# BÁO CÁO THỰC HÀNH LAP 3
# LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

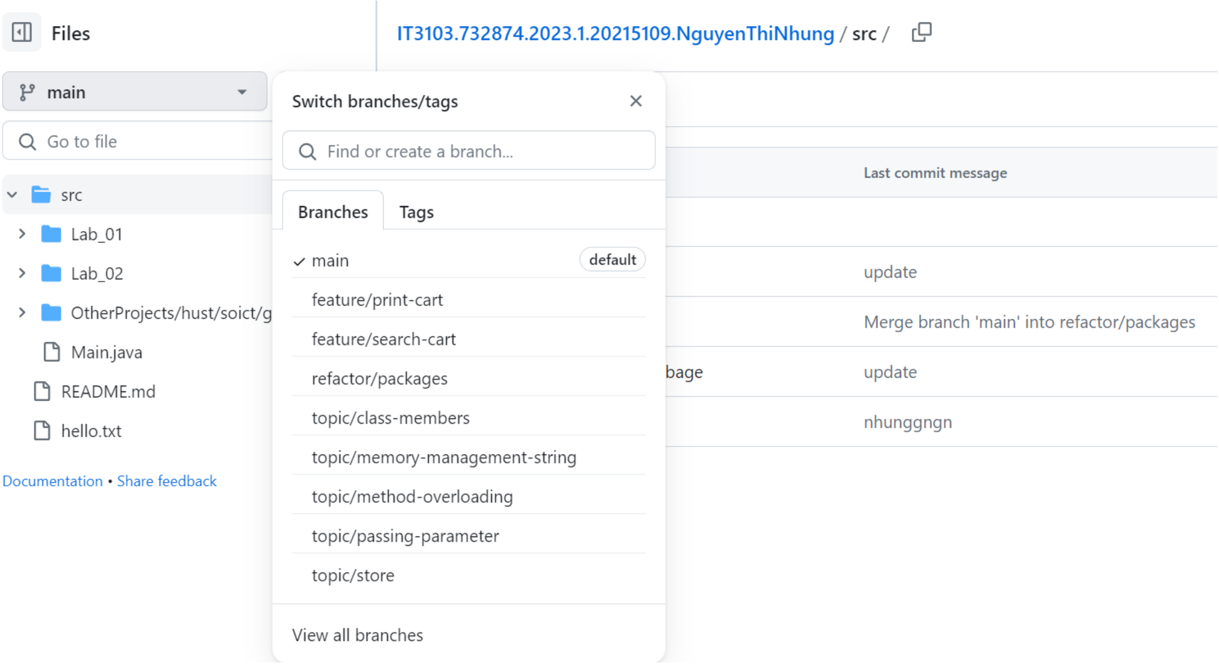
## Mục lục

## Mục lục hình ảnh

# I. Nội dung thực hành

## 1. Branch your repository

Create new branch: git checkout -b name



Files

IT3103.732874.2023.1.20215109.NguyenThiNhung / src /

main

Go to file

- src
  - Lab_01
  - Lab_02
  - OtherProjects/hust/soict/g
  - Main.java
- README.md
- hello.txt

Documentation • Share feedback

Switch branches/tags

Find or create a branch...

Branches | Tags

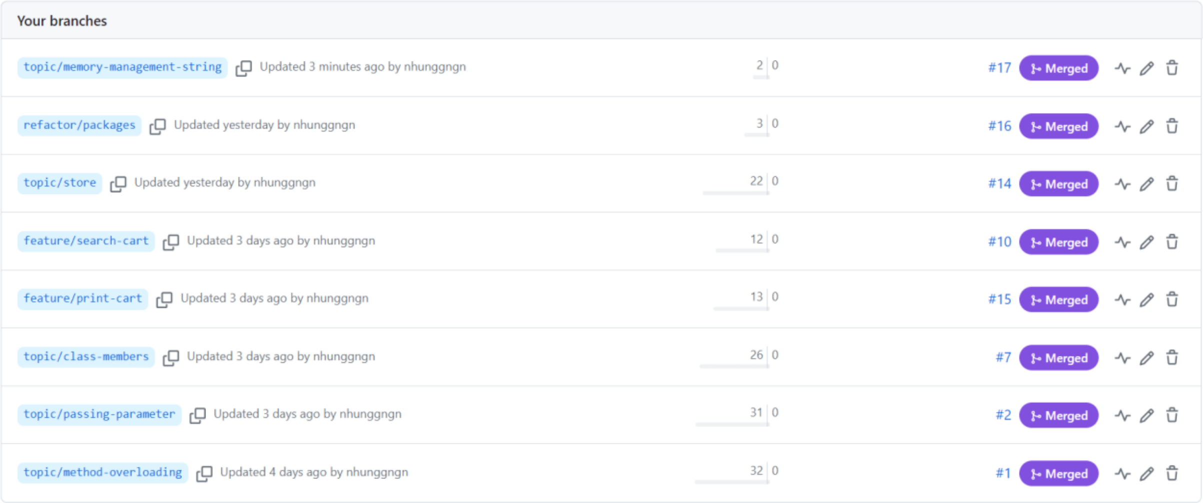
- ✓ main (default)
- feature/print-cart
- feature/search-cart
- refactor/packages
- topic/class-members
- topic/memory-management-string
- topic/method-overloading
- topic/passing-parameter
- topic/store

View all branches

| | Last commit message |
|---|---|
| | update |
| | Merge branch 'main' into refactor/packages |
| bage | update |
| | nhunggngn |

*Figure 1: Branch*

Merge the remote branch to the main branch:

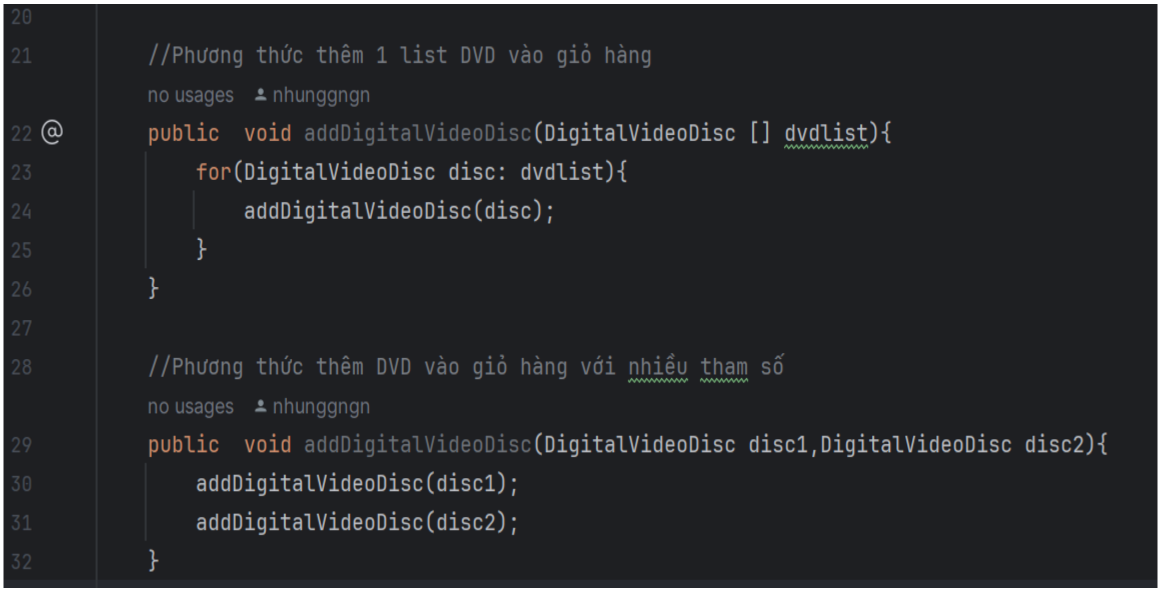


Your branches

| | | | | |
|---|---|---|---|---|
| topic/memory-management-string | Updated 3 minutes ago by nhunggngn | 2 \| 0 | #17 | Merged |
| refactor/packages | Updated yesterday by nhunggngn | 3 \| 0 | #16 | Merged |
| topic/store | Updated yesterday by nhunggngn | 22 \| 0 | #14 | Merged |
| feature/search-cart | Updated 3 days ago by nhunggngn | 12 \| 0 | #10 | Merged |
| feature/print-cart | Updated 3 days ago by nhunggngn | 13 \| 0 | #15 | Merged |
| topic/class-members | Updated 3 days ago by nhunggngn | 26 \| 0 | #7 | Merged |
| topic/passing-parameter | Updated 3 days ago by nhunggngn | 31 \| 0 | #2 | Merged |
| topic/method-overloading | Updated 4 days ago by nhunggngn | 32 \| 0 | #1 | Merged |

*Figure 2: Merge*

## 2. Working with method overloading

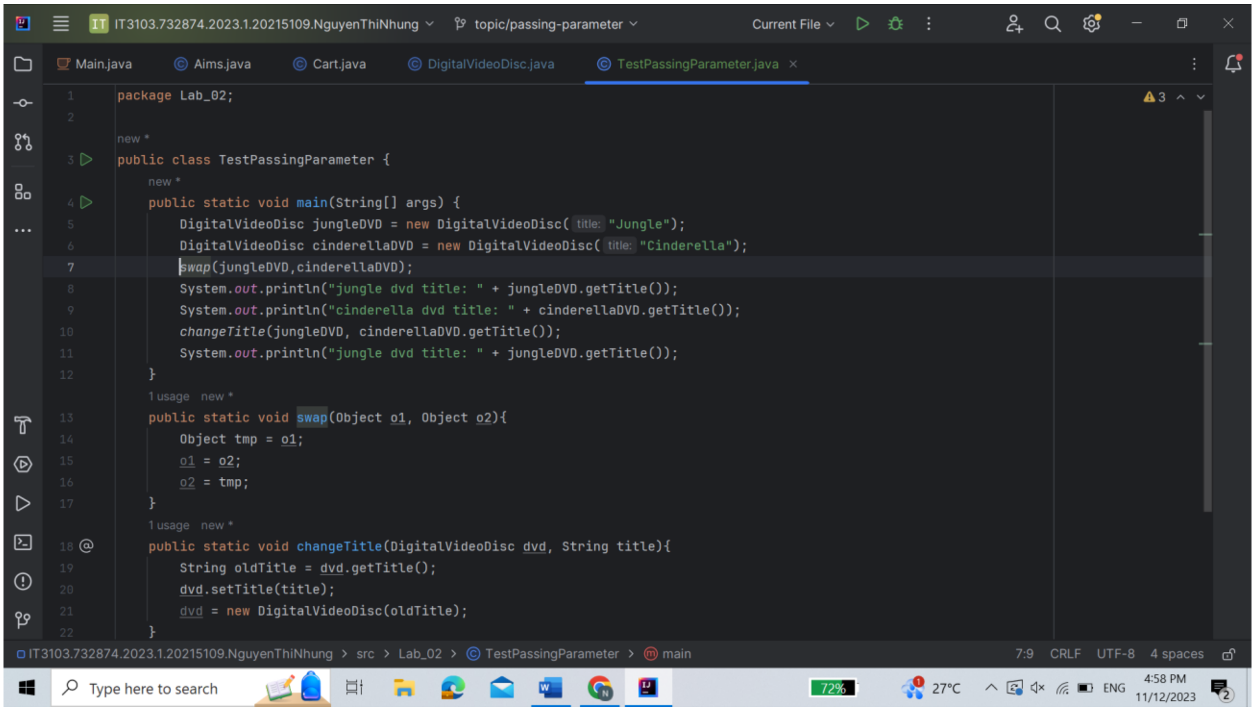


```java
    //Phương thức thêm 1 list DVD vào giỏ hàng
    public  void addDigitalVideoDisc(DigitalVideoDisc [] dvdlist){
        for(DigitalVideoDisc disc: dvdlist){
            addDigitalVideoDisc(disc);
        }
    }

    //Phương thức thêm DVD vào giỏ hàng với nhiều tham số
    public  void addDigitalVideoDisc(DigitalVideoDisc disc1,DigitalVideoDisc disc2){
        addDigitalVideoDisc(disc1);
        addDigitalVideoDisc(disc2);
    }
```

*Figure 3: addDigitalVideoDisc*

## 3. Passing parameter

Mã nguồn ban đầu:

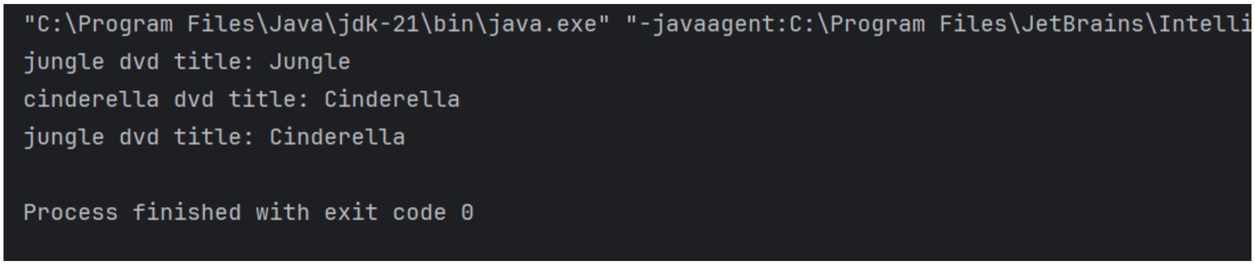


```java
package Lab_02;

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

IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > TestPassingParameter > main
7:9 CRLF UTF-8 4 spaces
Type here to search
72%
27°C
ENG
4:58 PM
11/12/2023

*Figure 4: swap(1)*

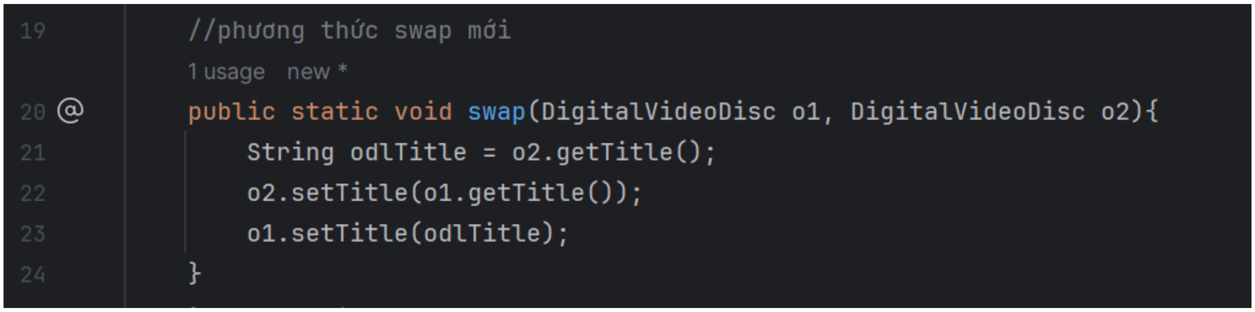
Kết quả:



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Intelli
jungle dvd title: Jungle
cinderella dvd title: Cinderella
jungle dvd title: Cinderella

Process finished with exit code 0
```

