BÁO CÁO THỰC HÀNH LAB 3
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

Basic Object-Oriented Techniques

2.Working with method overloading

2.1 Overloading by differing types of parameter

```
21
22 @    public void addDigitalVideoDisc(DigitalVideoDisc[] dvdList) {
23          for(DigitalVideoDisc disc : dvdList) {
24              if(qutyOrdered == MAX_NUMBERS_ORDERED) System.out.println("The cart is almost full");
25              else {
26                  itemsOrdered[qutyOrdered] = disc;
27                  qutyOrdered++;
28                  System.out.println("The disc has been added");
29              }
30          }
31      }
32
```

2.2. Overloading by differing the number of parameters

```
33      public void addDigitalVideoDisc(DigitalVideoDisc dvd1,DigitalVideoDisc dvd2) {
34          if(qutyOrdered == MAX_NUMBERS_ORDERED) System.out.println("The cart is almost full to add dvd1");
35          else {
36              itemsOrdered[qutyOrdered] = dvd1;
37              qutyOrdered++;
38              System.out.println("The dvd1 has been added");
39          }
40          if(qutyOrdered == MAX_NUMBERS_ORDERED) System.out.println("The cart is almost full to add dvd2");
41          else {
42              itemsOrdered[qutyOrdered] = dvd2;
43              qutyOrdered++;
44              System.out.println("The dvd2 has been added");
45          }
46      }
```

3.Passing parameters

Cart.java TestPassingParameter.java

```java
package hust.soict.globalict.test.disc;

import hust.soict.globalict.aims.disc.DigitalVideoDisc;

public class TestPassingParameter {
    public static void main(String[] args) {
        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) {
        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 TestPassingParameter

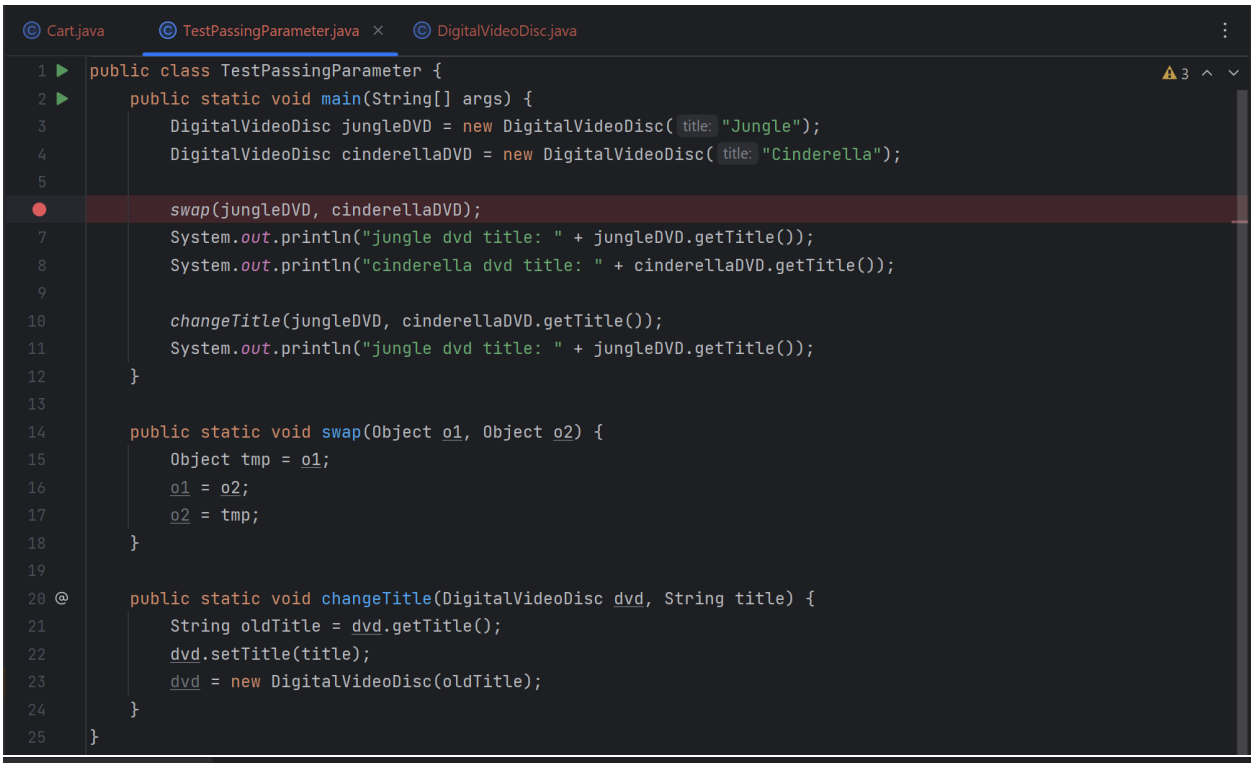
```
"C:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:E:\JetBrains\IntelliJ IDEA 2023.1\lib\idea_rt.jar=62030
jungle dvd title: Jungle
cinderella dvd title: Cinderella
jungle dvd title: Cinderella

