Báo cáo thực hành OOP Lab 03

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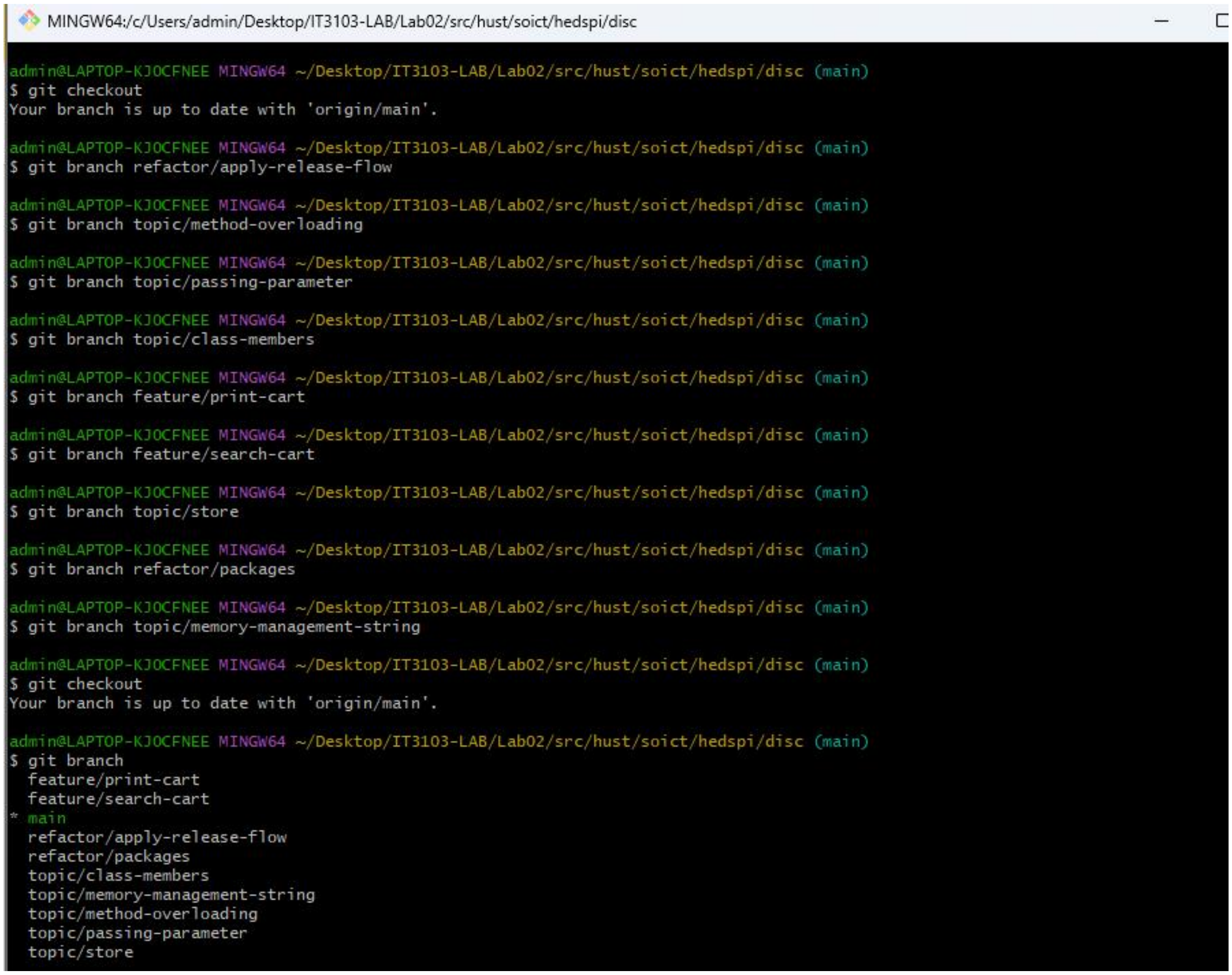
1. Branch your repository

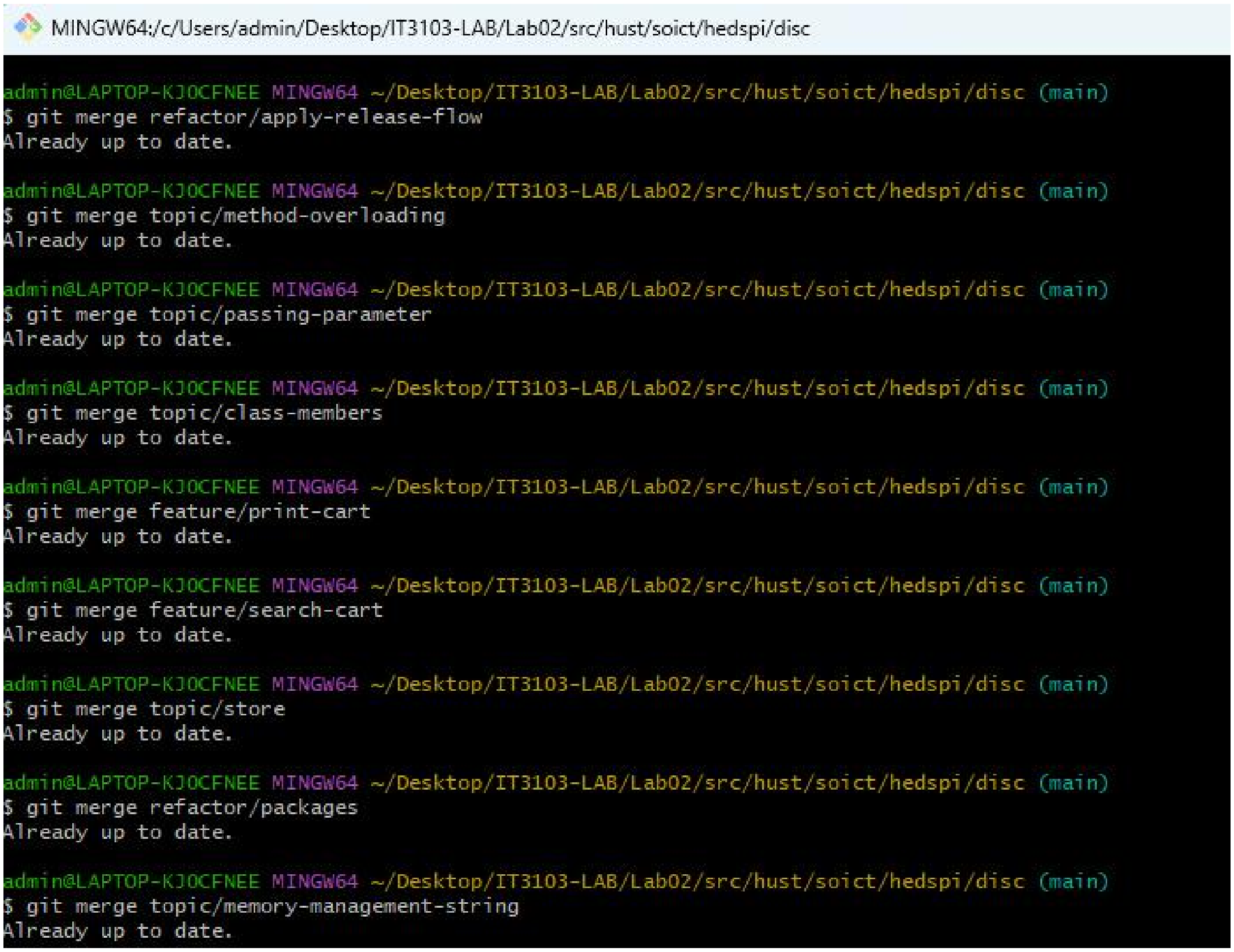
Tạo các branch:



