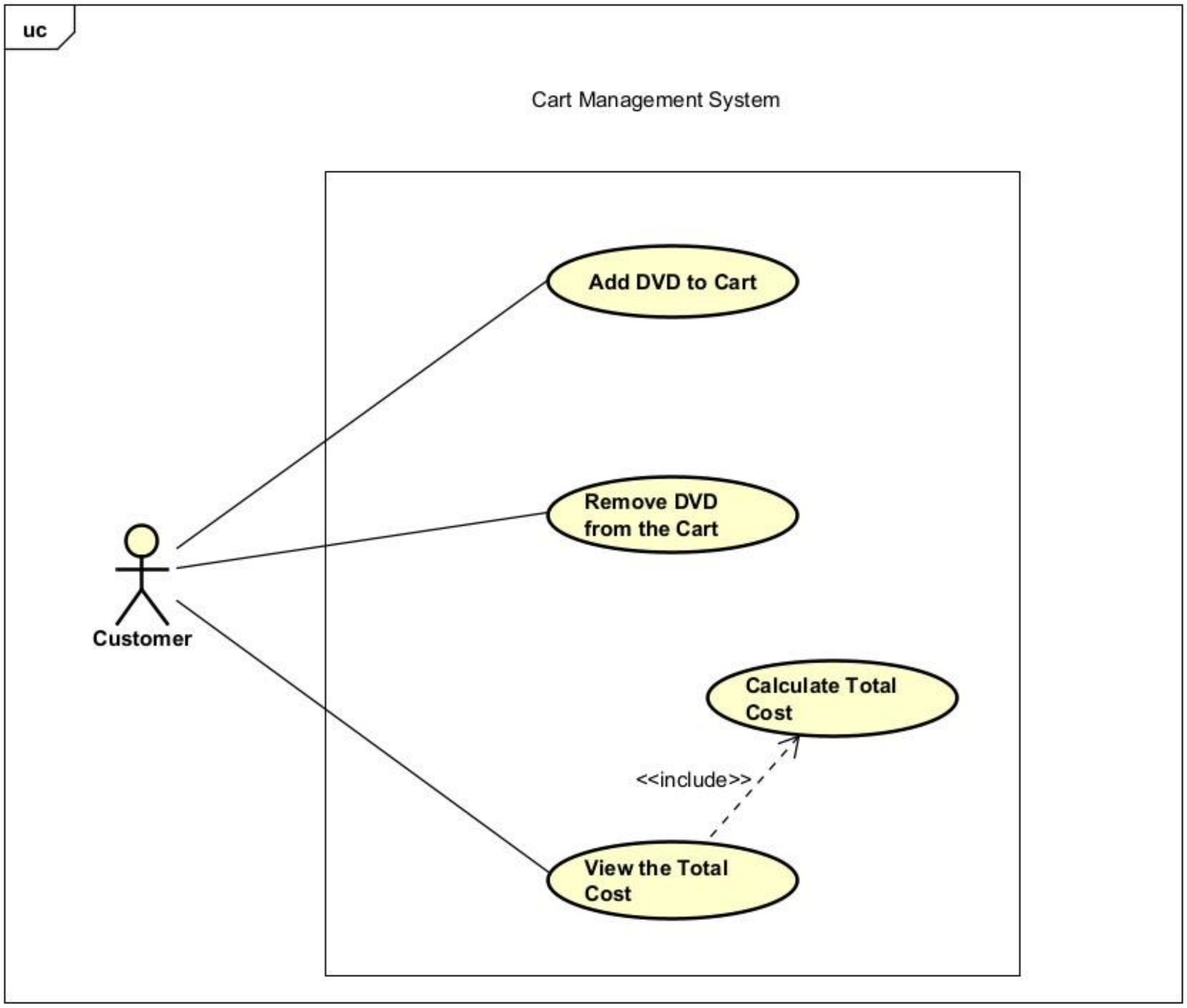
IT3100E Object-Oriented Programming Lab Report

