Lab Report

OOP Lab

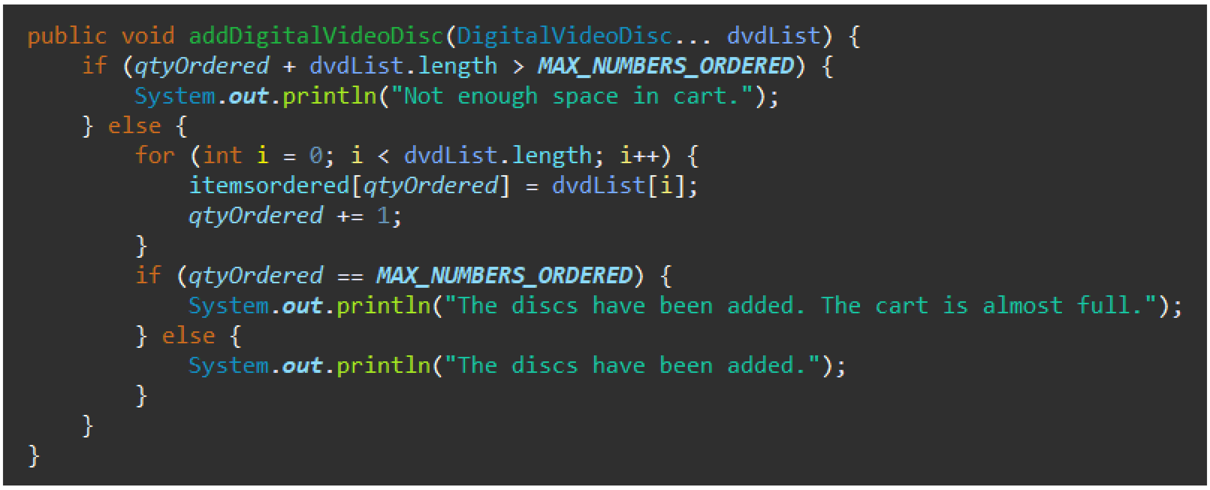
Lab 03

Student name: Trần Lê Hạ Đan

Student ID: 20235483

I. Method overloading

- Try to add method addDigitalVideoDisc which allows to pass an arbitrary number of arguments for dvd. Compare to an array parameter. What do you prefer in this case?



```
public void addDigitalVideoDisc(DigitalVideoDisc... dvdList) {
    if (qtyOrdered + dvdList.length > MAX_NUMBERS_ORDERED) {
        System.out.println("Not enough space in cart.");
    } else {
        for (int i = 0; i < dvdList.length; i++) {
            itemsordered[qtyOrdered] = dvdList[i];
            qtyOrdered += 1;
        }
        if (qtyOrdered == MAX_NUMBERS_ORDERED) {
            System.out.println("The discs have been added. The cart is almost full.");
        } else {
            System.out.println("The discs have been added.");
        }
    }
}
```

➔ Comparison:

- ○ The addDigitalVideoDisc(DigitalVideoDisc [] dvdList) method takes one array parameter
- ○ The addDigitalVideoDisc(DigitalVideoDisc... dvdList) method takes an arbitray number of DigitalVideoDisc parameters which will be in the dvdList array

➔ In this case, I prefer the second method, because we don’t have to declare an array before calling the method.

II. Passing parameter

- Is JAVA a Pass by Value or a Pass by Reference programming language?

➔ Java is a pass by value programming language.

