Báo cáo bài thực hành số 4

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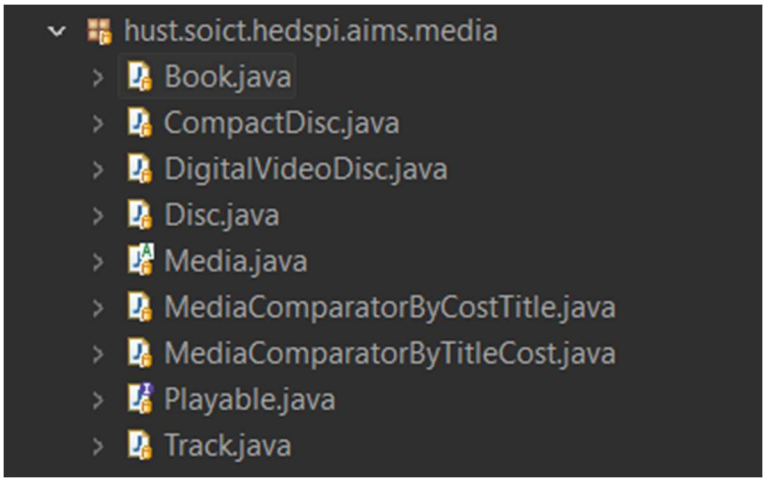
1. New written code:

1.1. Create Book class:

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

import java.util.*;

public class Book extends Media {

    private List<String> authors;

    // Constructor
    public Book(String title) {
        super(title);
        this.authors = new ArrayList<>();
    }

    public Book(String title, String category) {
        super(title, category);
        this.authors = new ArrayList<>();
    }

    public Book(String title, String category, float cost) {
        super(title, category, cost);
        this.authors = new ArrayList<>();
    }

    public Book(String title, String category, float cost, String author) {
        super(title, category, cost);
        this.authors = new ArrayList<>();
        this.authors.add(author);
    }

    // Getter and Setter for authors
    public List<String> getAuthors() {
        return authors;
    }

    public void setAuthors(List<String> authors) {
        this.authors = authors;
    }
```

1.2. Creating Media abstract:




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

import java.util.Objects;

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;

    // Getter and setter methods
    public int getId() {
        return id;
    }

    public void setId(int id) {
        this.id = id;
    }

    public String getTitle() {
        return title;
    }

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

    public String getCategory() {
        return category;
    }

    public void setCategory(String category) {
        this.category = category;
```

1.3. Creating the CompactDisc class

- Create the Disc class:

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

public class Disc extends Media {

    private String director;
    private int length;

    // Getter and setter for director
    public String getDirector() {
        return director;
    }

    public void setDirector(String director) {
        this.director = director;
    }

    // Getter and setter for length
    public int getLength() {
        return length;
    }

    public void setLength(int length) {
        this.length = length;
    }

    // Constructor with only title
    public Disc(String title) {
        super(title, "Unknown", 0.0f);  // Set default category and cost
    }

    // Constructor with title and category
    public Disc(String title, String category) {
        super(title, category, 0.0f);  // Set default cost
    }

    // Constructor with title, category, and cost
    public Disc(String title, String category, float cost) {
        super(title, category, cost);
```

- Create the Track class:

```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 String getTitle() {
        return title;
    }

    public int getLength() {
        return length;
    }

    @Override
    public void play() {
        System.out.println("Playing track: " + this.title);
        System.out.println("Track length: " + this.length + " minutes");
    }

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

- Create the CompactDisc class:

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

import java.util.ArrayList;

public class CompactDisc extends Disc implements Playable {
    private String artist;
    private List<Track> tracks = new ArrayList<>();

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

    public String getArtist() {
        return artist;
    }

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

    public void removeTrack(Track track) {
        if (tracks.contains(track)) {
            tracks.remove(track);
            System.out.println("Track removed successfully.");
        } else {
            System.out.println("Track not found in the CD.");
        }
    }

    public int getLength() {
        int totalLength = 0;
        for (Track track : tracks) {
```

1.4. Create the Playable interface:

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

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

1.5. Update the Cart class to work with Media:

```java
    // Search for media by ID
    public void searchById(int id) {
        for (Media media : itemsOrdered) {
            if (media.getId() == id) {
                System.out.println("Found Media: " + media);
                return;
            }
        }
        System.out.println("No media found with ID: " + id);
    }

    // Search for media by title
    public void searchByTitle(String title) {
        boolean found = false;
        for (Media media : itemsOrdered) {
            if (media.isMatch(title)) {
                System.out.println("Found Media: " + media);
                found = true;
            }
        }
        if (!found) {
            System.out.println("No media found with title: " + title);
        }
    }

// Search to remove
    public Media searchToRemove(String title) {
        for (Media media : itemsOrdered) {
            if (media.getTitle().equals(title)) {
                return media;
            }
        }
        return null;
    }