Process finished with exit code 0
```

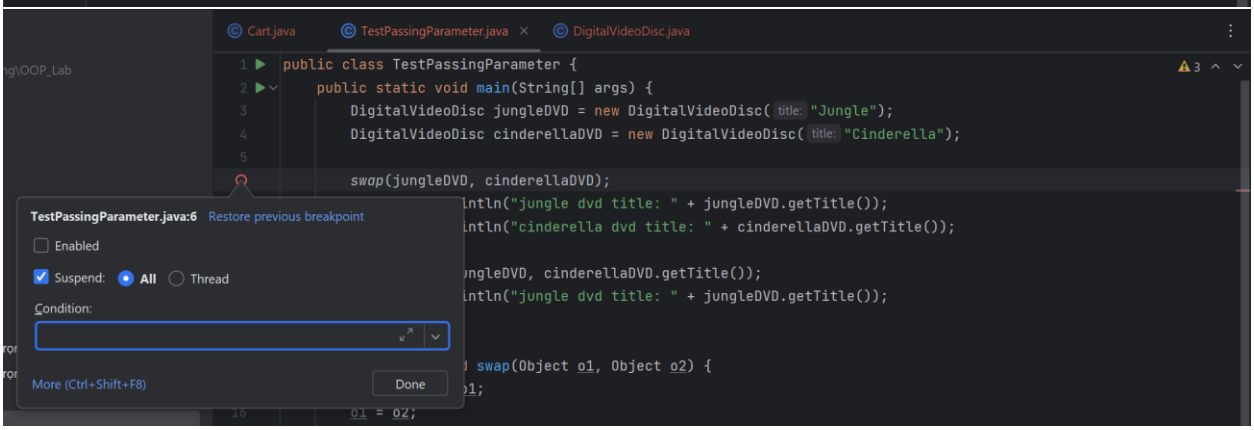
Java is a pass-by-value language. This means that when a value is passed to a method, a copy of the value is made and passed to the method. Any changes made to the value inside the method will not affect the original value.

However, there is a special case in Java where pass-by-reference is used. This is when a reference