

Nội dung

2. Additional requirements of AIMS	1
3. Creating the Book class	1
4. Creating the abstract Media class	3
5. Creating the CompactDisc class	8
6. Create the Playable interface.....	10
7. Update the Cart class to work with Media	11
8. Update the Store class to work with Media	12
9. Constructors of whole classes and parent classes.....	13
10. Unique item in a list.....	13
11. Polymorphism with toString() method	14
12. Sort media in the cart.....	15
13. Create a complete console application in the Aims class	17

2. Additional requirements of AIMS

3. Creating the **Book** class

- Ta dùng biến nbBook để có thể gán ID cho sách như với DigitalVideoDisc
- Mã nguồn bao gồm khởi tạo, getter, setter , thêm và xóa tác giả:

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

```
import java.util.List;
```

```
import java.util.ArrayList;
```

```
public class Book {  
    private int id;  
    private String title;  
    private String category;
```

```
private float cost;

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

private static int nbBook=0;

public int getId() {
    return 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;
}

public float getCost() {
    return cost;
}

public void setCost(float cost) {
    this.cost = cost;
}

public List<String> getAuthor() {
    return author;
}

public void setAuthor(List<String> author) {
    this.author = author;
}
```

```
}
```

```
public Book( String title, String category, float cost, List<String> author) {
```

```
    this.id = nbBook;
```

```
    this.title = title;
```

```
    this.category = category;
```

```
    this.cost = cost;
```

```
    this.author = author;
```

```
    nbBook+=1;
```

```
}
```

```
public void addAuthor(String authorName){
```

```
    if(!author.contains(authorName)){ // nếu danh sách không chứa tên tác giả truyền vào
```

```
    author.add(authorName);} // thêm tác giả
```

```
    else{
```

```
        System.out.println(authorName + " đã tồn tại!");
```

```
    }
```

```
}
```

```
public void removeAuthor(String authorName){
```

```
    if(author.contains(authorName)){ // nếu tồn tại tên tác giả đã truyền vào
```

```
    author.remove(authorName);} // xóa tác giả
```

```
    else{
```

```
        System.out.println("Không thể xóa tác giả chưa tồn tại!");
```

```
    }
```

```
}
```

```
}
```

4. Creating the abstract **Media** class

- Media class: (tạo biến static nbMedia để tạo ID và bỏ biến nbDigitalVideoDisc và nbBook)

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

public abstract class Media {    //lớp trừu tượng
    protected int id; // để lớp con có thể sử dụng
    private String title;
    private String category;
    private float cost;
    private static int nbMedia=0;
    public String getTitle() {
        return title;
    }
    public Media(String title) {
        this.title = title;
        this.id=nbMedia;
        nbMedia++;
    }

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

    public int getId() {
        return id;
    }

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

    public String getCategory() {
        return category;
    }

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

    public float getCost() {
        return cost;
    }
}
```

```

    }

    public void setCost(float cost) {
        this.cost = cost;
    }
}

```

- DigitalVideoDiscs class:

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

```
public class DigitalVideoDisc extends Media{// kế thừa Media
```

```

    private int length;

    private String director;

    private static int nbDigitalVideoDisc=0;

    public DigitalVideoDisc(String title) {
        super(title);
    }

```

```

    public DigitalVideoDisc(String title, String category, float cost) {           // khởi tạo
        super(title, category, cost);
    }

```

```

    public DigitalVideoDisc(String director, String category, String title, float cost) { // khởi tạo
        super(title,category,cost);
        this.director=director;
    }

```

```

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

```

```
    this.director=director;

    this.length=length;
}
```

```
public String toString() {
    StringBuilder builder = new StringBuilder();
    builder.append("DVD - ");

    if (super.getTitle() != null) {
        builder.append(super.getTitle());
    }
    builder.append(" - ");

    if (super.getCategory() != null) {
        builder.append(super.getCategory());
    }
    builder.append(" - ");

    if (director != null) {
        builder.append(director);
    }
    builder.append(" - ");

    if (length > 0) {
        builder.append(length).append(" minutes");
    }
    builder.append(": ");

    if (super.getCost() >= 0) {
```

```

        builder.append(String.format("%.2f $", super.getCost()));
    }

    return builder.toString();
}

public int getID(){
    return id;
}

public String getDirector() {
    return director;
}

public int getLength() {
    return length;
}

}

```

- Book class:

```

package hust.soict.dsai.aims.media;

import java.util.List;
import java.util.ArrayList;

public class Book extends Media{

    private List<String> author = new ArrayList<String>();
    private static int nbBook=0;

    public List<String> getAuthor() {
        return author;
    }
}

```

```

    }

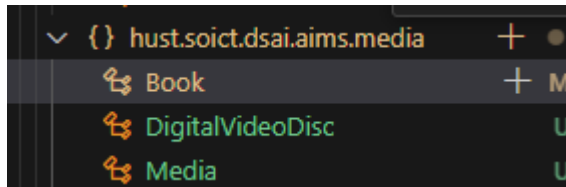
    public Book(String title, String category, float cost) {
        super(title, category, cost);
        this.id=nbBook;
        nbBook++;
    }
    public Book(String title, String category, float cost,List<String> author){
        super(title, category, cost);
        this.author=author;
    }

    public void setAuthor(List<String> author) {
        this.author = author;
    }

    public void addAuthor(String authorName){
        if(!author.contains(authorName)){
            author.add(authorName);}
        else{
            System.out.println(authorName +" đã tồn tại!");
        }
    }
    public void removeAuthor(String authorName){
        if(author.contains(authorName)){
            author.remove(authorName);}
        else{
            System.out.println("Không thể xóa tác giả chưa tồn tại!");
        }
    }
}

```

- Xóa package hust.soict.dsai.aims.dics và Move DigitalVideoDisc vào package hust.soict.dsai.aims.media:



5. Creating the **CompactDisc** class

- 5.1
 - Class Disc:


```
public class Disc extends Media{
```



```

private int length;

private String director;

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

public Disc(String title){
    super(title);
}

public int getLength() {
    return length;
}

public String getDirector() {
    return director;
}
}

```

```
public class CompactDisc extends Disc {
```

```
public class DigitalVideoDisc extends Disc{
```

- 5.2

```

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

- Update Disc: thêm hàm thêm, xóa Track và lấy độ dài của Disc:

```
public void addTrack(Track track){
    if(!tracks.contains(track)){
        tracks.add(track);
        System.out.println("Track "+track.getTitle()+" đã được thêm thành công!");
    }else{
        System.out.println("Track" +track.getTitle()+" đã tồn tại!");
    }
}

public void removeTrack(Track track){
    if(tracks.contains(track)){
        tracks.remove(track);
        System.out.println("Đã xóa Track "+track.getTitle()+" thành công!");
    }
    else{
        System.out.println("Không thể xóa Track chưa tồn tại!");
    }
}

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

6. Create the Playable interface

- Thêm play cho CD:

```
public void play(){
    System.out.println("CD Title: " + getTitle());
    System.out.println("Category: " + getCategory());
    System.out.println("Artist: " + artist);
    System.out.println("Director: " + getDirector());
    System.out.println("Cost: " + getCost() + " $");
    System.out.println("CD Length: " + getCDLength() + " minutes");

    System.out.println("\nTracks:");
    for (Track track : tracks) {
        track.play();
    }
}
```

- Play cho DVD:

```
public void play(){
    System.out.println("Playing DVD: "+this.getTitle());
    System.out.println("DVD length: "+this.getLength());
    System.out.println("Category: " + getCategory());
    System.out.println("Director: " + getDirector());
    System.out.println("Cost: " + getCost() + " $");
}
```

7. Update the **Cart** class to work with **Media**

- Mã nguồn Cart: gồm phương thức thêm, xóa và lưu trữ ItemOrdered thành danh sách Media và cập nhật phương thức TotalCost();

```
public class Cart {

    private List<Media> itemOrdered;

    public Cart(){
        itemOrdered=new ArrayList<Media>();
    }

    public void addMedia(Media media){
        if(!itemOrdered.contains(media)){
            itemOrdered.add(media);
            System.out.println("Đã thêm thành công");
        }else{
            System.out.println("Đã tồn tại!");
        }
    }

    public void removeMedia(Media media){
        if(itemOrdered.contains(media)){
            itemOrdered.remove(media);
            System.out.println("Đã xóa thành công!");
        }
    }
}
```

```

    }else{
        System.out.println("Không thể xóa!");
    }
}

```

```

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

```

8. Update the **store** class to work with **Media**

- Tương tự với Store:

```

public class Store {
    private ArrayList<Media> itemInStore; // lưu trữ các mặt hàng bằng danh sách liên kết

    public Store() {
        itemInStore = new ArrayList<Media>();
    }

    public void addDVD(Media media) {
        itemInStore.add(media);

        System.out.println("Đĩa "+media.getTitle()+" được thêm thành công!");
    }

    public void addMedia(Media... medias) {
        for (Media media : medias) {
            itemInStore.add(media);
            System.out.println("Đĩa "+media.getTitle()+" được thêm thành công!");
        }
    }
}

```

```

    }
    public void removeMedia(Media media){
        itemInStore.remove(media);

        System.out.println("Đã xóa đĩa "+media.getTitle());
    }
    public void removeMedia(Media... medias){
        for(Media media: medias){
            itemInStore.remove(media);

            System.out.println("Đã xóa đĩa "+media.getTitle());
        }
    }
    public void printStore(){

        System.out.println("*****Store*****");
        for(Media media:itemInStore){
            System.out.println(media.toString());
        }

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

```

9. Constructors of whole classes and parent classes

10. Unique item in a list

- Override equals cho Media:

```

public boolean equals(Object obj) {
    if (this == obj) return true; //
    if (obj == null || getClass() != obj.getClass()) return false;

    Media otherMedia = (Media) obj;
    return Objects.equals(title, otherMedia.title);
}

```

- Override equals cho Track:

```
public boolean equals(Object obj) {
    if (this == obj) return true;
    if (obj == null || getClass() != obj.getClass()) return false;

    Track otherTrack = (Track) obj;
    return Objects.equals(title, otherTrack.title) && length == otherTrack.length;
}
```

11. Polymorphism with toString() method

- Ta thực hiện ghi đè toString cho CD và Book; toString của DVD đã được viết từ trước, tương tự với CD và Book.

- CD

```
public String toString() {
    StringBuilder builder = new StringBuilder();
    builder.append("CompactDisc - ");

    if (super.getTitle() != null) {
        builder.append(super.getTitle());
    }
    builder.append(" - ");

    if (super.getCategory() != null) {
        builder.append(super.getCategory());
    }
    builder.append(" - ");

    if (super.getCost() >= 0) {
        builder.append(String.format("%.2f $", super.getCost()));
    }

    builder.append(" - ");

    if (artist != null) {
        builder.append("Artist: ").append(artist);
    }

    return builder.toString();
}
```

- Book:

```
public String toString() {
    StringBuilder builder = new StringBuilder();
```

```

        builder.append("Book - ");

        if (super.getTitle() != null) {
            builder.append(super.getTitle());
        }
        builder.append(" - ");

        if (super.getCategory() != null) {
            builder.append(super.getCategory());
        }
        builder.append(" - ");

        if (super.getCost() >= 0) {
            builder.append(String.format("%.2f $", super.getCost()));
        }

        return builder.toString();
    }
}

```

- Tạo CD,DVD,Book như sau:

```

List<Media> medias=new ArrayList<Media>();
CompactDisc cd = new CompactDisc( "Lover", "Country", 20f, "TaylorSwift");
DigitalVideoDisc dvd = new DigitalVideoDisc("Hello", "Pop", 18f);
Book book = new Book("Get richer","Selfhelf",5f);

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

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

```

- Thì tại mỗi con của Media sẽ chạy phương thức tương ứng của nó:

```

CompactDisc - Lover - Country - 20.00 $ - Artist: TaylorSwift
DVD - Hello - Pop - - : 18.00 $
Book - Get richer - Selfhelf - 5.00 $

```

12. Sort media in the cart

- Class Title->Cost:
import java.util.Comparator;

```

public class MediaComparatorByTitleCost implements Comparator<Media>{
    public int compare(Media media1, Media media2) {
        int titleComparison = media1.getTitle().compareTo(media2.getTitle());
        if (titleComparison != 0) {
            return titleComparison;
        }
        // Nếu tiêu đề giống nhau, so sánh theo giá
        return Float.compare(media1.getCost(), media2.getCost());
    }
}

```

- Class Cost-> Title

