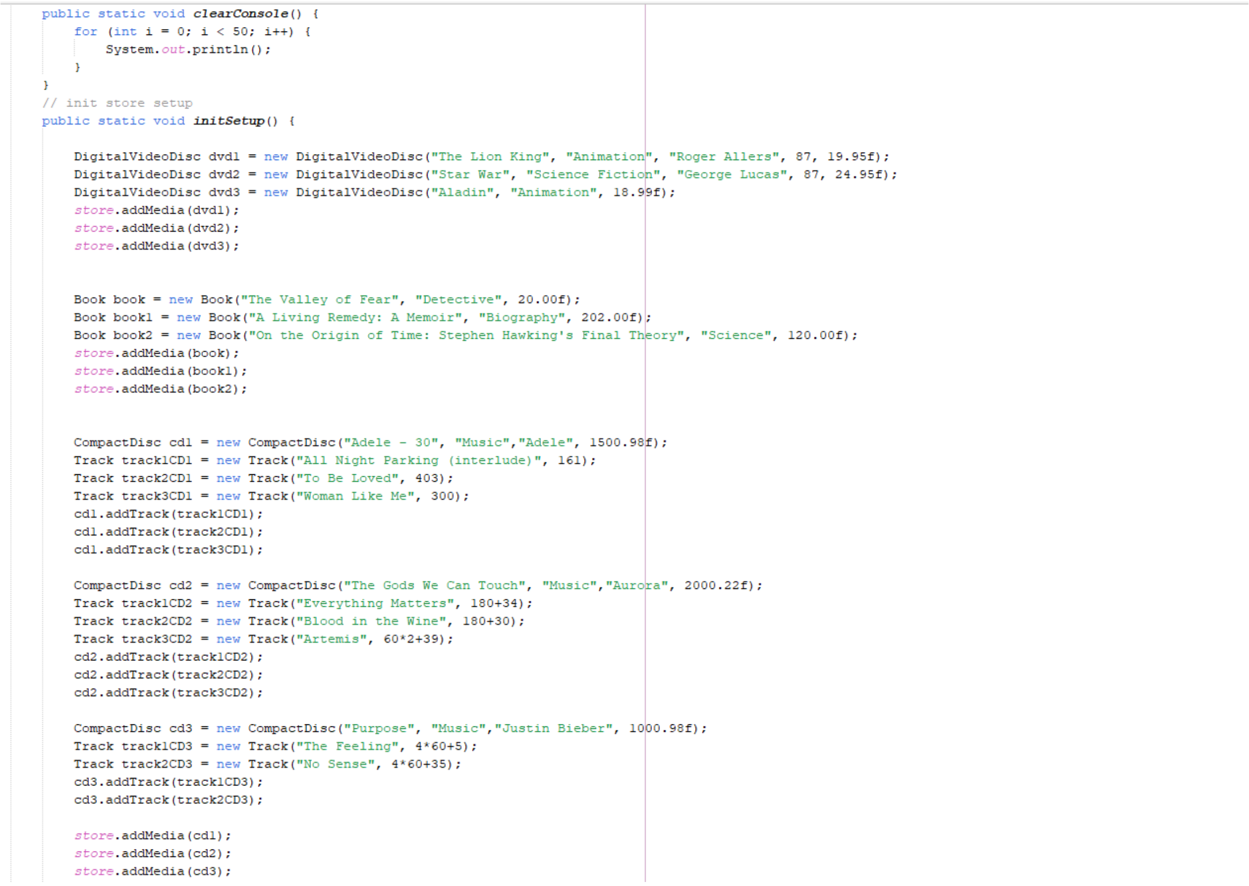


```java
package hust.soict.hedspi.aims.media;

import java.util.Comparator;

public class MediaComparatorByTitleCost implements Comparator<Media> {
    @Override
    public int compare(Media o1, Media o2) {
        // Compare by title
        int titleComparison = o1.getTitle().compareTo(o2.getTitle());
        if (titleComparison != 0) {
            return titleComparison;
        }
        // Compare by cost
        return Double.compare(o2.getCost(), o1.getCost());
    }
```