to an object is passed to a method. In this case, the method will receive a copy of the reference, but the reference will still point to the same object in memory. This means that any changes made to the object inside the method will be visible outside the method.

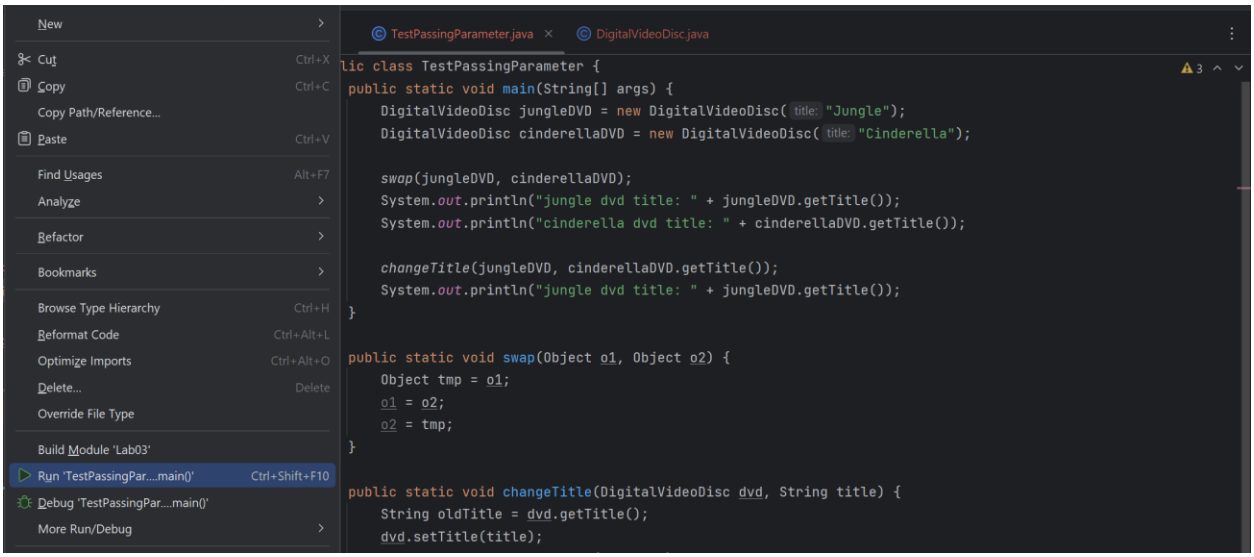
4. Use debug run

4.2.1. Setting, deleting & deactivate breakpoints.

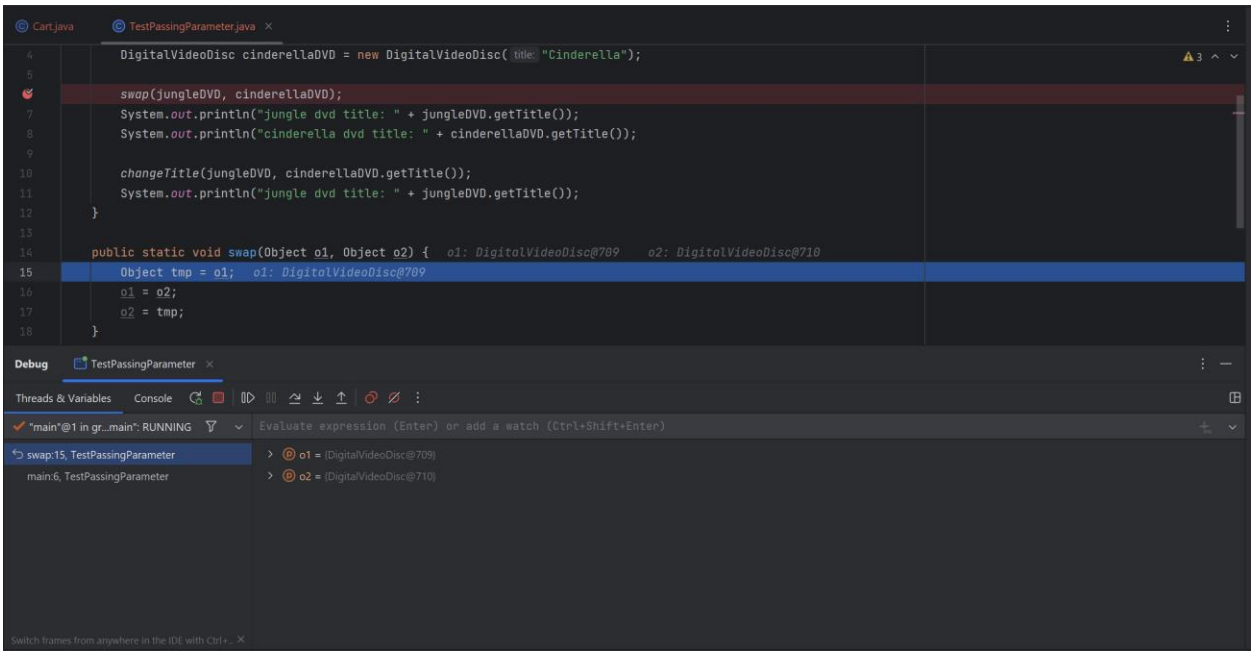