MINGW64:/c/Users/admin/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc

```
admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git checkout
Your branch is up to date with 'origin/main'.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch refactor/apply-release-flow

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch topic/method-overloading

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch topic/passing-parameter

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch topic/class-members

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch feature/print-cart

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch feature/search-cart

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch topic/store

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch refactor/packages

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch topic/memory-management-string

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git checkout
Your branch is up to date with 'origin/main'.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git branch
  feature/print-cart
  feature/search-cart
* main
  refactor/apply-release-flow
  refactor/packages
  topic/class-members
  topic/memory-management-string
  topic/method-overloading
  topic/passing-parameter
  topic/store
```

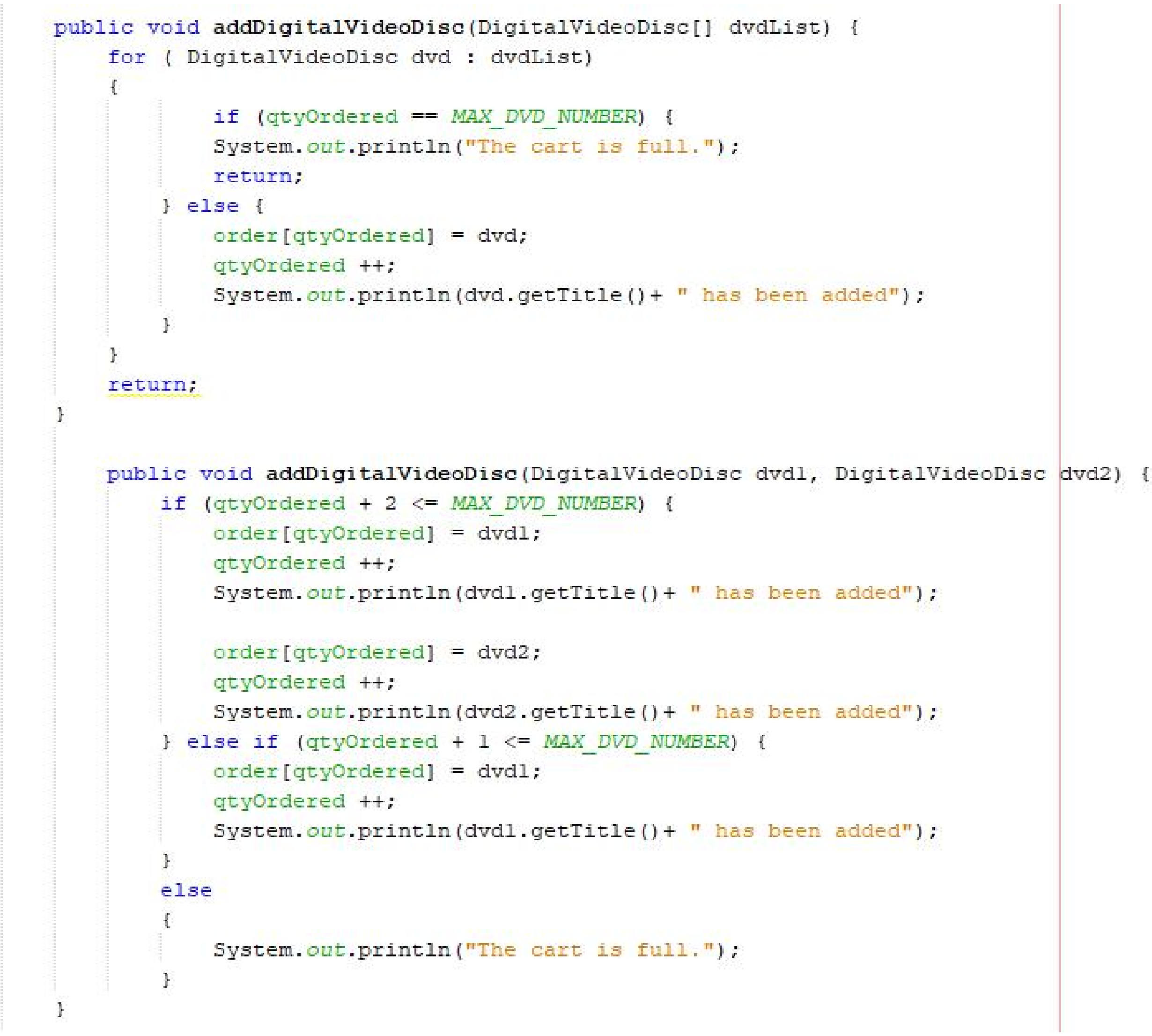
Merge các branch:



MINGW64:/c/Users/admin/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc

```
admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge refactor/apply-release-flow
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge topic/method-overloading
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge topic/passing-parameter
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge topic/class-members
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge feature/print-cart
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge feature/search-cart
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge topic/store
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge refactor/packages
Already up to date.

admin@LAPTOP-KJOCFNEE MINGW64 ~/Desktop/IT3103-LAB/Lab02/src/hust/soict/hedspi/disc (main)
$ git merge topic/memory-management-string
Already up to date.
```

2. Working with method overloading:



```
public void addDigitalVideoDisc(DigitalVideoDisc[] dvdList) {
    for ( DigitalVideoDisc dvd : dvdList)
    {
            if (qtyOrdered == MAX_DVD_NUMBER) {
            System.out.println("The cart is full.");
            return;
        } else {
            order[qtyOrdered] = dvd;
            qtyOrdered ++;
            System.out.println(dvd.getTitle()+ " has been added");
        }
    }
    return;
}

    public void addDigitalVideoDisc(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2) {
        if (qtyOrdered + 2 <= MAX_DVD_NUMBER) {
            order[qtyOrdered] = dvd1;
            qtyOrdered ++;
            System.out.println(dvd1.getTitle()+ " has been added");

            order[qtyOrdered] = dvd2;
            qtyOrdered ++;
            System.out.println(dvd2.getTitle()+ " has been added");
        } else if (qtyOrdered + 1 <= MAX_DVD_NUMBER) {
            order[qtyOrdered] = dvd1;
            qtyOrdered ++;
            System.out.println(dvd1.getTitle()+ " has been added");
        }
        else
        {
            System.out.println("The cart is full.");
        }
}
```

3. Passing parameter:

Question: Is JAVA a Pass by Value or a Pass by Reference programming language?