*Figure 5: Kết quả swap (1)*

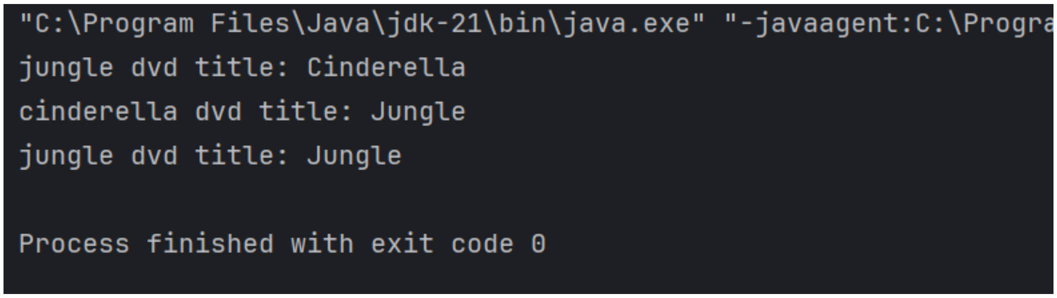
Mã nguồn mới:



```
    //phương thức swap mới
    public static void swap(DigitalVideoDisc o1, DigitalVideoDisc o2){
        String odlTitle = o2.getTitle();
        o2.setTitle(o1.getTitle());
        o1.setTitle(odlTitle);
    }
```

*Figure 6: swap(2) code*

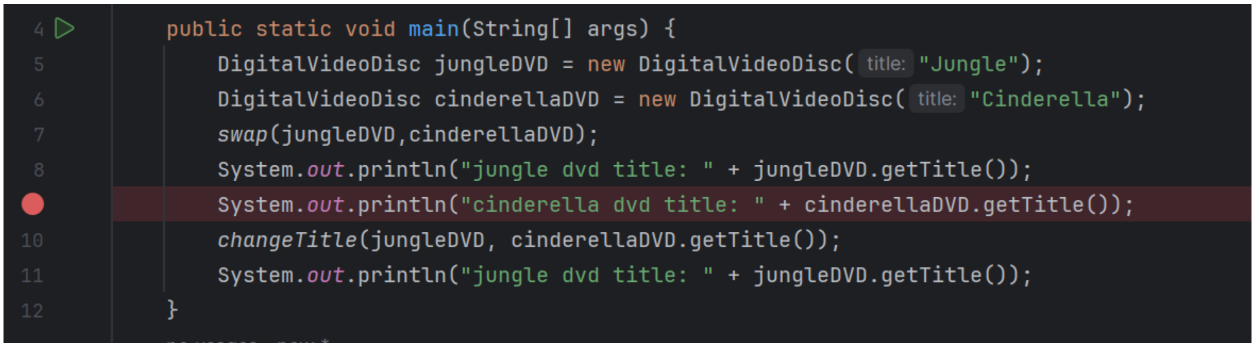
Kết quả:



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Progra
jungle dvd title: Cinderella
cinderella dvd title: Jungle
jungle dvd title: Jungle

Process finished with exit code 0
```

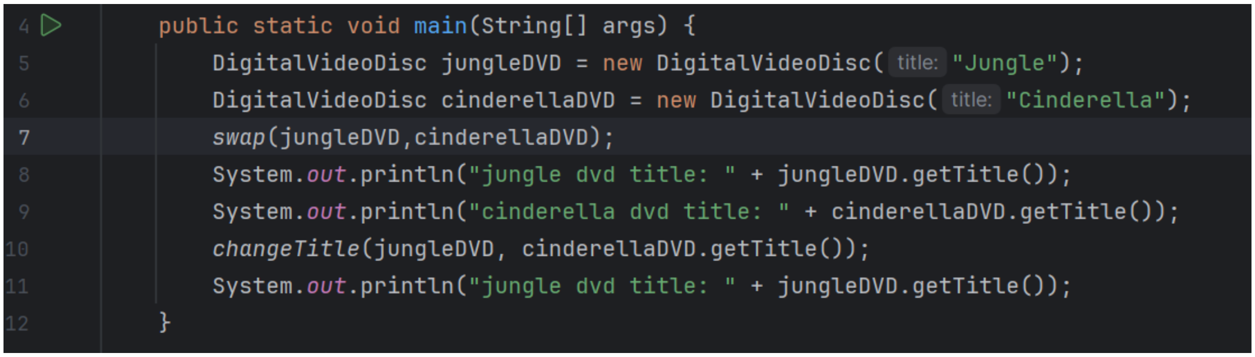
*Figure 7: swap(2) result*

## 4. Use debug run:



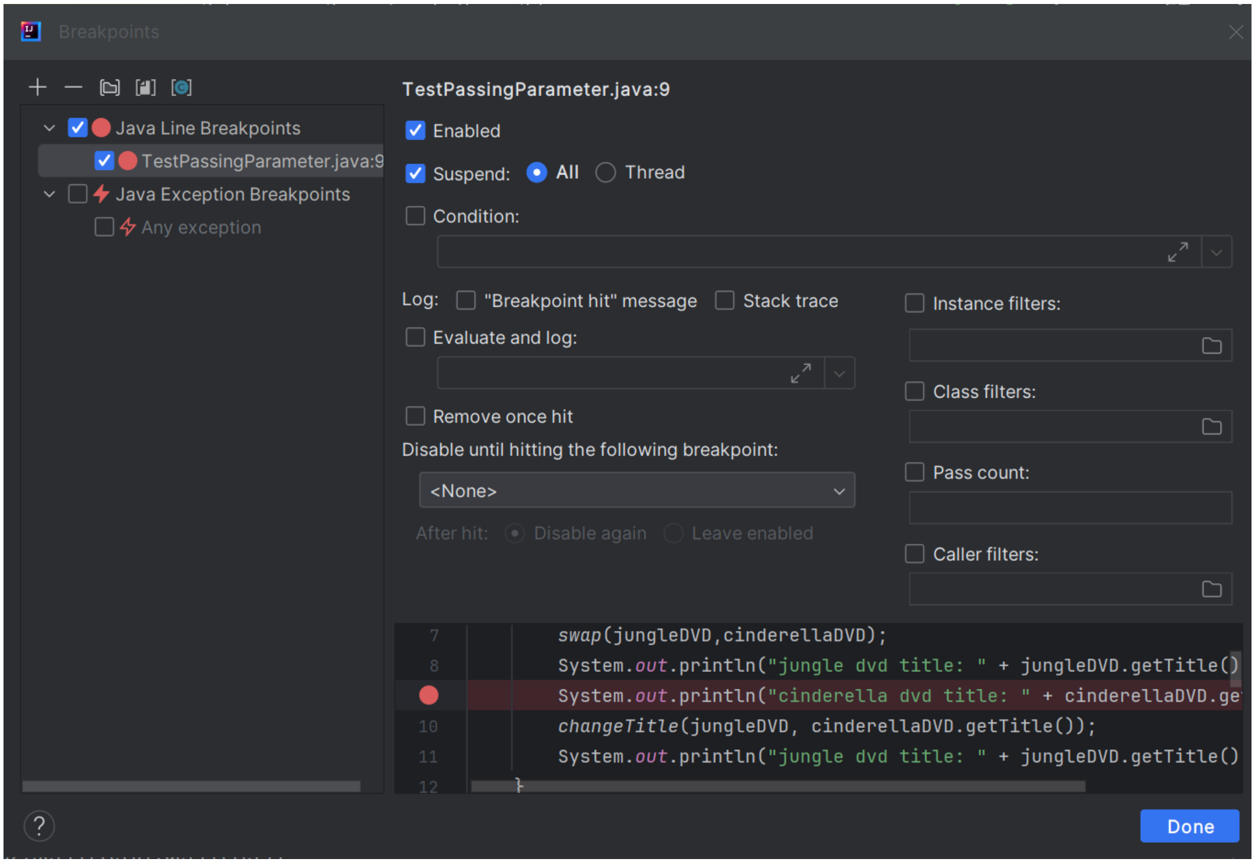
```
    public static void main(String[] args) {
        DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("Cinderella");
        swap(jungleDVD,cinderellaDVD);
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
        System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());
        changeTitle(jungleDVD, cinderellaDVD.getTitle());
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
    }
```

*Figure 8: A breakpoint is set*



```
    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());
    }
```

*Figure 9: The breakpoint is deleted*



- ☑ Java Line Breakpoints
  - ☑ TestPassingParameter.java:9
- □ Java Exception Breakpoints
  - □ Any exception

**TestPassingParameter.java:9**

☑ Enabled

☑ Suspend: ● All ○ Thread

□ Condition:

Log: □ "Breakpoint hit" message □ Stack trace

□ Evaluate and log:

□ Remove once hit

Disable until hitting the following breakpoint: <None>

After hit: ● Disable again ○ Leave enabled

□ Instance filters:

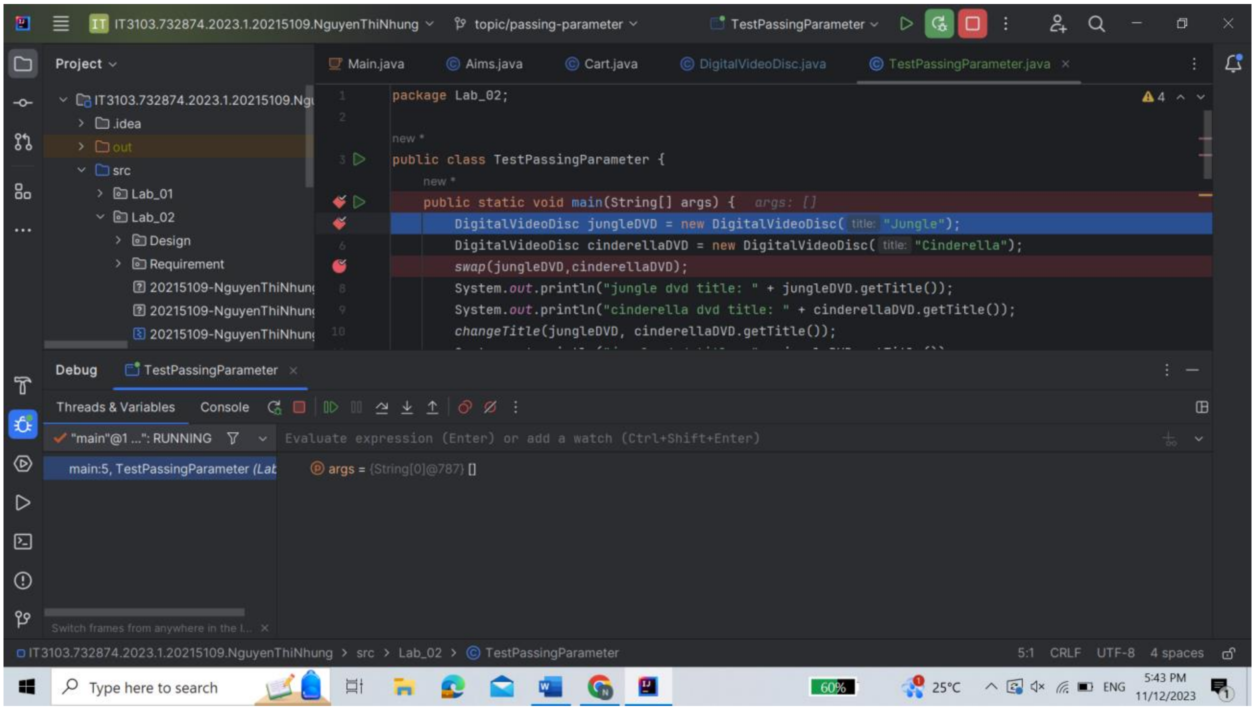
□ Class filters:

□ Pass count:

□ Caller filters:

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

*Figure 10: Deactivated breakpoint in Breakpoints View*

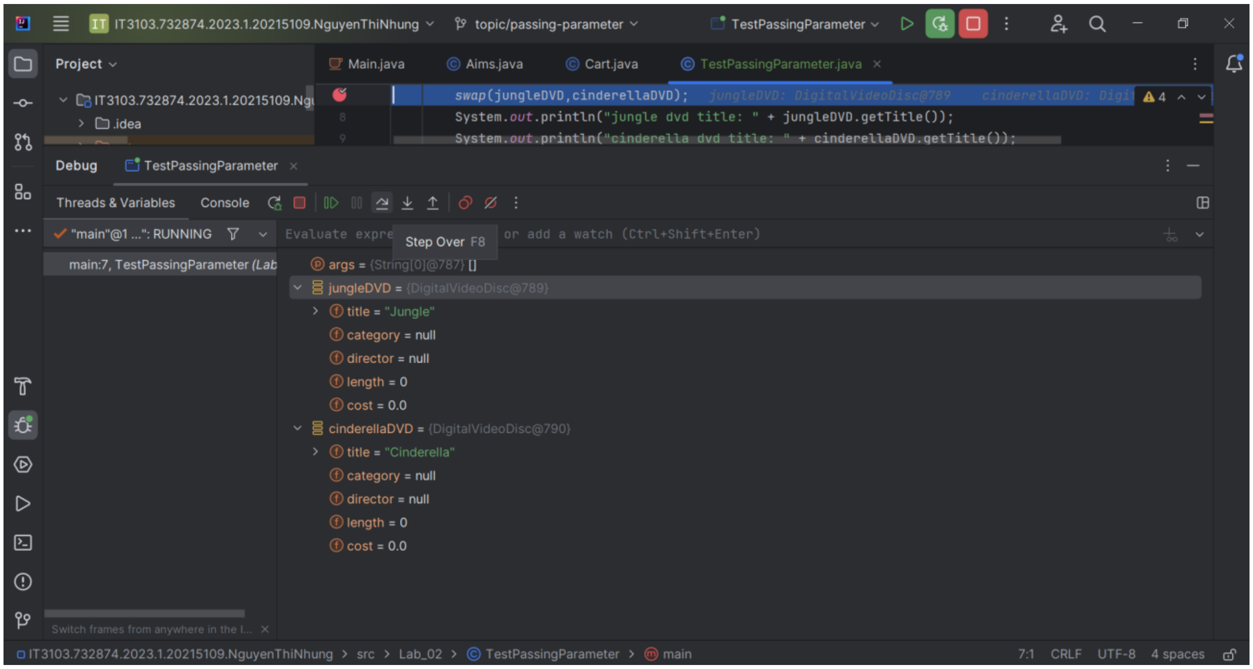