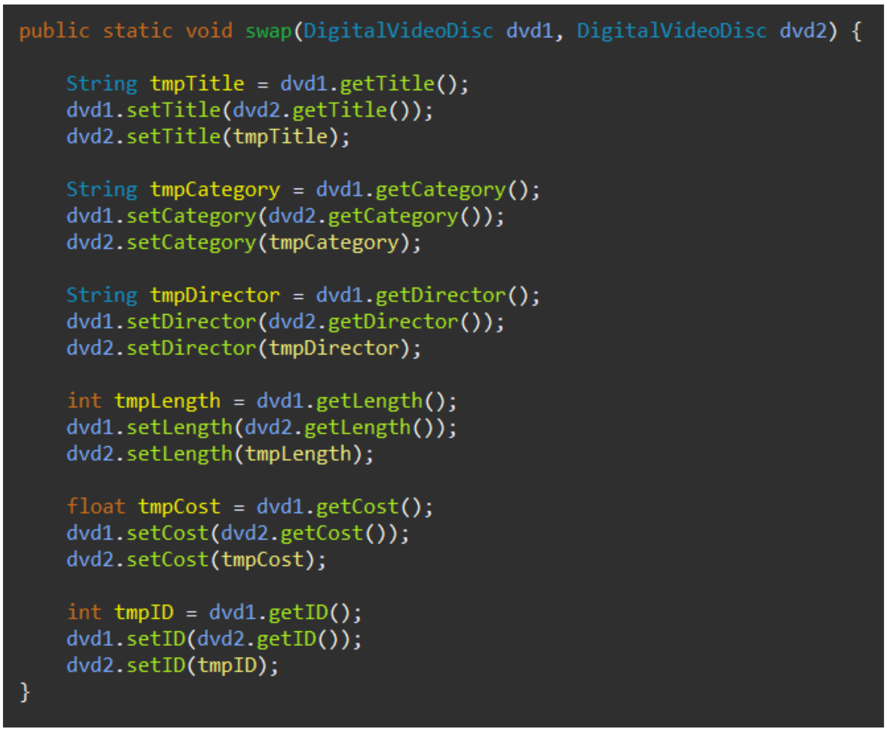
- After the call of swap(jungleDVD, cinderellaDVD) why does the title of these two objects still remain?

➔ The parameter passed into the method is only the value of jungleDVD and cinderellaDVD, not the reference to the objects themselves, so they are not modified.

- After the call of changeTitle(jungleDVD, cinderellaDVD.getTitle()) why is the title of the JungleDVD changed?

➔ Because when we call the changeTitle method, we call setTitle(title), which directly modifies the object.

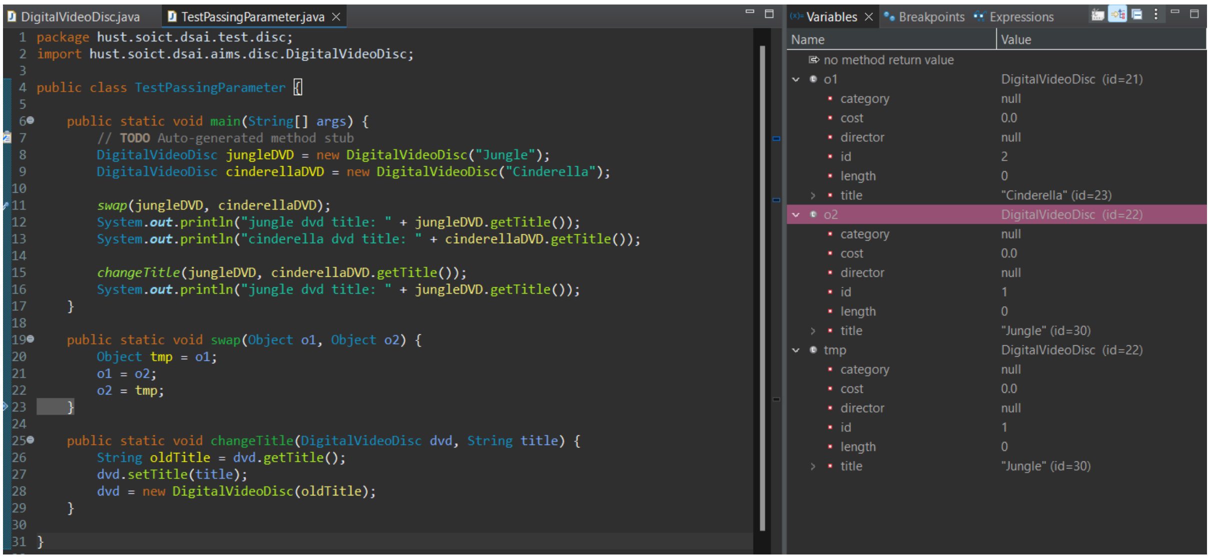
- Please write a swap() method that can correctly swap the two objects



```java
public static void swap(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2) {

    String tmpTitle = dvd1.getTitle();
    dvd1.setTitle(dvd2.getTitle());
    dvd2.setTitle(tmpTitle);

    String tmpCategory = dvd1.getCategory();
    dvd1.setCategory(dvd2.getCategory());
    dvd2.setCategory(tmpCategory);

    String tmpDirector = dvd1.getDirector();
    dvd1.setDirector(dvd2.getDirector());
    dvd2.setDirector(tmpDirector);

    int tmpLength = dvd1.getLength();
    dvd1.setLength(dvd2.getLength());
    dvd2.setLength(tmpLength);

    float tmpCost = dvd1.getCost();
    dvd1.setCost(dvd2.getCost());
    dvd2.setCost(tmpCost);

    int tmpID = dvd1.getID();
    dvd1.setID(dvd2.getID());
    dvd2.setID(tmpID);
}
```