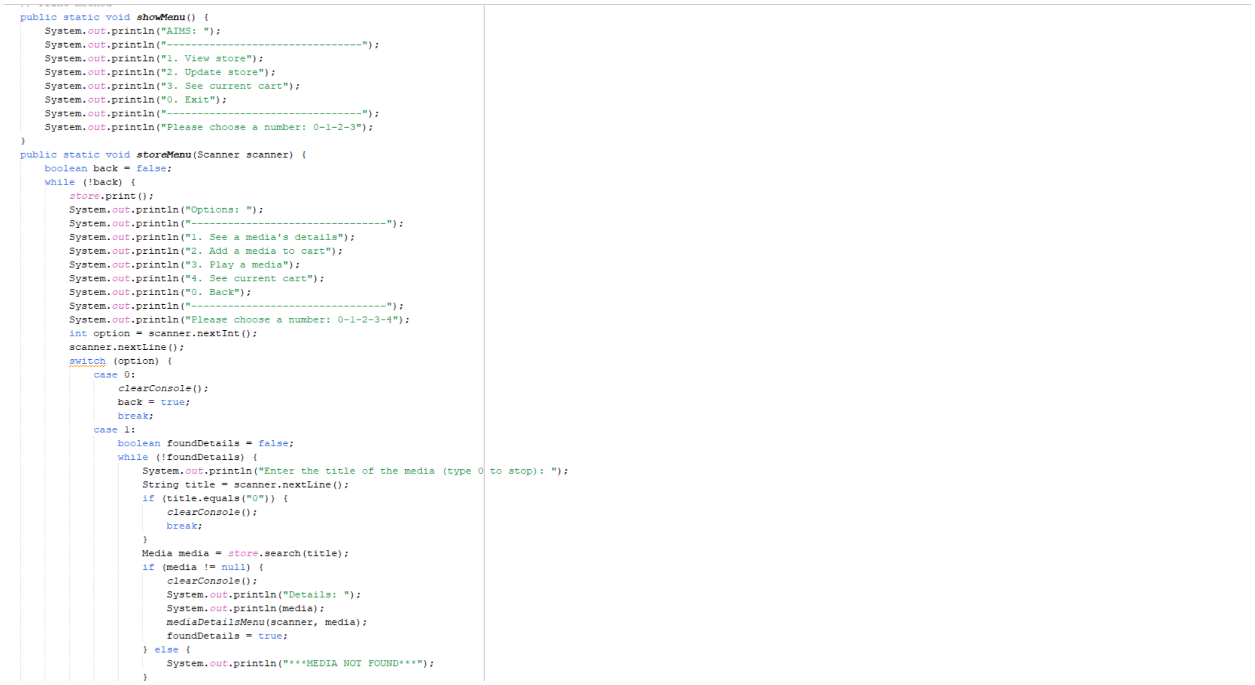
13. Tạo 1 ứng dụng bảng điều chỉnh trong Aims



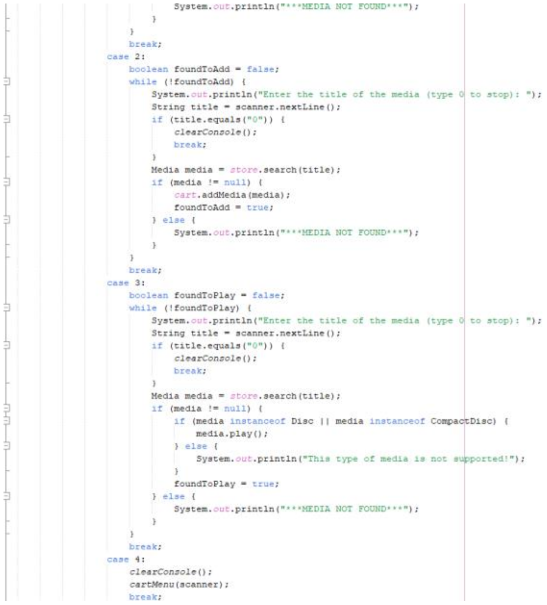
```java
package hust.soict.hedspi.aims.Aims;
import hust.soict.hedspi.aims.cart.Cart.Cart;
import hust.soict.hedspi.aims.media.*;
import hust.soict.hedspi.aims.store.Store.Store;
import java.util.*;

public class Aims {
    private static Store store = new Store();
    private static Cart cart = new Cart();

    public static void main(String[] args) {

        // Init add media to the store
        initSetup();

        boolean exit = false;
        // CLI
        while (!exit) {

            showMenu();

            Scanner scanner = new Scanner(System.in);
            int option = scanner.nextInt();
            scanner.nextLine();

            switch (option) {
                case 0:
                    exit = true;
                    System.out.println("Good bye!");
                    break;
                case 1:
                    clearConsole();
                    storeMenu(scanner);
                    break;
                case 2:
                    clearConsole();
                    updateStoreMenu(scanner);
                    break;
                case 3:
                    clearConsole();
                    cartMenu(scanner);
                    break;
                default:
                    clearConsole();
                    System.out.println("Invalid option, please choose again.");
                    break;
            }

        }
```