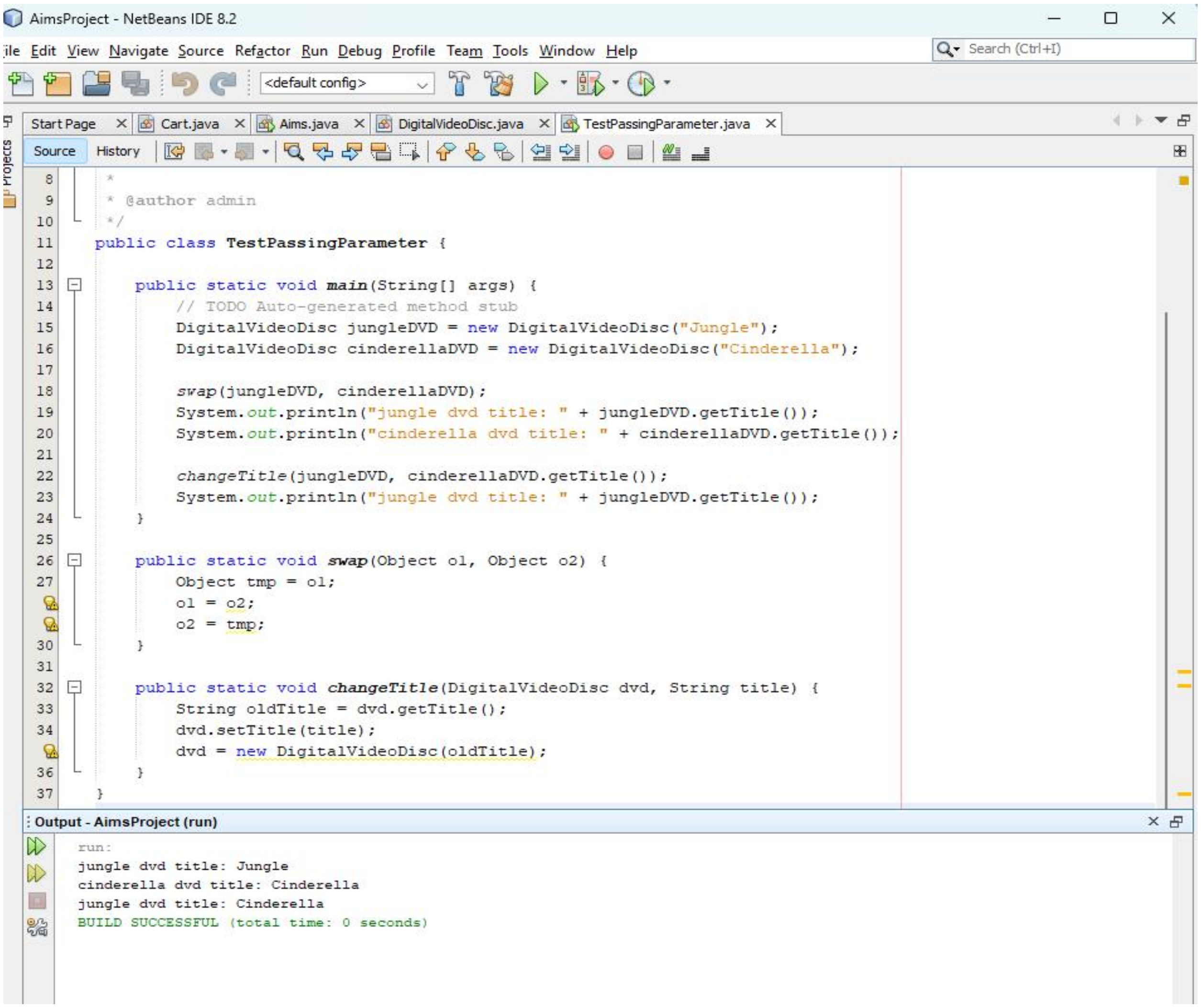
Answer: Java là ngôn ngữ Pass by Value.

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

Answer: Phương thức swap không thay đổi gì vì Java chỉ truyền bản sao của tham chiếu, và việc hoán đổi bản sao không ảnh hưởng đến bản gốc.

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

Answer: Phương thức changeTitle thay đổi tiêu đề vì nó trực tiếp thay đổi nội dung của đối tượng thông qua tham chiếu, và thay đổi này được phản ánh trên đối tượng gốc.


AimsProject - NetBeans IDE 8.2
ile Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
<default config>
Start Page
Cart.java
Aims.java
DigitalVideoDisc.java
TestPassingParameter.java
Source
History
Projects
Output - AimsProject (run)

```
 *
 * @author admin
 */
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);
    }
}
```

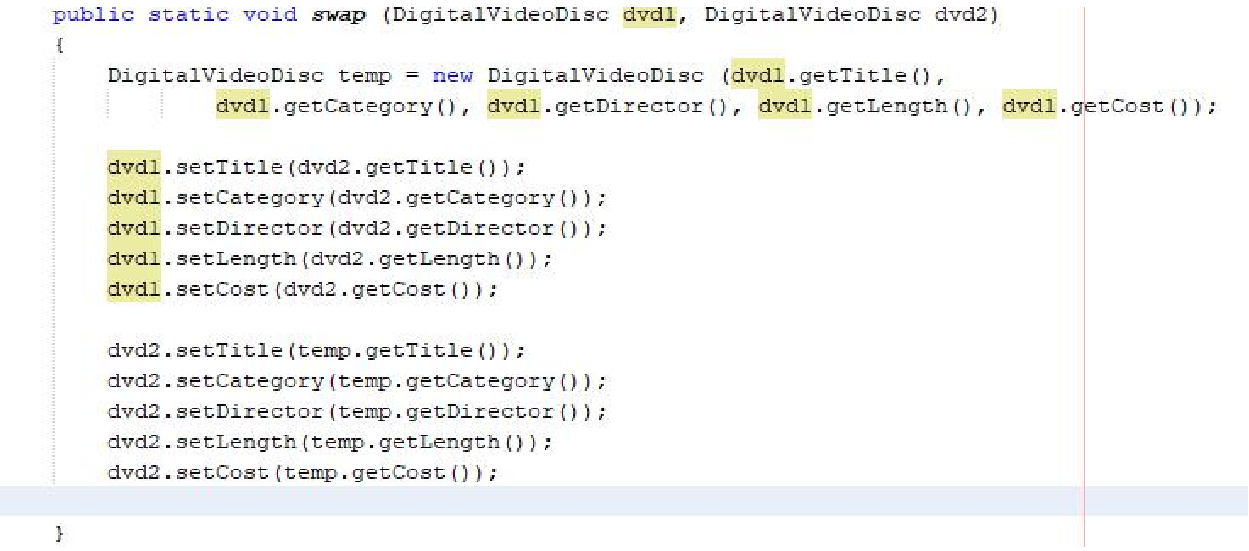
```
run:
jungle dvd title: Jungle
cinderella dvd title: Cinderella
jungle dvd title: Cinderella
BUILD SUCCESSFUL (total time: 0 seconds)
```

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

Answer: Phương thức swap không thay đổi gì vì Java chỉ truyền bản sao của tham chiếu, và việc hoán đổi bản sao không ảnh hưởng đến bản gốc.

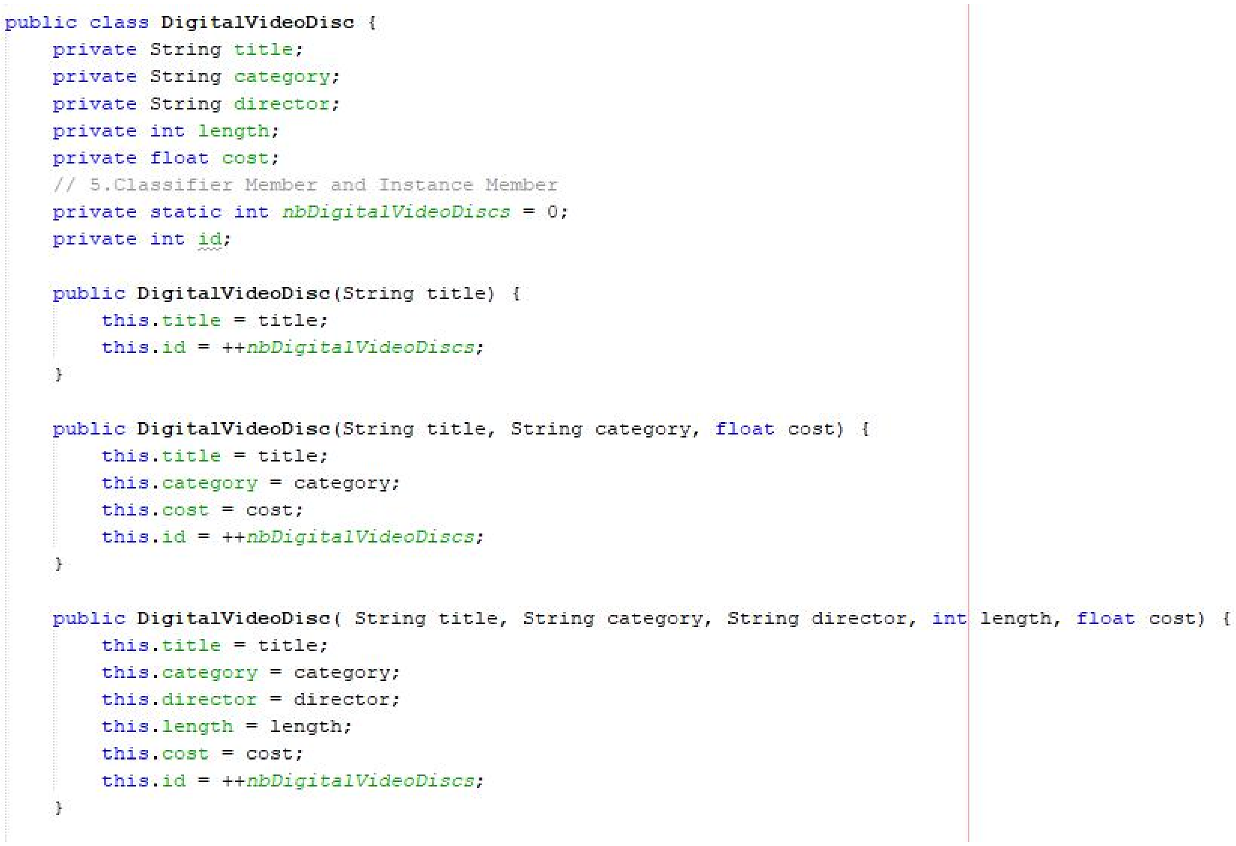
Questions: After the call of changeTitle(jungleDVD, cinderellaDVD.getTitle()) why is the title of the JungleDVD changed?