III. Debug run

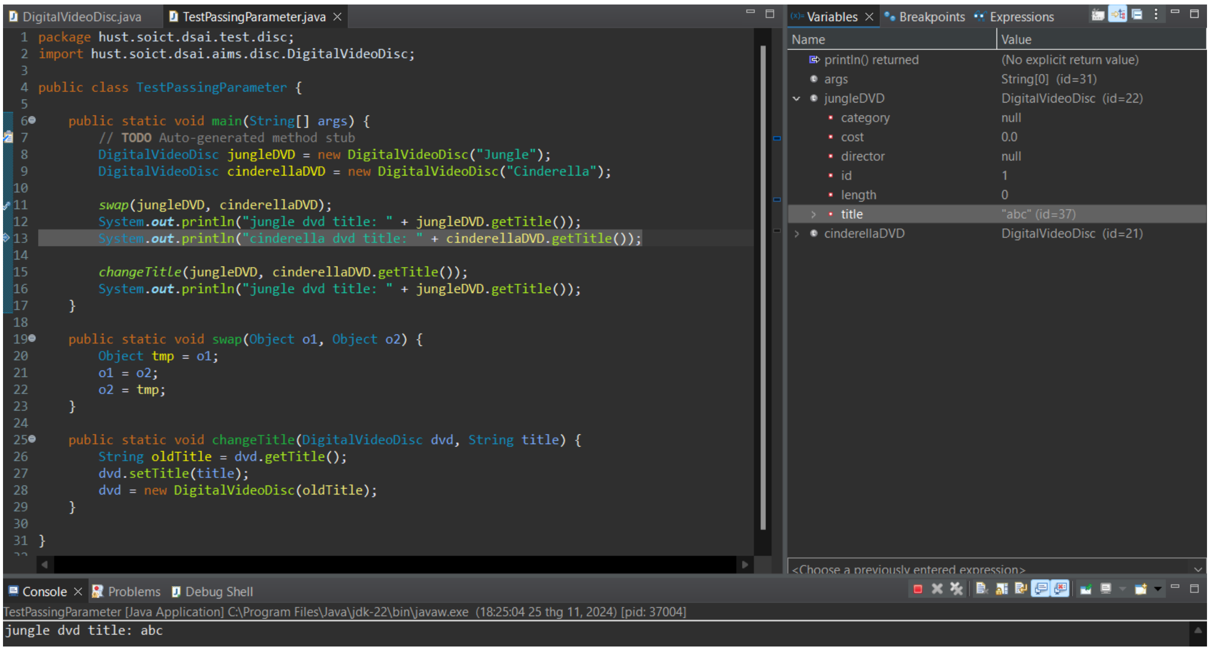
- Investigate value of variables



```java
package hust.soict.dsai.test.disc;
import hust.soict.dsai.aims.disc.DigitalVideoDisc;

public class TestPassingParameter {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("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) {
        Object tmp = o1;
        o1 = o2;
        o2 = tmp;
    }

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

}
```

Name	Value
no method return value	
o1	DigitalVideoDisc (id=21)
category	null
cost	0.0
director	null
id	2
length	0
title	"Cinderella" (id=23)
o2	DigitalVideoDisc (id=22)
category	null
cost	0.0
director	null
id	1
length	0
title	"Jungle" (id=30)
tmp	DigitalVideoDisc (id=22)
category	null
cost	0.0
director	null
id	1
length	0
title	"Jungle" (id=30)

- Change value of variables



DigitalVideoDisc.java | TestPassingParameter.java

```java
package hust.soict.dsai.test.disc;
import hust.soict.dsai.aims.disc.DigitalVideoDisc;

public class TestPassingParameter {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("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) {
        Object tmp = o1;
        o1 = o2;
        o2 = tmp;
    }

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

}
```