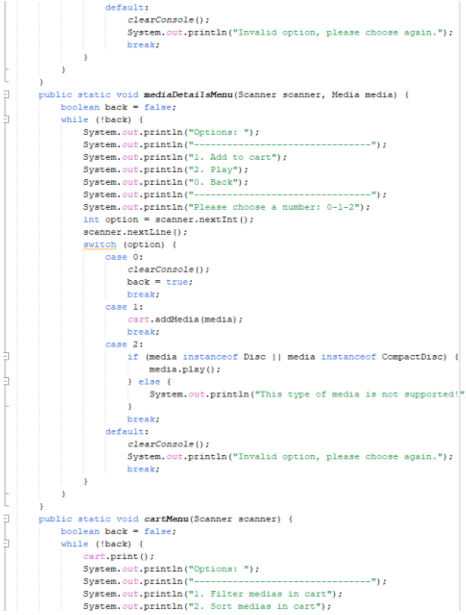
```
    public static void clearConsole() {
        for (int i = 0; i < 50; i++) {
            System.out.println();
        }
    }
    // init store setup
    public static void initSetup() {

        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", 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", 4*60+35);
        cd3.addTrack(track1CD3);
        cd3.addTrack(track2CD3);

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



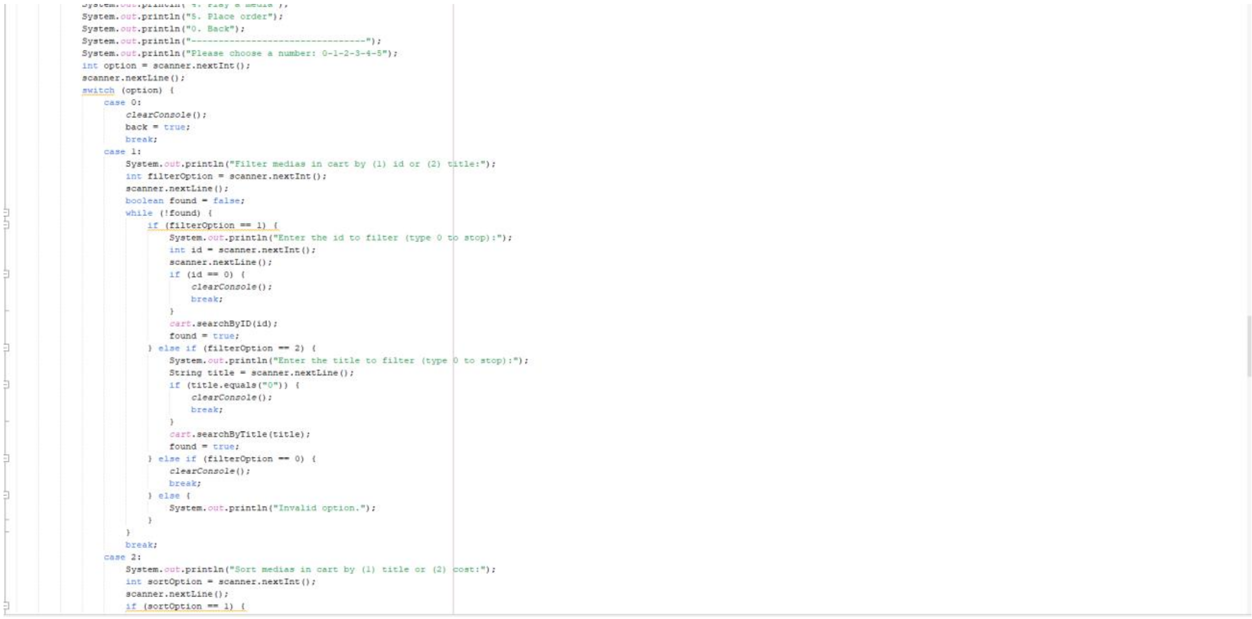
```
public static void showMenu() {
    System.out.println("AIMS: ");
    System.out.println("--------------------------------");
    System.out.println("1. View store");
    System.out.println("2. Update store");
    System.out.println("3. See current cart");
    System.out.println("0. Exit");
    System.out.println("--------------------------------");
    System.out.println("Please choose a number: 0-1-2-3");
}
public static void storeMenu(Scanner scanner) {
    boolean back = false;
    while (!back) {
        store.print();
        System.out.println("Options: ");
        System.out.println("--------------------------------");
        System.out.println("1. See a media's details");
        System.out.println("2. Add a media to cart");
        System.out.println("3. Play a media");
        System.out.println("4. See current cart");
        System.out.println("0. Back");
        System.out.println("--------------------------------");
        System.out.println("Please choose a number: 0-1-2-3-4");
        int option = scanner.nextInt();
        scanner.nextLine();
        switch (option) {
            case 0:
                clearConsole();
                back = true;
                break;
            case 1:
                boolean foundDetails = false;
                while (!foundDetails) {
                    System.out.println("Enter the title of the media (type 0 to stop): ");
                    String title = scanner.nextLine();
                    if (title.equals("0")) {
                        clearConsole();
                        break;
                    }
                    Media media = store.search(title);
                    if (media != null) {
                        clearConsole();
                        System.out.println("Details: ");
                        System.out.println(media);
                        mediaDetailsMenu(scanner, media);
                        foundDetails = true;
                    } else {
                        System.out.println("***MEDIA NOT FOUND***");
                    }
```



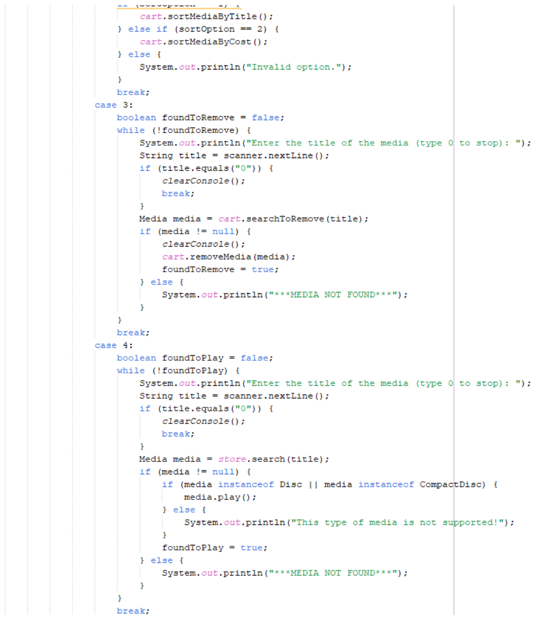
```
                        System.out.println("***MEDIA NOT FOUND***");
                    }
                }
                break;
            case 2:
                boolean foundToAdd = false;