Name: Nguyễn Đức Anh

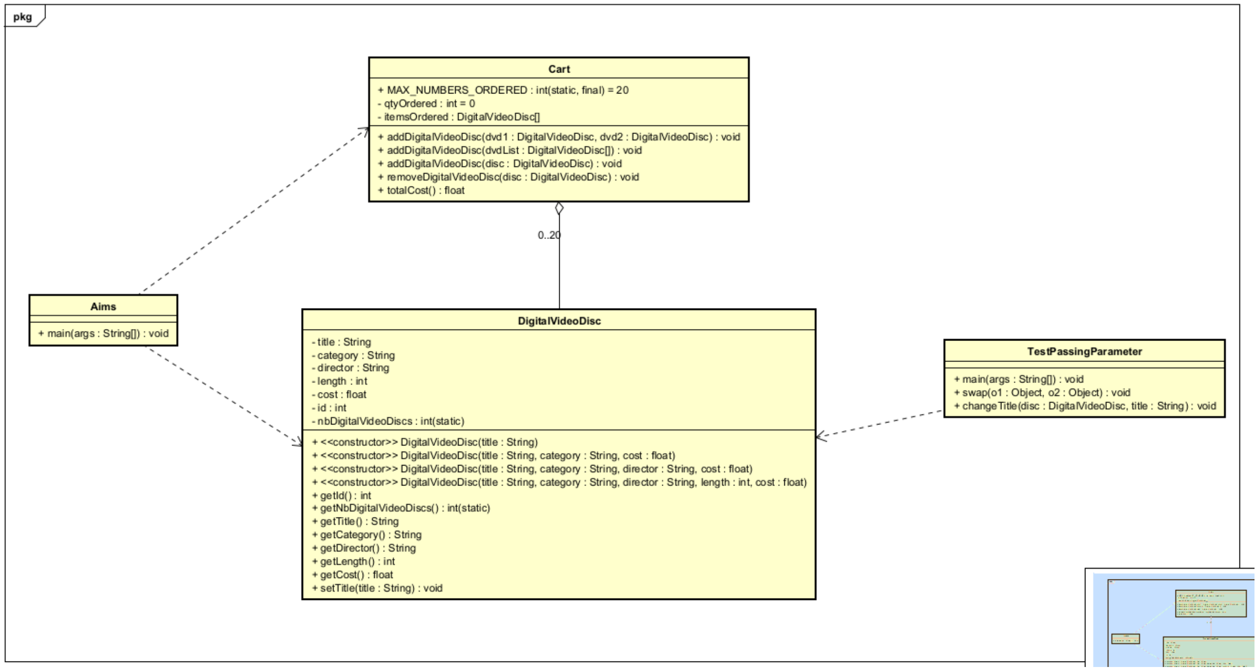
Student ID: 20235890

5, 6: UML UseCase Diagram and Class Diagram for use cases related to cart management.