Answer: Phương thức changeTitle thay đổi tiêu đề vì nó trực tiếp thay đổi nội dung của đối tượng thông qua tham chiếu, và thay đổi này được phản ánh trên đối tượng gốc.



```
public static void swap (DigitalVideoDisc dvd1, DigitalVideoDisc dvd2)
{
    DigitalVideoDisc temp = new DigitalVideoDisc (dvd1.getTitle(),
            dvd1.getCategory(), dvd1.getDirector(), dvd1.getLength(), dvd1.getCost());

    dvd1.setTitle(dvd2.getTitle());
    dvd1.setCategory(dvd2.getCategory());
    dvd1.setDirector(dvd2.getDirector());
    dvd1.setLength(dvd2.getLength());
    dvd1.setCost(dvd2.getCost());

    dvd2.setTitle(temp.getTitle());
    dvd2.setCategory(temp.getCategory());
    dvd2.setDirector(temp.getDirector());
    dvd2.setLength(temp.getLength());
    dvd2.setCost(temp.getCost());

}
```

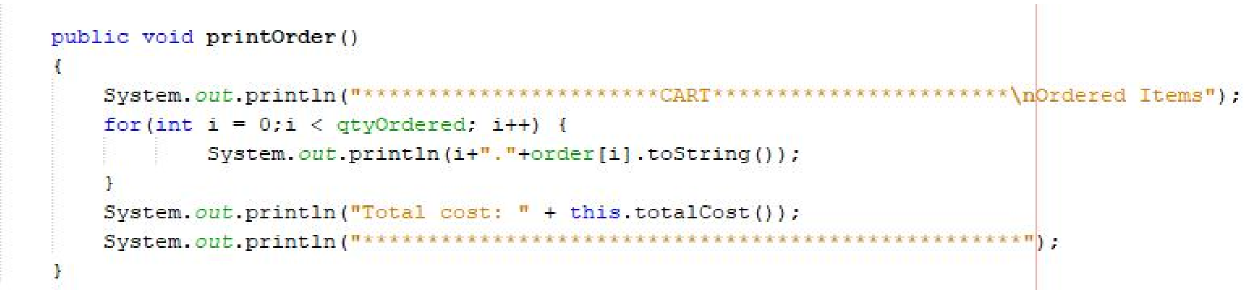
4. Debugging Java
5. Classifier Member and Instance Member:



```java
public class DigitalVideoDisc {
    private String title;
    private String category;
    private String director;
    private int length;
    private float cost;
    // 5.Classifier Member and Instance Member
    private static int nbDigitalVideoDiscs = 0;
    private int id;

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

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

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

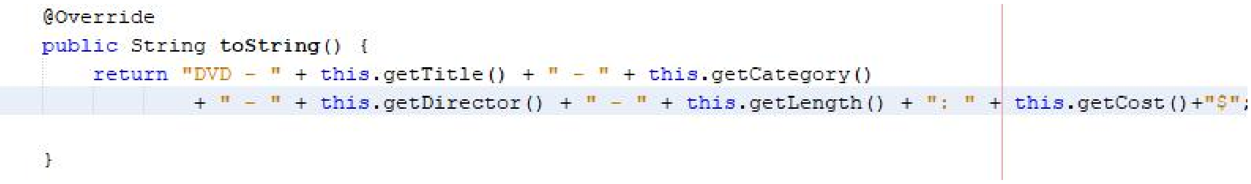
6. Open the Cart class:

The “printOrder” function in Cart class



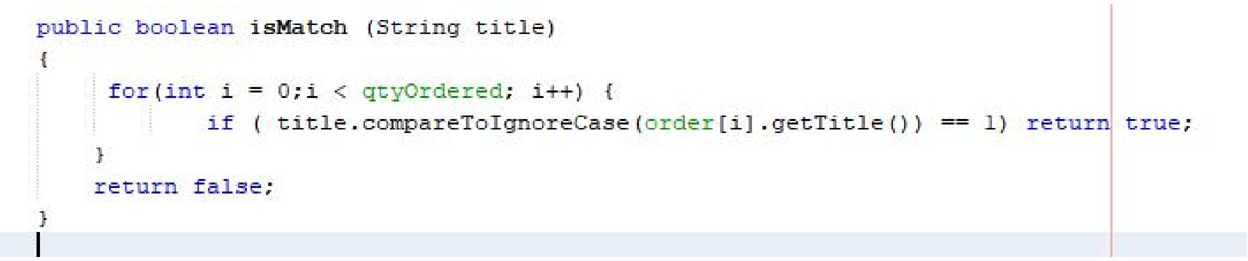
```
public void printOrder()
{
    System.out.println("**********************CART**********************\nOrdered Items");
    for(int i = 0;i < qtyOrdered; i++) {
            System.out.println(i+"."+order[i].toString());
    }
    System.out.println("Total cost: " + this.totalCost());
    System.out.println("************************************************");
}
```

The “toString” function in DigitalVideoDisc class



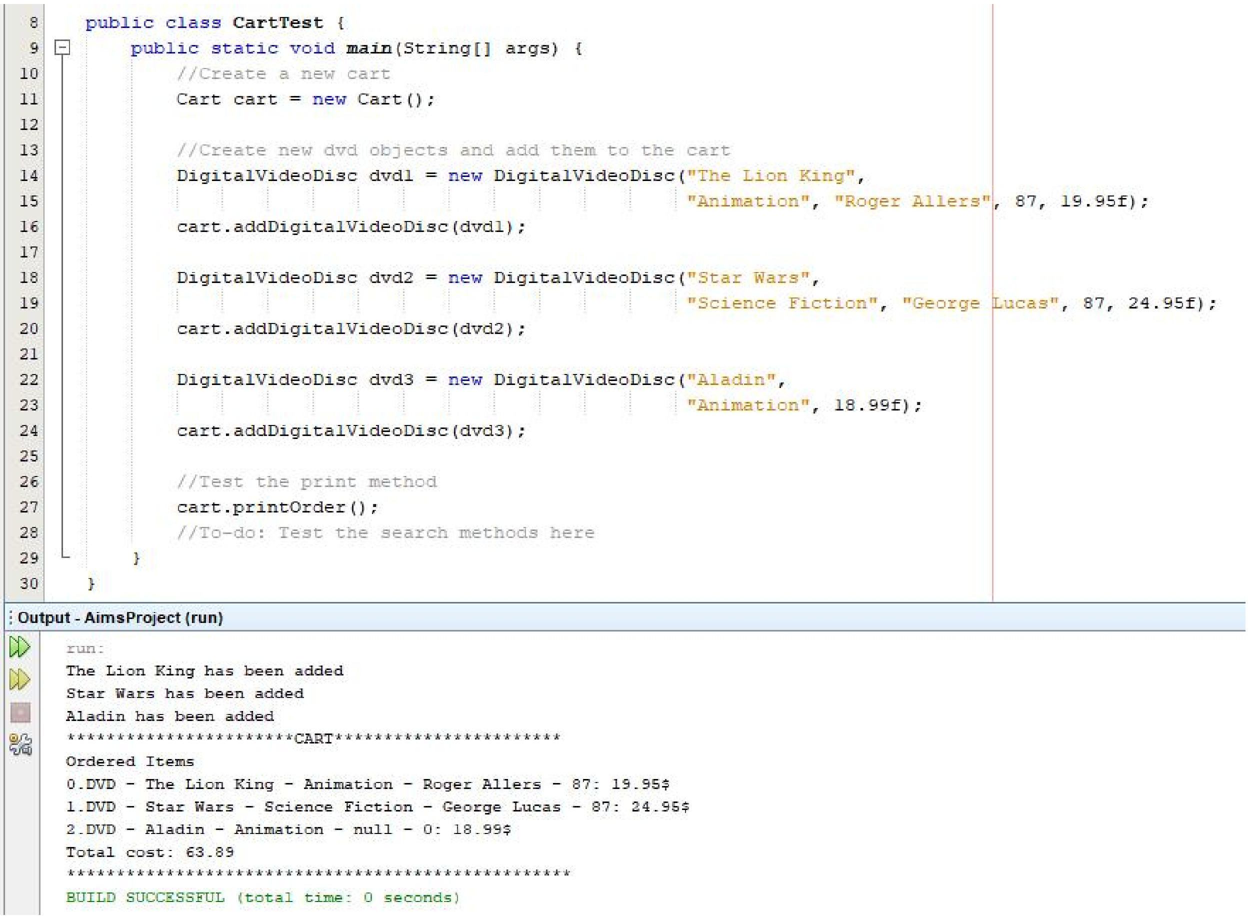
```
@Override
public String toString() {
    return "DVD - " + this.getTitle() + " - " + this.getCategory()
            + " - " + this.getDirector() + " - " + this.getLength() + ": " + this.getCost()+"$";