                while (!foundToAdd) {
                    System.out.println("Enter the title of the media (type 0 to stop): ");
                    String title = scanner.nextLine();
                    if (title.equals("0")) {
                        clearConsole();
                        break;
                    }
                    Media media = store.search(title);
                    if (media != null) {
                        cart.addMedia(media);
                        foundToAdd = true;
                    } else {
                        System.out.println("***MEDIA NOT FOUND***");
                    }
                }
                break;
            case 3:
                boolean foundToPlay = false;
                while (!foundToPlay) {
                    System.out.println("Enter the title of the media (type 0 to stop): ");
                    String title = scanner.nextLine();
                    if (title.equals("0")) {
                        clearConsole();
                        break;
                    }
                    Media media = store.search(title);
                    if (media != null) {
                        if (media instanceof Disc || media instanceof CompactDisc) {
                            media.play();
                        } else {
                            System.out.println("This type of media is not supported!");
                        }
                        foundToPlay = true;
                    } else {
                        System.out.println("***MEDIA NOT FOUND***");
                    }
                }
                break;
            case 4:
                clearConsole();
                cartMenu(scanner);
                break;
```



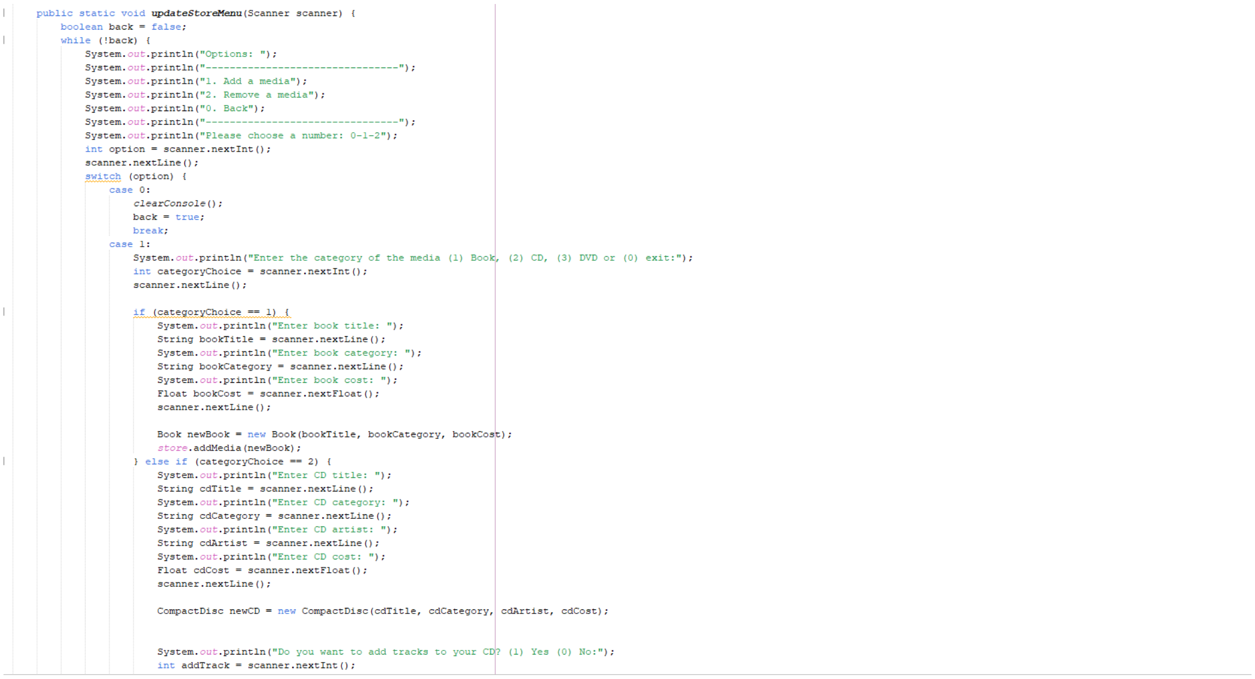
```
                default:
                    clearConsole();
                    System.out.println("Invalid option, please choose again.");
                    break;
            }
        }
    }
    public static void mediaDetailsMenu(Scanner scanner, Media media) {
        boolean back = false;
        while (!back) {
            System.out.println("Options: ");
            System.out.println("--------------------------------");
            System.out.println("1. Add to cart");
            System.out.println("2. Play");
            System.out.println("0. Back");
            System.out.println("--------------------------------");
            System.out.println("Please choose a number: 0-1-2");
            int option = scanner.nextInt();
            scanner.nextLine();
            switch (option) {
                case 0:
                    clearConsole();
                    back = true;
                    break;
                case 1:
                    cart.addMedia(media);
                    break;
                case 2:
                    if (media instanceof Disc || media instanceof CompactDisc) {
                        media.play();
                    } else {
                        System.out.println("This type of media is not supported!");
                    }
                    break;
                default:
                    clearConsole();
                    System.out.println("Invalid option, please choose again.");
                    break;
            }
        }
    }
    public static void cartMenu(Scanner scanner) {
        boolean back = false;
        while (!back) {
            cart.print();
            System.out.println("Options: ");
            System.out.println("--------------------------------");
            System.out.println("1. Filter medias in cart");
            System.out.println("2. Sort medias in cart");
```



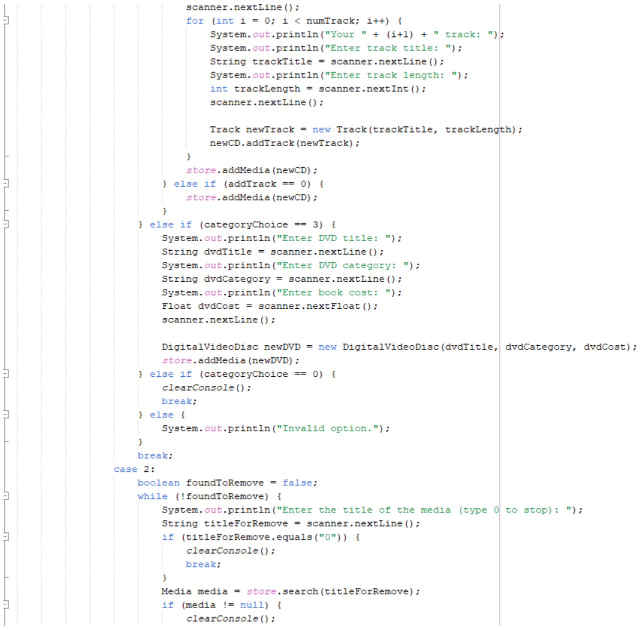
```
            System.out.println("4. Play a media");
            System.out.println("5. Place order");
            System.out.println("0. Back");
            System.out.println("--------------------------------");
            System.out.println("Please choose a number: 0-1-2-3-4-5");
            int option = scanner.nextInt();
            scanner.nextLine();
            switch (option) {
                case 0:
                    clearConsole();
                    back = true;
                    break;
                case 1:
                    System.out.println("Filter medias in cart by (1) id or (2) title:");
                    int filterOption = scanner.nextInt();
                    scanner.nextLine();
                    boolean found = false;
                    while (!found) {
                        if (filterOption == 1) {
                            System.out.println("Enter the id to filter (type 0 to stop):");
                            int id = scanner.nextInt();
                            scanner.nextLine();
                            if (id == 0) {
                                clearConsole();
                                break;
                            }
                            cart.searchByID(id);
                            found = true;
                        } else if (filterOption == 2) {
                            System.out.println("Enter the title to filter (type 0 to stop):");
                            String title = scanner.nextLine();
                            if (title.equals("0")) {
                                clearConsole();
                                break;
                            }
                            cart.searchByTitle(title);
                            found = true;
                        } else if (filterOption == 0) {
                            clearConsole();
                            break;
                        } else {
                            System.out.println("Invalid option.");