- **UseCase Diagram:**

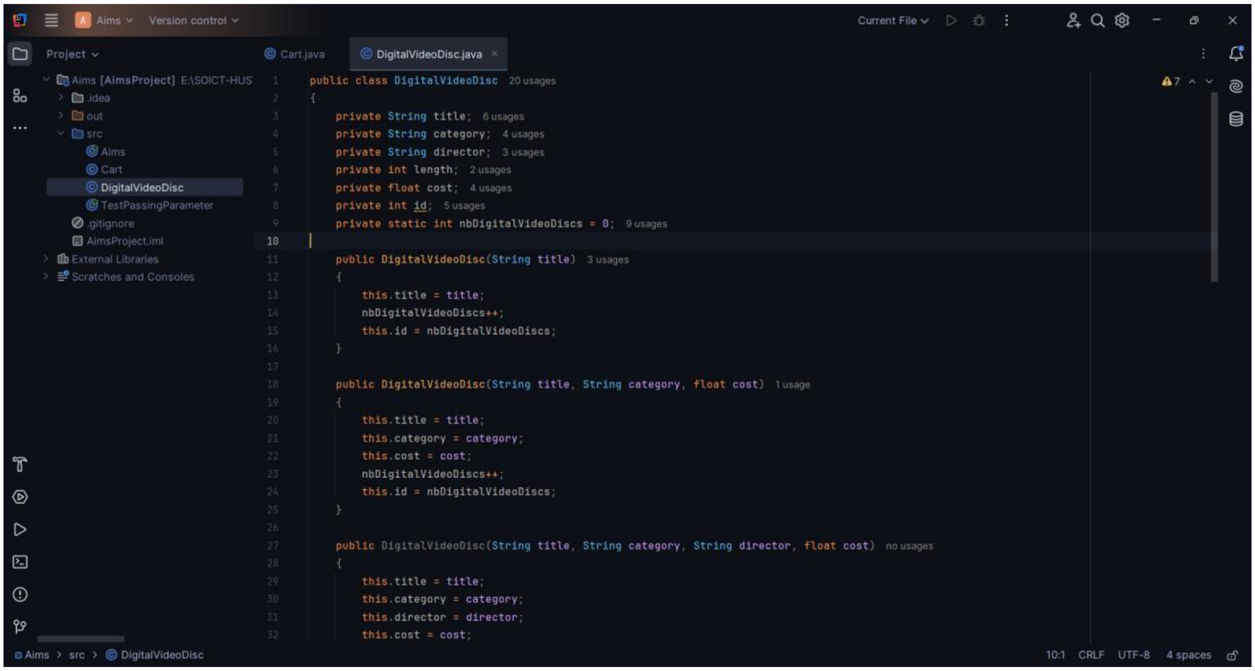


- **Class Diagram:**

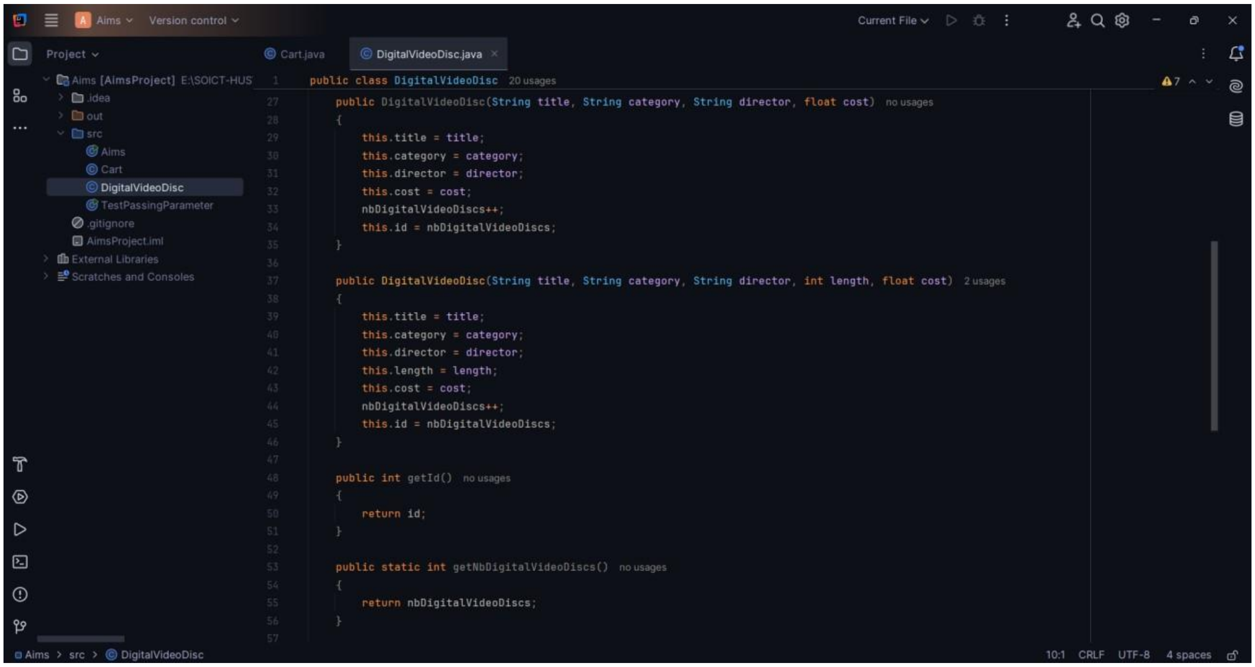

pkg
Cart
+ MAX_NUMBERS_ORDERED : int(static, final) = 20
- qtyOrdered : int = 0
- itemsOrdered : DigitalVideoDisc[]
+ addDigitalVideoDisc(dvd1 : DigitalVideoDisc, dvd2 : DigitalVideoDisc) : void
+ addDigitalVideoDisc(dvdList : DigitalVideoDisc[]) : void
+ addDigitalVideoDisc(disc : DigitalVideoDisc) : void
+ removeDigitalVideoDisc(disc : DigitalVideoDisc) : void
+ totalCost() : float
0..20
Aims
+ main(args : String[]) : void
DigitalVideoDisc
- title : String
- category : String
- director : String
- length : int
- cost : float
- id : int
- nbDigitalVideoDiscs : int(static)
+ <<constructor>> DigitalVideoDisc(title : String)
+ <<constructor>> DigitalVideoDisc(title : String, category : String, cost : float)
+ <<constructor>> DigitalVideoDisc(title : String, category : String, director : String, cost : float)
+ <<constructor>> DigitalVideoDisc(title : String, category : String, director : String, length : int, cost : float)
+ getId() : int
+ getNbDigitalVideoDiscs() : int(static)
+ getTitle() : String
+ getCategory() : String
+ getDirector() : String
+ getLength() : int
+ getCost() : float
+ setTitle(title : String) : void
TestPassingParameter
+ main(args : String[]) : void
+ swap(o1 : Object, o2 : Object) : void
+ changeTitle(disc : DigitalVideoDisc, title : String) : void

7, 8, 9, ..., 16: AimsProject (Class, Attributes, Accessors, Mutators, Constructor, Overloading, Passing parameter, Classifier Member and Instance Member)

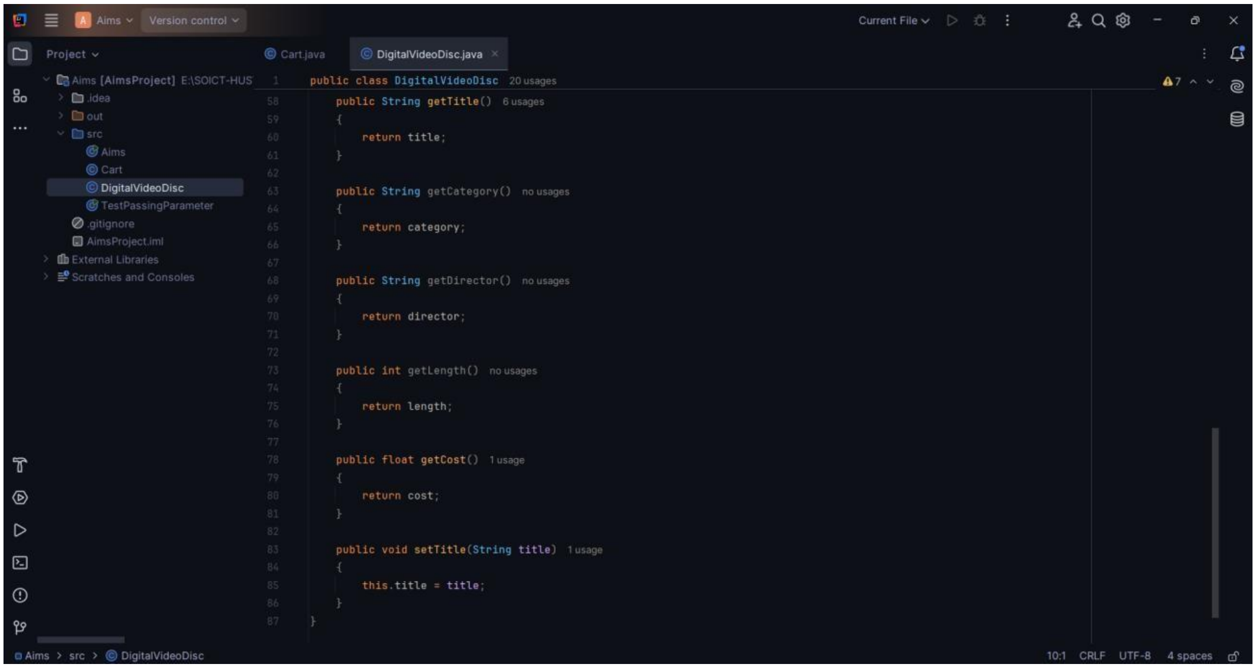
1. DigitalVideoDisc class:



```java
public class DigitalVideoDisc  20 usages
{
    private String title;  6 usages
    private String category;  4 usages
    private String director;  3 usages
    private int length;  2 usages
    private float cost;  4 usages
    private int id;  5 usages
    private static int nbDigitalVideoDiscs = 0;  9 usages

    public DigitalVideoDisc(String title)  3 usages
    {
        this.title = title;
        nbDigitalVideoDiscs++;
        this.id = nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String title, String category, float cost)  1 usage
    {
        this.title = title;
        this.category = category;
        this.cost = cost;
        nbDigitalVideoDiscs++;
        this.id = nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String title, String category, String director, float cost)  no usages
    {
        this.title = title;
        this.category = category;
        this.director = director;
        this.cost = cost;
```

