

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

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## 2. Working with method overloading

### 2.1 Overloading by differing types of parameter

Code:

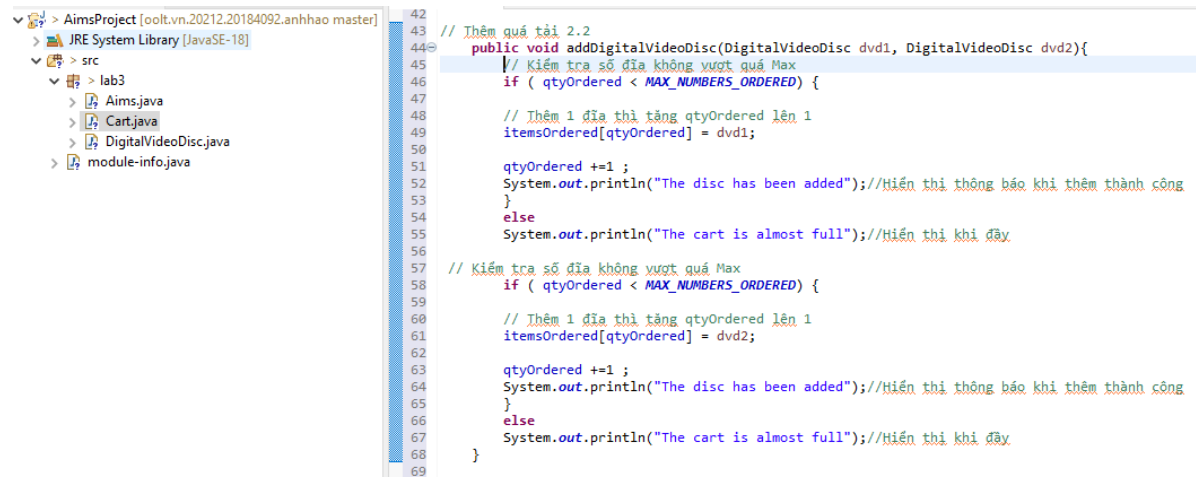
```

3 // Họ và tên: Lê Anh Hào
4 // MSSV: 20184092
5 //
6 public class Cart {
7     public static final int MAX_NUMBERS_ORDERED = 20;
8     private DigitalVideoDisc itemsOrdered[] = new DigitalVideoDisc[MAX_NUMBERS_ORDERED];
9     private int qtyOrdered; // Khai báo biến đếm số sản phẩm trong giỏ
10    //Thêm đĩa vào giỏ
11    public void addDigitalVideoDisc(DigitalVideoDisc disc) {
12        // Kiểm tra số đĩa không vượt quá Max
13        if ( qtyOrdered < MAX_NUMBERS_ORDERED ) {
14
15            // Thêm 1 đĩa thì tăng qtyOrdered lên 1
16            itemsOrdered[qtyOrdered] = disc;
17
18            qtyOrdered +=1 ;
19            System.out.println("The disc has been added");//Hiển thị thông báo khi thêm thành công
20        }
21        else
22            System.out.println("The cart is almost full");//Hiển thị khi đầy
23    }
24
25    // Thêm làm quá tải 2.1
26
27    public void addDigitalVideoDisc(DigitalVideoDisc [] dvdList) {
28        // Kiểm tra số đĩa không vượt quá Max
29        for(int i=0; i<dvdList.length; i++){
30            if ( qtyOrdered < MAX_NUMBERS_ORDERED ) {
31
32                // Thêm 1 đĩa thì tăng qtyOrdered lên 1
33                itemsOrdered[qtyOrdered] = dvdList[i];
34
35                qtyOrdered +=1 ;
36                System.out.println("The disc has been added");//Hiển thị thông báo khi thêm thành công
37            }
38            else
39                System.out.println("The cart is almost full");//Hiển thị khi đầy
40        }
41    }
42