}
```

The “isMatch” function



```
public boolean isMatch (String title)
{
     for(int i = 0;i < qtyOrdered; i++) {
            if ( title.compareToIgnoreCase(order[i].getTitle()) == 1) return true;
    }
    return false;
}
```

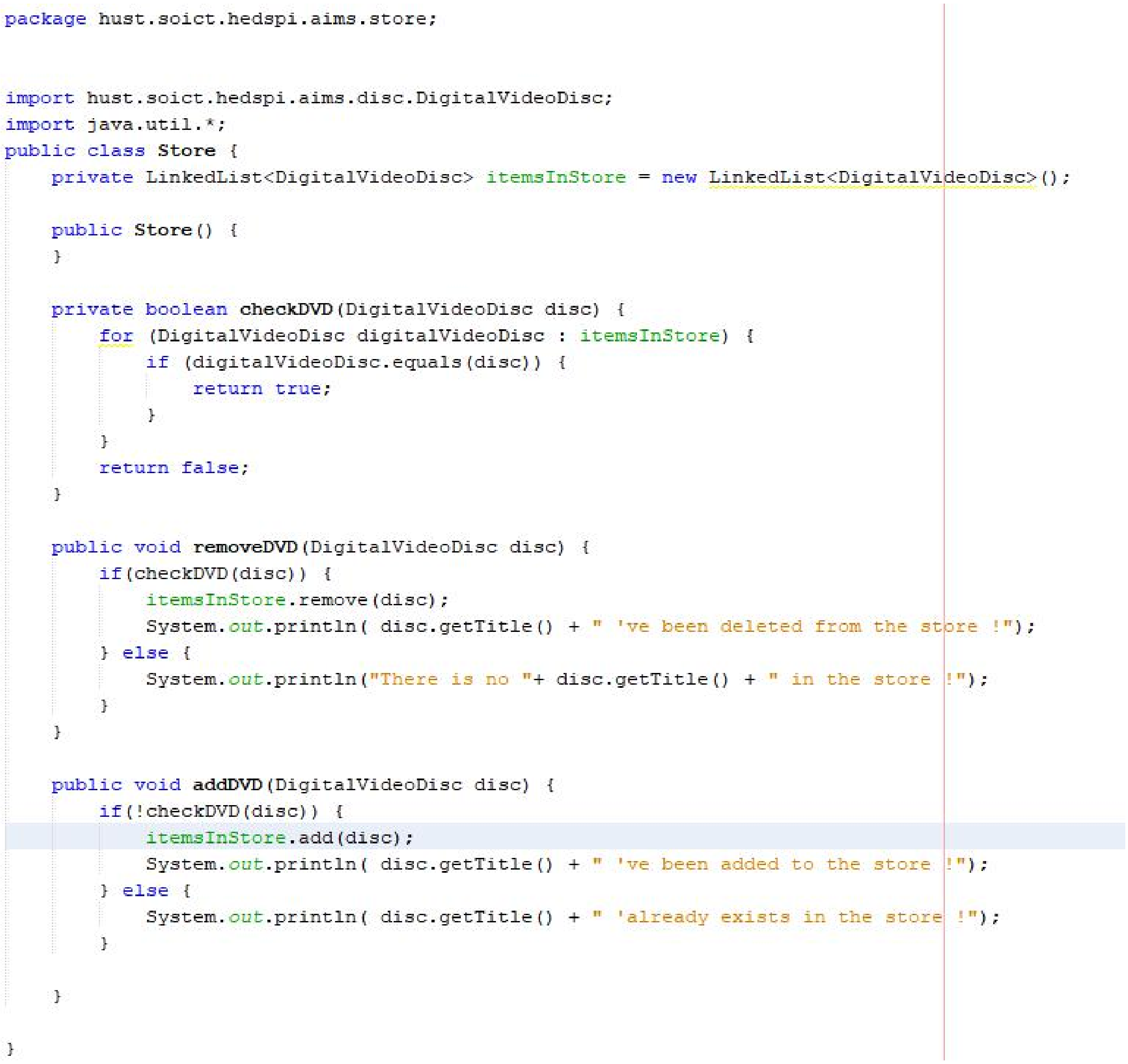
CartTest:



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

        //Create new dvd objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc("The Lion King",
                                                     "Animation", "Roger Allers", 87, 19.95f);
        cart.addDigitalVideoDisc(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc("Star Wars",
                                                     "Science Fiction", "George Lucas", 87, 24.95f);
        cart.addDigitalVideoDisc(dvd2);

        DigitalVideoDisc dvd3 = new DigitalVideoDisc("Aladin",
                                                     "Animation", 18.99f);
        cart.addDigitalVideoDisc(dvd3);

        //Test the print method
        cart.printOrder();
        //To-do: Test the search methods here
    }
}
```