```
package Lab_02;

new *
public class TestPassingParameter {
    new *
    public static void main(String[] args) {   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());
```

```
"main"@1 ...": RUNNING
main:5, TestPassingParameter (Lab
Evaluate expression (Enter) or add a watch (Ctrl+Shift+Enter)
args = {String[0]@787} []
```

IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > TestPassingParameter

*Figure 11: Debug mode*

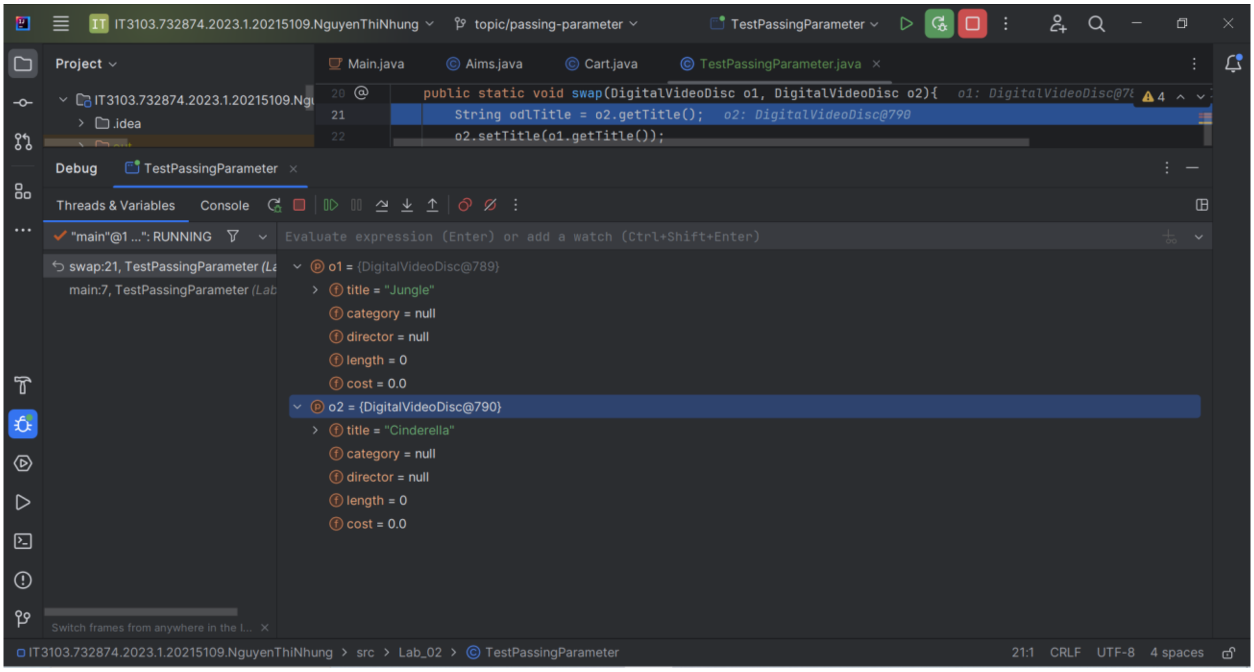


```
        swap(jungleDVD,cinderellaDVD);   jungleDVD: DigitalVideoDisc@789   cinderellaDVD: Digi
        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
        System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());
```

```
"main"@1 ...": RUNNING
main:7, TestPassingParameter (Lab
Evaluate expre... or add a watch (Ctrl+Shift+Enter)
args = {String[0]@787} []
jungleDVD = {DigitalVideoDisc@789}
    title = "Jungle"
    category = null
    director = null
    length = 0
    cost = 0.0
cinderellaDVD = {DigitalVideoDisc@790}
    title = "Cinderella"
    category = null
    director = null
    length = 0
    cost = 0.0
```

IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > TestPassingParameter > main

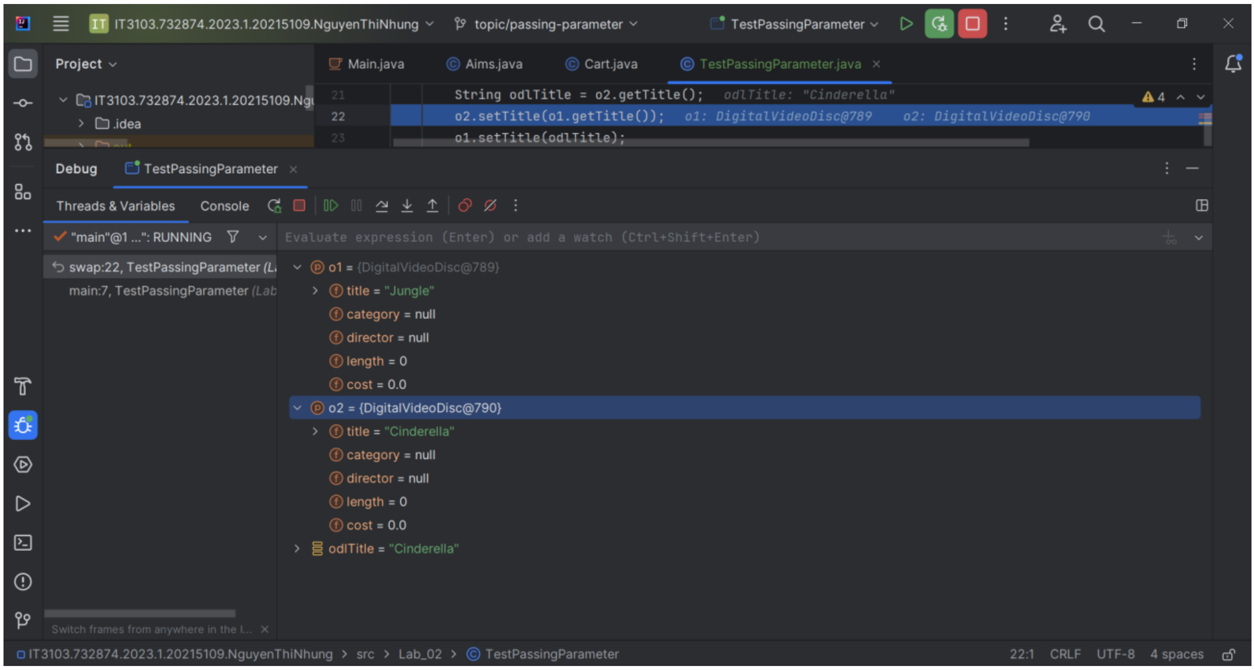
*Figure 12: Variables shown in Variable View*


IT3103.732874.2023.1.20215109.NguyenThiNhung
topic/passing-parameter
TestPassingParameter
Project
Main.java
Aims.java
Cart.java
TestPassingParameter.java
Debug
Threads & Variables
Console
"main"@1 ...": RUNNING
Evaluate expression (Enter) or add a watch (Ctrl+Shift+Enter)
Switch frames from anywhere in the I...
IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > TestPassingParameter
21:1 CRLF UTF-8 4 spaces

```
20    public static void swap(DigitalVideoDisc o1, DigitalVideoDisc o2){   o1: DigitalVideoDisc@7
21        String odlTitle = o2.getTitle();   o2: DigitalVideoDisc@790
22        o2.setTitle(o1.getTitle());
```

```
swap:21, TestPassingParameter (La
main:7, TestPassingParameter (Lab

o1 = {DigitalVideoDisc@789}
    title = "Jungle"
    category = null
    director = null
    length = 0
    cost = 0.0
o2 = {DigitalVideoDisc@790}
    title = "Cinderella"
    category = null
    director = null
    length = 0
    cost = 0.0
```

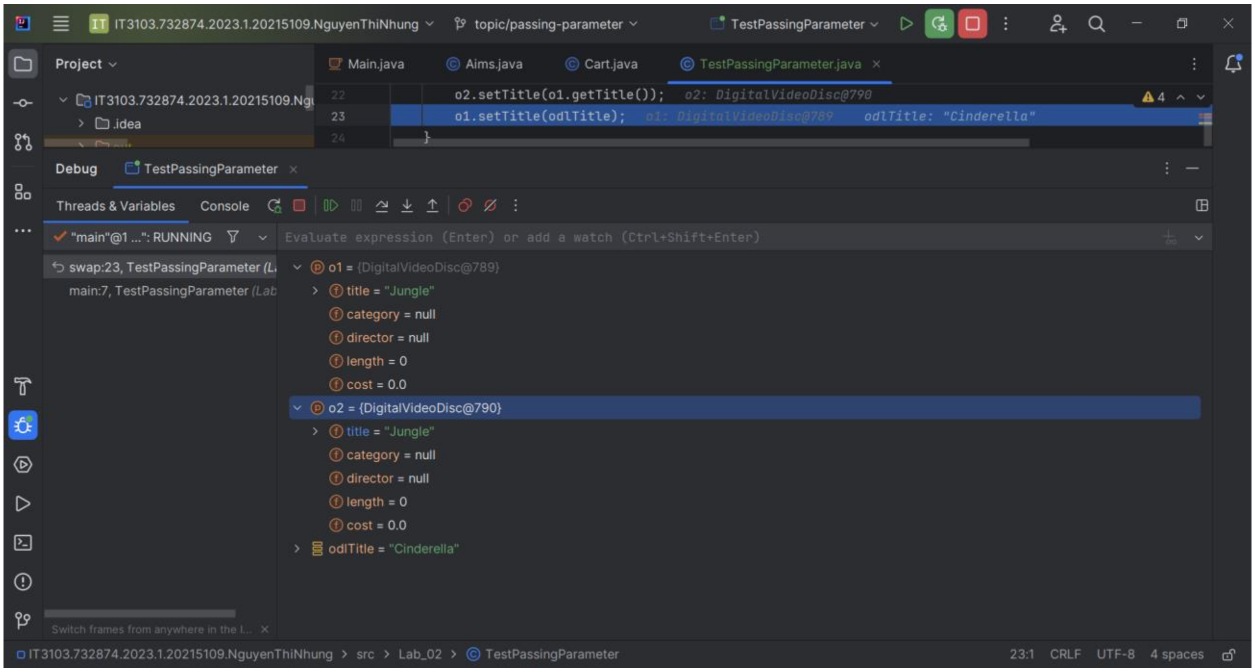
*Figure 13: Step into*


IT3103.732874.2023.1.20215109.NguyenThiNhung
topic/passing-parameter
TestPassingParameter
Project
Main.java
Aims.java
Cart.java
TestPassingParameter.java
Debug
Threads & Variables
Console
"main"@1 ...": RUNNING
Evaluate expression (Enter) or add a watch (Ctrl+Shift+Enter)
Switch frames from anywhere in the I...
IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > TestPassingParameter
22:1 CRLF UTF-8 4 spaces

```
21        String odlTitle = o2.getTitle();   odlTitle: "Cinderella"
22        o2.setTitle(o1.getTitle());   o1: DigitalVideoDisc@789    o2: DigitalVideoDisc@790
23        o1.setTitle(odlTitle);
```

```
swap:22, TestPassingParameter (L
main:7, TestPassingParameter (Lab

o1 = {DigitalVideoDisc@789}
    title = "Jungle"
    category = null
    director = null
    length = 0
    cost = 0.0
o2 = {DigitalVideoDisc@790}
    title = "Cinderella"
    category = null
    director = null
    length = 0
    cost = 0.0
odlTitle = "Cinderella"
```

*Figure 14: Step over line 21 of swap function*

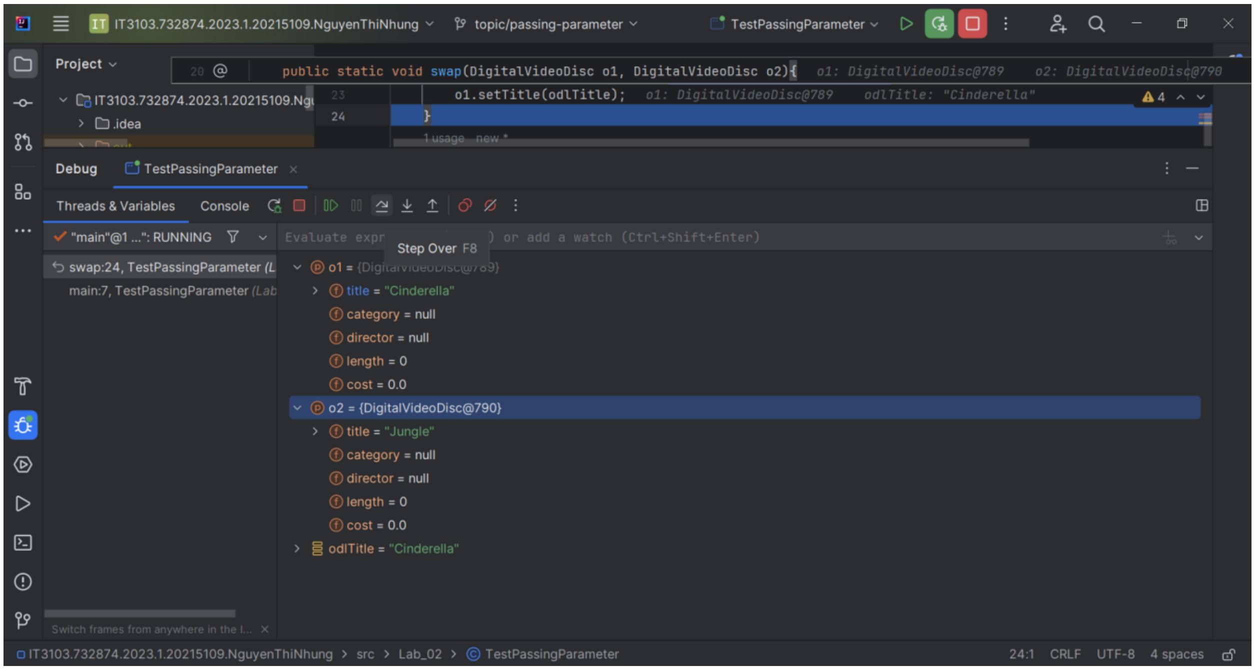

IT3103.732874.2023.1.20215109.NguyenThiNhung
topic/passing-parameter
TestPassingParameter
Project
Main.java
Aims.java
Cart.java
TestPassingParameter.java
.idea
Debug
Threads & Variables
Console
"main"@1 ...": RUNNING
Evaluate expression (Enter) or add a watch (Ctrl+Shift+Enter)
Switch frames from anywhere in the I...
src > Lab_02 > TestPassingParameter
23:1 CRLF UTF-8 4 spaces