```

### 2.2. Overloading by differing the number of parameters

Code:



```

42 // Thêm quá tải 2.2
43
44 public void addDigitalVideoDisc(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2){
45     // Kiểm tra số đĩa không vượt quá Max
46     if ( qtyOrdered < MAX_NUMBERS_ORDERED) {
47
48         // Thêm 1 đĩa thì tăng qtyOrdered lên 1
49         itemsOrdered[qtyOrdered] = dvd1;
50
51         qtyOrdered +=1 ;
52         System.out.println("The disc has been added");//Hiển thị thông báo khi thêm thành công
53     }
54     else
55         System.out.println("The cart is almost full");//Hiển thị khi đầy.
56
57     // Kiểm tra số đĩa không vượt quá Max
58     if ( qtyOrdered < MAX_NUMBERS_ORDERED) {
59
60         // Thêm 1 đĩa thì tăng qtyOrdered lên 1
61         itemsOrdered[qtyOrdered] = dvd2;
62
63         qtyOrdered +=1 ;
64         System.out.println("The disc has been added");//Hiển thị thông báo khi thêm thành công
65     }
66     else
67         System.out.println("The cart is almost full");//Hiển thị khi đầy.
68 }
69

```

### 3. Passing parameter

- **Question:** Is JAVA a Pass by Value or a Pass by Reference programming language?
- **Answer:** Java is always pass-by-value. Unfortunately, when we pass the value of an object, we pass a reference to it. This is confusing for beginners.

Add a setter for the attribute title of the DigitalVideoDisc class.

```
*DigitalVideoDisc.java × *TestPassingParameter.java Cart.j
1 package lab3;
2 // Họ và tên: Lê Anh Hà
3 // MSSV: 20184092
4 // Lab2 - 6 Create DigitalVideoDisc
5 public class DigitalVideoDisc {
6
7     private String title;
8     private String category;
9     private String director;
10    private int length;
11    private float cost;
12    public String getTitle() {
13        return title;
14    }
15    public String getCategory() {
16        return category;
17    }
18    public String getDirector() {
19        return director;
20    }
21    public int getLength() {
22        return length;
23    }
24    public float getCost() {
25        return cost;
26    }
27    public void setTitle(String title) {
28        this.title = title;
29    }
30    public void setCategory(String category) {
31        this.category = category;
32    }
33    public void setDirector(String director) {
34        this.director = director;
35    }
36    public void setLength(int length) {
37        this.length = length;
38    }
39    public void setCost(float cost) {
40        this.cost = cost;
41    }
42 }
```

Create a new class named TestPassingParameter in the current project

```

DigitalVideoDisc.java  Cart.java  Aims.java  TestPassingParameter.java ×
1 // Họ và tên: Lê Anh Hào
2 // MSSV: 20184092
3 //
4
5 package lab3;
6
7 public class TestPassingParameter {
8
9     public static void main(String[] args) {
10         // TODO Auto-generated method stub
11
12         DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
13         DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("Cinderella");
14
15         swap(jungleDVD, cinderellaDVD);
16         System.out.println("jungle dvd title: " + jungleDVD.getTitle());
17         System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());
18
19         changeTitle(jungleDVD, cinderellaDVD.getTitle());
20         System.out.println("jungle dvd title: " + jungleDVD.getTitle());
21     }
22
23     public static void swap(Object o1, Object o2) {
24         Object tmp = o1;
25         o1 = o2;
26         o2 = tmp;
27     }
28
29     public static void changeTitle(DigitalVideoDisc dvd, String title) {
30         String oldTitle = dvd.getTitle();
31         dvd.setTitle(title);
32         dvd = new DigitalVideoDisc(oldTitle);
33     }
34 }
35

```

### Kết quả:

```

<terminated> TestPassingParameter [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justj.openj
jungle dvd title: Jungle
cinderella dvd title: Cinderella
jungle dvd title: Cinderella