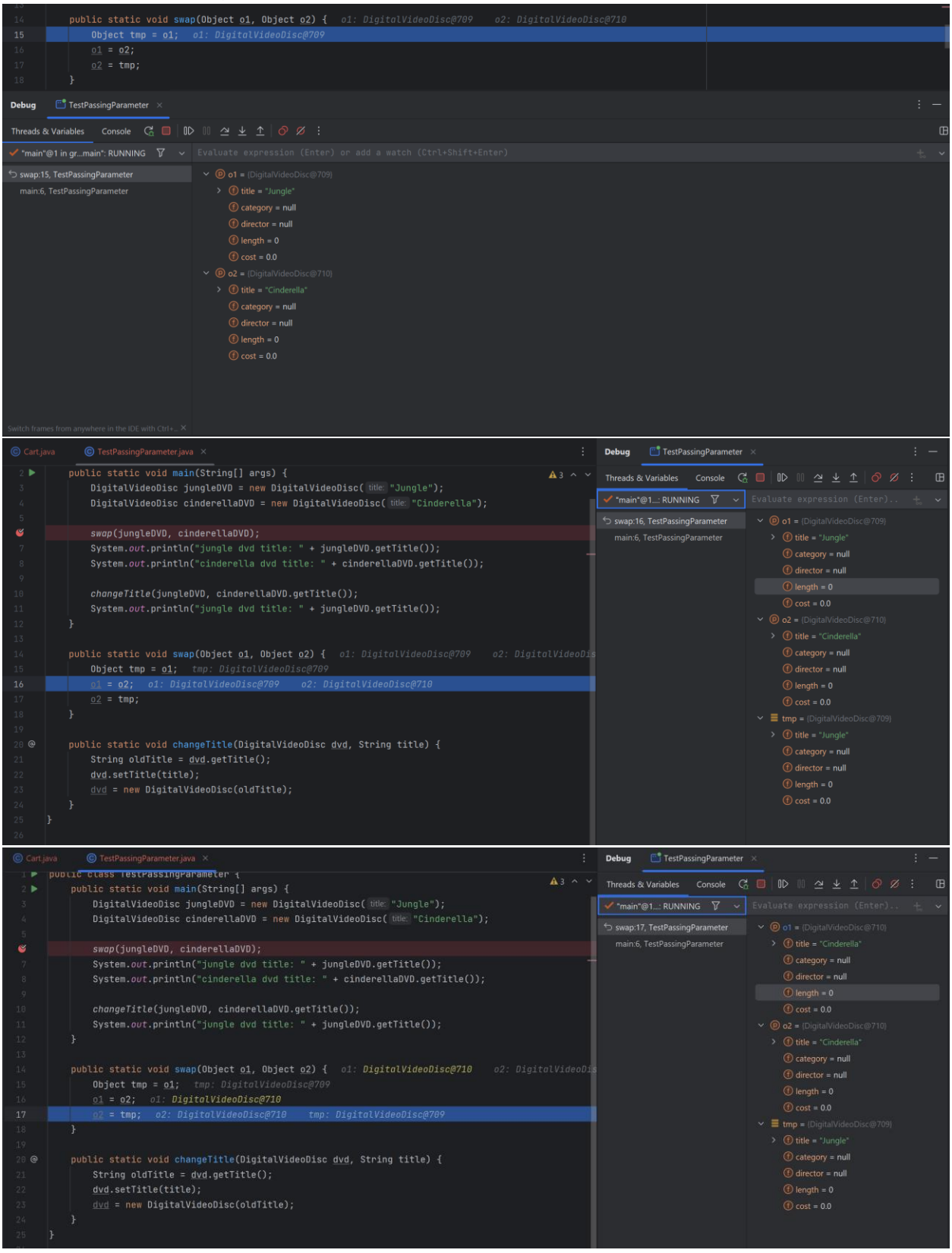
4.2.2. Run in Debug mode:

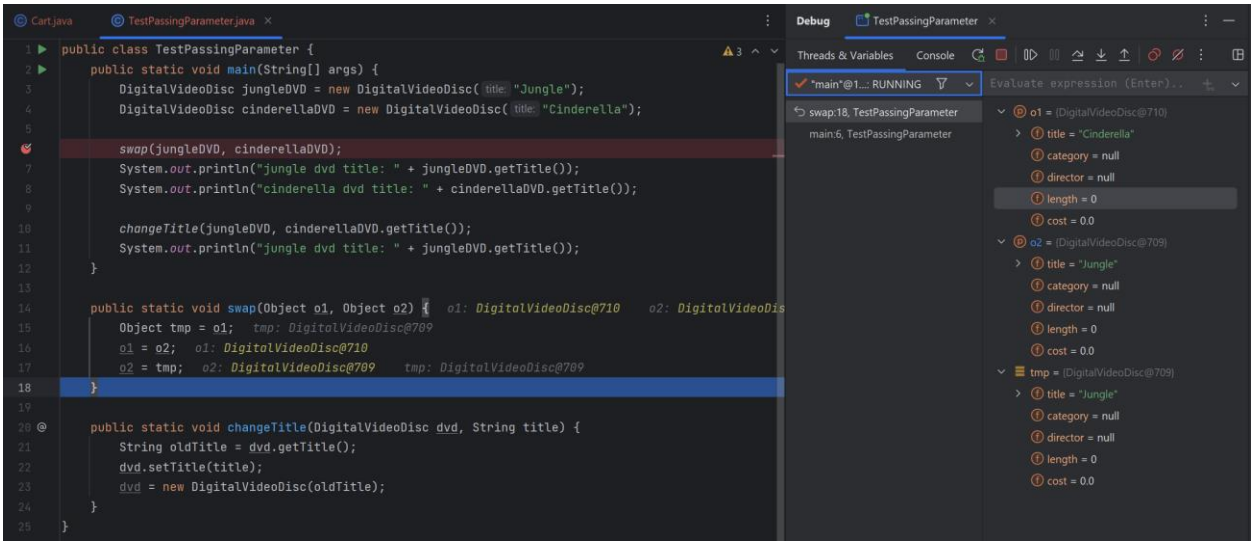


4.2.3. Step Into, Step Over, Step Return, Resume:

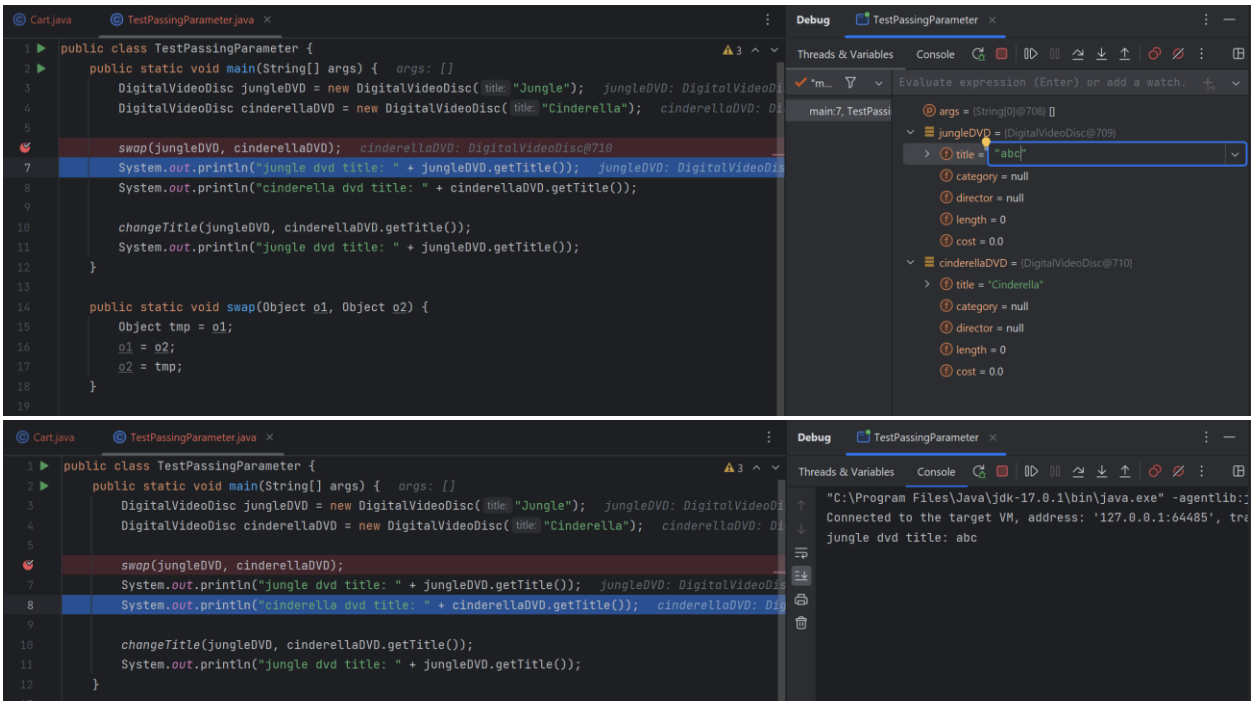


4.2.4. Investigate value of variables:





4.2.4. Change value of variables:



5. Classifier Member and Instance Member

Cart.java TestPassingParameter.java DigitalVideoDisc.java