                        }
                    }
                    break;
                case 2:
                    System.out.println("Sort medias in cart by (1) title or (2) cost:");
                    int sortOption = scanner.nextInt();
                    scanner.nextLine();
                    if (sortOption == 1) {
```



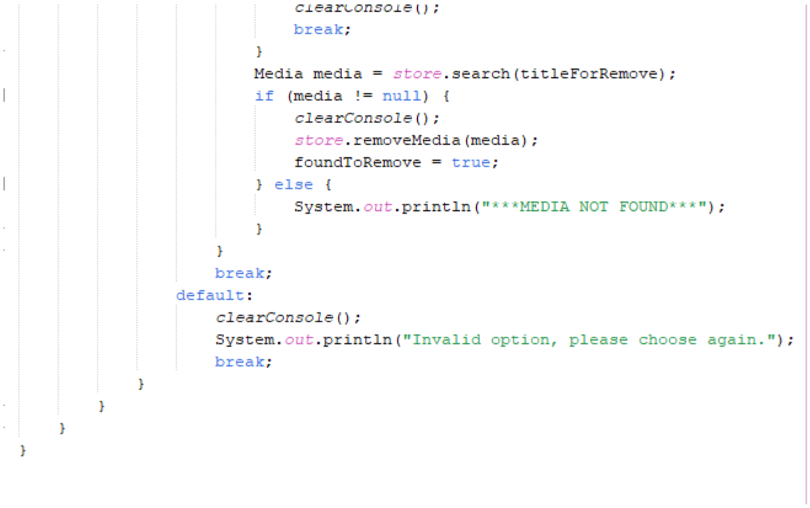
```
                        if (sortOption == 1) {
                            cart.sortMediaByTitle();
                        } else if (sortOption == 2) {
                            cart.sortMediaByCost();
                        } else {
                            System.out.println("Invalid option.");
                        }
                        break;
                    case 3:
                        boolean foundToRemove = false;
                        while (!foundToRemove) {
                            System.out.println("Enter the title of the media (type 0 to stop): ");
                            String title = scanner.nextLine();
                            if (title.equals("0")) {
                                clearConsole();
                                break;
                            }
                            Media media = cart.searchToRemove(title);
                            if (media != null) {
                                clearConsole();
                                cart.removeMedia(media);
                                foundToRemove = true;
                            } else {
                                System.out.println("***MEDIA NOT FOUND***");
                            }
                        }
                        break;
                    case 4:
                        boolean foundToPlay = false;
                        while (!foundToPlay) {
                            System.out.println("Enter the title of the media (type 0 to stop): ");
                            String title = scanner.nextLine();
                            if (title.equals("0")) {
                                clearConsole();
                                break;
                            }
                            Media media = store.search(title);
                            if (media != null) {
                                if (media instanceof Disc || media instanceof CompactDisc) {
                                    media.play();
                                } else {
                                    System.out.println("This type of media is not supported!");
                                }
                                foundToPlay = true;
                            } else {
                                System.out.println("***MEDIA NOT FOUND***");
                            }
                        }
                        break;
```