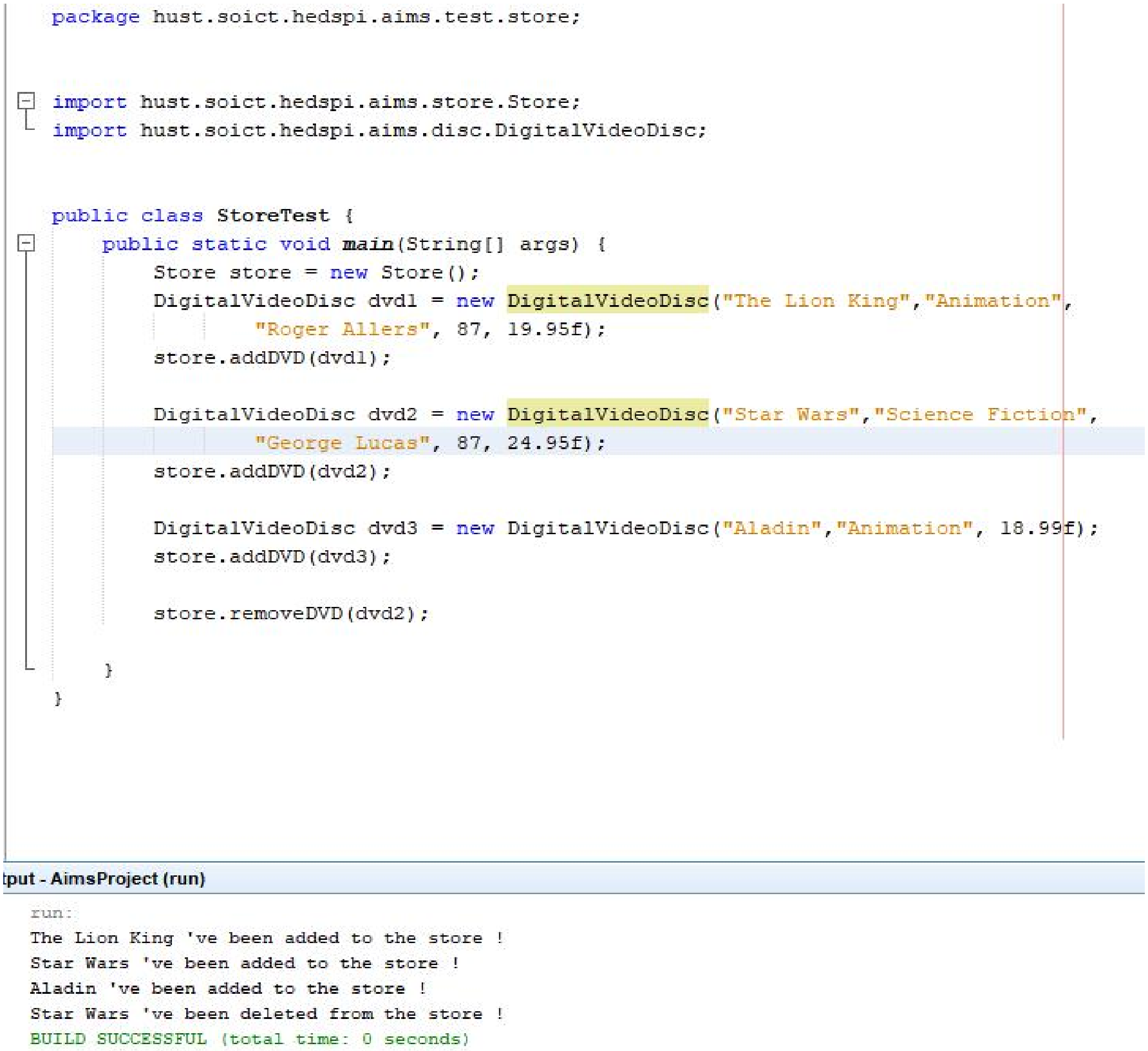
```
run:
The Lion King has been added
Star Wars has been added
Aladin has been added
***********************CART***********************
Ordered Items
0.DVD - The Lion King - Animation - Roger Allers - 87: 19.95$
1.DVD - Star Wars - Science Fiction - George Lucas - 87: 24.95$
2.DVD - Aladin - Animation - null - 0: 18.99$
Total cost: 63.89
***************************************************
BUILD SUCCESSFUL (total time: 0 seconds)
```

7. Implement the Store class:



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


import hust.soict.hedspi.aims.disc.DigitalVideoDisc;
import java.util.*;
public class Store {
    private LinkedList<DigitalVideoDisc> itemsInStore = new LinkedList<DigitalVideoDisc>();

    public Store() {
    }

    private boolean checkDVD(DigitalVideoDisc disc) {
        for (DigitalVideoDisc digitalVideoDisc : itemsInStore) {
            if (digitalVideoDisc.equals(disc)) {
                return true;
            }
        }
        return false;
    }

    public void removeDVD(DigitalVideoDisc disc) {
        if(checkDVD(disc)) {
            itemsInStore.remove(disc);
            System.out.println( disc.getTitle() + " 've been deleted from the store !");
        } else {
            System.out.println("There is no "+ disc.getTitle() + " in the store !");
        }
    }

    public void addDVD(DigitalVideoDisc disc) {
        if(!checkDVD(disc)) {
            itemsInStore.add(disc);
            System.out.println( disc.getTitle() + " 've been added to the store !");
        } else {
            System.out.println( disc.getTitle() + " 'already exists in the store !");
        }

    }

}
```

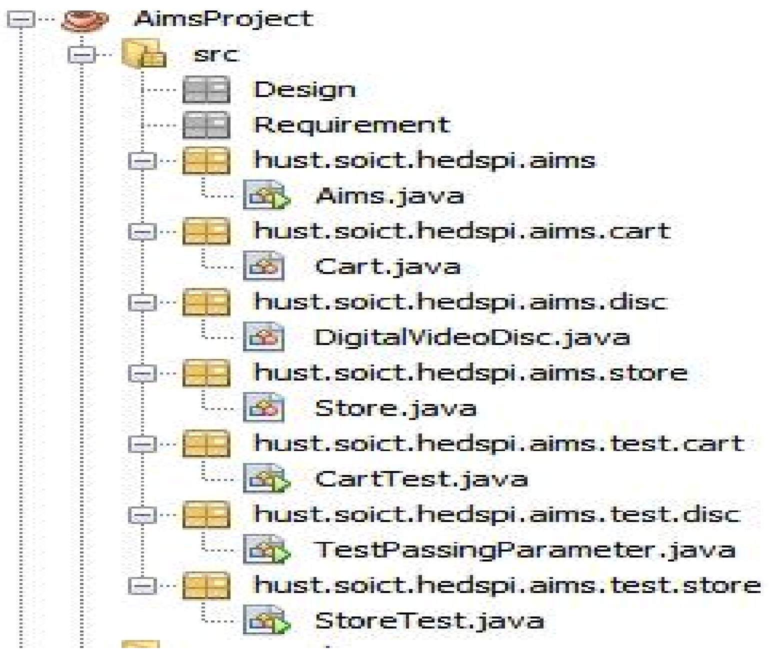
Testing:



```
package hust.soict.hedspi.aims.test.store;


import hust.soict.hedspi.aims.store.Store;
import hust.soict.hedspi.aims.disc.DigitalVideoDisc;


public class StoreTest {
    public static void main(String[] args) {
        Store store = new Store();
        DigitalVideoDisc dvd1 = new DigitalVideoDisc("The Lion King","Animation",
                "Roger Allers", 87, 19.95f);
        store.addDVD(dvd1);

        DigitalVideoDisc dvd2 = new DigitalVideoDisc("Star Wars","Science Fiction",
                "George Lucas", 87, 24.95f);
        store.addDVD(dvd2);

        DigitalVideoDisc dvd3 = new DigitalVideoDisc("Aladin","Animation", 18.99f);
        store.addDVD(dvd3);

        store.removeDVD(dvd2);