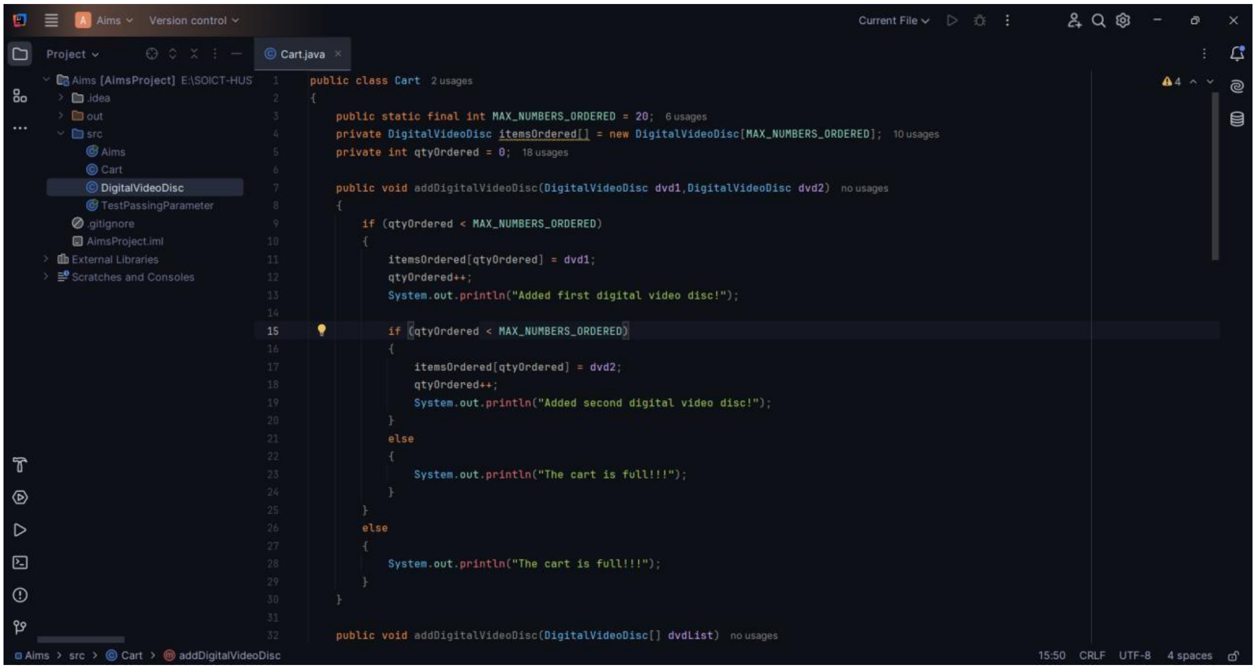


```java
public class DigitalVideoDisc  20 usages
    public DigitalVideoDisc(String title, String category, String director, float cost)  no usages
    {
        this.title = title;
        this.category = category;
        this.director = director;
        this.cost = cost;
        nbDigitalVideoDiscs++;
        this.id = nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String title, String category, String director, int length, float cost)  2 usages
    {
        this.title = title;
        this.category = category;
        this.director = director;
        this.length = length;
        this.cost = cost;
        nbDigitalVideoDiscs++;
        this.id = nbDigitalVideoDiscs;
    }

    public int getId()  no usages
    {
        return id;
    }

    public static int getNbDigitalVideoDiscs()  no usages
    {
        return nbDigitalVideoDiscs;
    }
```