```
    public static void updateStoreMenu(Scanner scanner) {
        boolean back = false;
        while (!back) {
            System.out.println("Options: ");
            System.out.println("--------------------------------");
            System.out.println("1. Add a media");
            System.out.println("2. Remove a media");
            System.out.println("0. Back");
            System.out.println("--------------------------------");
            System.out.println("Please choose a number: 0-1-2");
            int option = scanner.nextInt();
            scanner.nextLine();
            switch (option) {
                case 0:
                    clearConsole();
                    back = true;
                    break;
                case 1:
                    System.out.println("Enter the category of the media (1) Book, (2) CD, (3) DVD or (0) exit:");
                    int categoryChoice = scanner.nextInt();
                    scanner.nextLine();

                    if (categoryChoice == 1) {
                        System.out.println("Enter book title: ");
                        String bookTitle = scanner.nextLine();
                        System.out.println("Enter book category: ");
                        String bookCategory = scanner.nextLine();
                        System.out.println("Enter book cost: ");
                        Float bookCost = scanner.nextFloat();
                        scanner.nextLine();

                        Book newBook = new Book(bookTitle, bookCategory, bookCost);
                        store.addMedia(newBook);
                    } else if (categoryChoice == 2) {
                        System.out.println("Enter CD title: ");
                        String cdTitle = scanner.nextLine();
                        System.out.println("Enter CD category: ");
                        String cdCategory = scanner.nextLine();
                        System.out.println("Enter CD artist: ");
                        String cdArtist = scanner.nextLine();
                        System.out.println("Enter CD cost: ");
                        Float cdCost = scanner.nextFloat();
                        scanner.nextLine();