```java
public class DigitalVideoDisc {
    private static int nbDigitalVideoDiscs = 0;

    private int id;
    private String title;
    private String category;
    private String director;
    private int length;
    private float cost;


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

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

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

    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;
        nbDigitalVideoDiscs++;
        this.id = nbDigitalVideoDiscs;
    }
```

6. Open the Cart class

```java
    @Override
    public String toString() {
        return "DVD - " + this.title + " - " + this.category +
                (this.director != null ? " - " + this.director : "") +
                (this.length > 0 ? " - " + this.length : "") +
                ": " + this.cost + "$";
    }
}
```

Cart.java | TestPassingParameter.java | DigitalVideoDisc.java

```java
    public void printCart() {
        System.out.println("**********CART**********");
        System.out.println("Ordered Items:");
        for(int i=0;i<qutyOrdered;i++){
            System.out.println("" + (i+1) + ". " + itemsOrdered[i].toString());
        }
        System.out.println("Total cost: " + this.totalCost() + "$");
        System.out.println("**************************************************");
    }
    public void searchById(int id) {
        for(int i=0;i<qutyOrdered;i++){
            if(itemsOrdered[i].getId() == id) {
                System.out.println("Result for id: " + id);
                System.out.println(itemsOrdered[i].toString());
                System.out.println();
                return;
            }
        }
        System.out.println("No match is found!");
    }
    public void searchByTitle(String title) {
        for(int i=0;i<qutyOrdered;i++){
            if(itemsOrdered[i].getTitle() == title) {
                System.out.println("Result for title: " + title);
                System.out.println(itemsOrdered[i].toString());
                System.out.println();
                return;
            }
        }
        System.out.println("No match is found!");
```

Cart.java | CartTest.java | TestPassingParameter.java | DigitalVideoDisc.java

```java
package hust.soict.globalict.test.cart;

import hust.soict.globalict.aims.cart.Cart;
import hust.soict.globalict.aims.disc.DigitalVideoDisc;

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

        // Create new dvd objects and add them to cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King", category: "Animation", director: "Roger Aller
        cart.addDigitalVideoDisc(dvd1);

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

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

        // Test print method
        cart.printCart();

        // Test search by id method
        cart.searchById(2);

        // Test search by title method
        cart.searchByTitle("Aladin");
    }
}
```

```
"C:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:E:\JetBrains\IntelliJ IDEA 2023.1\lib\idea_rt.jar=62243:E:\JetBrains\IntelliJ IDEA 2023.1\bin" -Dfile.encod
The disc has been added
The disc has been added
The disc has been added
**********CART**********
Ordered Items:
1. DVD - The Lion King - Animation - Roger Allers - 87: 19.95$
2. DVD - Star Wars - Science Fiction - George Lucas - 87: 24.95$
3. DVD - Aladin - Animation: 18.99$
Total cost: 63.89$
**************************************************
Result for id: 2
DVD - Star Wars - Science Fiction - George Lucas - 87: 24.95$