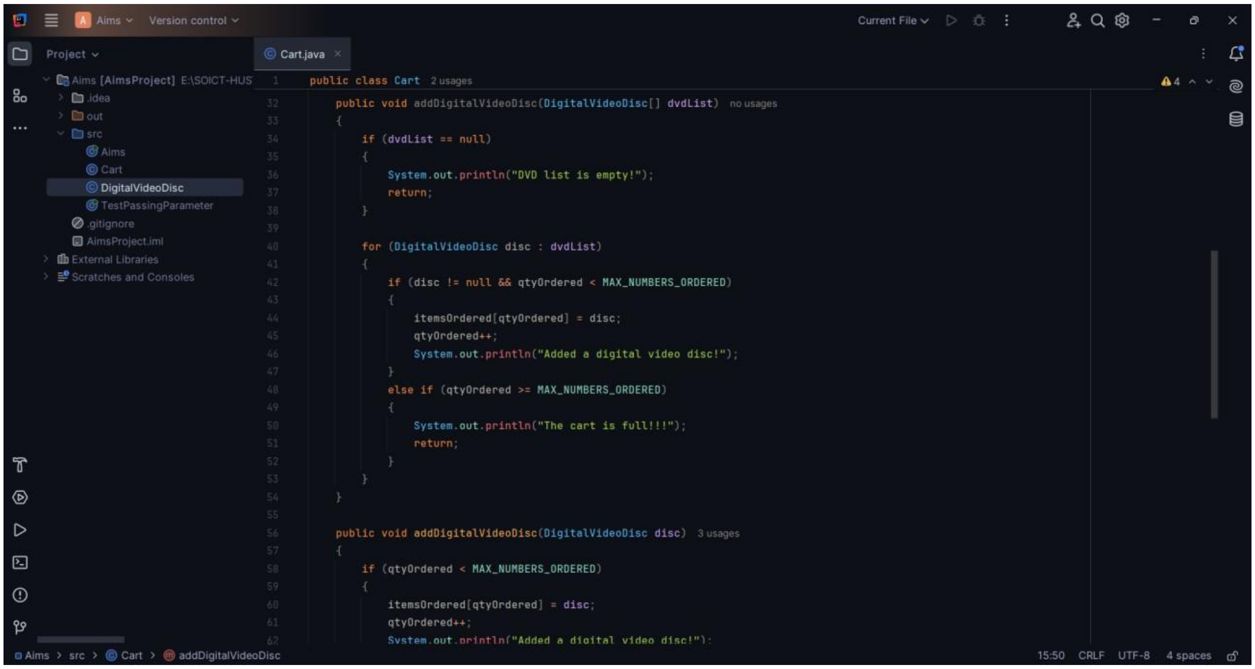


```java
public class DigitalVideoDisc
    public String getTitle()
    {
        return title;
    }

    public String getCategory()
    {
        return category;
    }

    public String getDirector()
    {
        return director;
    }

    public int getLength()
    {
        return length;
    }

    public float getCost()
    {
        return cost;
    }

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

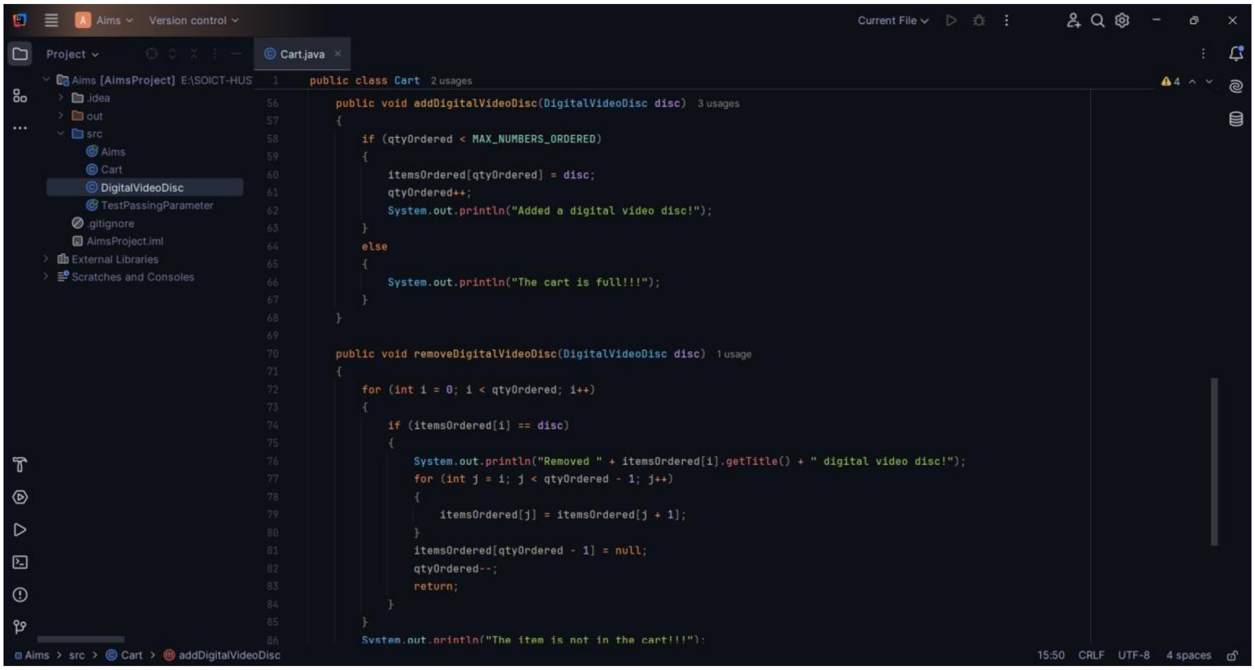
2. Cart class:



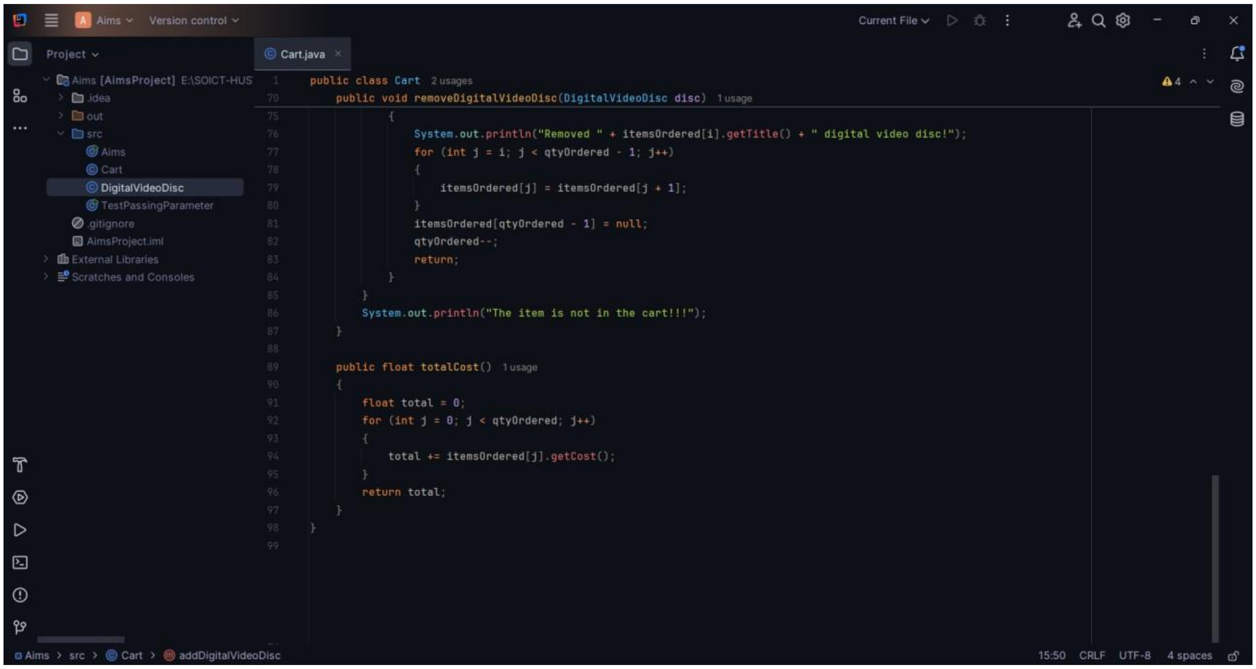
```java
public class Cart
{
    public static final int MAX_NUMBERS_ORDERED = 20;
    private DigitalVideoDisc itemsOrdered[] = new DigitalVideoDisc[MAX_NUMBERS_ORDERED];
    private int qtyOrdered = 0;