```

## 4. Use debug run

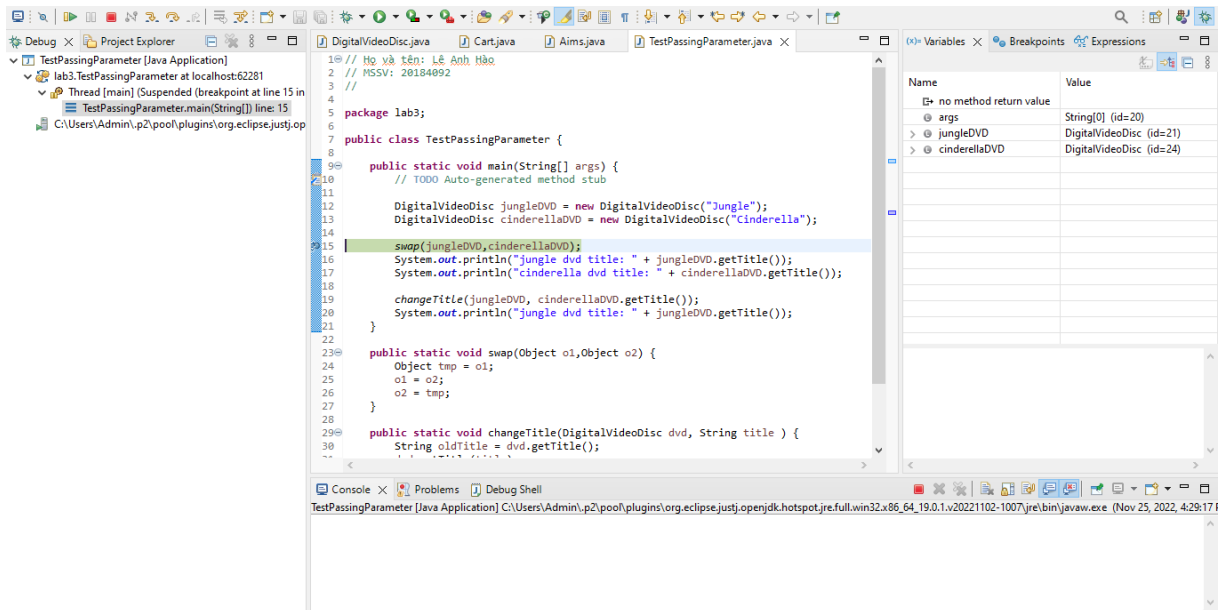
### 4.1. Debugging Java in Eclipse

### 4.2. Example of debug run for the swap method of TestPassingParameter

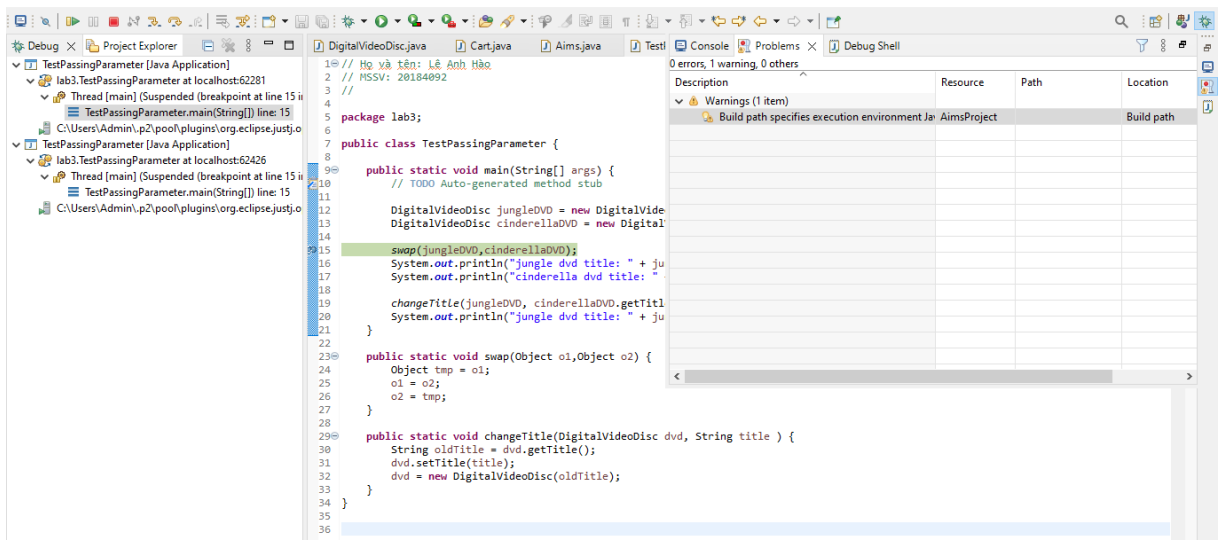
#### 4.2.1. Setting, deleting & deactivate breakpoints:

```
1 // Họ và tên: Lê Anh Hào
2 // MSSV: 20184092
3 //
4
5 package lab3;
6
7 public class TestPassingParameter {
8
9     public static void main(String[] args) {
10         // TODO Auto-generated method stub
11
12         DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
13         DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("Cinderella");
14
15         swap(jungleDVD, cinderellaDVD);
16         System.out.println("jungle dvd title: " + jungleDVD.getTitle());
17         System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());
18
19         changeTitle(jungleDVD, cinderellaDVD.getTitle());
20         System.out.println("jungle dvd title: " + jungleDVD.getTitle());
21     }
22
23     public static void swap(Object o1, Object o2) {
24         Object tmp = o1;
25         o1 = o2;
26         o2 = tmp;
27     }
28
29     public static void changeTitle(DigitalVideoDisc dvd, String title) {
30         String oldTitle = dvd.getTitle();
31         dvd.setTitle(title);
32         dvd = new DigitalVideoDisc(oldTitle);
33     }
34 }
35
```