Variables | Breakpoints | Expressions

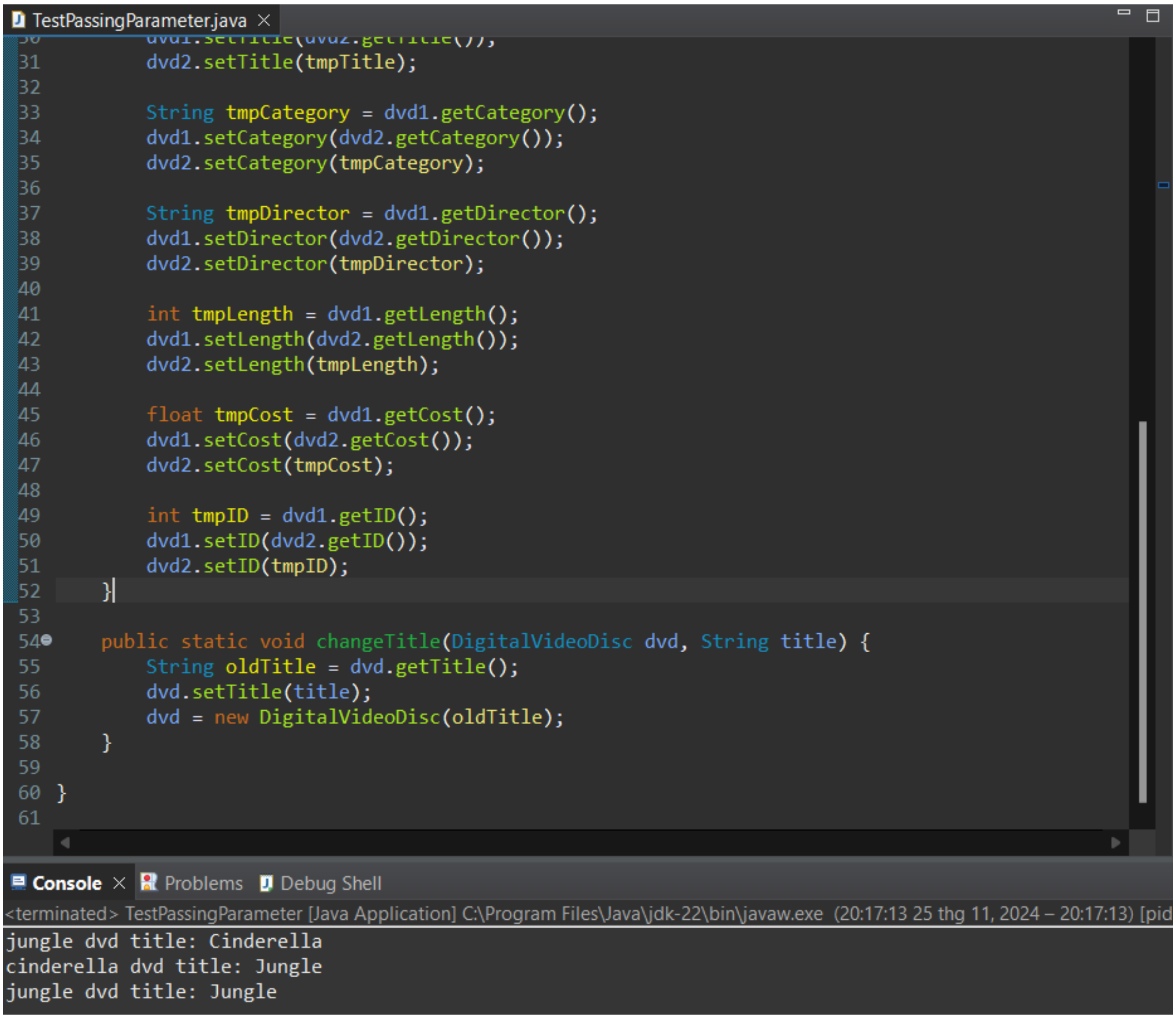
Name	Value
println() returned	(No explicit return value)
args	String[0] (id=31)
jungleDVD	DigitalVideoDisc (id=22)
category	null
cost	0.0
director	null
id	1
length	0
title	"abc" (id=37)
cinderellaDVD	DigitalVideoDisc (id=21)