    public void addDigitalVideoDisc(DigitalVideoDisc dvd1,DigitalVideoDisc dvd2)
    {
        if (qtyOrdered < MAX_NUMBERS_ORDERED)
        {
            itemsOrdered[qtyOrdered] = dvd1;
            qtyOrdered++;
            System.out.println("Added first digital video disc!");

            if (qtyOrdered < MAX_NUMBERS_ORDERED)
            {
                itemsOrdered[qtyOrdered] = dvd2;
                qtyOrdered++;
                System.out.println("Added second digital video disc!");
            }
            else
            {
                System.out.println("The cart is full!!!");
            }
        }
        else
        {
            System.out.println("The cart is full!!!");
        }
    }

    public void addDigitalVideoDisc(DigitalVideoDisc[] dvdList)
```



```java
public class Cart
    public void addDigitalVideoDisc(DigitalVideoDisc[] dvdList)
    {
        if (dvdList == null)
        {
            System.out.println("DVD list is empty!");
            return;
        }

        for (DigitalVideoDisc disc : dvdList)
        {
            if (disc != null && qtyOrdered < MAX_NUMBERS_ORDERED)
            {
                itemsOrdered[qtyOrdered] = disc;
                qtyOrdered++;
                System.out.println("Added a digital video disc!");
            }
            else if (qtyOrdered >= MAX_NUMBERS_ORDERED)
            {
                System.out.println("The cart is full!!!");
                return;
            }
        }
    }

    public void addDigitalVideoDisc(DigitalVideoDisc disc)
    {
        if (qtyOrdered < MAX_NUMBERS_ORDERED)
        {
            itemsOrdered[qtyOrdered] = disc;
            qtyOrdered++;
            System.out.println("Added a digital video disc!");
```

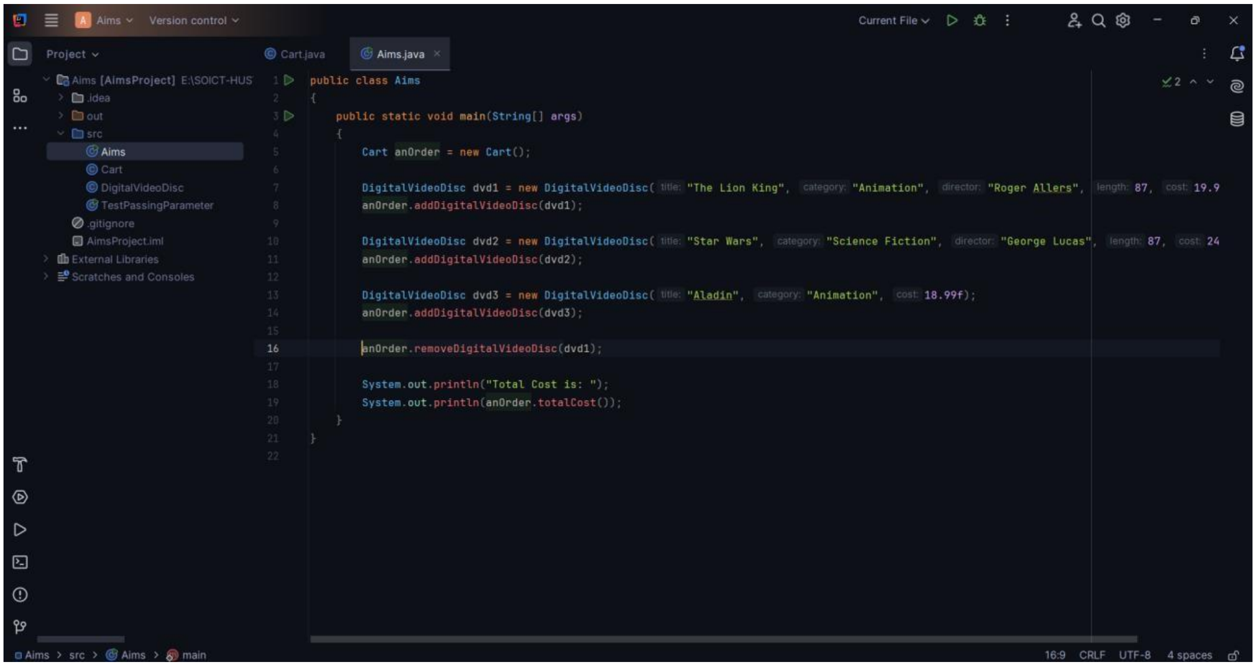