```
o2.setTitle(o1.getTitle());   o2: DigitalVideoDisc@790
o1.setTitle(odlTitle);   o1: DigitalVideoDisc@789   odlTitle: "Cinderella"
}
```

```
swap:23, TestPassingParameter (L...
main:7, TestPassingParameter (Lab...
```

```
o1 = {DigitalVideoDisc@789}
    title = "Jungle"
    category = null
    director = null
    length = 0
    cost = 0.0
o2 = {DigitalVideoDisc@790}
    title = "Jungle"
    category = null
    director = null
    length = 0
    cost = 0.0
odlTitle = "Cinderella"
```

*Figure 15: Step over line 22 of swap function*

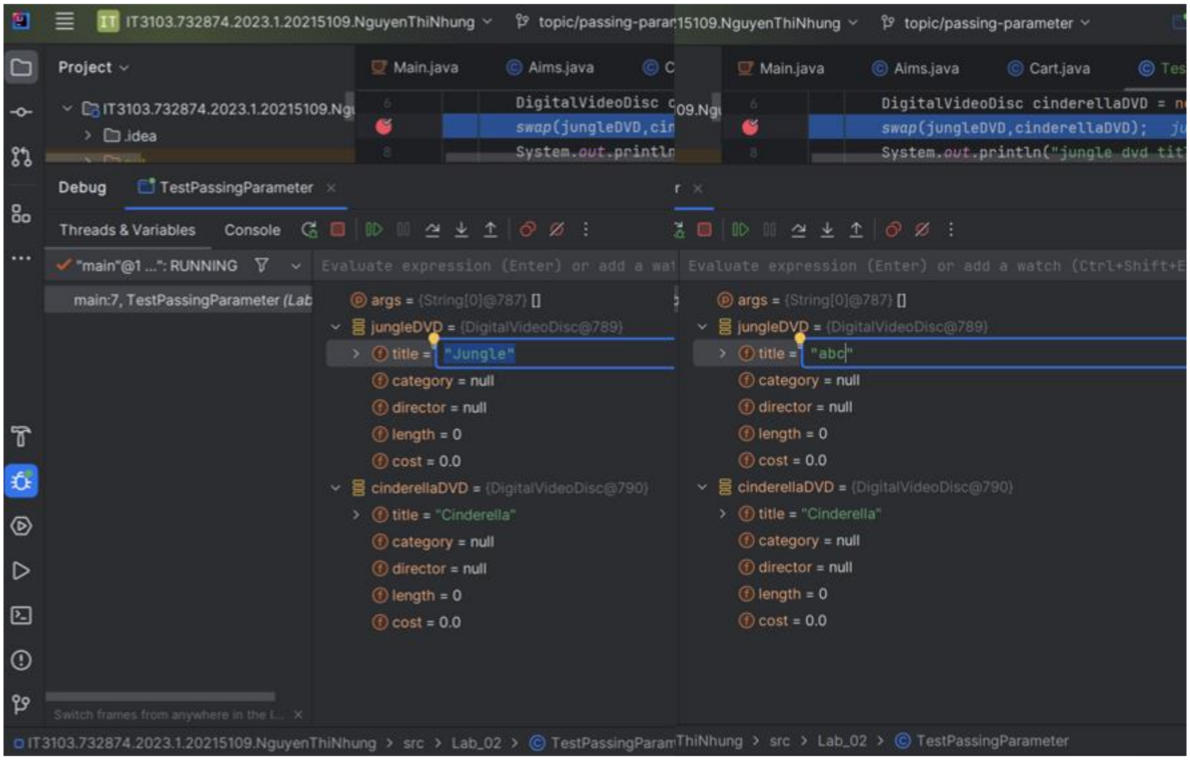

IT3103.732874.2023.1.20215109.NguyenThiNhung
topic/passing-parameter
TestPassingParameter
Project
.idea
Debug
Threads & Variables
Console
"main"@1 ...": RUNNING
Evaluate expr ... ) or add a watch (Ctrl+Shift+Enter)
Step Over F8
Switch frames from anywhere in the I...
src > Lab_02 > TestPassingParameter
24:1 CRLF UTF-8 4 spaces

```
public static void swap(DigitalVideoDisc o1, DigitalVideoDisc o2){   o1: DigitalVideoDisc@789   o2: DigitalVideoDisc@790
    o1.setTitle(odlTitle);   o1: DigitalVideoDisc@789   odlTitle: "Cinderella"
}
1 usage  new *
```

```
swap:24, TestPassingParameter (L
main:7, TestPassingParameter (Lab
```

```
o1 = {DigitalVideoDisc@789}
    title = "Cinderella"
    category = null
    director = null
    length = 0
    cost = 0.0
o2 = {DigitalVideoDisc@790}
    title = "Jungle"
    category = null
    director = null
    length = 0
    cost = 0.0
odlTitle = "Cinderella"
```

*Figure 16: Step over line 23 of swap function*



```
DigitalVideoDisc cinderellaDVD = n
swap(jungleDVD,cinderellaDVD);   ju
System.out.println("jungle dvd tit
```

"main"@1 ...": RUNNING

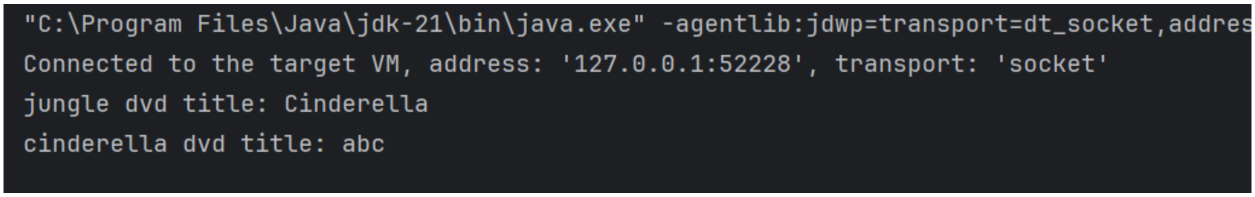
main:7, TestPassingParameter (Lab

```
args = {String[0]@787} []
jungleDVD = {DigitalVideoDisc@789}
  title = "Jungle"
  category = null
  director = null
  length = 0
  cost = 0.0
cinderellaDVD = {DigitalVideoDisc@790}
  title = "Cinderella"
  category = null
  director = null
  length = 0
  cost = 0.0
```

```
args = {String[0]@787} []
jungleDVD = {DigitalVideoDisc@789}
  title = "abc"
  category = null
  director = null
  length = 0
  cost = 0.0
cinderellaDVD = {DigitalVideoDisc@790}
  title = "Cinderella"
  category = null
  director = null
  length = 0
  cost = 0.0
```

IT3103.732874.2023.1.20215109.NguyenThiNhung
topic/passing-parameter
Project
Main.java
Aims.java
Cart.java
.idea
Debug
TestPassingParameter
Threads & Variables
Console
Evaluate expression (Enter) or add a watch (Ctrl+Shift+E
Switch frames from anywhere in the I...
IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > TestPassingParameter

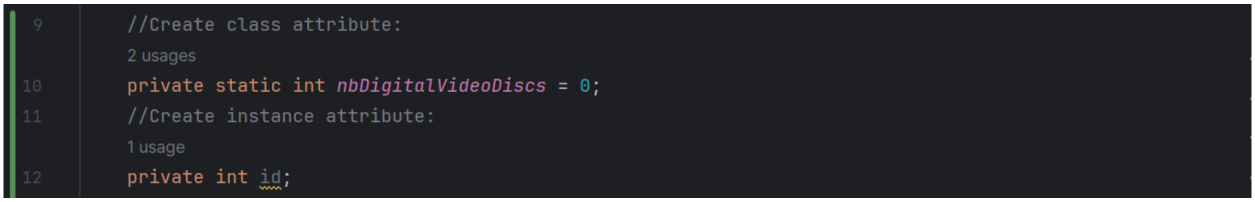
*Figure 17: Change title of jungleDVD*



```
"C:\Program Files\Java\jdk-21\bin\java.exe" -agentlib:jdwp=transport=dt_socket,addres
Connected to the target VM, address: '127.0.0.1:52228', transport: 'socket'
jungle dvd title: Cinderella
cinderella dvd title: abc
```

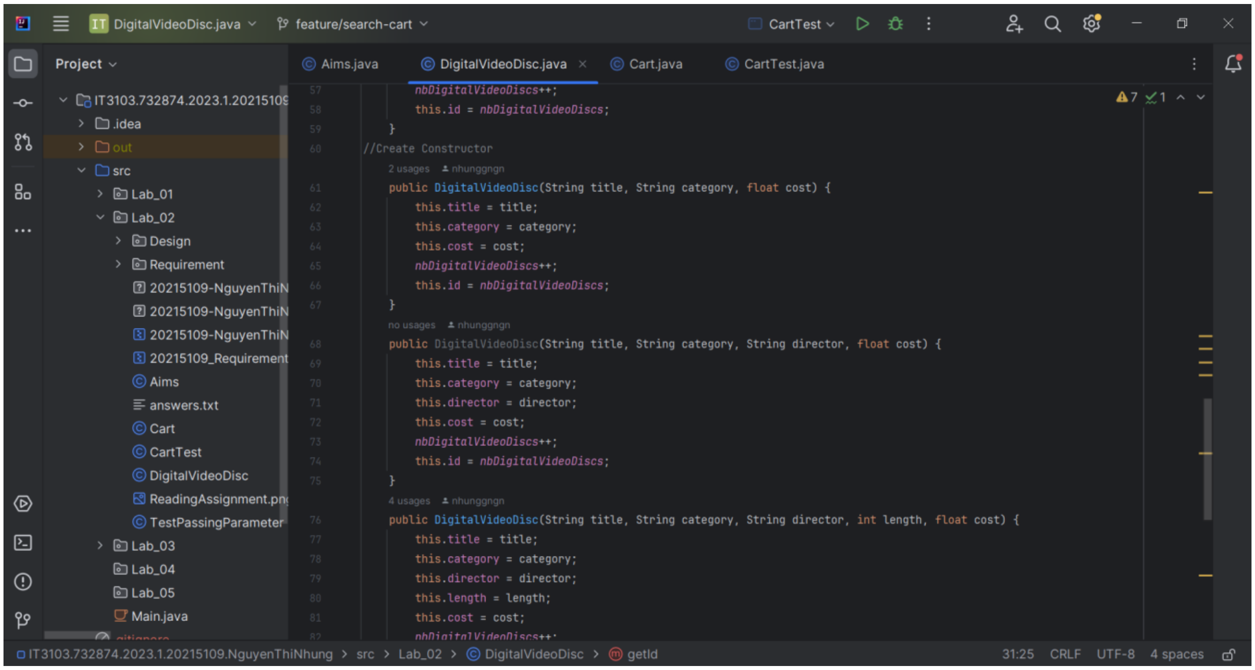
*Figure 18: Results*

## 5. Classifier Member and Instance Member



```
//Create class attribute:
2 usages
private static int nbDigitalVideoDiscs = 0;
//Create instance attribute:
1 usage
private int id;
```

*Figure 19: Create class attribute and instance attribute*

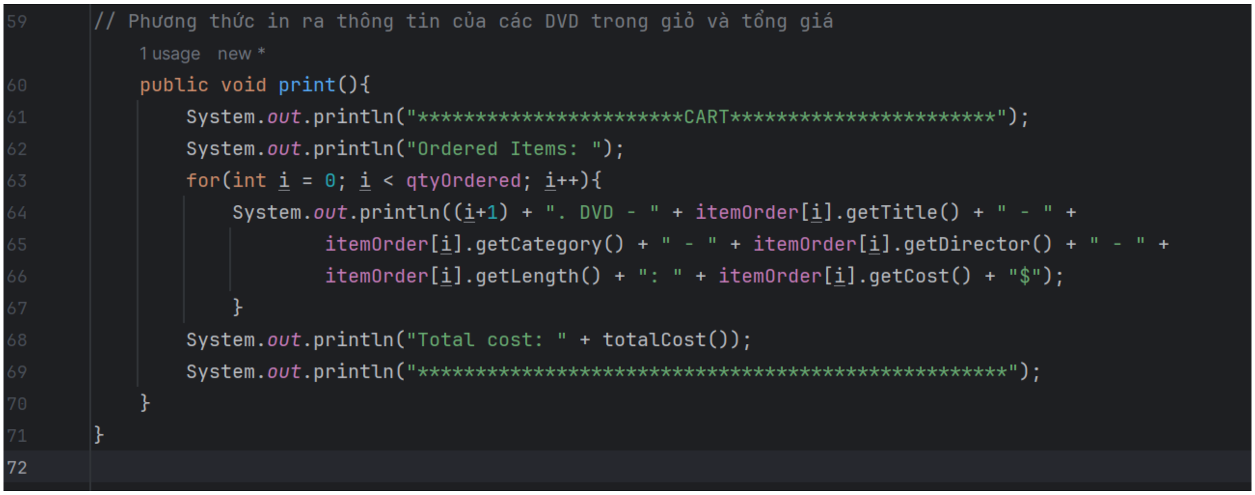