Result for title: Aladin
DVD - Aladin - Animation: 18.99$


Process finished with exit code 0
```

7. Implement the Store class

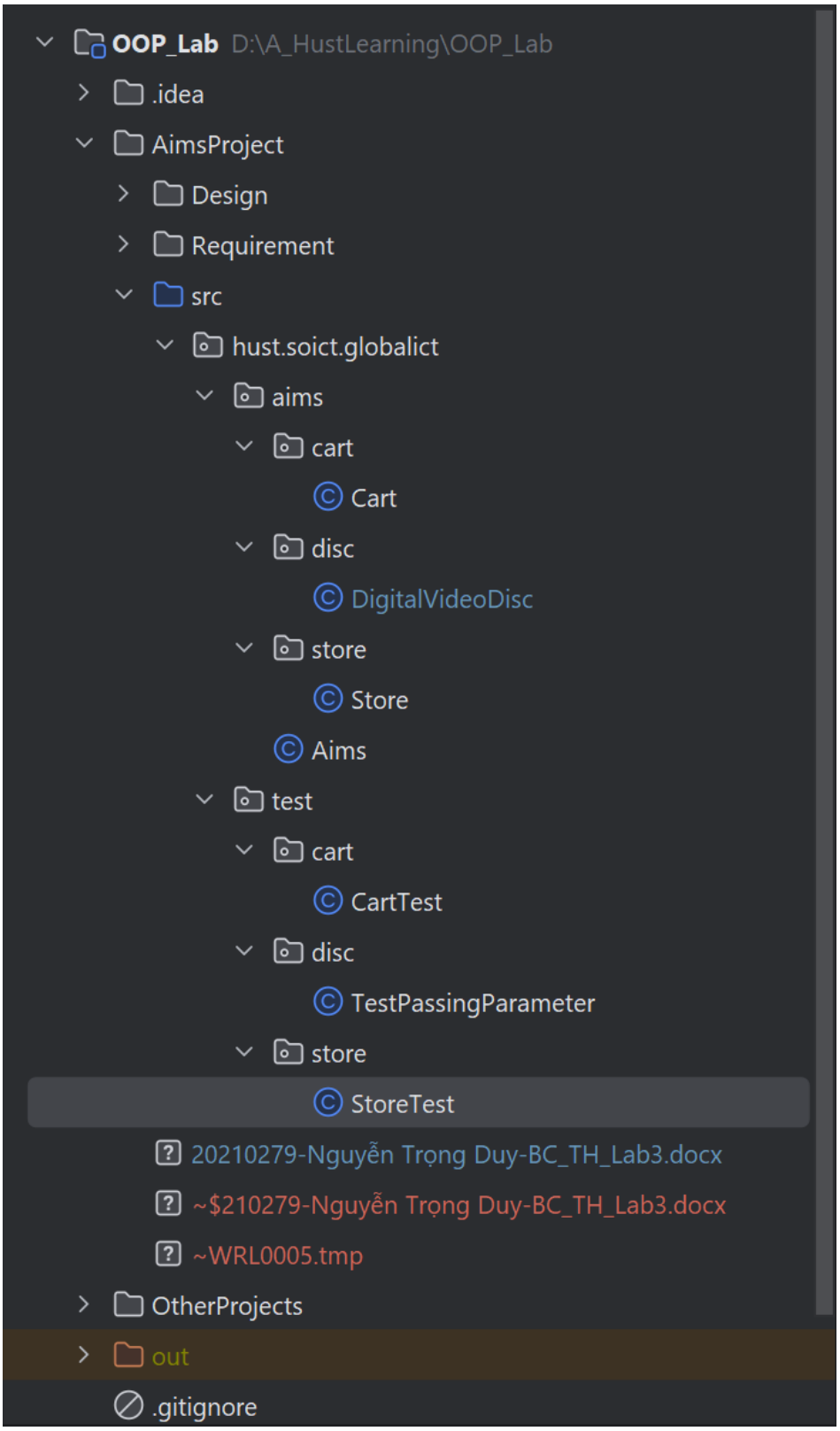
Cart.java CartTest.java Store.java TestPassingParameter.java DigitalVideoDisc.java

```java
public class Store {
    public static final int MAX_NUMBERS_VIDEOS = 20;
    private DigitalVideoDisc itemsInStore[] = new DigitalVideoDisc[MAX_NUMBERS_VIDEOS];
    int quantity = 0;

    public void addDVD(DigitalVideoDisc disc) {
        if(quantity == MAX_NUMBERS_VIDEOS) System.out.println("The store is almost full");
        else {
            itemsInStore[quantity] = disc;
            quantity++;
            System.out.println("The dvd has been added");
        }
    }