```

public class MediaComparatorByCostTitle implements Comparator<Media>{
    public int compare(Media media1, Media media2) {
        int costComparison = Float.compare(media2.getCost(), media1.getCost());
        if (costComparison != 0) {
            return costComparison;
        }
        // Nếu giá giống nhau, so sánh theo tiêu đề
        return media1.getTitle().compareTo(media2.getTitle());
    }
}

```

- Ta vẫn dùng dữ liệu của phần 11

- Sắp xếp theo title->cost:

```

Collections.sort(medias,Media.COMPARE_BY_TITLE_COST);
for(Media media:medias){
    System.out.println(media.toString());
}

```

- Kết quả: thứ tự từ điển: 'g' -> 'h' -> 'l'

```

1a
Book - Get richer - Selfhelp - 5.00 $
DVD - Hello - Pop - - : 18.00 $
CompactDisc - Lover - Country - 20.00 $ - Artist: TaylorSwift

```

- Sắp xếp theo cost->title:

- Với giá khác nhau:

```

Collections.sort(medias,Media.COMPARE_BY_COST_TITLE);

```

- Kết quả:

```

1b
CompactDisc - Lover - Country - 20.00 $ - Artist: TaylorSwift
DVD - Hello - Pop - - : 18.00 $
Book - Get richer - Selfhelp - 5.00 $

```


- Giả sử thêm 1 Media có cùng giá:
 - DigitalVideoDisc dvd1=new DigitalVideoDisc("Avenger","SuperHero",18f);
 - Kết quả: thứ tự từ điển: 'A' ->'H'

```
1a
CompactDisc - Lover - Country - 20.00 $ - Artist: TaylorSwift
DVD - Avenger - SuperHero - - : 18.00 $
DVD - Hello - Pop - - : 18.00 $
Book - Get richer - Selfhelp - 5.00 $
```

13. Create a complete console application in the Aims class

- Ta tạo dữ liệu sau:

```
public static void main(String[] args) {
    int choice;

    Store store = new Store();

    Cart cart = new Cart();

    DigitalVideoDisc dvd1 = new DigitalVideoDisc("Director 1", "Category 1", "DVD Title 1",
15.0f);

    DigitalVideoDisc dvd2 = new DigitalVideoDisc("Director 2", "Category 2", "DVD Title 2",
20.0f);

    DigitalVideoDisc dvd3 = new DigitalVideoDisc("Director 3", "Category 3", "DVD Title 3",
25.0f);

    CompactDisc cd1 = new CompactDisc("CD Title 1", "Category 1", 12.0f, "Artist 1");
    CompactDisc cd2 = new CompactDisc("CD Title 2", "Category 2", 18.0f, "Artist 2");
    CompactDisc cd3 = new CompactDisc("CD Title 3", "Category 3", 22.0f, "Artist 3");

    Track track1 = new Track("hello", 12);
    Track track3 = new Track("hello1", 13);
    Track track2 = new Track("hello2", 14);

    cd1.addTrack(track1);
    cd1.addTrack(track2);
    cd1.addTrack(track3);
```

```

Book book1 = new Book("Book Title 1", "Category 1", 8.0f);
Book book2 = new Book("Book Title 2", "Category 2", 10.0f);
Book book3 = new Book("Book Title 3", "Category 3", 14.0f);
Book book4 = new Book("Book Title 4", "Category 4", 16.0f);