```java
            nbDigitalVideoDiscs++;
            this.id = nbDigitalVideoDiscs;
        }
    //Create Constructor
        2 usages  nhunggngn
        public DigitalVideoDisc(String title, String category, float cost) {
            this.title = title;
            this.category = category;
            this.cost = cost;
            nbDigitalVideoDiscs++;
            this.id = nbDigitalVideoDiscs;
        }
        no usages  nhunggngn
        public DigitalVideoDisc(String title, String category, String director, float cost) {
            this.title = title;
            this.category = category;
            this.director = director;
            this.cost = cost;
            nbDigitalVideoDiscs++;
            this.id = nbDigitalVideoDiscs;
        }
        4 usages  nhunggngn
        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;
            nbDigitalVideoDiscs++;
```

*Figure 20: Update the value*

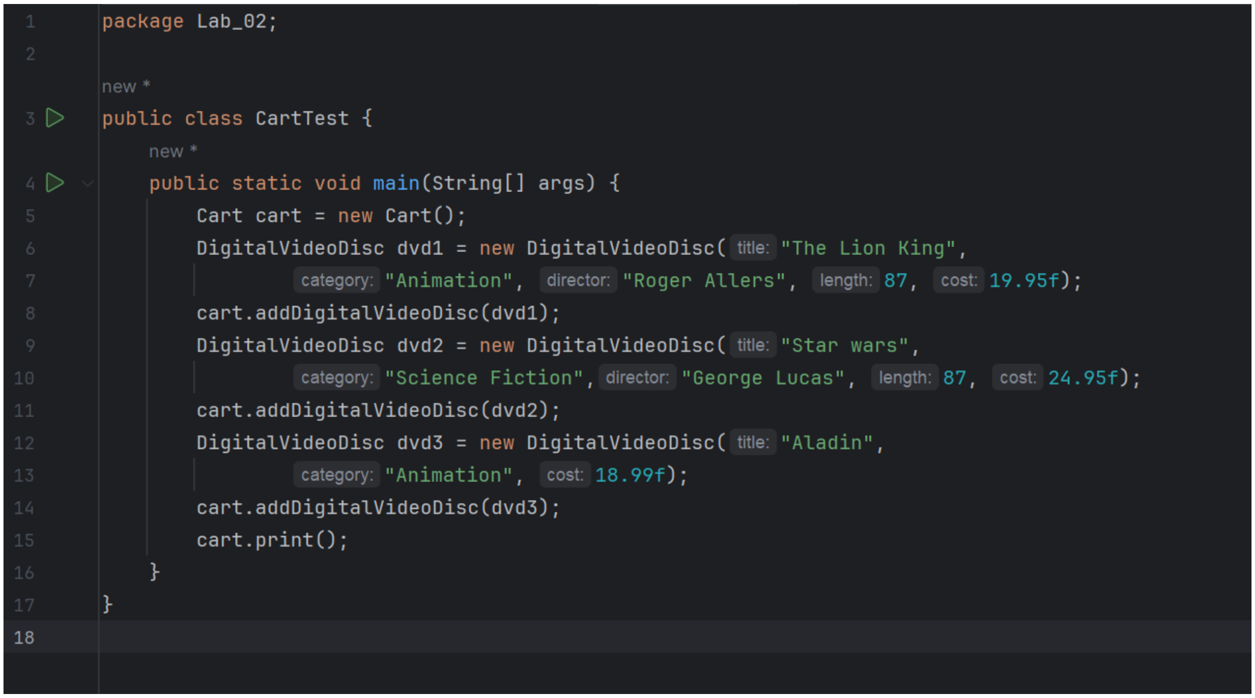
## 6. Open the Cart class

### a. Create a new method to print the list of ordered items of a cart, the price of each item, and the total price.



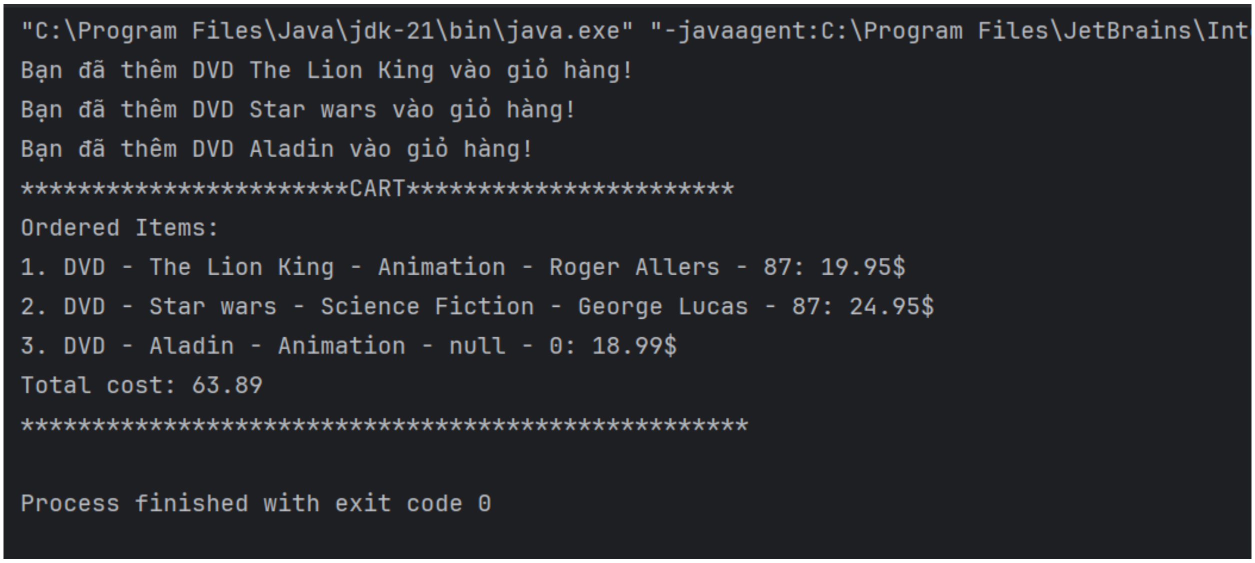
```java
// Phương thức in ra thông tin của các DVD trong giỏ và tổng giá
    1 usage  new *
    public void print(){
        System.out.println("**********************CART***********************");
        System.out.println("Ordered Items: ");
        for(int i = 0; i < qtyOrdered; i++){
            System.out.println((i+1) + ". DVD - " + itemOrder[i].getTitle() + " - " +
                    itemOrder[i].getCategory() + " - " + itemOrder[i].getDirector() + " - " +
                    itemOrder[i].getLength() + ": " + itemOrder[i].getCost() + "$");
        }
        System.out.println("Total cost: " + totalCost());
        System.out.println("***************************************************");
    }
}
```

*Figure 21: Code snippet for Print() methods*



```
package Lab_02;

new *
public class CartTest {
    new *
    public static void main(String[] args) {
        Cart cart = new Cart();
        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King",
                 category: "Animation",  director: "Roger Allers",  length: 87,  cost: 19.95f);
        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);
        cart.print();
    }
}

```

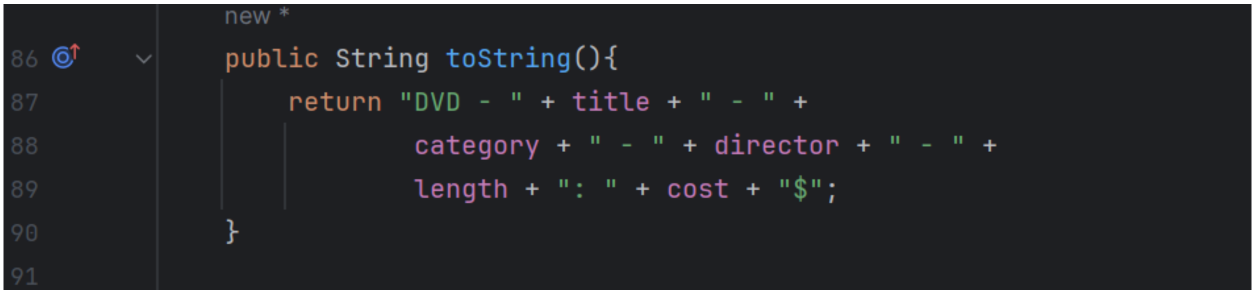
*Figure 22: Code snippet for CartTest*



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Int
Bạn đã thêm DVD The Lion King vào giỏ hàng!
Bạn đã thêm DVD Star wars vào giỏ hàng!
Bạn đã thêm DVD Aladin vào giỏ hàng!
***********************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 - null - 0: 18.99$
Total cost: 63.89
***************************************************

Process finished with exit code 0
```

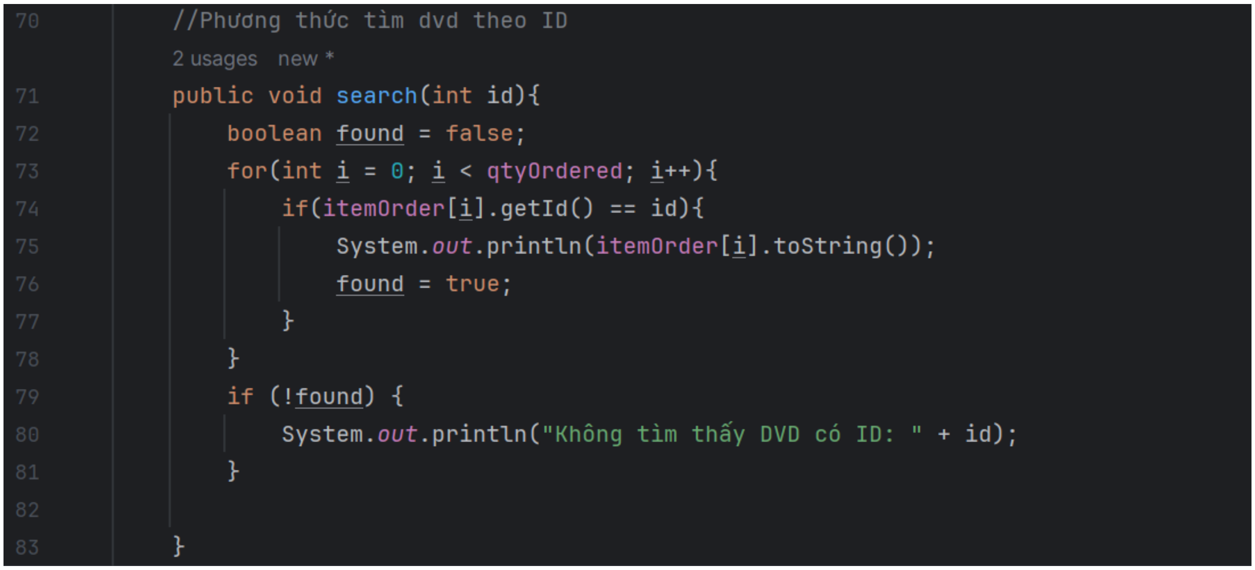
*Figure 23: Results*

### b. Search for DVDs in the cart by ID and display the search results.



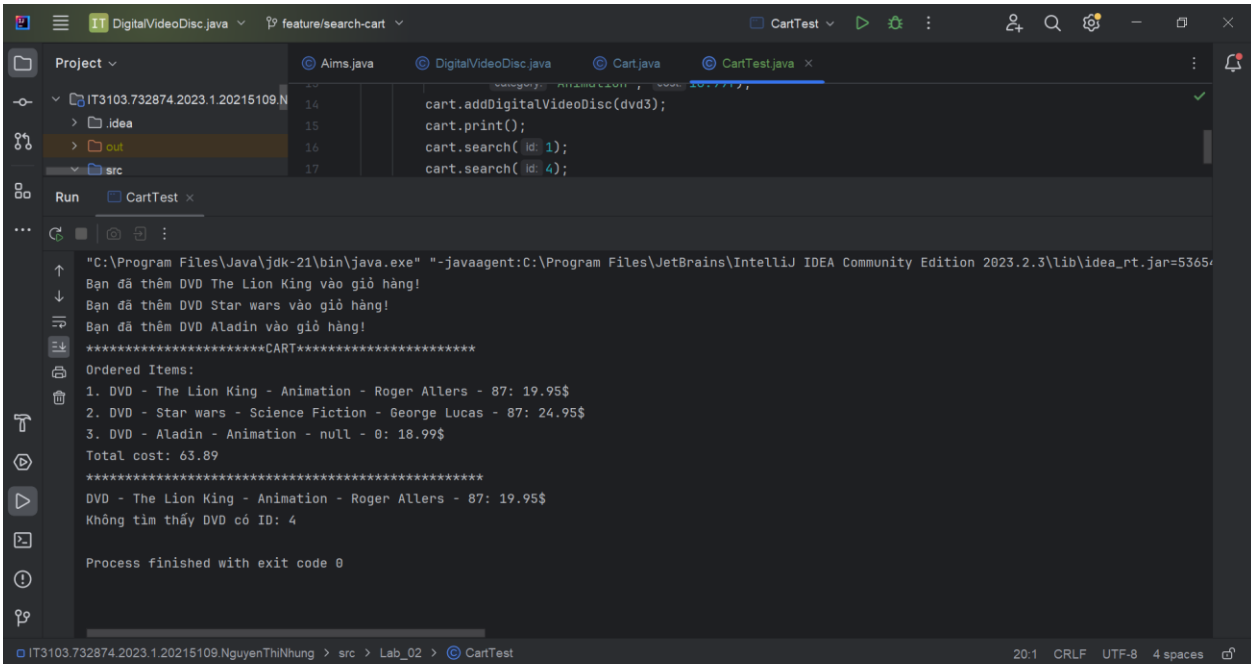
```java
    new *
    public String toString(){
        return "DVD - " + title + " - " +
                category + " - " + director + " - " +
                length + ": " + cost + "$";
    }
```

*Figure 24: Code snippet for toString()*



```java
    //Phương thức tìm dvd theo ID
    2 usages   new *
    public void search(int id){
        boolean found = false;
        for(int i = 0; i < qtyOrdered; i++){
            if(itemOrder[i].getId() == id){
                System.out.println(itemOrder[i].toString());
                found = true;
            }
        }
        if (!found) {
            System.out.println("Không tìm thấy DVD có ID: " + id);
        }

    }
```