```java
public class Cart
    public void addDigitalVideoDisc(DigitalVideoDisc disc)
    {
        if (qtyOrdered < MAX_NUMBERS_ORDERED)
        {
            itemsOrdered[qtyOrdered] = disc;
            qtyOrdered++;
            System.out.println("Added a digital video disc!");
        }
        else
        {
            System.out.println("The cart is full!!!");
        }
    }

    public void removeDigitalVideoDisc(DigitalVideoDisc disc)
    {
        for (int i = 0; i < qtyOrdered; i++)
        {
            if (itemsOrdered[i] == disc)
            {
                System.out.println("Removed " + itemsOrdered[i].getTitle() + " digital video disc!");
                for (int j = i; j < qtyOrdered - 1; j++)
                {
                    itemsOrdered[j] = itemsOrdered[j + 1];
                }
                itemsOrdered[qtyOrdered - 1] = null;
                qtyOrdered--;
                return;
            }
        }
        System.out.println("The item is not in the cart!!!");
```



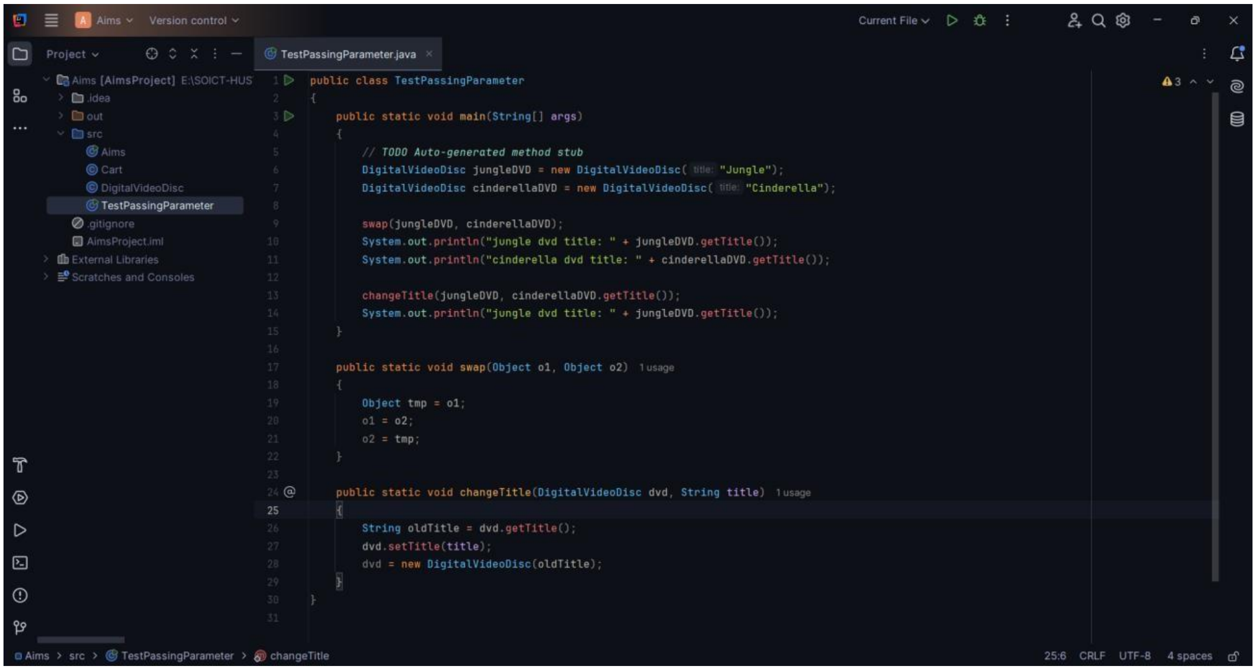
```java
public class Cart  2 usages
    public void removeDigitalVideoDisc(DigitalVideoDisc disc)  1 usage
                {
                    System.out.println("Removed " + itemsOrdered[i].getTitle() + " digital video disc!");
                    for (int j = i; j < qtyOrdered - 1; j++)
                    {
                        itemsOrdered[j] = itemsOrdered[j + 1];
                    }
                    itemsOrdered[qtyOrdered - 1] = null;
                    qtyOrdered--;
                    return;
                }
            }
        System.out.println("The item is not in the cart!!!");
    }

    public float totalCost()  1 usage
    {
        float total = 0;
        for (int j = 0; j < qtyOrdered; j++)
        {
            total += itemsOrdered[j].getCost();
        }
        return total;
    }
}
```

3. Aims class:



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

        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King",  category: "Animation",  director: "Roger Allers",  length: 87,  cost: 19.9
        anOrder.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars",  category: "Science Fiction",  director: "George Lucas",  length: 87,  cost: 24
        anOrder.addDigitalVideoDisc(dvd2);

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

        anOrder.removeDigitalVideoDisc(dvd1);

        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());
    }
}
```

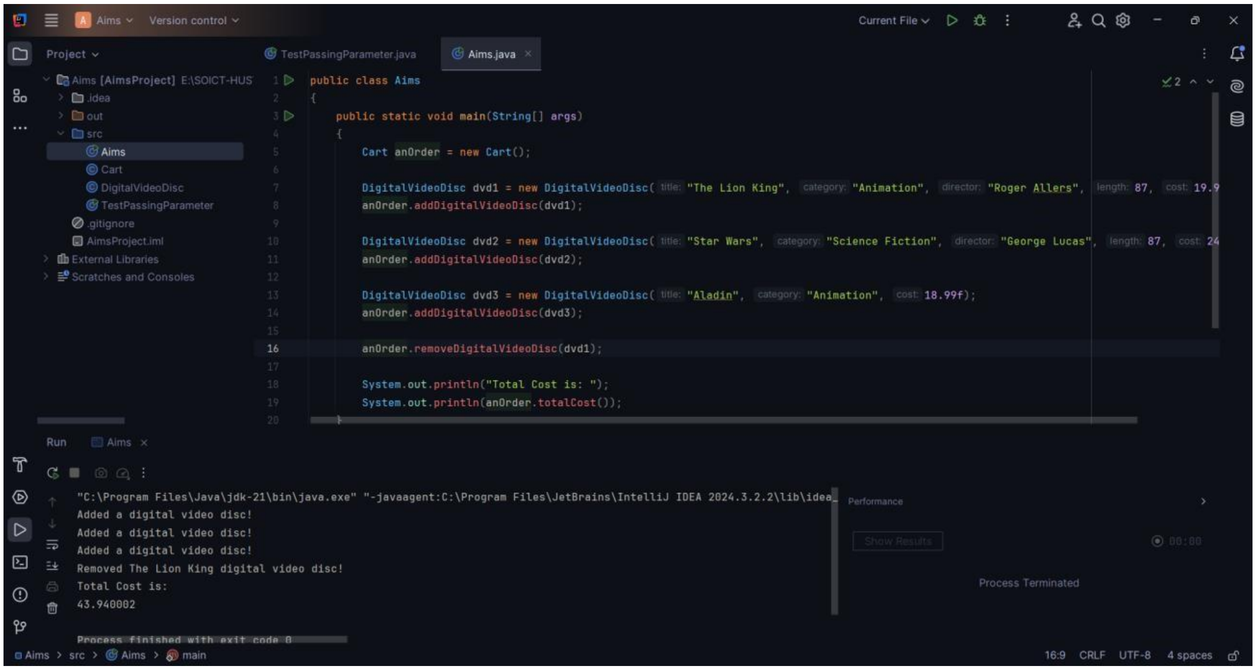
4. TestPassingParameter class:



```java
public class TestPassingParameter
{
    public static void main(String[] args)
    {
        // TODO Auto-generated method stub
        DigitalVideoDisc jungleDVD = new DigitalVideoDisc( title: "Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc( title: "Cinderella");

        swap(jungleDVD, cinderellaDVD);
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
        System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());

        changeTitle(jungleDVD, cinderellaDVD.getTitle());
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
    }

    public static void swap(Object o1, Object o2)  1 usage
    {
        Object tmp = o1;
        o1 = o2;
        o2 = tmp;
    }

    public static void changeTitle(DigitalVideoDisc dvd, String title)  1 usage
    {
        String oldTitle = dvd.getTitle();
        dvd.setTitle(title);
        dvd = new DigitalVideoDisc(oldTitle);
    }
}
```