    }
}
```

```
run:
The Lion King 've been added to the store !
Star Wars 've been added to the store !
Aladin 've been added to the store !
Star Wars 've been deleted from the store !
BUILD SUCCESSFUL (total time: 0 seconds)
```

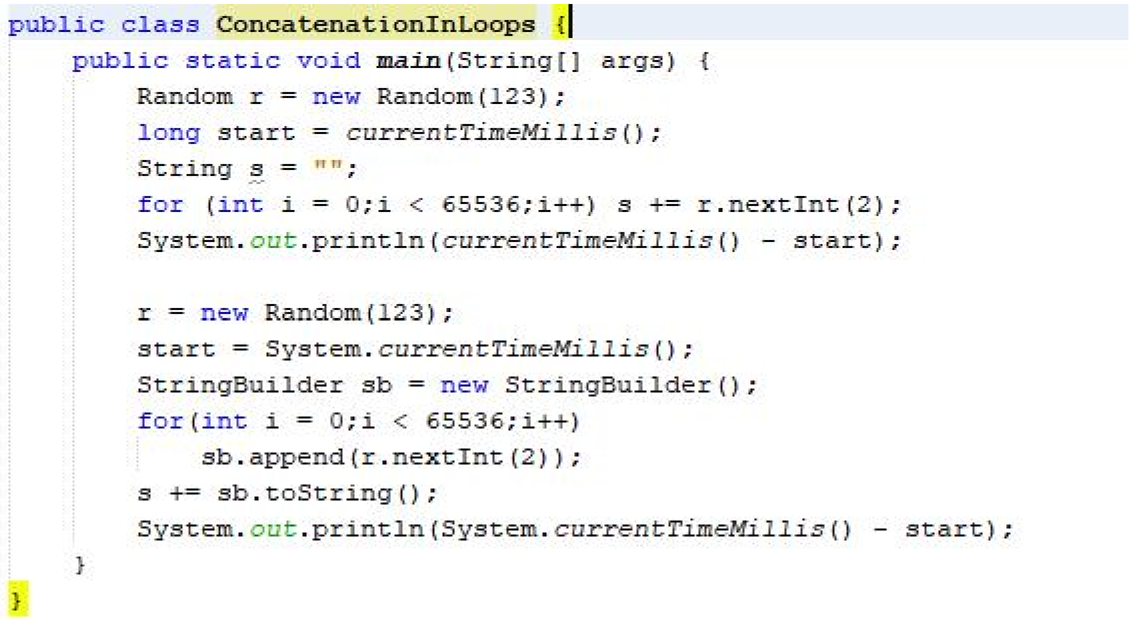
8. Re-organize your projects



```
AimsProject
  src
    Design
    Requirement
    hust.soict.hedspi.aims
      Aims.java
    hust.soict.hedspi.aims.cart
      Cart.java
    hust.soict.hedspi.aims.disc
      DigitalVideoDisc.java
    hust.soict.hedspi.aims.store
      Store.java
    hust.soict.hedspi.aims.test.cart
      CartTest.java
    hust.soict.hedspi.aims.test.disc
      TestPassingParameter.java
    hust.soict.hedspi.aims.test.store
      StoreTest.java
```

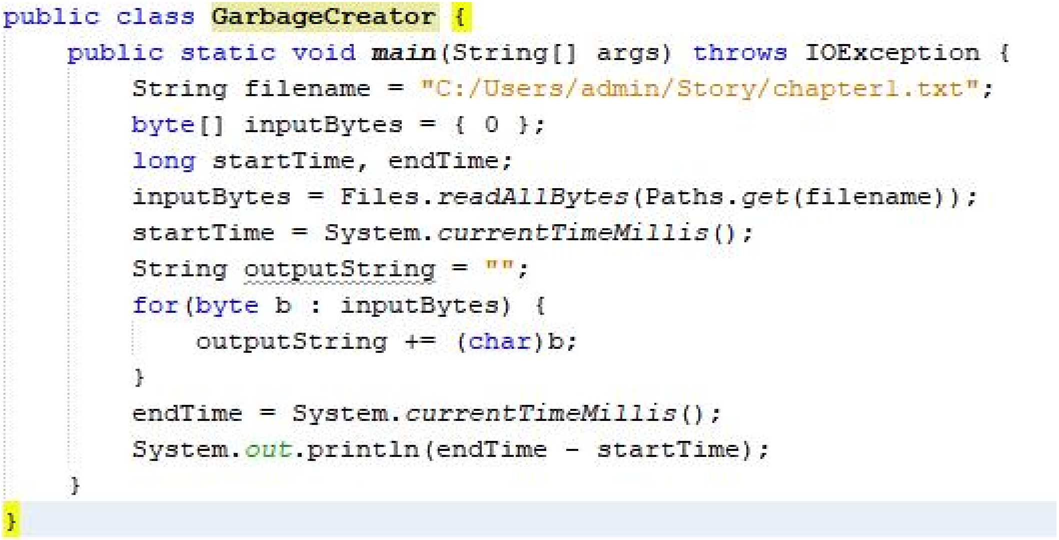
9. String, StringBuilder and StringBuffer

ConcatenationInLoops class:



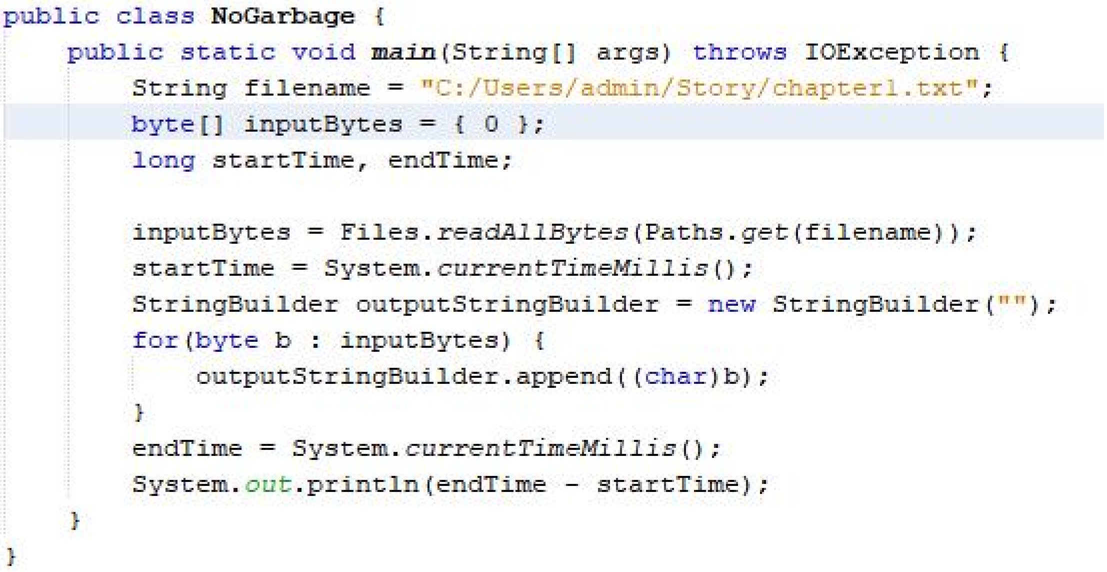
```java
public class ConcatenationInLoops {
    public static void main(String[] args) {
        Random r = new Random(123);
        long start = currentTimeMillis();
        String s = "";
        for (int i = 0;i < 65536;i++) s += r.nextInt(2);
        System.out.println(currentTimeMillis() - start);

        r = new Random(123);
        start = System.currentTimeMillis();
        StringBuilder sb = new StringBuilder();
        for(int i = 0;i < 65536;i++)
            sb.append(r.nextInt(2));
        s += sb.toString();
        System.out.println(System.currentTimeMillis() - start);
    }
}
```

GarbageCreator class:



```java
public class GarbageCreator {
    public static void main(String[] args) throws IOException {
        String filename = "C:/Users/admin/Story/chapter1.txt";
        byte[] inputBytes = { 0 };
        long startTime, endTime;
        inputBytes = Files.readAllBytes(Paths.get(filename));
        startTime = System.currentTimeMillis();
        String outputString = "";
        for(byte b : inputBytes) {
            outputString += (char)b;
        }
        endTime = System.currentTimeMillis();
        System.out.println(endTime - startTime);
    }
}
```

noGarbage class:

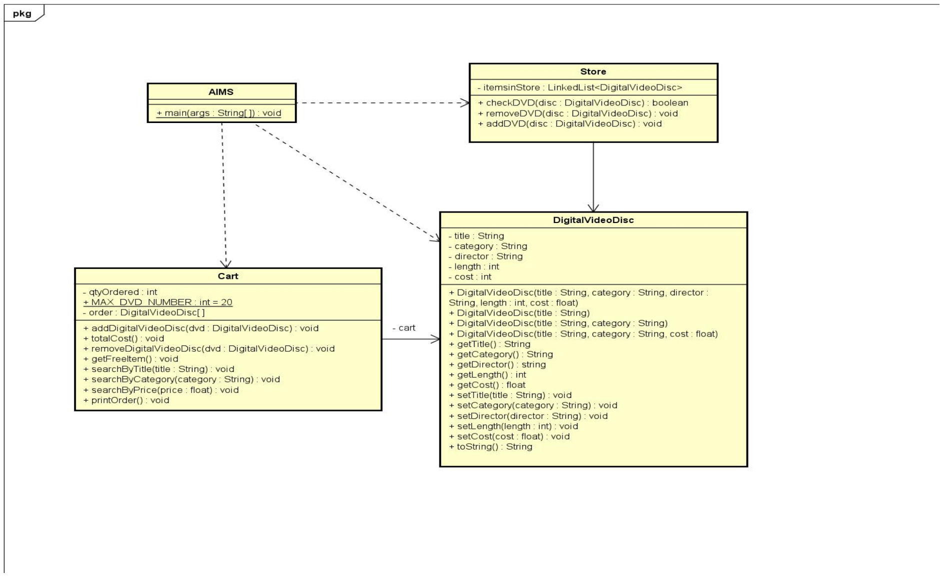


```java
public class NoGarbage {
    public static void main(String[] args) throws IOException {
        String filename = "C:/Users/admin/Story/chapter1.txt";
        byte[] inputBytes = { 0 };
        long startTime, endTime;

        inputBytes = Files.readAllBytes(Paths.get(filename));
        startTime = System.currentTimeMillis();
        StringBuilder outputStringBuilder = new StringBuilder("");
        for(byte b : inputBytes) {
            outputStringBuilder.append((char)b);
        }
        endTime = System.currentTimeMillis();
        System.out.println(endTime - startTime);
    }
}
```

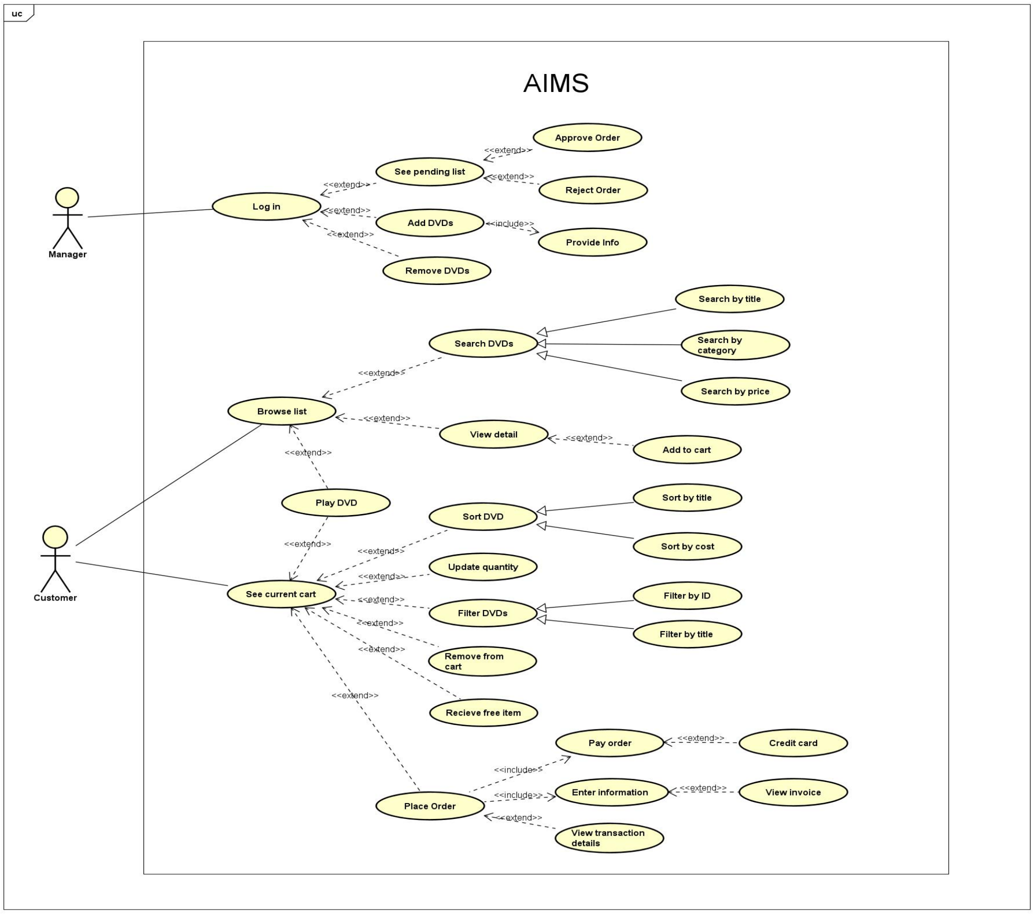
10. Release flow demonstration

11. Update Class Diagram and UseCase Diagram

Class Diagram:


pkg
AIMS
+ main(args : String[ ]) : void
Store
- itemsinStore : LinkedList<DigitalVideoDisc>
+ checkDVD(disc : DigitalVideoDisc) : boolean
+ removeDVD(disc : DigitalVideoDisc) : void
+ addDVD(disc : DigitalVideoDisc) : void
Cart
- qtyOrdered : int
+ MAX_DVD_NUMBER : int = 20
- order : DigitalVideoDisc[ ]
+ addDigitalVideoDisc(dvd : DigitalVideoDisc) : void
+ totalCost() : void
+ removeDigitalVideoDisc(dvd : DigitalVideoDisc) : void
+ getFreeItem() : void
+ searchByTitle(title : String) : void
+ searchByCategory(category : String) : void
+ searchByPrice(price : float) : void
+ printOrder() : void
- cart
DigitalVideoDisc
- title : String
- category : String
- director : String
- length : int
- cost : int
+ DigitalVideoDisc(title : String, category : String, director : String, length : int, cost : float)
+ DigitalVideoDisc(title : String)
+ DigitalVideoDisc(title : String, category : String)
+ DigitalVideoDisc(title : String, category : String, cost : float)
+ getTitle() : String
+ getCategory() : String
+ getDirector() : string
+ getLength() : int
+ getCost() : float
+ setTitle(title : String) : void
+ setCategory(category : String) : void
+ setDirector(director : String) : void
+ setLength(length : int) : void
+ setCost(cost : float) : void
+ toString() : String

UseCase Diagram:


uc
AIMS
Manager
Customer
Approve Order
<<extend>>
See pending list
<<extend>>
Reject Order
<<extend>>
Log in
<<extend>>
Add DVDs
<<include>>
Provide Info
<<extend>>
Remove DVDs
Search by title
Search DVDs
Search by category
<<extend>>
Search by price
Browse list
<<extend>>
View detail
<<extend>>
Add to cart
<<extend>>
Play DVD
Sort by title
Sort DVD
Sort by cost
<<extend>>
<<extend>>
Update quantity
<<extend>>
See current cart
<<extend>>
Filter by ID
Filter DVDs
Filter by title
<<extend>>
<<extend>>
Remove from cart
<<extend>>
Recieve free item
Pay order
<<extend>>
Credit card
<<include>>
Enter information
<<extend>>
View invoice
<<include>>
Place Order
<<extend>>
View transaction details