*Figure 25: Code snippet for search by ID*

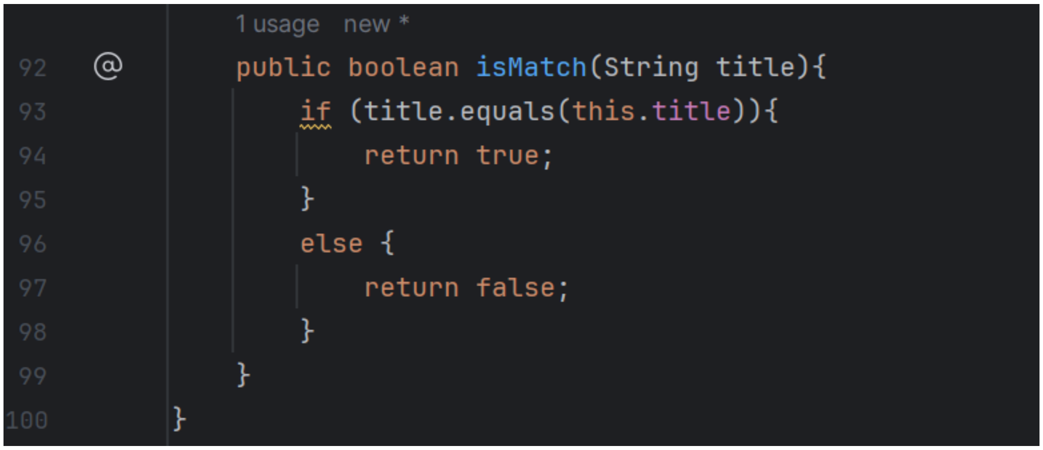


```java
        cart.addDigitalVideoDisc(dvd3);
        cart.print();
        cart.search( id: 1);
        cart.search( id: 4);
```

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.2.3\lib\idea_rt.jar=5365
Bạn đã thêm DVD The Lion King vào giỏ hàng!
Bạn đã thêm DVD Star wars vào giỏ hàng!
Bạn đã thêm DVD Aladin vào giỏ hàng!
***********************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 - null - 0: 18.99$
Total cost: 63.89
***************************************************
DVD - The Lion King - Animation - Roger Allers - 87: 19.95$
Không tìm thấy DVD có ID: 4

Process finished with exit code 0
```

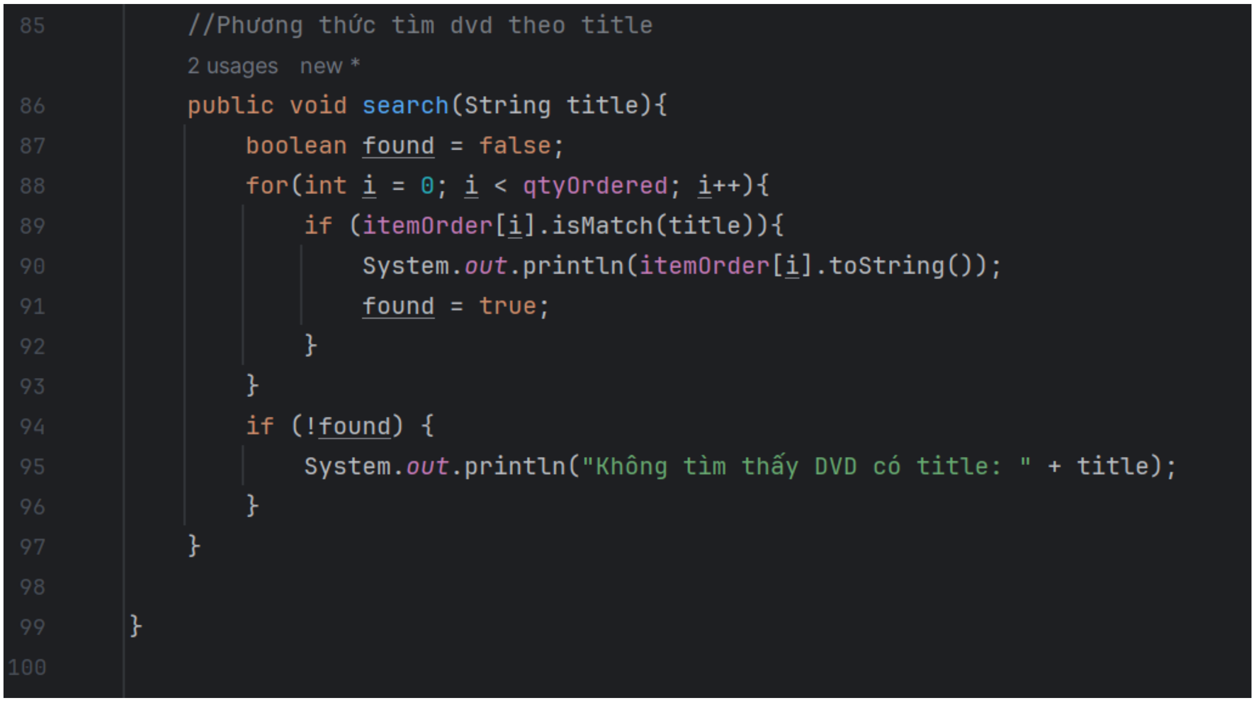
*Figure 26: Results*

### c. Search for DVDs in the cart by title and print the results.



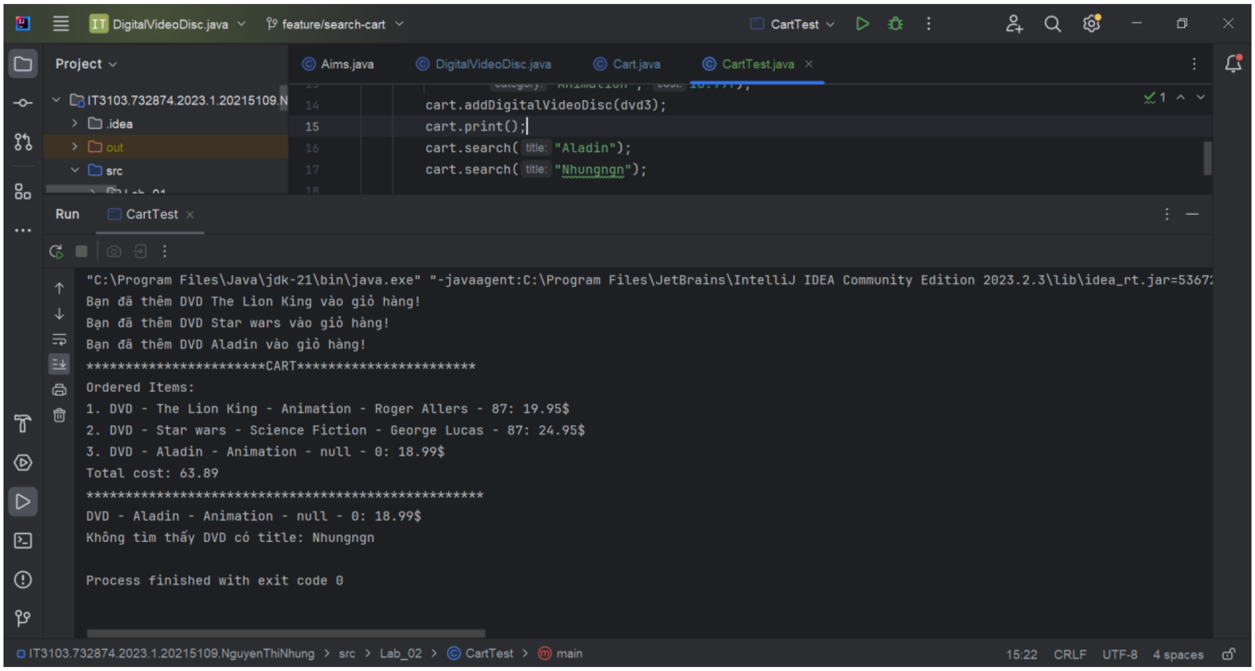
```
    public boolean isMatch(String title){
        if (title.equals(this.title)){
            return true;
        }
        else {
            return false;
        }
    }
}
```

*Figure 27: Code snippet for isMatch*



```
    //Phương thức tìm dvd theo title
    public void search(String title){
        boolean found = false;
        for(int i = 0; i < qtyOrdered; i++){
            if (itemOrder[i].isMatch(title)){
                System.out.println(itemOrder[i].toString());
                found = true;
            }
        }
        if (!found) {
            System.out.println("Không tìm thấy DVD có title: " + title);
        }
    }

}
```

*Figure 28: Code snippet for search by title*



```java
cart.addDigitalVideoDisc(dvd3);
cart.print();
cart.search( title: "Aladin");
cart.search( title: "Nhungngn");
```

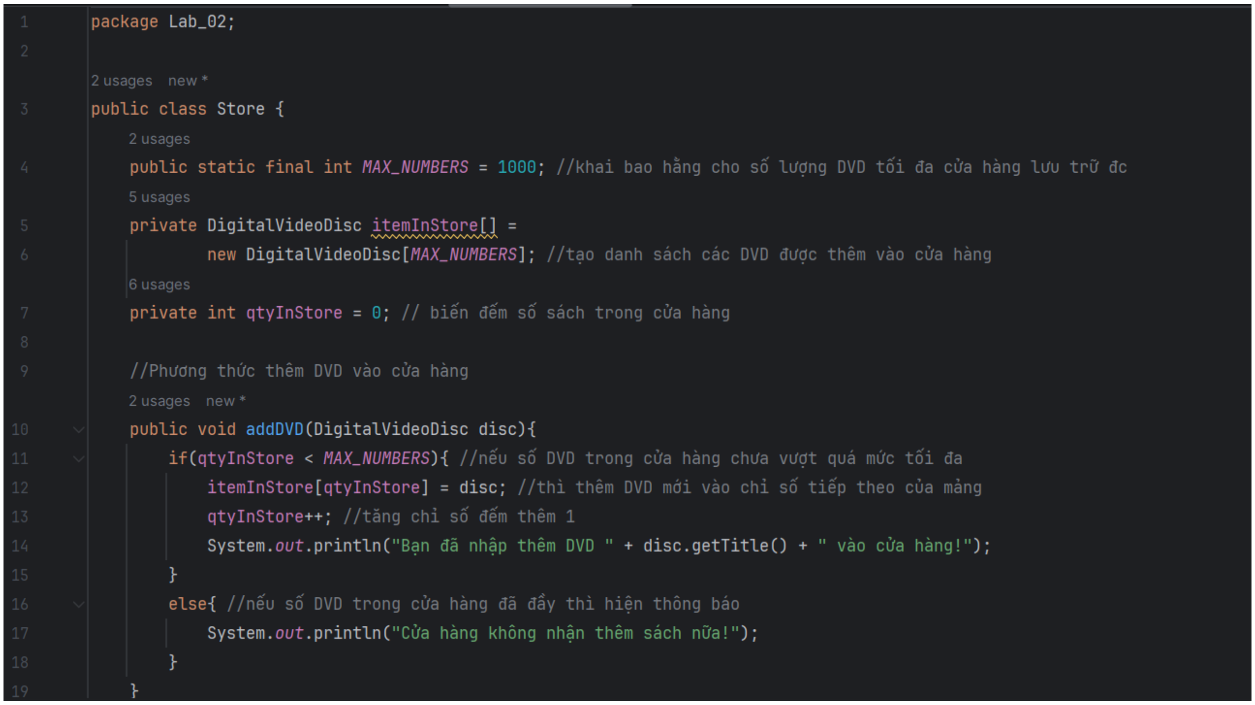
```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2023.2.3\lib\idea_rt.jar=5367
Bạn đã thêm DVD The Lion King vào giỏ hàng!
Bạn đã thêm DVD Star wars vào giỏ hàng!
Bạn đã thêm DVD Aladin vào giỏ hàng!
**********************CART***********************
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 - null - 0: 18.99$
Total cost: 63.89
***************************************************
DVD - Aladin - Animation - null - 0: 18.99$
Không tìm thấy DVD có title: Nhungngn