Result:

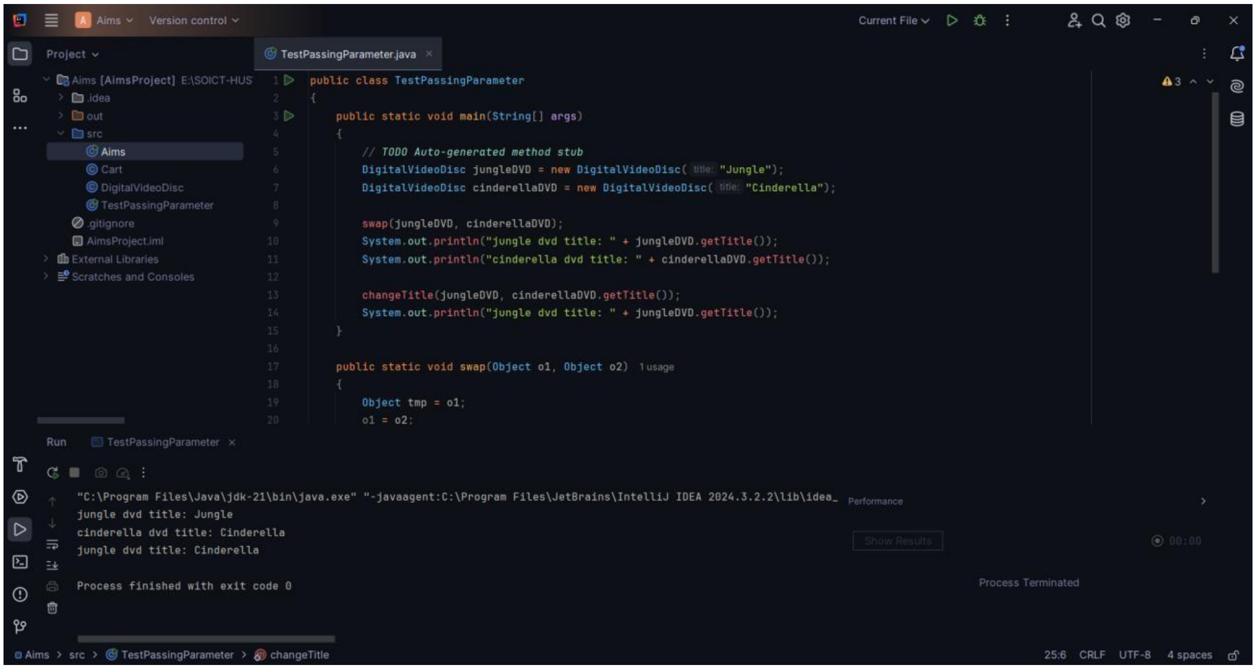
- **Runnning Aims:**



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

        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King", category: "Animation", director: "Roger Allers", length: 87, cost: 19.9
        anOrder.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars", category: "Science Fiction", director: "George Lucas", length: 87, cost: 24
        anOrder.addDigitalVideoDisc(dvd2);

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

        anOrder.removeDigitalVideoDisc(dvd1);

        System.out.println("Total Cost is: ");
        System.out.println(anOrder.totalCost());
    }
```

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2024.3.2.2\lib\idea_
Added a digital video disc!
Added a digital video disc!
Added a digital video disc!
Removed The Lion King digital video disc!
Total Cost is:
43.940002

Process finished with exit code 0
```

- **Running TestPassingParameter:**



```java
public class TestPassingParameter
{
    public static void main(String[] args)
    {
        // TODO Auto-generated method stub
        DigitalVideoDisc jungleDVD = new DigitalVideoDisc( title: "Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc( title: "Cinderella");

        swap(jungleDVD, cinderellaDVD);
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
        System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());

        changeTitle(jungleDVD, cinderellaDVD.getTitle());
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
    }

    public static void swap(Object o1, Object o2)  1 usage
    {
        Object tmp = o1;
        o1 = o2;
```

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2024.3.2.2\lib\idea_
jungle dvd title: Jungle
cinderella dvd title: Cinderella
jungle dvd title: Cinderella

Process finished with exit code 0
```