<Choose a previously entered expression>

Console | Problems | Debug Shell

```
TestPassingParameter [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe  (18:25:04 25 thg 11, 2024) [pid: 37004]
jungle dvd title: abc
```

- Output of correct swap method



TestPassingParameter.java

```java
        dvd1.setTitle(dvd2.getTitle());
        dvd2.setTitle(tmpTitle);

        String tmpCategory = dvd1.getCategory();
        dvd1.setCategory(dvd2.getCategory());
        dvd2.setCategory(tmpCategory);

        String tmpDirector = dvd1.getDirector();
        dvd1.setDirector(dvd2.getDirector());
        dvd2.setDirector(tmpDirector);

        int tmpLength = dvd1.getLength();
        dvd1.setLength(dvd2.getLength());
        dvd2.setLength(tmpLength);

        float tmpCost = dvd1.getCost();
        dvd1.setCost(dvd2.getCost());
        dvd2.setCost(tmpCost);

        int tmpID = dvd1.getID();
        dvd1.setID(dvd2.getID());
        dvd2.setID(tmpID);
    }

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

}
```

Console | Problems | Debug Shell

```
<terminated> TestPassingParameter [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe  (20:17:13 25 thg 11, 2024 – 20:17:13) [pid
jungle dvd title: Cinderella
cinderella dvd title: Jungle
jungle dvd title: Jungle
```