Process finished with exit code 0
```

DigitalVideoDisc.java
feature/search-cart
CartTest
Project
IT3103.732874.2023.1.20215109.N
.idea
out
src
Aims.java
DigitalVideoDisc.java
Cart.java
CartTest.java
Run
CartTest
IT3103.732874.2023.1.20215109.NguyenThiNhung > src > Lab_02 > CartTest > main
15:22 CRLF UTF-8 4 spaces

*Figure 29: Results*

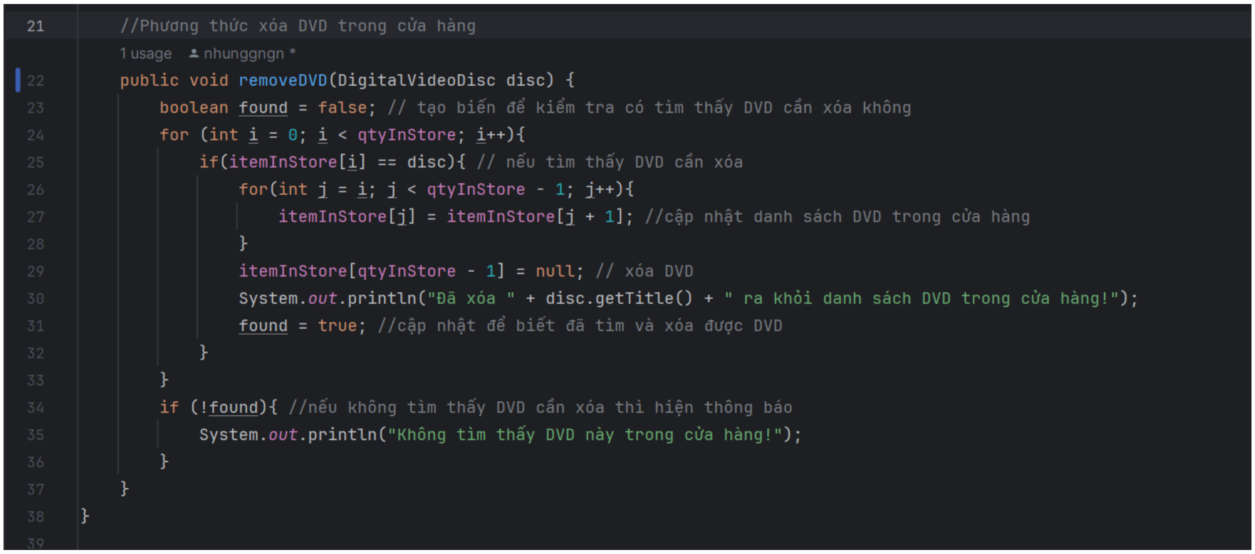
## 7. Implement the Store class

Mã nguồn:



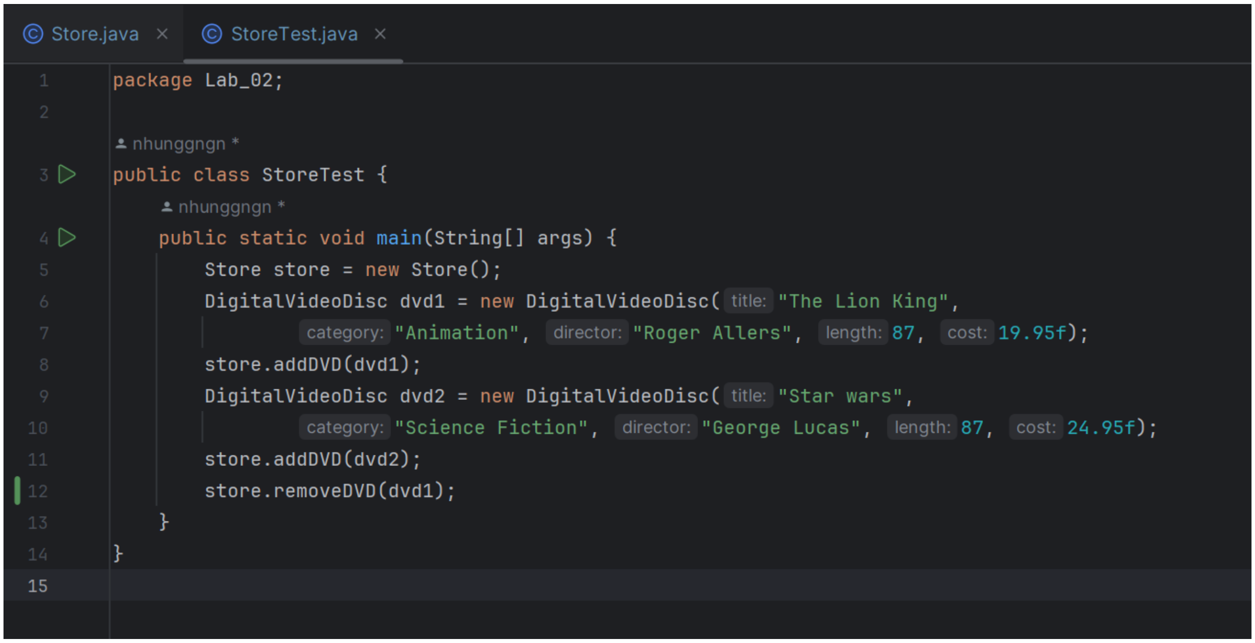
```java
package Lab_02;

2 usages   new *
public class Store {
    2 usages
    public static final int MAX_NUMBERS = 1000; //khai bao hằng cho số lượng DVD tối đa cửa hàng lưu trữ đc
    5 usages
    private DigitalVideoDisc itemInStore[] =
            new DigitalVideoDisc[MAX_NUMBERS]; //tạo danh sách các DVD được thêm vào cửa hàng
    6 usages
    private int qtyInStore = 0; // biến đếm số sách trong cửa hàng

    //Phương thức thêm DVD vào cửa hàng
    2 usages   new *
    public void addDVD(DigitalVideoDisc disc){
        if(qtyInStore < MAX_NUMBERS){ //nếu số DVD trong cửa hàng chưa vượt quá mức tối đa
            itemInStore[qtyInStore] = disc; //thì thêm DVD mới vào chỉ số tiếp theo của mảng
            qtyInStore++; //tăng chỉ số đếm thêm 1
            System.out.println("Bạn đã nhập thêm DVD " + disc.getTitle() + " vào cửa hàng!");
        }
        else{ //nếu số DVD trong cửa hàng đã đầy thì hiện thông báo
            System.out.println("Cửa hàng không nhận thêm sách nữa!");
        }
    }
```

*Figure 30: Code snippet for Store class (1)*



```java
    //Phương thức xóa DVD trong cửa hàng
    1 usage  nhunggngn *
    public void removeDVD(DigitalVideoDisc disc) {
        boolean found = false; // tạo biến để kiểm tra có tìm thấy DVD cần xóa không
        for (int i = 0; i < qtyInStore; i++){
            if(itemInStore[i] == disc){ // nếu tìm thấy DVD cần xóa
                for(int j = i; j < qtyInStore - 1; j++){
                    itemInStore[j] = itemInStore[j + 1]; //cập nhật danh sách DVD trong cửa hàng
                }
                itemInStore[qtyInStore - 1] = null; // xóa DVD
                System.out.println("Đã xóa " + disc.getTitle() + " ra khỏi danh sách DVD trong cửa hàng!");
                found = true; //cập nhật để biết đã tìm và xóa được DVD
            }
        }
        if (!found){ //nếu không tìm thấy DVD cần xóa thì hiện thông báo
            System.out.println("Không tìm thấy DVD này trong cửa hàng!");
        }
    }
}
```

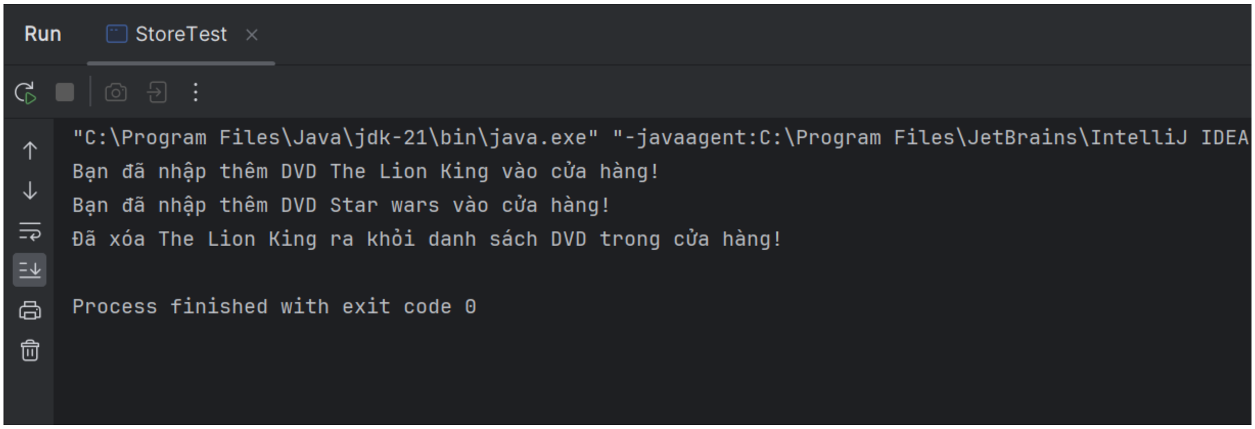
*Figure 31: Code snippet for Store class (2)*



```java
package Lab_02;

 nhunggngn *
public class StoreTest {
     nhunggngn *
    public static void main(String[] args) {
        Store store = new Store();
        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);
        store.removeDVD(dvd1);
    }
}
```

*Figure 32: Code snippet for StoreTest*

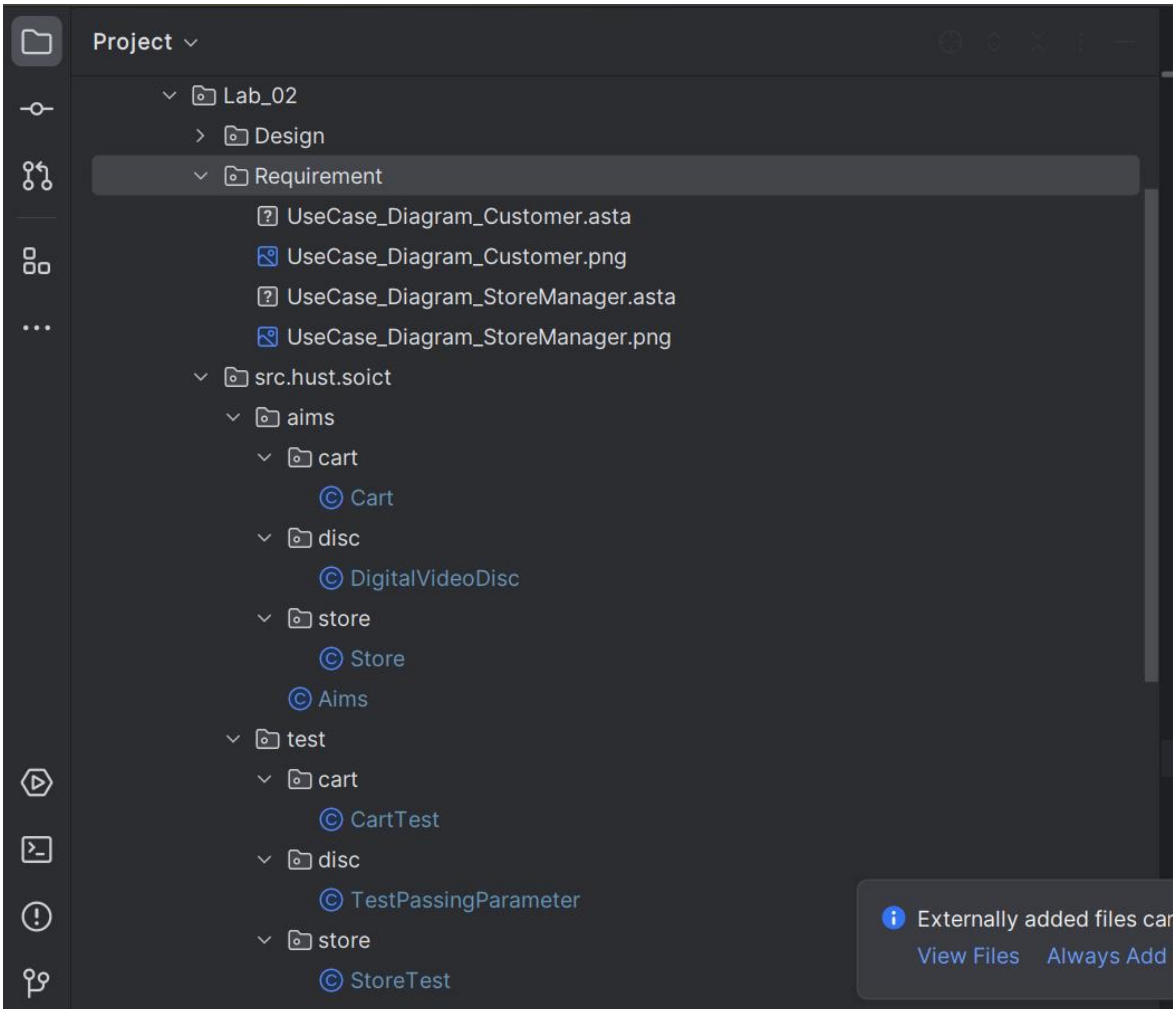
Kết quả:



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA
Bạn đã nhập thêm DVD The Lion King vào cửa hàng!
Bạn đã nhập thêm DVD Star wars vào cửa hàng!
Đã xóa The Lion King ra khỏi danh sách DVD trong cửa hàng!

Process finished with exit code 0
```

*Figure 33: Results*

## 8. Re-organize your projects

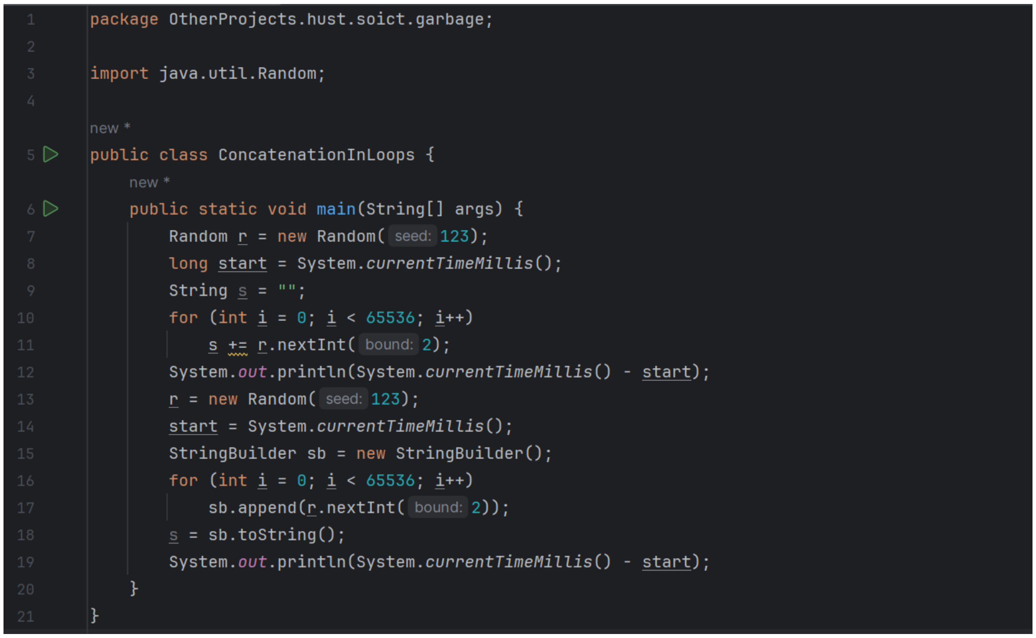


```
Lab_02
  Design
  Requirement
    UseCase_Diagram_Customer.asta
    UseCase_Diagram_Customer.png
    UseCase_Diagram_StoreManager.asta
    UseCase_Diagram_StoreManager.png
  src.hust.soict
    aims
      cart
        Cart
      disc
        DigitalVideoDisc
      store
        Store
      Aims
    test
      cart
        CartTest
      disc
        TestPassingParameter
      store
        StoreTest
```

