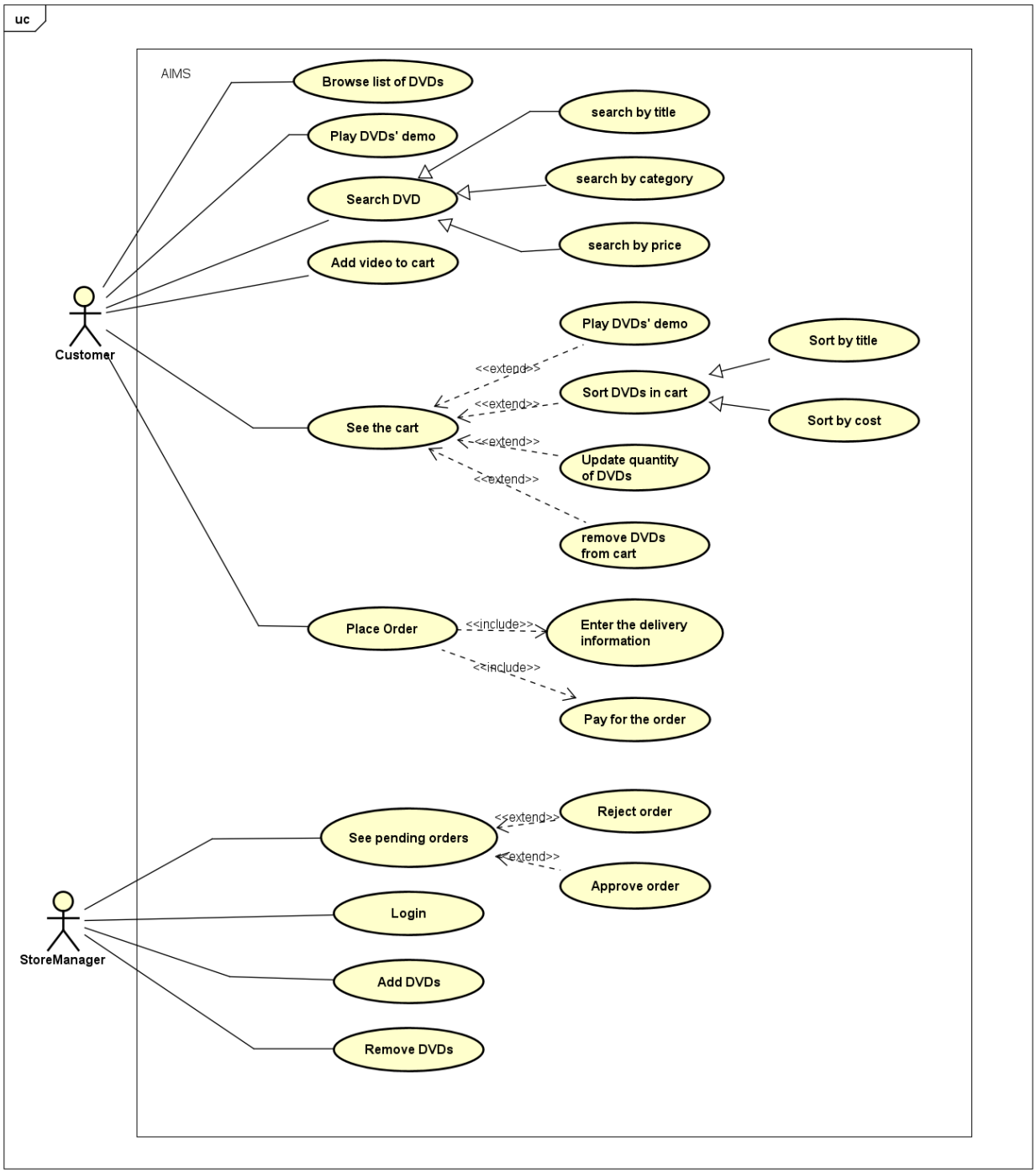
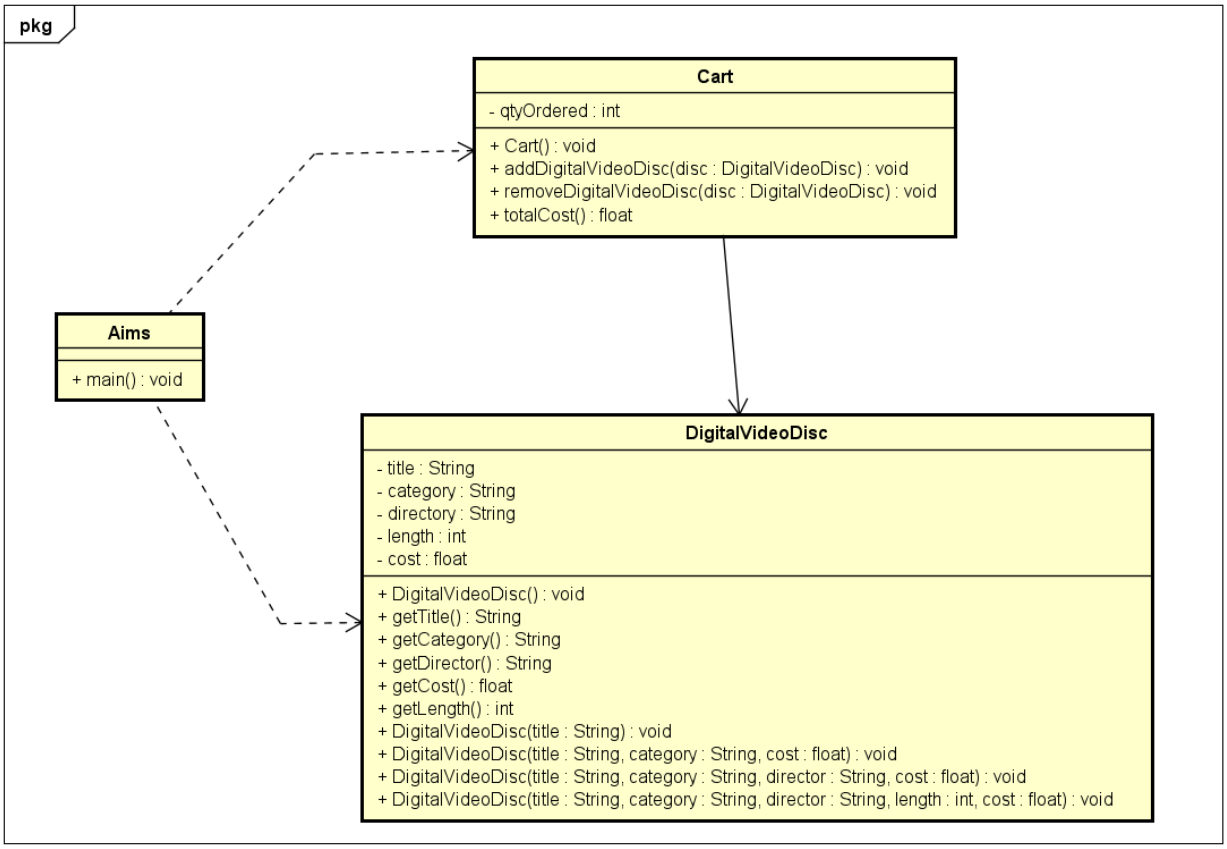
BÁO CÁO THỰC HÀNH LAB 2
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