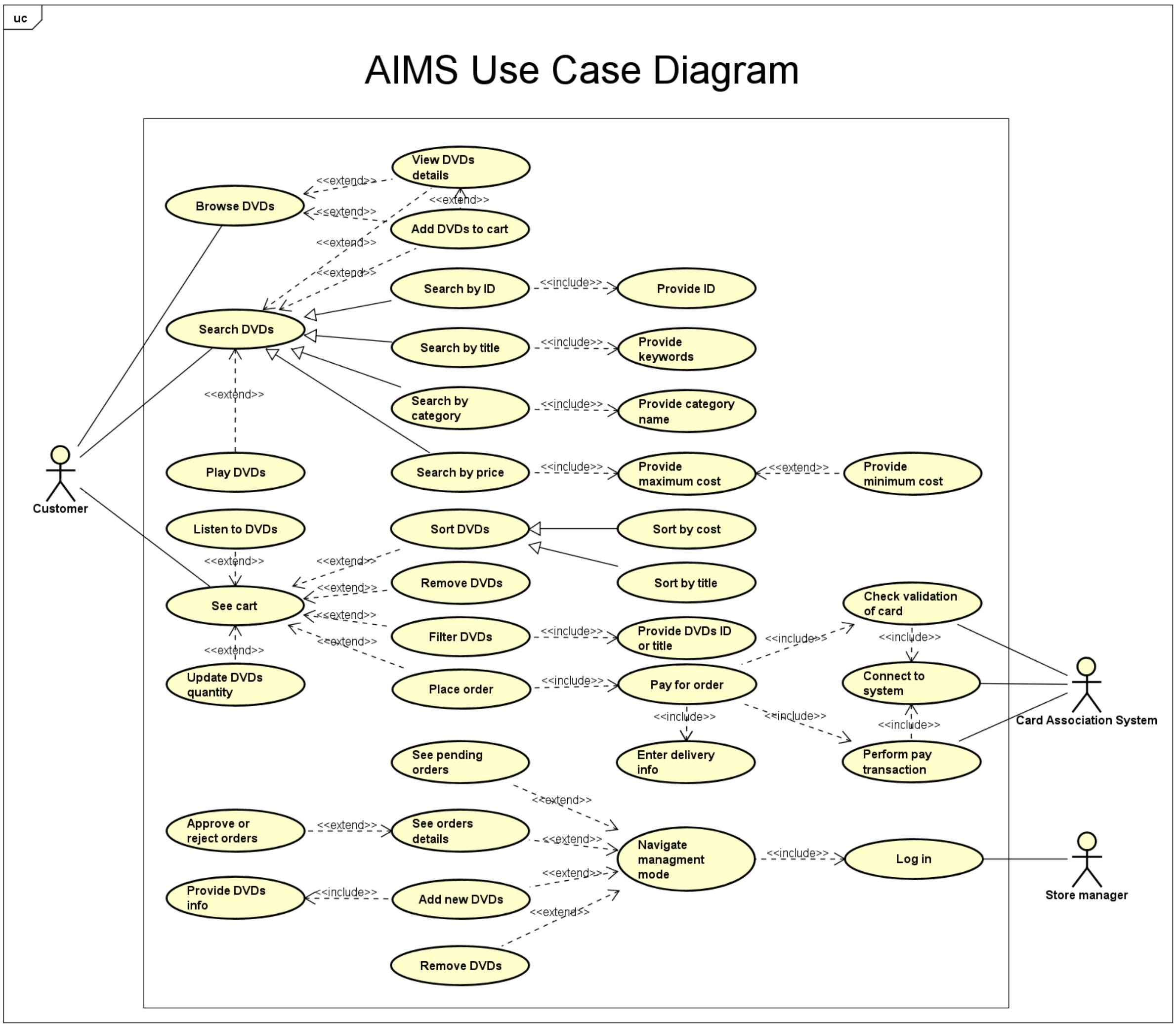
IV. Print cart

- Write a toString() method for the DigitalVideoDisc class. What should be the return type of this method?

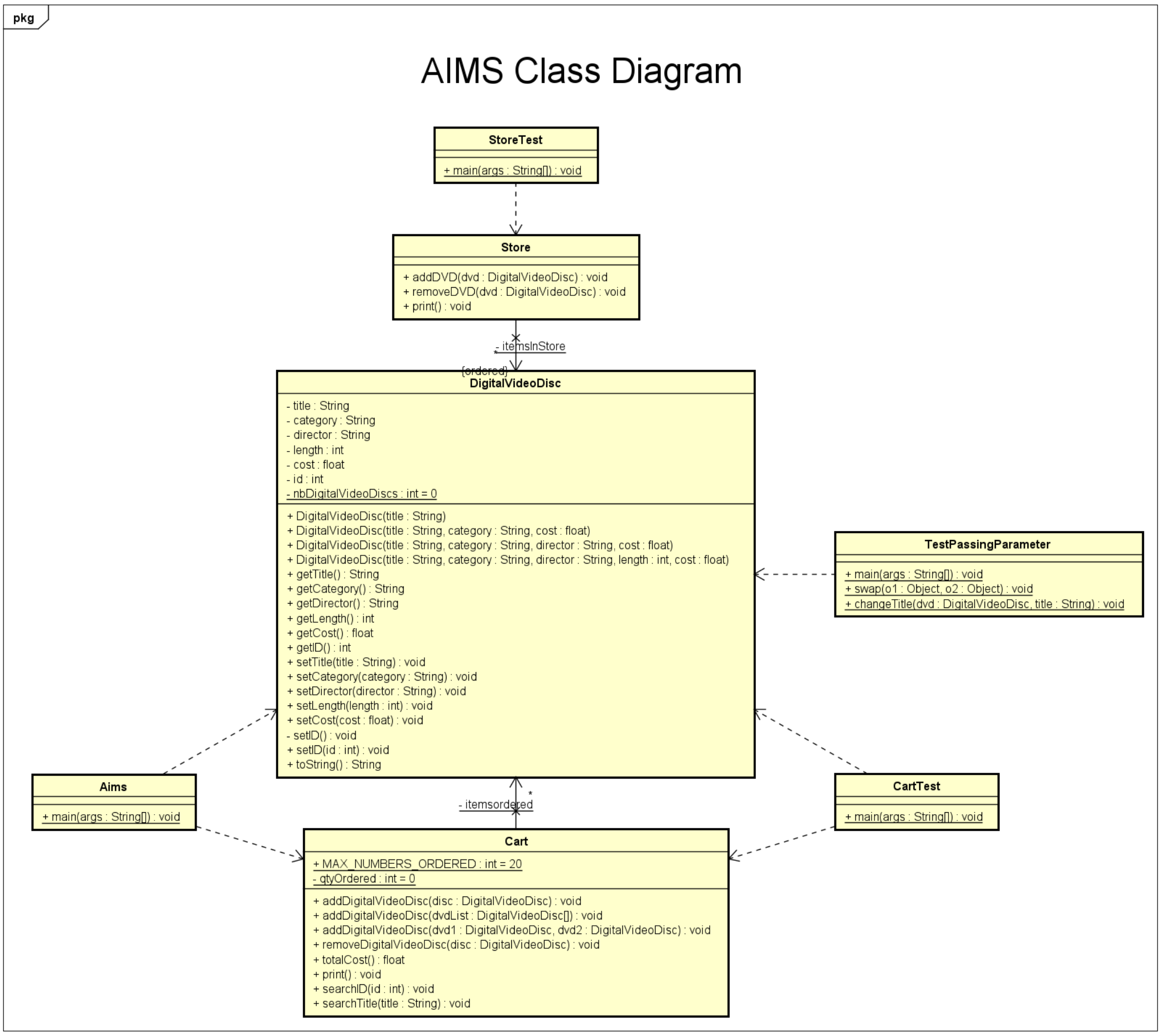
➔ The return type should be String.

V. Updated diagrams

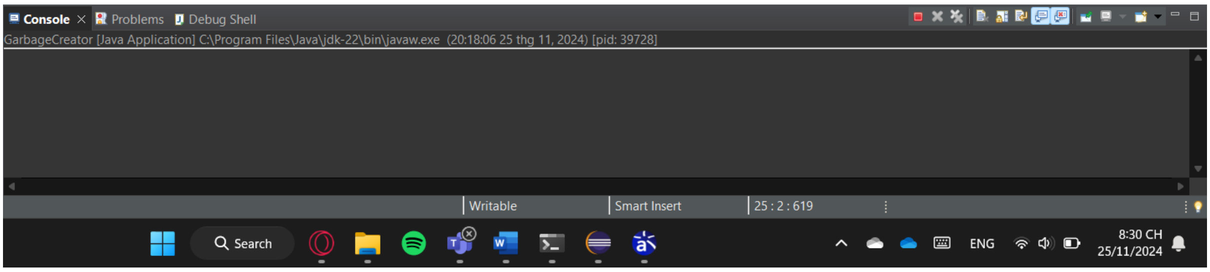
- Use Case Diagram



- Class Diagram


pkg
AIMS Class Diagram
StoreTest
+ main(args : String[]) : void
Store
+ addDVD(dvd : DigitalVideoDisc) : void
+ removeDVD(dvd : DigitalVideoDisc) : void
+ print() : void
- itemsInStore
{ordered}
DigitalVideoDisc
- title : String
- category : String
- director : String
- length : int
- cost : float
- id : int
- nbDigitalVideoDiscs : int = 0
+ DigitalVideoDisc(title : String)
+ DigitalVideoDisc(title : String, category : String, cost : float)
+ DigitalVideoDisc(title : String, category : String, director : String, cost : float)
+ DigitalVideoDisc(title : String, category : String, director : String, length : int, cost : float)
+ getTitle() : String
+ getCategory() : String
+ getDirector() : String
+ getLength() : int
+ getCost() : float
+ getID() : int
+ setTitle(title : String) : void
+ setCategory(category : String) : void
+ setDirector(director : String) : void
+ setLength(length : int) : void
+ setCost(cost : float) : void
- setID() : void
+ setID(id : int) : void
+ toString() : String
TestPassingParameter
+ main(args : String[]) : void
+ swap(o1 : Object, o2 : Object) : void
+ changeTitle(dvd : DigitalVideoDisc, title : String) : void
Aims
+ main(args : String[]) : void
CartTest
+ main(args : String[]) : void
- itemsordered
*
Cart
+ MAX_NUMBERS_ORDERED : int = 20
- qtyOrdered : int = 0
+ addDigitalVideoDisc(disc : DigitalVideoDisc) : void
+ addDigitalVideoDisc(dvdList : DigitalVideoDisc[]) : void
+ addDigitalVideoDisc(dvd1 : DigitalVideoDisc, dvd2 : DigitalVideoDisc) : void
+ removeDigitalVideoDisc(disc : DigitalVideoDisc) : void
+ totalCost() : float
+ print() : void
+ searchID(id : int) : void
+ searchTitle(title : String) : void

VI. String, StringBuilder, and StringBuffer



```
GarbageCreator [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe  (20:18:06 25 thg 11, 2024) [pid: 39728]
```

➔ GarbageCreator has been running for over 10 minutes.

VII. Apply Release Flow

Unfortunately, I read the instructions to apply release flow after I was done with other sections. I am very sorry for this mistake.