Externally added files car

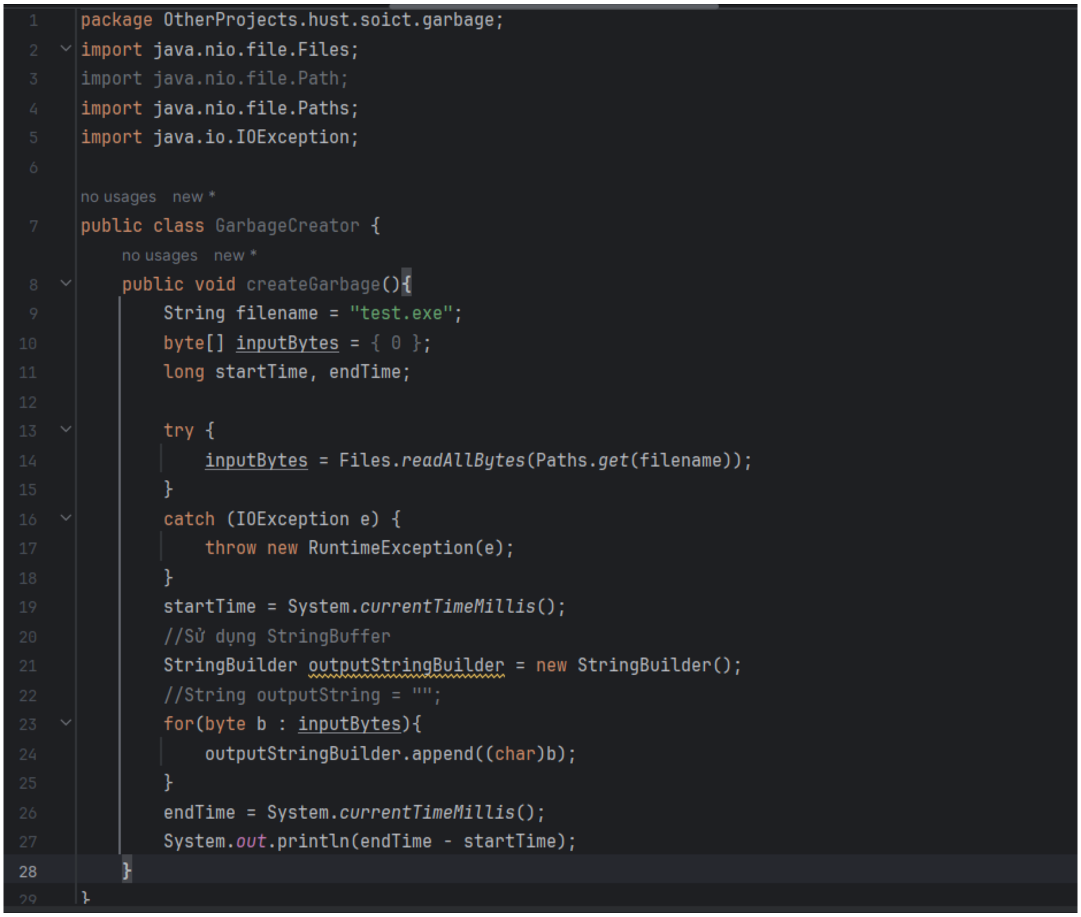
*Figure 34: Structure*

## 9. String, StringBuilder and StringBuffer



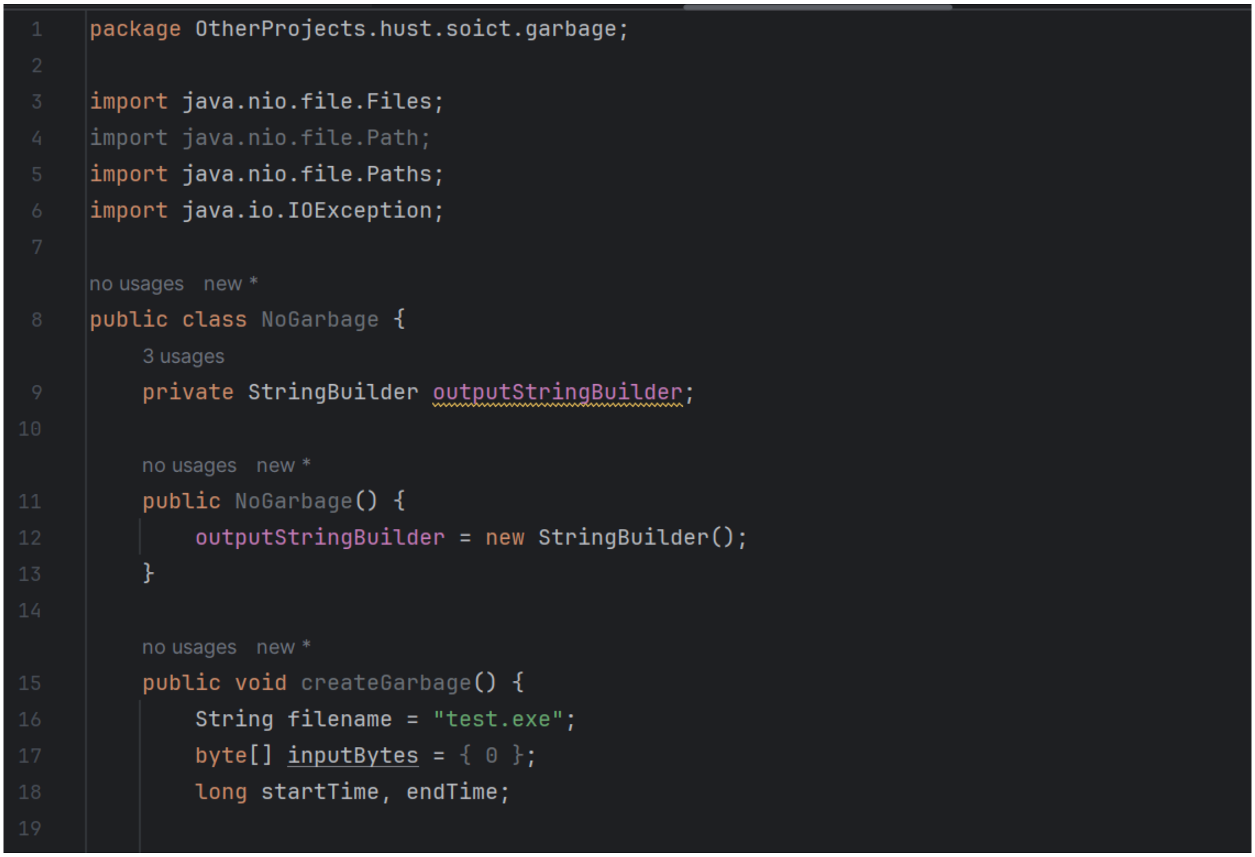
```
package OtherProjects.hust.soict.garbage;

import java.util.Random;

new *
public class ConcatenationInLoops {
    new *
    public static void main(String[] args) {
        Random r = new Random( seed: 123);
        long start = System.currentTimeMillis();
        String s = "";
        for (int i = 0; i < 65536; i++)
            s += r.nextInt( bound: 2);
        System.out.println(System.currentTimeMillis() - start);
        r = new Random( seed: 123);
        start = System.currentTimeMillis();
        StringBuilder sb = new StringBuilder();
        for (int i = 0; i < 65536; i++)
            sb.append(r.nextInt( bound: 2));
        s = sb.toString();
        System.out.println(System.currentTimeMillis() - start);
    }
}
```

*Figure 35: ConcatenationInLoops*



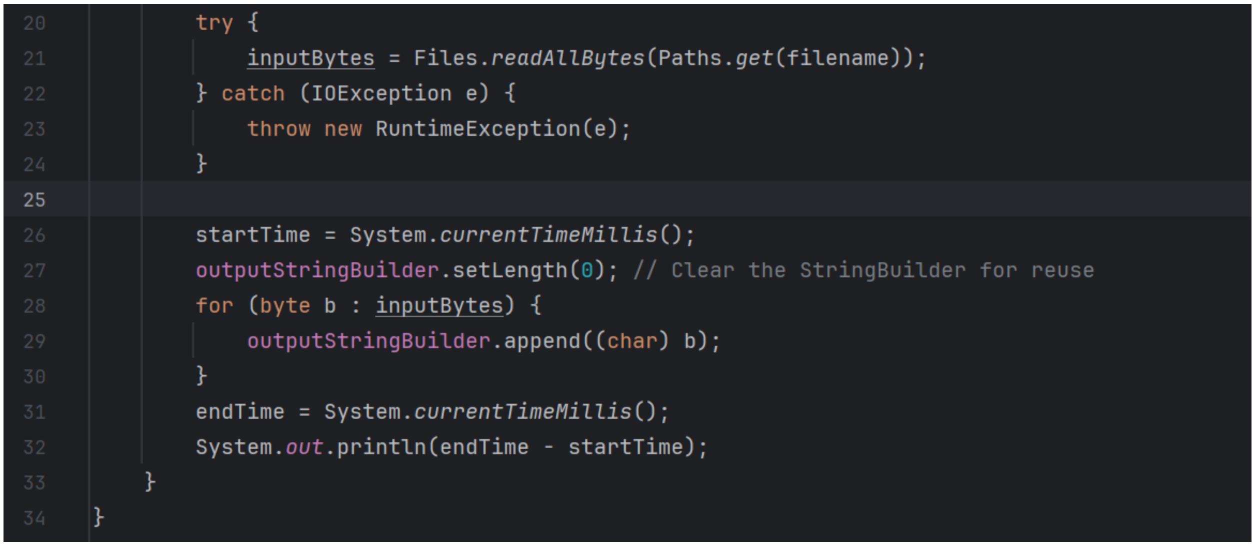
```
package OtherProjects.hust.soict.garbage;
import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.Paths;
import java.io.IOException;

no usages   new *
public class GarbageCreator {
    no usages   new *
    public void createGarbage(){
        String filename = "test.exe";
        byte[] inputBytes = { 0 };
        long startTime, endTime;

        try {
            inputBytes = Files.readAllBytes(Paths.get(filename));
        }
        catch (IOException e) {
            throw new RuntimeException(e);
        }
        startTime = System.currentTimeMillis();
        //Sử dụng StringBuffer
        StringBuilder outputStringBuilder = new StringBuilder();
        //String outputString = "";
        for(byte b : inputBytes){
            outputStringBuilder.append((char)b);
        }
        endTime = System.currentTimeMillis();
        System.out.println(endTime - startTime);
    }
}
```

*Figure 36: GarbageCreator*



```java
package OtherProjects.hust.soict.garbage;

import java.nio.file.Files;
import java.nio.file.Path;
import java.nio.file.Paths;
import java.io.IOException;

no usages   new *
public class NoGarbage {
    3 usages
    private StringBuilder outputStringBuilder;

    no usages   new *
    public NoGarbage() {
        outputStringBuilder = new StringBuilder();
    }

    no usages   new *
    public void createGarbage() {
        String filename = "test.exe";
        byte[] inputBytes = { 0 };
        long startTime, endTime;

```

*Figure 37: NoGarbage (1)*



```java
        try {
            inputBytes = Files.readAllBytes(Paths.get(filename));
        } catch (IOException e) {
            throw new RuntimeException(e);
        }

        startTime = System.currentTimeMillis();
        outputStringBuilder.setLength(0); // Clear the StringBuilder for reuse
        for (byte b : inputBytes) {
            outputStringBuilder.append((char) b);
        }
        endTime = System.currentTimeMillis();
        System.out.println(endTime - startTime);
    }
}
```

*Figure 38: NoGarbage (2)*

## II. Update the use case diagram and the class diagram

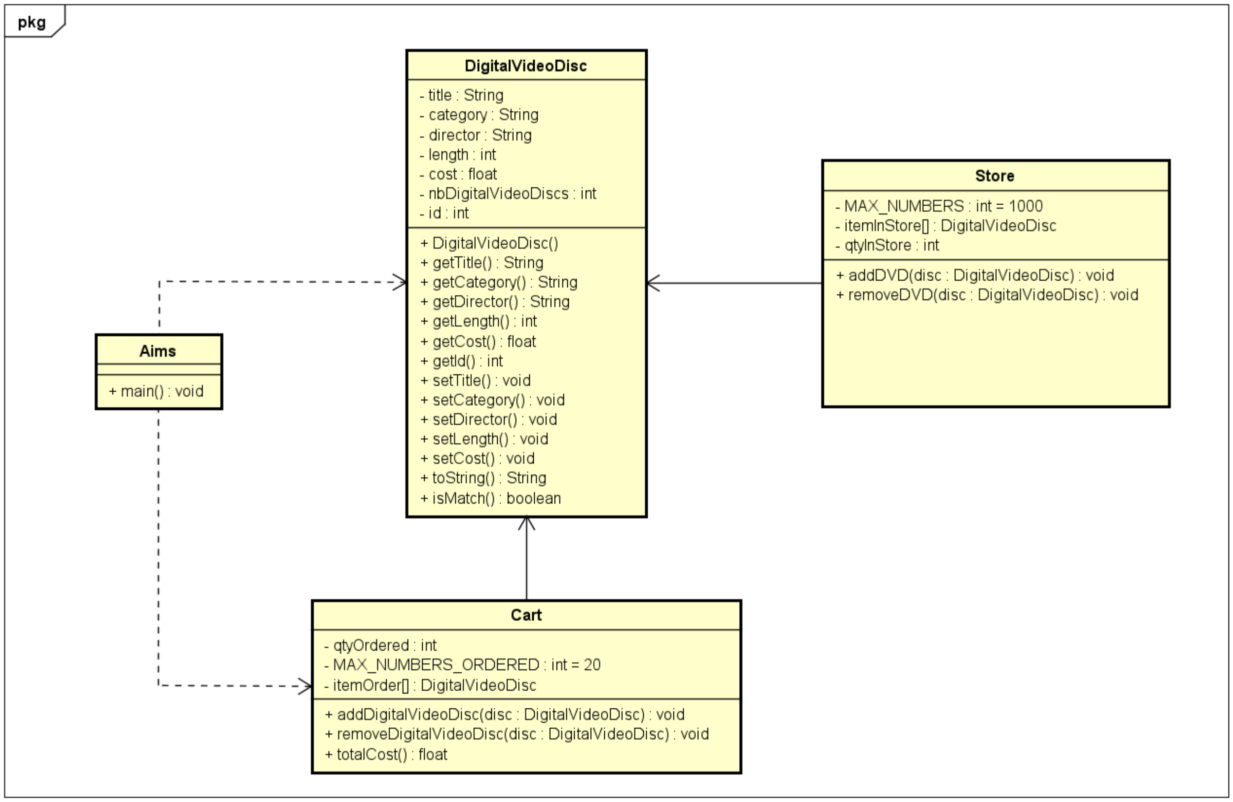


*Figure 39: Class Diagram update*