// Sort media in cart
    public void sortMediaByTitle() {
        Collections.sort((List<Media>)itemsOrdered, Media.COMPARE_BY_TITLE_COST);
        Iterator<Media> iterator = itemsOrdered.iterator();
        iterator = itemsOrdered.iterator();

        while (iterator.hasNext()) {
```

1.6. Update the Store class to work with Media:

```
public class Store {
    private ArrayList<Media> itemsInStore = new ArrayList<>();

    // Thêm một Media vào kho
    public void addMedia(Media media) {
        itemsInStore.add(media);
        System.out.println(media.getTitle() + " has been added to the store.");
    }

    // Xóa một Media khỏi kho
    public void removeMedia(Media media) {
        if (itemsInStore.remove(media)) {
            System.out.println(media.getTitle() + " has been removed from the store.");
        } else {
            System.out.println(media.getTitle() + " is not found in the store.");
        }
    }

    // Hiển thị danh sách các Media trong kho
    public void printStore() {
        System.out.println("**********STORE**********");
        System.out.println("Available Media in the Store:");
        for (int i = 0; i < itemsInStore.size(); i++) {
            Media media = itemsInStore.get(i);
            System.out.println((i + 1) + ". " + media.toString());
        }
        System.out.println("**************************************************");
    }

    // Tìm kiếm Media theo tiêu đề
    public Media searchByTitle(String title) {
        for (Media media : itemsInStore) {
            if (media.getTitle().equals(title)) {
                return media;
            }
        }
        return null;
    }
```

1.7. Polymorphism with toString() method:

```
public class MediaTest {

    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("The Valley of Fear", "Detective", 20.00f);


        CompactDisc cd = new CompactDisc("Adele - 30", "Music",1500.98f, "Adele");
        Track track1 = new Track("All Night Parking (interlude)", 161);
        Track track2 = new Track("To Be Loved", 403);
        Track track3 = new Track("Woman Like Me", 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());
        }
    }
```

:

1.8. Sort media in the cart:

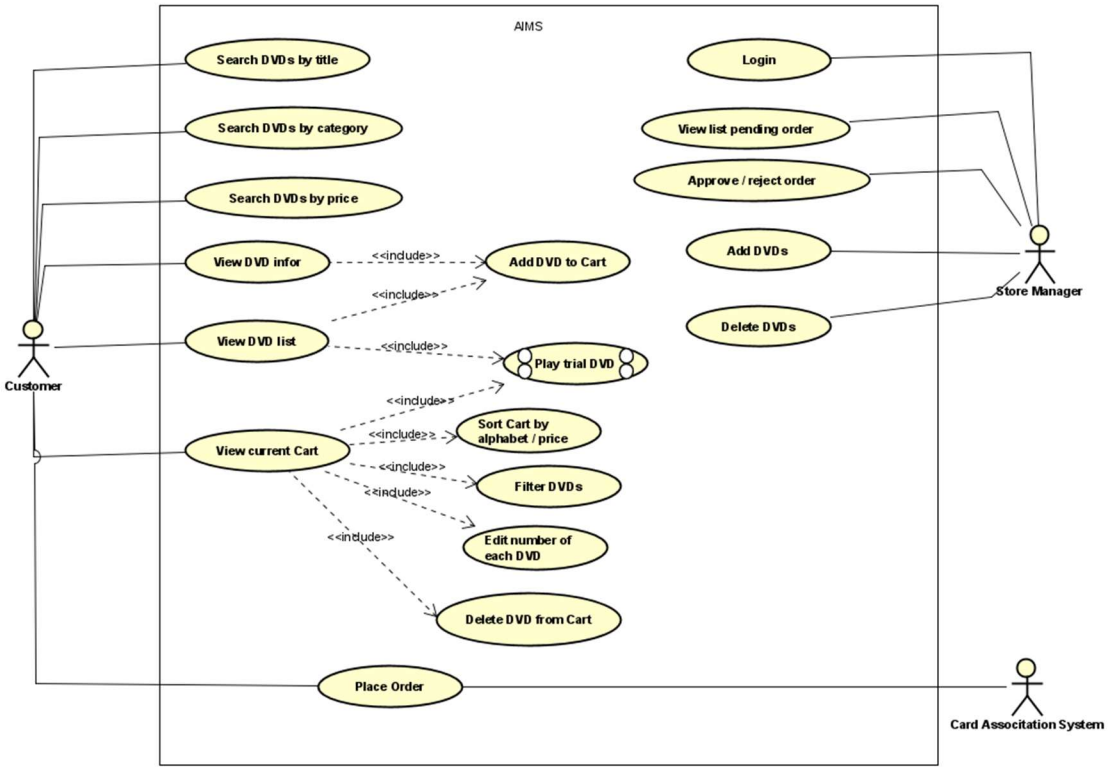
```java
import java.util.Objects;
import java.util.Comparator;