    public void removeDVD(DigitalVideoDisc disc) {
        if(quantity == 0) System.out.println("The store is already empty");
        else {
            DigitalVideoDisc[] arr_new = new DigitalVideoDisc[MAX_NUMBERS_VIDEOS];
            for(int i=0, k=0;i<quantity;i++){
                if(!Objects.equals(itemsInStore[i].getTitle(), disc.getTitle())){
                    arr_new[k]=itemsInStore[i];
                    k++;
                }
            }
            quantity--;
            itemsInStore = arr_new;
            System.out.println("The dvd has been removed");
        }
    }
```

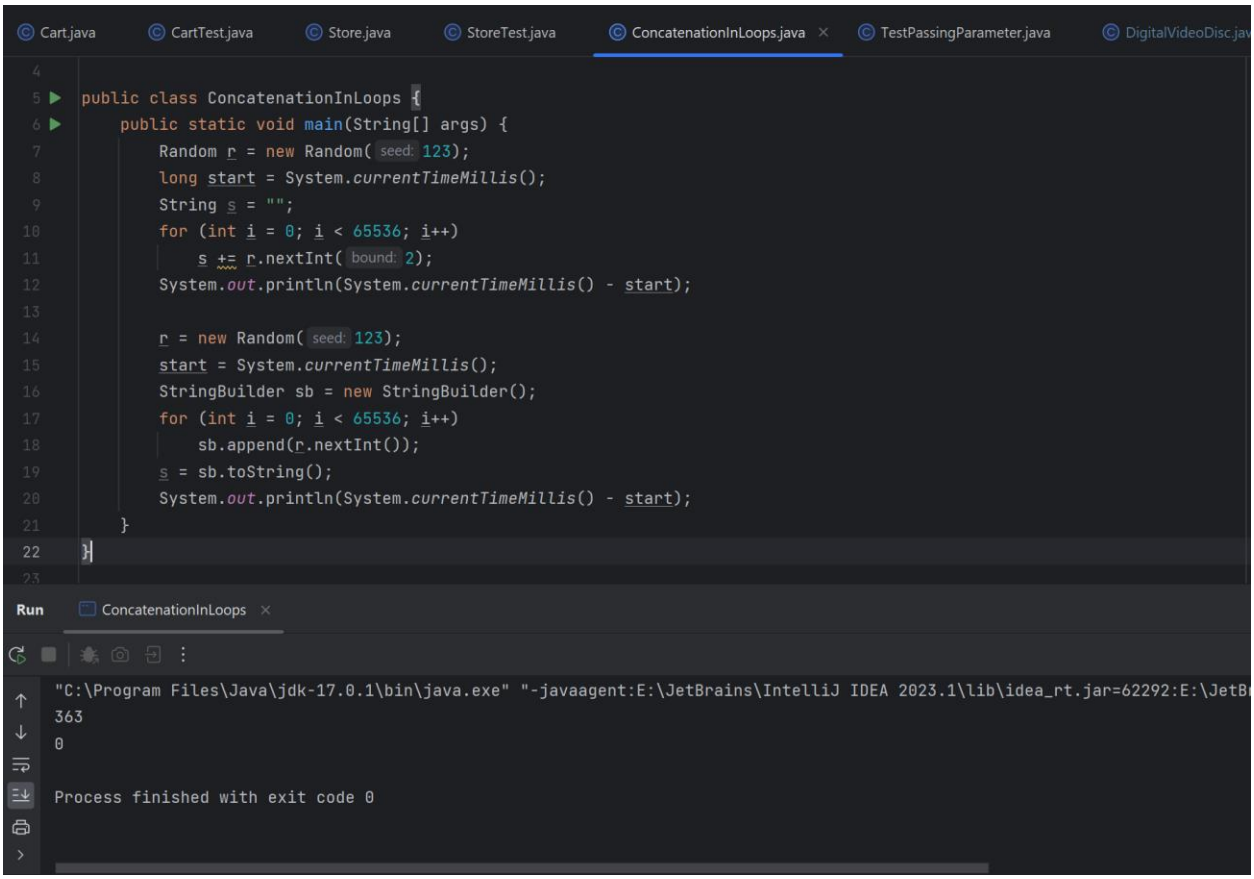
Cart.java CartTest.java Store.java StoreTest.java TestPassingParameter.java DigitalVideoDisc.java

```java
import hust.soict.globalict.aims.store.Store;

public class StoreTest {
    public static void main(String[] args) {
        //Create a new cart
        Store store = new Store();

        // 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);
        store.addDVD(dvd1);