### 4.2.2. Run in Debug mode



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



#### 4.2.4. Investigate value of variables

The screenshot shows an IDE with a Java file named `DigitalVideoDisc.java` and a `Variables` window on the right.

**Code Snippet:**

```

1 // Họ và tên: Lê Anh Hòa
2 // MSSV: 20184092
3 //
4
5 package lab3;
6
7 public class TestPassingParameter {
8
9     public static void main(String[] args) {
10         // TODO Auto-generated method stub
11
12         DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
13         DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("Cinderella");
14
15         swap(jungleDVD, cinderellaDVD);
16         System.out.println("jungle dvd title: " + jungleDVD.getTitle());
17         System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());
18
19         changeTitle(jungleDVD, cinderellaDVD.getTitle());
20         System.out.println("jungle dvd title: " + jungleDVD.getTitle());
21     }
22
23     public static void swap(Object o1, Object o2) {
24         Object tmp = o1;
25         o1 = o2;
26         o2 = tmp;
27     }
28
29     public static void changeTitle(DigitalVideoDisc dvd, String title) {
30         String oldTitle = dvd.getTitle();
31         dvd.setTitle(title);
32         dvd = new DigitalVideoDisc(oldTitle);
33     }
34 }

```

**Variables Window:**

Name	Value
no method return value	
args	String[] (id=20)
jungleDVD	DigitalVideoDisc (id=21)
category	null
cost	0.0
director	null
length	0
title	"Jungle" (id=26)
cinderellaDVD	DigitalVideoDisc (id=24)
category	null
cost	0.0
director	null
length	0
title	"Cinderella" (id=32)

At the bottom of the Variables window, there is a dropdown menu with the text: `<Choose a previously entered expression>`.



#### 4.2.4. Change value of variables

(x)= Variables × Breakpoints Expressions	
Name	Value
no method return value	
args	String[0] (id=20)
▼ jungleDVD	DigitalVideoDisc (id=21)
category	null
cost	0.0
director	null
length	0
> title	"ABC" (id=38)
▼ cinderellaDVD	DigitalVideoDisc (id=24)
category	null
cost	0.0
director	null
length	0
> title	"Cinderella" (id=32)

#### Kết quả

The screenshot shows the Eclipse IDE with a Java project. The editor displays the following code in `DigitalVideoDisc.java`:

```

1 // Họ và tên: Lê Anh Hào
2 // MSSV: 20184092
3 //
4
5 package lab3;
6
7 public class TestPassingParameter {
8
9     public static void main(String[] args) {
10         // TODO Auto-generated method stub
11
12         DigitalVideoDisc jungleDVD = new DigitalVide
13         DigitalVideoDisc cinderellaDVD = new Digital
14
15         swap(jungleDVD, cinderellaDVD);
16         System.out.println("jungle dvd title: " + ju
17         System.out.println("cinderella dvd title: "

```

The console output shows the result of the program execution:

```

TestPassingParameter [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.f
jungle dvd title: ABC

```

## 5. Classifier Member and Instance Member

```

1 package lab3;
2 // Họ và tên: Lê Anh Hào
3 // MSSV: 20184092
4
5 public class DigitalVideoDisc {
6
7     private String title;
8     private String category;
9     private String director;
10    private int length;
11    private int id;
12
13    public int getId() {
14        return id;
15    }
16    public void setId(int id) {
17        this.id = id;
18    }
19    public static int getNbDigitalVideoDiscs() {
20        return nbDigitalVideoDiscs;
21    }
22    public static void setNbDigitalVideoDiscs(int nbDigitalVideoDiscs) {
23        DigitalVideoDisc.nbDigitalVideoDiscs = nbDigitalVideoDiscs;
24    }
25    --