store.addMedia(dvd1);
store.addMedia(dvd2);
store.addMedia(dvd3);
store.addMedia(cd1);
store.addMedia(cd2);
store.addMedia(cd3);
store.addMedia(book1);
store.addMedia(book2);
store.addMedia(book3);
store.addMedia(book4);

```

- Dưới đây là kết quả chạy thử Aims.java:

- Chức năng 1: View store

Aims:

-
1. View store
 2. Update store
 3. See current cart
 0. Exit
-

Please choose a number: 0-1-2-3

1

*****Store*****

DVD - DVD Title 1 - Category 1 - Director 1 - : 15.00 \$

DVD - DVD Title 2 - Category 2 - Director 2 - : 20.00 \$

DVD - DVD Title 3 - Category 3 - Director 3 - : 25.00 \$

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

CompactDisc - CD Title 2 - Category 2 - 18.00 \$ - Artist: Artist 2

CompactDisc - CD Title 3 - Category 3 - 22.00 \$ - Artist: Artist 3

Book - Book Title 1 - Category 1 - 8.00 \$

Book - Book Title 2 - Category 2 - 10.00 \$

Book - Book Title 3 - Category 3 - 14.00 \$

Book - Book Title 4 - Category 4 - 16.00 \$

Option:

1. See a media's detail

2. Add a media to cart

3. Play a media

4. See current Cart

0. Back

Please choose a number: 0-1-2-3-4

1

Enter Media's title:

CD Title 1

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

Option:

1. Add to cart

2. Play

0. Back

Please choose a number: 0-1-2

2

CD Title: CD Title 1

Category: Category 1

Artist: Artist 1

Director: null

Cost: 12.0 \$

CD Length: 39 minutes

Tracks:

Playing Track: hello

Track length: 12

Playing Track: hello2

Track length: 14

Playing Track: hello1

Track length: 13

Option:

- 1. Add to cart
- 2. Play
- 0. Back

Please choose a number: 0-1-2

1

Đã thêm thành công

- Chức năng 2: UPDATE STORE:

Aims:

-
- 1. View store
 - 2. Update store
 - 3. See current cart
 - 0. Exit

Please choose a number: 0-1-2-3

2

Update Store Menu:

- 1. Add a media to the store
- 2. Remove a media from the store
- 0. Back to the main menu

Please choose an option: 1

Choose the type of Media to add(CD/DVD/BOOK)

CD

Update Store Menu:

- 1. Add a media to the store
- 2. Remove a media from the store
- 0. Back to the main menu

Please choose an option: 1

Choose the type of Media to add(CD/DVD/BOOK)

CD

Please enter title, category, cost, and artist:(Input each line(Nhập từng dòng))

CD Title 6

EDM

26

Minh Truonggg

Enter number of Tracks:2

Enter Track 1 information:

Sinh vien 1

10

Track Sinh vien 1 đã được thêm thành công!

Enter Track 2 information:

Sinh Vien 2

12

Track Sinh Vien 2 đã được thêm thành công!

Media CD Title 6 được thêm thành công!

Update Store Menu:

1. Add a media to the store
2. Remove a media from the store
0. Back to the main menu

Please choose an option: 2

Enter title to delete: Bookkkk

Media không tồn tại!

Update Store Menu:

1. Add a media to the store
2. Remove a media from the store
0. Back to the main menu

Please choose an option: 2

Enter title to delete: Book Title 2

Đã xóa Media Book Title 2

Update Store Menu:

1. Add a media to the store
2. Remove a media from the store
0. Back to the main menu

- Chức năng 3: View Cart:

Aims:

-
1. View store
 2. Update store
 3. See current cart
 0. Exit

Please choose a number: 0-1-2-3

3

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

CompactDisc - CD Title 3 - Category 3 - 22.00 \$ - Artist: Artist 3

Book - Book Title 1 - Category 1 - 8.00 \$

DVD - DVD Title 1 - Category 1 - Director 1 - : 15.00 \$

57.0

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

2

Sort by:

- 1. Title
- 2. Cost

1

Book - Book Title 1 - Category 1 - 8.00 \$

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

CompactDisc - CD Title 3 - Category 3 - 22.00 \$ - Artist: Artist 3

DVD - DVD Title 1 - Category 1 - Director 1 - : 15.00 \$

57.0

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

2

Sort by:

- 1. Title
- 2. Cost

2

CompactDisc - CD Title 3 - Category 3 - 22.00 \$ - Artist: Artist 3

DVD - DVD Title 1 - Category 1 - Director 1 - : 15.00 \$

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

Book - Book Title 1 - Category 1 - 8.00 \$

57.0

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

3

Enter title to delete:

CD Title 3

Đã xóa thành công!

DVD - DVD Title 1 - Category 1 - Director 1 - : 15.00 \$

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

Book - Book Title 1 - Category 1 - 8.00 \$

35.0

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 title to play:

CD Title 1

CD Title: CD Title 1

Category: Category 1

Artist: Artist 1

Director: null

Cost: 12.0 \$

CD Length: 39 minutes

Tracks:

Playing Track: hello

Track length: 12

Playing Track: hello2

Track length: 14

Playing Track: hello1

Track length: 13

DVD - DVD Title 1 - Category 1 - Director 1 - : 15.00 \$

CompactDisc - CD Title 1 - Category 1 - 12.00 \$ - Artist: Artist 1

Book - Book Title 1 - Category 1 - 8.00 \$

35.0

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

5

Order successfully! Your total cost is: 35.0 \$