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

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

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

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

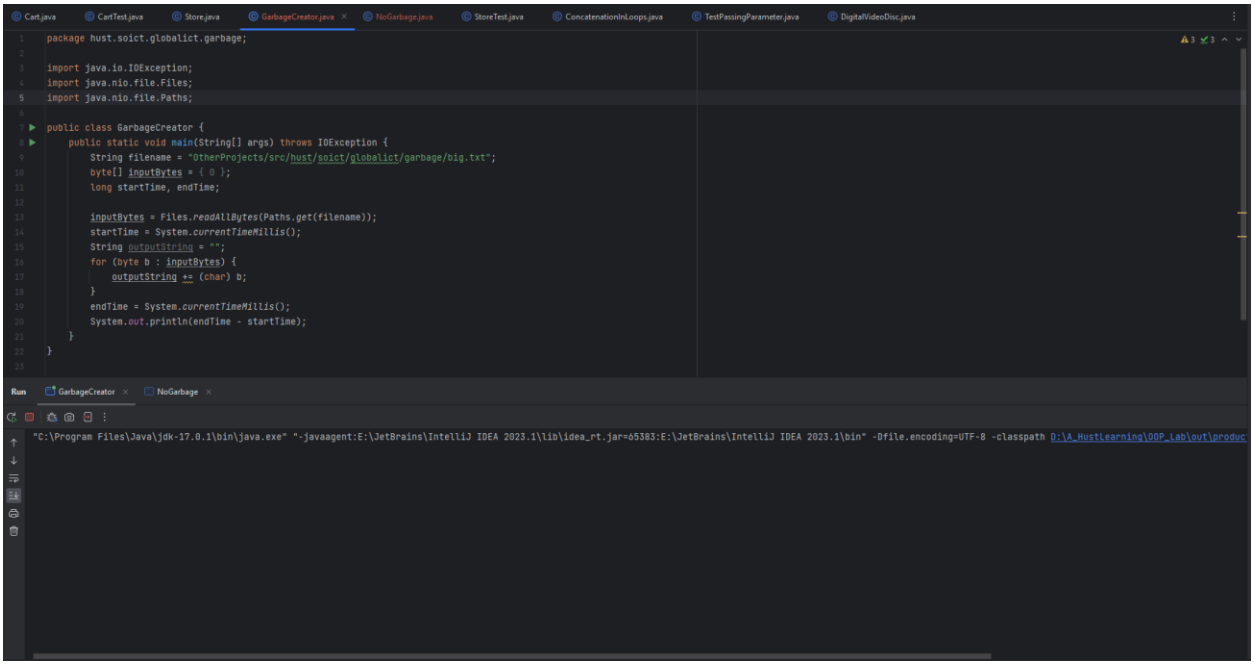
8. Re-organize your projects



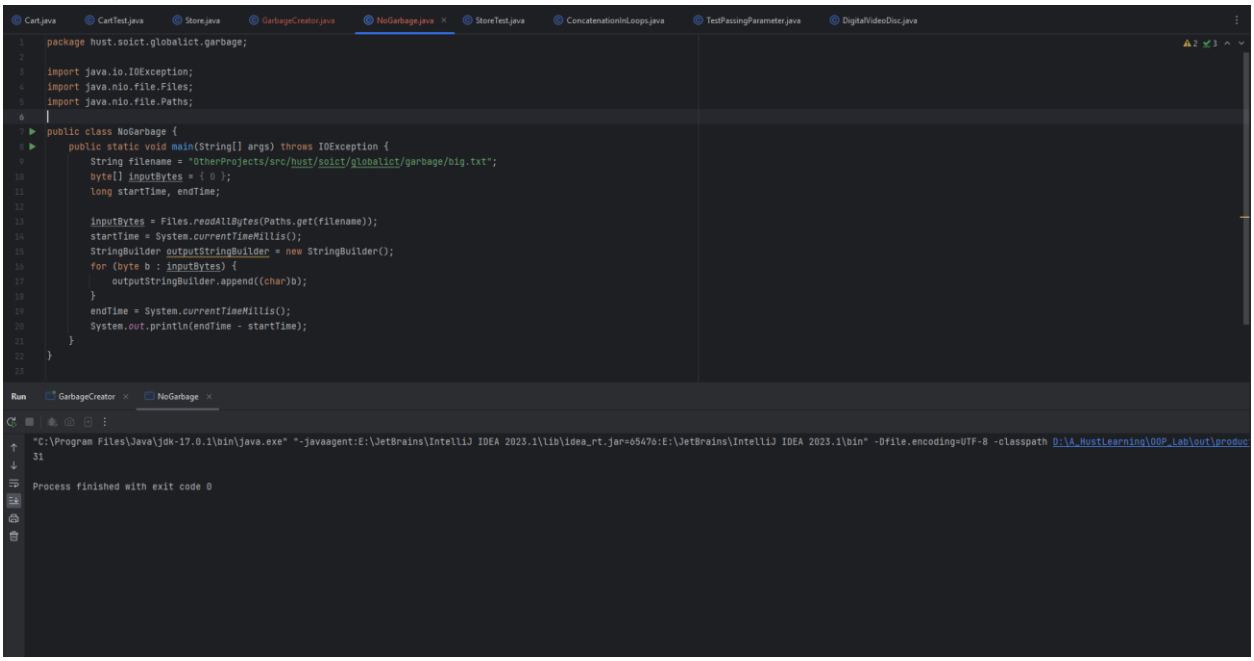
9. String, StringBuilder and StringBuffer



GarbageCreator



NoGarbage


Cart.java
CartTest.java
Store.java
GarbageCreator.java
NoGarbage.java
StoreTest.java
ConcatenationInLoops.java
TestPassingParameter.java
DigitalVideoDisc.java
package hust.soict.globalict.garbage;
import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Paths;
public class NoGarbage {
public static void main(String[] args) throws IOException {
String filename = "OtherProjects/src/hust/soict/globalict/garbage/big.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);
}
}
Run
GarbageCreator
NoGarbage
"C:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:E:\JetBrains\IntelliJ IDEA 2023.1\lib\idea_rt.jar=65476:E:\JetBrains\IntelliJ IDEA 2023.1\bin" -Dfile.encoding=UTF-8 -classpath D:\A_HustLearning\OOP_Lab\out\produc
31
Process finished with exit code 0