```

## 6. Open the Cart class

### Add method SearchId

```

s
//tìm kiếm bằng id
//LeAnhHao-20184092
public void SearchId(int id) {
    boolean search = false;
    for(int i=0; i < qtyOrdered; i++) {
        if (itemsOrdered[i].getId() == id) {
            System.out.println(itemsOrdered[i]);
            search =true;
            break;
        }
    }
    if (!search)
        System.out.println("Not Search");
}

```

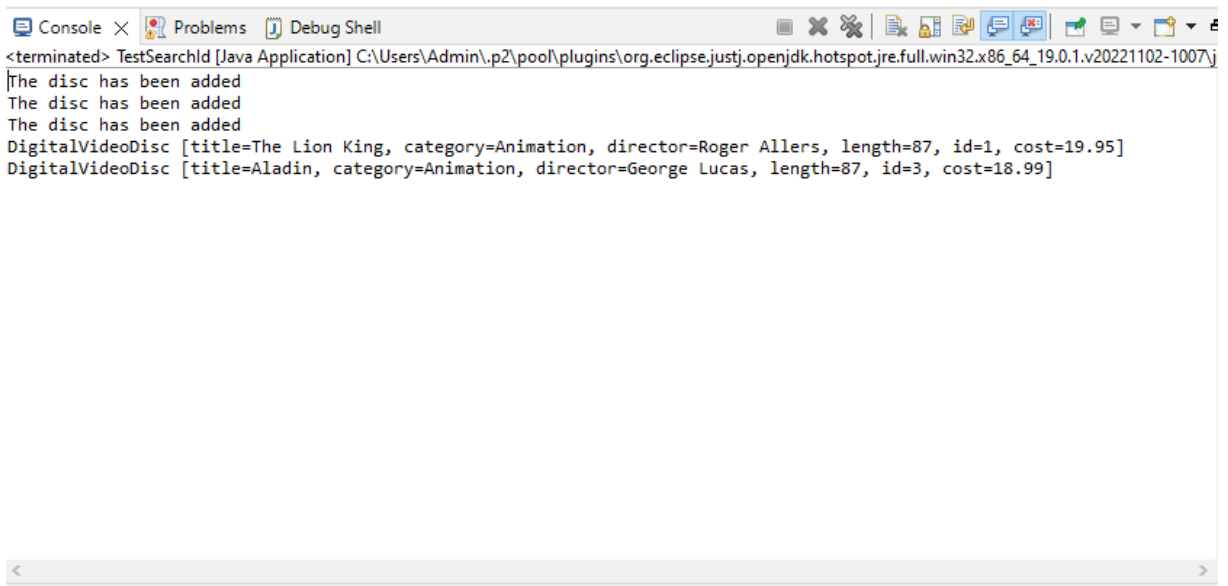
## Add Class TestSearchId

```

1 package hust.soict.dsai.test.cart.CartTest;
2
3 import hust.soict.dsai.aims.cart.Cart;
4 import hust.soict.dsai.aims.disc.DigitalVideoDisc;
5
6 public class TestSearchId {
7     public static void main(String[] args){
8         //Create a new cart
9         Cart anOrder = new Cart();
10        // Create new dvd object and add them to the cart
11        DigitalVideoDisc dvd1 = new DigitalVideoDisc
12            ("The Lion King","Animation","Roger Allers",87,01, 19.95f);
13        anOrder.addDigitalVideoDisc(dvd1);
14
15        DigitalVideoDisc dvd2 = new DigitalVideoDisc
16            ("Star Wars","Science Fiction","George Lucas",87,02,24.95f);
17        anOrder.addDigitalVideoDisc(dvd2);
18
19        DigitalVideoDisc dvd3 = new DigitalVideoDisc
20            ("Aladin","Animation","George Lucas",87,03,18.99f);
21
22        anOrder.SearchId(1);
23        anOrder.SearchId(2);
24    }
25 }

```

## Kết Quả:



```

<terminated> TestSearchId [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_19.0.1.v20221102-1007\j
The disc has been added
The disc has been added
The disc has been added
DigitalVideoDisc [title=The Lion King, category=Animation, director=Roger Allers, length=87, id=1, cost=19.95]
DigitalVideoDisc [title=Aladin, category=Animation, director=George Lucas, length=87, id=3, cost=18.99]