Problem Modeling and Encapsulation

3. Use case diagram:



4. UML Class Diagram for use cases related to cart management



5. Create Aims class

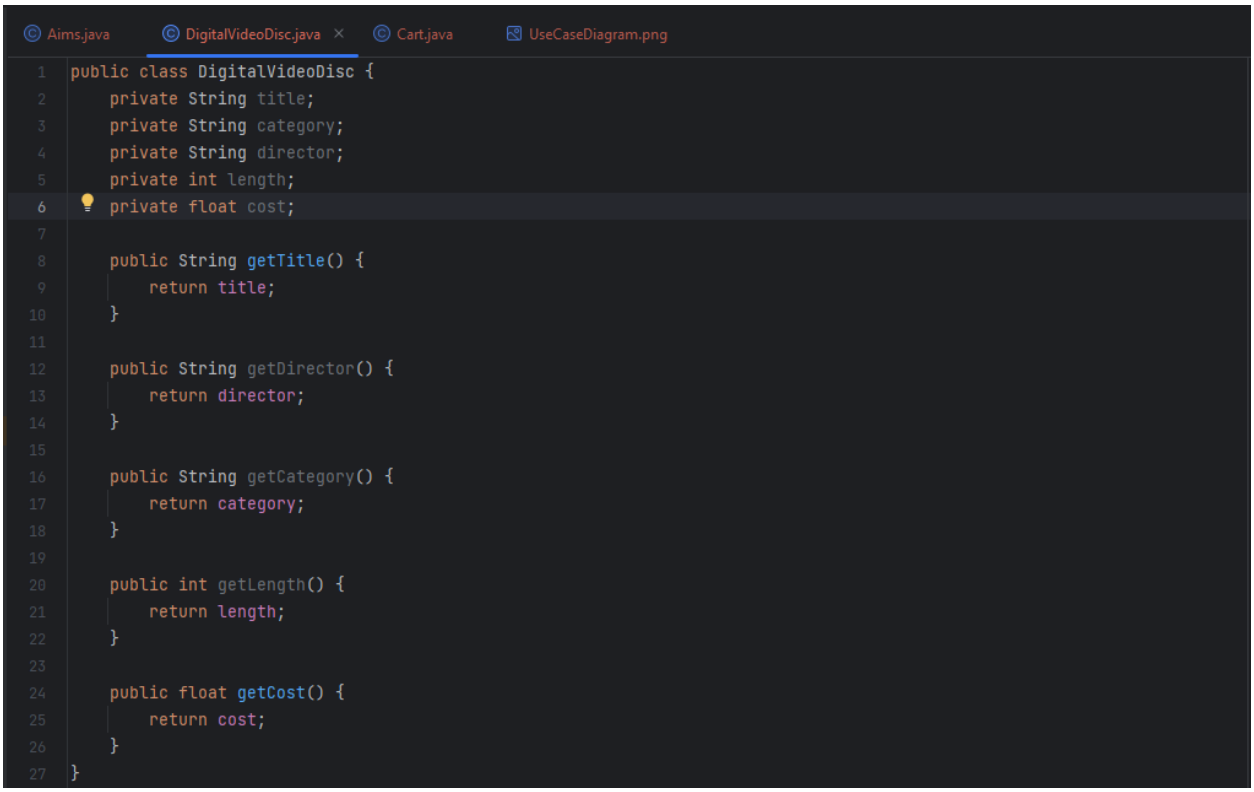
Aims.java | DigitalVideoDisc.java | Cart.java | UseCaseDiagram.png

```java
public class Aims {
    public static void main(String[] args) {
        //Create a new cart
        Cart anOrder = new Cart();

        //Create new DVD objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King", category: "Animation",
                director: "Roger Allers", length: 87, cost: 19.95f);
        anOrder.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars", category: "Science Fiction",
                director: "George Lucas", length: 87, cost: 24.95f);
        anOrder.addDigitalVideoDisc(dvd2);

        DigitalVideoDisc dvd3 = new DigitalVideoDisc( title: "Aladin", category: "Animation", cost: 18.99f);
        anOrder.addDigitalVideoDisc(dvd3);

        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());

        anOrder.removeDigitalVideoDisc(dvd3);
        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());

        anOrder.removeDigitalVideoDisc(dvd1);
        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());

        anOrder.removeDigitalVideoDisc(dvd2);
        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());
    }
}
```

6. Create the DigitalVideoDisc class and its attributes

```java
public class DigitalVideoDisc {
    private String title;
    private String category;
    private String director;
    private int length;
    private float cost;

}
```

7. Create accessors and mutators for the class DigitalVideoDisc




```java
public class DigitalVideoDisc {
    private String title;
    private String category;
    private String director;
    private int length;
    private float cost;

    public String getTitle() {
        return title;
    }

    public String getDirector() {
        return director;
    }

    public String getCategory() {
        return category;
    }

    public int getLength() {
        return length;
    }

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

Reading Assignment:

Accessor methods should be used in Java when we want to enforce encapsulation and ensure that the internal state of an object is only accessed and modified in a controlled manner.

By using accessor methods, we can hide the implementation details of the object from other classes, which makes it easier to maintain and modify the code without affecting other parts of the system.

Additionally, accessor methods can be used to add additional functionality, such as validation or synchronization, when accessing or modifying the object's state.

8. Create Constructor method

Aims.java | DigitalVideoDisc.java | Cart.java | UseCaseDiagram.png

```java
public class DigitalVideoDisc {
    private String title;
    private String category;
    private String director;
    private int length;
    private float cost;

    public DigitalVideoDisc(String title) {
        this.title = title;
    }

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

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

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

    public String getTitle() {
        return title;
    }

    public String getDirector() {
        return director;
    }

    public String getCategory() {
        return category;
```

9. Create the Cart class to work with DigitalVideoDisc

Aims.java DigitalVideoDisc.java Cart.java

```java
import java.util.Objects;

public class Cart {
    public static final int MAX_NUMBERS_ORDERED = 20;
    private DigitalVideoDisc itemsOrdered[] = new DigitalVideoDisc[MAX_NUMBERS_ORDERED];

    int qutyOrdered = 0;

    public void addDigitalVideoDisc(DigitalVideoDisc disc) {
        if(qutyOrdered == MAX_NUMBERS_ORDERED) System.out.println("The cart is almost full");
        else {
            itemsOrdered[qutyOrdered] = disc;
            qutyOrdered++;
            System.out.println("The disc has been added");
        }
    }

    public void removeDigitalVideoDisc(DigitalVideoDisc disc) {
        if(qutyOrdered == 0) System.out.println("The cart is already empty");
        else {
            DigitalVideoDisc[] arr_new = new DigitalVideoDisc[MAX_NUMBERS_ORDERED];
            for(int i=0, k=0;i<qutyOrdered;i++){
                if(!Objects.equals(itemsOrdered[i].getTitle(), disc.getTitle())){
                    arr_new[k]=itemsOrdered[i];
                    k++;
                }
            }
            qutyOrdered--;
            itemsOrdered = arr_new;
            System.out.println("The disc has been removed");
        }
    }

    public float totalCost() {
        float sum = 0;
        for(int i = 0; i<qutyOrdered; i++) {
            sum += itemsOrdered[i].getCost();
        }
        return sum;
    }
}
```

10.Create Carts of DigitalVideoDiscs

```java
public class Aims {
    public static void main(String[] args) {
        //Create a new cart
        Cart anOrder = new Cart();

        //Create new DVD objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King", category: "Animation",
                director: "Roger Allers", length: 87, cost: 19.95f);
        anOrder.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars", category: "Science Fiction",
                director: "George Lucas", length: 87, cost: 24.95f);
        anOrder.addDigitalVideoDisc(dvd2);

        DigitalVideoDisc dvd3 = new DigitalVideoDisc( title: "Aladin", category: "Animation", cost: 18.99f);
        anOrder.addDigitalVideoDisc(dvd3);

        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());
    }
}
```

Result:

```java
public class Aims {
    public static void main(String[] args) {
        //Create a new cart
        Cart anOrder = new Cart();

        //Create new DVD objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King", category: "Animation",
                director: "Roger Allers", length: 87, cost: 19.95f);
        anOrder.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars", category: "Science Fiction",
                director: "George Lucas", length: 87, cost: 24.95f);
```

```
Run  Aims
"C:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:E:\JetBrains\IntelliJ IDEA 2023.1\lib\idea_rt.jar=60742:E:\JetB
The disc has been added
The disc has been added
The disc has been added
Total Cost is:
63.89

Process finished with exit code 0
```

11.Removing items from the cart

```java
public class Aims {
    public static void main(String[] args) {
        //Create a new cart
        Cart anOrder = new Cart();

        //Create new DVD objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King", category: "Animation",
                director: "Roger Allers", length: 87, cost: 19.95f);
        anOrder.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars", category: "Science Fiction",
                director: "George Lucas", length: 87, cost: 24.95f);
        anOrder.addDigitalVideoDisc(dvd2);

        DigitalVideoDisc dvd3 = new DigitalVideoDisc( title: "Aladin", category: "Animation", cost: 18.99f);
        anOrder.addDigitalVideoDisc(dvd3);

        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());

        anOrder.removeDigitalVideoDisc(dvd3);
        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());
    }
}
```

Result:

```java
        DigitalVideoDisc dvd3 = new DigitalVideoDisc( title: "Aladin", category: "Animation", cost: 18.99f);
        anOrder.addDigitalVideoDisc(dvd3);

        //print total cost of the items in the cart
        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());
```

```
Run  Aims
"C:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:E:\JetBrains\IntelliJ IDEA 2023.1\lib\idea_rt.jar=60936:E:\JetB
The disc has been added
The disc has been added
The disc has been added
Total Cost is:
63.89
The disc has been removed
Total Cost is:
44.9

Process finished with exit code 0
```