                        CompactDisc newCD = new CompactDisc(cdTitle, cdCategory, cdArtist, cdCost);


                        System.out.println("Do you want to add tracks to your CD? (1) Yes (0) No:");
                        int addTrack = scanner.nextInt();
```



```
                            scanner.nextLine();
                            for (int i = 0; i < numTrack; i++) {
                                System.out.println("Your " + (i+1) + " track: ");
                                System.out.println("Enter track title: ");
                                String trackTitle = scanner.nextLine();
                                System.out.println("Enter track length: ");
                                int trackLength = scanner.nextInt();
                                scanner.nextLine();

                                Track newTrack = new Track(trackTitle, trackLength);
                                newCD.addTrack(newTrack);
                            }
                            store.addMedia(newCD);
                        } else if (addTrack == 0) {
                            store.addMedia(newCD);
                        }
                    } else if (categoryChoice == 3) {
                        System.out.println("Enter DVD title: ");
                        String dvdTitle = scanner.nextLine();
                        System.out.println("Enter DVD category: ");
                        String dvdCategory = scanner.nextLine();
                        System.out.println("Enter book cost: ");
                        Float dvdCost = scanner.nextFloat();
                        scanner.nextLine();

                        DigitalVideoDisc newDVD = new DigitalVideoDisc(dvdTitle, dvdCategory, dvdCost);
                        store.addMedia(newDVD);
                    } else if (categoryChoice == 0) {
                        clearConsole();
                        break;
                    } else {
                        System.out.println("Invalid option.");
                    }
                    break;
                case 2:
                    boolean foundToRemove = false;
                    while (!foundToRemove) {
                        System.out.println("Enter the title of the media (type 0 to stop): ");
                        String titleForRemove = scanner.nextLine();
                        if (titleForRemove.equals("0")) {
                            clearConsole();
                            break;
                        }
                        Media media = store.search(titleForRemove);
                        if (media != null) {
                            clearConsole();
```



```
                            clearConsole();
                            break;
                        }
                        Media media = store.search(titleForRemove);
                        if (media != null) {
                            clearConsole();
                            store.removeMedia(media);
                            foundToRemove = true;
                        } else {
                            System.out.println("***MEDIA NOT FOUND***");
                        }
                    }
                    break;
                default:
                    clearConsole();
                    System.out.println("Invalid option, please choose again.");
                    break;
            }
        }
    }
}
```

14. Question:

Câu 10 : Unique item in a list

- If the passing object is not an instance of Media, what happens?

- Nếu đối tượng truyền vào không phải là một instance của Media thì sẽ không thực hiện được phép so sánh. Nhưng nếu đối tượng truyền là instance con của Media thì ta vẫn sẽ thực hiện được phép so sánh.

Ví dụ được thực hiện ở lớp Aims:

```
Media book1 = new Book(5, "Book1", "Horror", 4.5f);
Media book2 = new Book(6, "Book1", "Scientific", 5.5f);

if (book1.equals(book2)) System.out.println("Two objects are equal");
else System.out.println("Two objects are not equal");
```

=> Kết quả là "Two objects are equal"

12. Sort media in the cart

a. What class should implement the Comparable interface?

- Lớp chứa đối tượng cần so sánh, chẳng hạn Media hoặc các lớp con của nó như DigitalVideoDisc, Book, CompactDisc.

b. In those classes, how should you implement the compareTo() method be to reflect the ordering that we want?

- Em đã triển khai phương thức compareTo() trong lớp Media:

```
   @Override
   public int compareTo(Media other) {
      int titleComparison = this.title.compareTo(other.title);
      if (titleComparison != 0) return titleComparison;



      return Float.compare(other.cost, this.cost);
   }
```

c. Can we have two ordering rules of the item (by title then cost and by cost then title) if we use this Comparable interface approach?

- Không ta không thể, Comparable chỉ cho phép định nghĩa một quy tắc sắp xếp duy nhất thông qua phương thức compareTo().

Nếu cần nhiều quy tắc thì khi đó ta phải sử dụng Comparator như đã triển khai trong MediaComparatorByCostTitle và MediaComparatorByTitleCost.

d. Suppose the DVDs has a different ordering rule from the other media types, that is by title, then decreasing

length, then cost. How would you modify your code to allow this?

- Em ghi đè phương thức compareTo() trong lớp DigitalVideoDisc:

```
    @Override
    public int compareTo(Media other) {
        if (!(other instanceof DigitalVideoDisc)) return
super.compareTo(other);

        DigitalVideoDisc otherDVD = (DigitalVideoDisc) other;

        int titleComparison = this.getTitle().compareTo(other.getTitle());
        if (titleComparison != 0) return titleComparison;

        if (this.getLength() == otherDVD.getLength()) return
Float.compare(otherDVD.getCost(), this.getCost());

        return Integer.compare(otherDVD.getLength(), this.getLength());
    }
```