```

## Add toString method

```

1 package hust.soict.dsai.aims.disc.DigitalVideoDisc;
2 // Họ và tên: Lê Anh Hà
3 // MSSV: 20184092
4
5 public class DigitalVideoDisc {
6
7     private String title;
8     private String category;
9     private String director;
10    private int length;
11    private int id;
12
13    @Override
14    public String toString() {
15        return "DigitalVideoDisc [title=" + title + ", category=" + category + ", director=" + director + ", length="
16            + length + ", id=" + id + ", cost=" + cost + "]";
17    }
18
19    public int getId() {
20        return id;
21    }
22    public void setId(int id) {
23        this.id = id;
24    }
25    public static int getNbDigitalVideoDiscs() {
26        return nbDigitalVideoDiscs;
27    }
28    public static void setNbDigitalVideoDiscs(int nbDigitalVideoDiscs) {
29        nbDigitalVideoDiscs = nbDigitalVideoDiscs;
30    }
31
32 }

```

## Add method print Cart

```

//In giỏ hàng
//LeAnhHao-20184092
public void printCart() {
    float total = 0; // biến tính tổng giá trị giỏ
    System.out.println("*****CART*****");
    System.out.println("Ordered Items: ");
    for (int i = 0; i < qtyOrdered; i++) {
        System.out.println(itemsOrdered[i]);
        total += itemsOrdered[i].getCost();
    }
    System.out.println("Total cost: " + total + "$");
    System.out.println("*****");
}

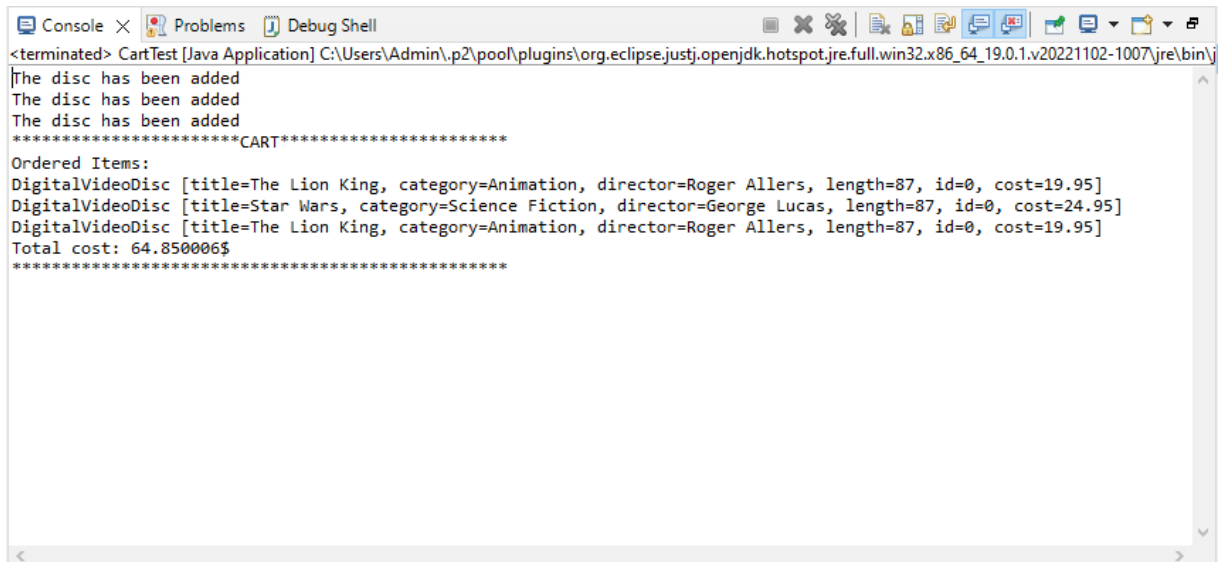
```

**Add class CartTest**

```

1 //LeAnhHao - 20184092
2 //LeAnhHao - 20184092
3 //LeAnhHao - 20184092
4 //LeAnhHao - 20184092
5
6 package hust.soict.dsai.test.cart.CartTest;
7
8 import hust.soict.dsai.aims.cart.Cart;
9
10
11 public class CartTest {
12     public static void main(String[] args){
13         //Create a new cart
14         Cart anOrder = new Cart();
15         // Create new dvd object and add them to the cart
16         DigitalVideoDisc dvd1 = new DigitalVideoDisc
17             ("The Lion King", "Animation", "Roger Allers", 87, 19.95f);
18         anOrder.addDigitalVideoDisc(dvd1);
19
20         DigitalVideoDisc dvd2 = new DigitalVideoDisc
21             ("Star Wars", "Science Fiction", "George Lucas", 87, 24.95f);
22         anOrder.addDigitalVideoDisc(dvd2);
23
24         DigitalVideoDisc dvd3 = new DigitalVideoDisc
25             ("Aladin", "Animation", "George Lucas", 87, 18.99f);
26
27         anOrder.addDigitalVideoDisc(dvd1);
28         anOrder.printCart();
29     }
30 }
31