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();
```

1.9. Create a complete console application in the Aims class:

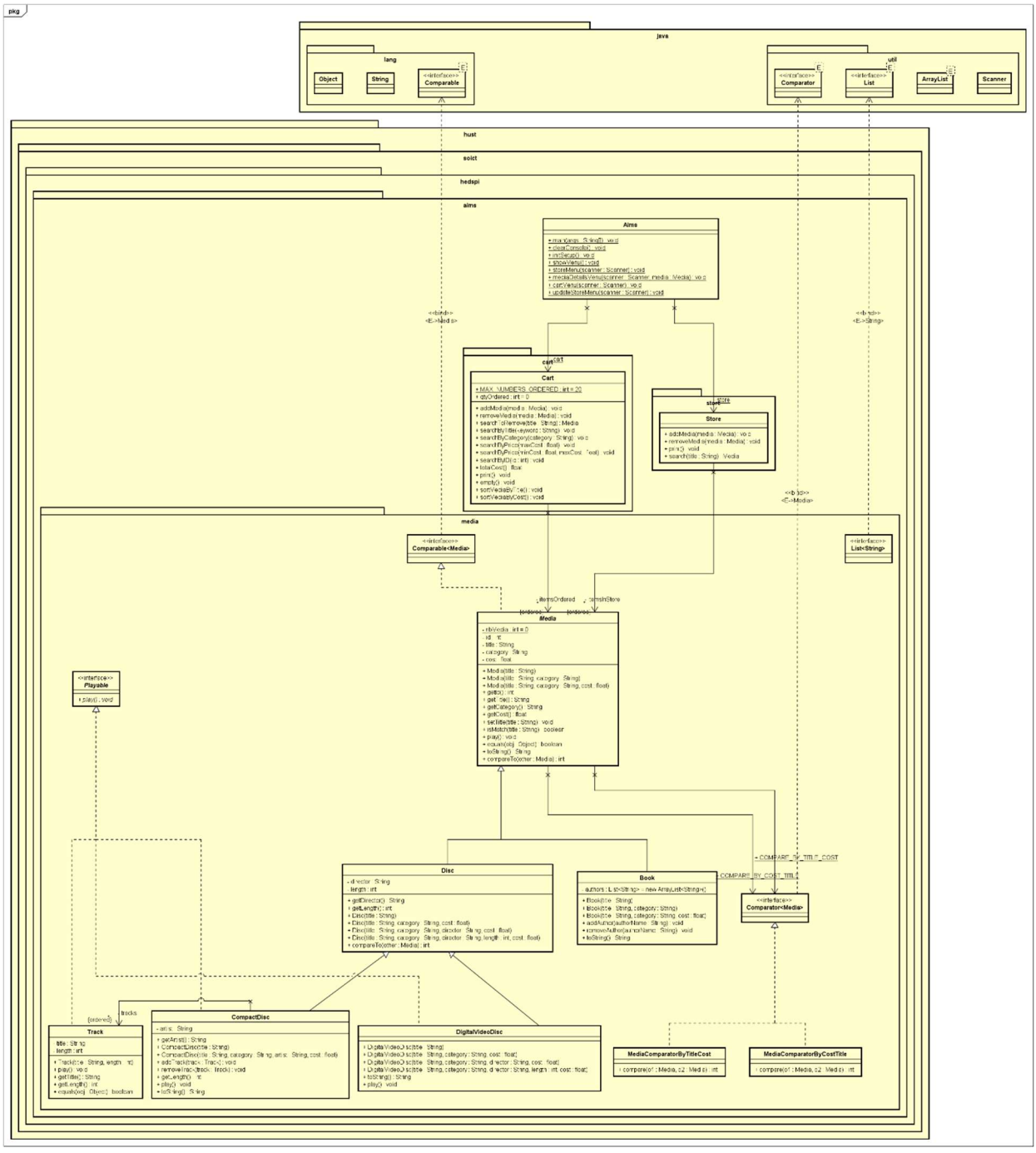
```java
// Show menu
public static void showMenu() {
    System.out.println("AIMS:");
    System.out.println("--------------------------------");
    System.out.println("1. View store");
    System.out.println("2. Update store");
    System.out.println("3. See current cart");
    System.out.println("0. 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 == false)
    {
        store.printStore();

        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;
```

2. Diagram

2.1. Use case Diagram



2.2. Class Diagram



3. Answer Questions
    - Question: Alternatively, to compare items in the cart, instead of using Comparator, we can use the Comparable interface and override the compareTo() method. You can refer to the Java docs to

see the information of this interface.Suppose we are taking this Comparable interface approach.

- What class should implement the Comparable interface?
  Media class should implement the Comparable interface
- In those classes, how should you implement the compareTo()method be to reflect the ordering that we want?
  The answer can be found in `src/hust/socit/hedspi/aims/Media.java` file.
- 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?
  No we cannot. The Comparable interface assumes that there is only one natural ordering for the objects being compared.
- 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?
  We can override the compareTo method in Disc class to reflect the new ordering rule.
  The modified code can be found in `src/hust/soict/hedspi/aims/Disc.java` file