```

**Run Test => Kết quả**


```

<terminated> CartTest [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_19.0.1.v20221102-1007\jre\bin\j
The disc has been added
The disc has been added
The disc has been added
*****CART*****
Ordered Items:
DigitalVideoDisc [title=The Lion King, category=Animation, director=Roger Allers, length=87, id=0, cost=19.95]
DigitalVideoDisc [title=Star Wars, category=Science Fiction, director=George Lucas, length=87, id=0, cost=24.95]
DigitalVideoDisc [title=The Lion King, category=Animation, director=Roger Allers, length=87, id=0, cost=19.95]
Total cost: 64.850006$
*****

```

## 7. Implement the Store class

### Store class

```

1 package hust.soict.dsai.aims.store.Store;
2
3 import java.util.ArrayList;
4
5 import hust.soict.dsai.aims.disc.DigitalVideoDisc.DigitalVideoDisc;
6
7 public class Store {
8     private ArrayList<DigitalVideoDisc> itemsinStore = new ArrayList<DigitalVideoDisc>();
9     //Ham them Dvd
10    public void addDVD(DigitalVideoDisc [] dvdList) {
11        for(DigitalVideoDisc dvd : dvdList )
12            itemsinStore.add(dvd);
13    }
14    //Xoa DVD
15    public void removeDVD(DigitalVideoDisc dvd) {
16        itemsinStore.remove(dvd);
17    }
18    //Hien thi thogn tin DVD trong Store
19    public void print() {
20        for(DigitalVideoDisc dvd : itemsinStore )
21            System.out.println(dvd);
22    }
23 }
24

```

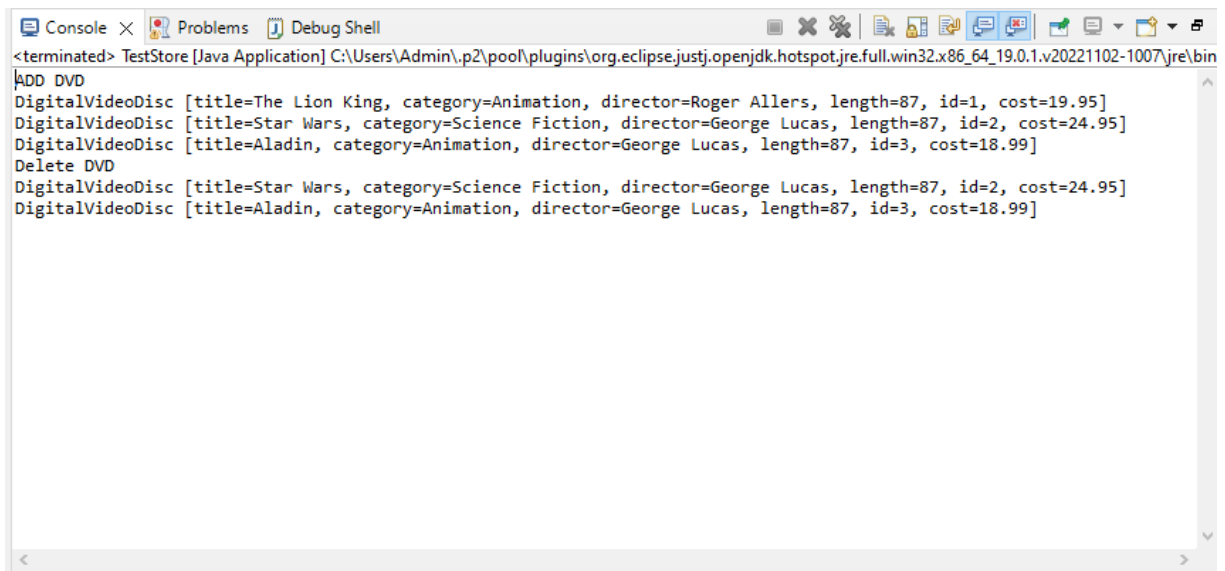
### TestStore class

```

1 //LeAnhHao-20184092
2 //LeAnhHao-20184092
3 //LeAnhHao-20184092
4
5 package hust.soict.dsai.test.cart.CartTest;
6
7 import hust.soict.dsai.aims.disc.DigitalVideoDisc.DigitalVideoDisc;
8 import hust.soict.dsai.aims.store.Store.Store;
9
10 public class TestStore {
11     public static void main(String[] args){
12         //Create a new cart
13         Store store = new Store();
14         // Create new dvd object and add them to the cart
15         DigitalVideoDisc dvd1 = new DigitalVideoDisc
16             ("The Lion King","Animation","Roger Allers",87,01, 19.95f);
17         DigitalVideoDisc dvd2 = new DigitalVideoDisc
18             ("Star Wars","Science Fiction","George Lucas",87,02,24.95f);
19         DigitalVideoDisc dvd3 = new DigitalVideoDisc
20             ("Aladin","Animation","George Lucas",87,03,18.99f);
21
22         store.addDvd(dvd1, dvd2, dvd3);
23         System.out.println("ADD DVD");
24         store.print();
25
26         store.removeDVD(dvd1);
27         System.out.println("Delete DVD");
28         store.print();
29     }
30 }

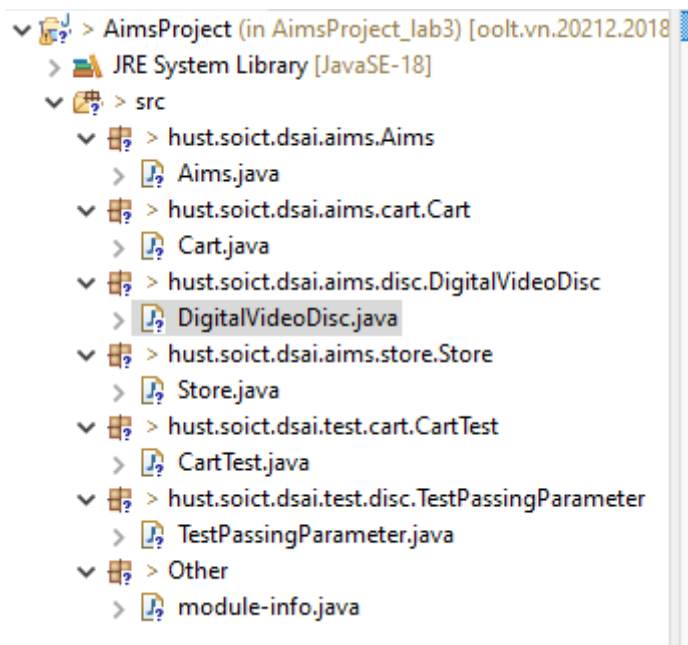
```

**Kết Quả:**



```
<terminated> TestStore [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_19.0.1.v20221102-1007\jre\bin
ADD DVD
DigitalVideoDisc [title=The Lion King, category=Animation, director=Roger Allers, length=87, id=1, cost=19.95]
DigitalVideoDisc [title=Star Wars, category=Science Fiction, director=George Lucas, length=87, id=2, cost=24.95]
DigitalVideoDisc [title=Aladin, category=Animation, director=George Lucas, length=87, id=3, cost=18.99]
Delete DVD
DigitalVideoDisc [title=Star Wars, category=Science Fiction, director=George Lucas, length=87, id=2, cost=24.95]
DigitalVideoDisc [title=Aladin, category=Animation, director=George Lucas, length=87, id=3, cost=18.99]
```

## 8. Re-organize your projects



```
▼ AimsProject (in AimsProject_lab3) [oolt.vn.20212.2018]
  > JRE System Library [JavaSE-18]
  ▼ src
    ▼ hust.soict.dsai.aims.Aims
      > Aims.java
    ▼ hust.soict.dsai.aims.cart.Cart
      > Cart.java
    ▼ hust.soict.dsai.aims.disc.DigitalVideoDisc
      > DigitalVideoDisc.java
    ▼ hust.soict.dsai.aims.store.Store
      > Store.java
    ▼ hust.soict.dsai.test.cart.CartTest
      > CartTest.java
    ▼ hust.soict.dsai.test.disc.TestPassingParameter
      > TestPassingParameter.java
    ▼ Other
      > module-info.java
```

## 9. String, StringBuilder and StringBuffer

## Kết Quả:

