Báo cáo OopLap03

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I. New Code

1. Working with method overloading

Tại class Cart.java

```
20          // Phương thức thêm list đĩa video vào giỏ hàng 2.1a (method overloading)
21      //    public void addDigitalVideoDisc(DigitalVideoDisc[] dvdList) {
22      //      for(DigitalVideoDisc dvd : dvdList) {
23      //              if (qtyOrdered < MAX_NUMBERS_ORDERED) {
24      //                      itemsOrdered[qtyOrdered] = dvd;
25      //                qtyOrdered++;
26      //                System.out.println("The disc \"" + dvd.getTitle() + "\" has been added.");
27      //                if (qtyOrdered == MAX_NUMBERS_ORDERED) {
28      //                    System.out.println("The cart is almost full!");
29      //                    return;
30      //                }
31      //              } else {
32      //                      System.out.println("The cart is full! Cannot add more items.");
33      //                      return;
34      //              }
35      //      }
36      //    }
37
38          // Phương thức thêm list đĩa video vào giỏ hàng 2.1b (method overloading)
39          public void addDigitalVideoDisc(DigitalVideoDisc... dvdList) {
40              for(DigitalVideoDisc dvd : dvdList) {
41                      if (qtyOrdered < MAX_NUMBERS_ORDERED) {
42                              itemsOrdered[qtyOrdered] = dvd;
43                      qtyOrdered++;
44                      System.out.println("The disc \"" + dvd.getTitle() + "\" has been added.");
45                      if (qtyOrdered == MAX_NUMBERS_ORDERED) {
46                          System.out.println("The cart is almost full!");
47                          return;
48                      }
49                      } else {
50                              System.out.println("The cart is full! Cannot add more items.");
51                              return;
52                      }
53              }
54          }
```

```
    // Phương thức thêm 2 đĩa video vào giỏ hàng 2.2 (method overloading)
    public void addDigitalVideoDisc(DigitalVideoDisc dvd1,DigitalVideoDisc dvd2) {
        if(qtyOrdered + 2 <= MAX_NUMBERS_ORDERED) {
                itemsOrdered[qtyOrdered] = dvd1;
            qtyOrdered++;
            System.out.println("The disc \"" + dvd1.getTitle() + "\" has been added.");
            itemsOrdered[qtyOrdered] = dvd2;
            qtyOrdered++;
            System.out.println("The disc \"" + dvd2.getTitle() + "\" has been added.");
            if (qtyOrdered == MAX_NUMBERS_ORDERED) {
                System.out.println("The cart is almost full!");
            }
        }else if (qtyOrdered + 1 == MAX_NUMBERS_ORDERED) {
                itemsOrdered[qtyOrdered] = dvd1;
            qtyOrdered++;
            System.out.println("The disc \"" + dvd1.getTitle() + "\" has been added.");
            System.out.println("The cart is almost full!");
        }else {
                System.out.println("The cart is full! Cannot add more items.");
        }
    }
```

Tại class Aims.java

```
24                  //lab3
25
26                  // Phương thức thêm list đĩa video vào giỏ hàng 2.1a (method overloading)
27                  Cart listOrderCart = new Cart();
28                  DigitalVideoDisc[] listDVD = new DigitalVideoDisc [2];
29                  listDVD[0] = new DigitalVideoDisc("The Lion King", "Animation", "Roger Allers", 87, 19.95f);
30                  listDVD[1] = new DigitalVideoDisc("Star Wars",
31                  "Science Fiction", "George", 87, 24.95f);
32                  //listOrderCart.addDigitalVideoDisc (listDVD);
33
34                  // Phương thức thêm list đĩa video vào giỏ hàng 2.1b (method overloading)
35                  listOrderCart.addDigitalVideoDisc (listDVD[0], listDVD [1], listDVD[0], listDVD [1]);
36
37                  // Phương thức thêm 2 đĩa video vào giỏ hàng 2.2 (method overloading)
38                  anOrderCart.addDigitalVideoDisc (dvd1, dvd2);
```

2. Passing parameter

Tạo một class con để tạo đối tượng có thuộc tính là DigitalVideoDisc:

```
1   class SubDigitalVideoDisc {
2       public DigitalVideoDisc dvd;
3
4       public SubDigitalVideoDisc(DigitalVideoDisc dvd) {
5           this.dvd = dvd;
6       }
7   }
```

Tại class TestPassingParameter:

```
        public static void swap(SubDigitalVideoDisc o1, SubDigitalVideoDisc o2) {
        // Hoán đổi đối tượng DVD
        DigitalVideoDisc temp = o1.dvd;
        o1.dvd = o2.dvd;
        o2.dvd = temp;
    }
```

Kết quả thu được

```
jungle dvd title: JungLe
cinderella dvd title: Cinderella
lab3

After swap:
Jungle DVD title: Cinderella
Cinderella DVD title: JungLe
```

3. **Classifier Member and Instance Member**

Tại class DigitalVideoDisc:

```
8               private static int nbDigitalVideoDiscs = 0;
9               private int id;
10
11
12              public int getId() {
13                      return id;
14              }
```

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

4. **Open the Cart class**

Tại class Cart:

```
110     public void print()
111     {
112         System.out.println("************************CART************************");
113         System.out.println("Ordered Items:");
114         for (int i = 0; i < qtyOrdered; i++)
115         {
116                 System.out.println(itemsOrdered[i]);
117         }
118         System.out.println("Total cost: " + totalCost());
119         System.out.println("****************************************************");
120     }
```

Kết quả thu được tại class TestCart:

```
**************************CART************************
Ordered Items:
hust.soict.hedspi.aims.disc.DigitalVideoDisc@5ecddf8f
hust.soict.hedspi.aims.disc.DigitalVideoDisc@3f102e87
hust.soict.hedspi.aims.disc.DigitalVideoDisc@27abe2cd
Total cost: 63.89
****************************************************
```

Với chức năng tìm kiếm

- Id:

```
public void searchByID(int id)
{
    boolean found = false;
    for (int i = 0; i < qtyOrdered; i++)
    {
            if (itemsOrdered[i].getId() == id)
            {
                    System.out.println("Found" + itemsOrdered[i]);
                    found = true;
            }
    }
    if (found==false)
    {
            System.out.println("Sorry, no DVDs were found that match the ID provided!");
    }
}
```

- Title:

```
    public void searchByTitle(String keyword)
    {
        boolean matchFound = false;
        for (int i=0; i < qtyOrdered; i++)
        {
                if (itemsOrdered[i].isMatch(keyword))
                {
                        System.out.println("Found" + itemsOrdered[i]);
                        matchFound = true;
                }
        }
        if (matchFound == false)
        {
                System.out.println("Sorry, no DVDs were found with \"" + keyword +"\" in the title
        }
    }
```

Kết quả chạy được trên file TestCart:

```
Sorry, no DVDs were found that match the ID provided!
Foundhust.soict.hedspi.aims.disc.DigitalVideoDisc@27abe2cd
```

5. Implement the Store class

Tại class Store:

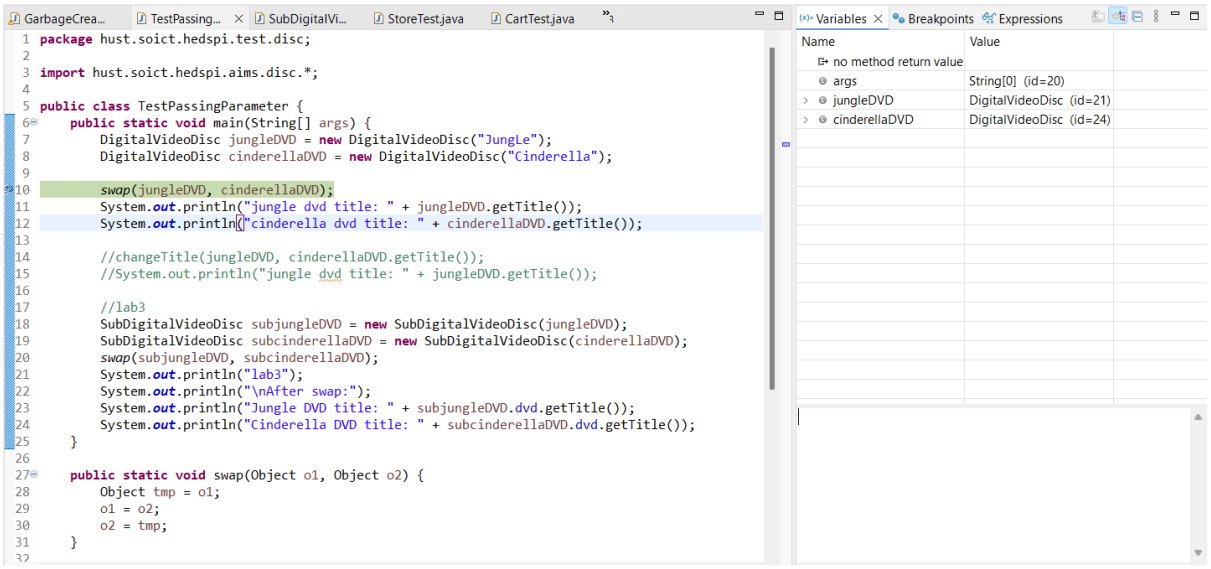
```
public void addDVD(DigitalVideoDisc dvd) {
        int index = itemsInStore.indexOf(dvd);
        if (index != -1) {
                System.out.println(dvd.getTitle() + " is already in the store.");
        } else {
                itemsInStore.add(dvd);
                System.out.println(dvd.getTitle() + " has been added to the store.");
        }
}

public void removeDVD(DigitalVideoDisc dvd) {
        boolean removed = itemsInStore.remove(dvd);
        if (removed) {
                System.out.println(dvd.getTitle() + " has been removed from the store.");
        } else {
                System.out.println(dvd.getTitle() + " is not found in the store.");
        }
}

public void print() {
        for (int i = 0; i < itemsInStore.size(); i++) {
                System.out.println((i + 1) + ". " + itemsInStore.get(i));
        }
}
```

Kết quả thu được khi chạy trên class StoreTest:

```
The Lion King has been added to the store.
Star Wars has been added to the store.
Aladin has been added to the store.
1. hust.soict.hedspi.aims.disc.DigitalVideoDisc@12f40c25
2. hust.soict.hedspi.aims.disc.DigitalVideoDisc@4fccd51b
3. hust.soict.hedspi.aims.disc.DigitalVideoDisc@44e81672
Aladin is already in the store.
Aladin has been removed from the store.
1. hust.soict.hedspi.aims.disc.DigitalVideoDisc@12f40c25
2. hust.soict.hedspi.aims.disc.DigitalVideoDisc@4fccd51b
Aladin has been added to the store.
1. hust.soict.hedspi.aims.disc.DigitalVideoDisc@12f40c25
2. hust.soict.hedspi.aims.disc.DigitalVideoDisc@4fccd51b
3. hust.soict.hedspi.aims.disc.DigitalVideoDisc@44e81672
```

II. Debug

Đặt breakpoint tại *swap*(jungleDVD, cinderellaDVD);



```
package hust.soict.hedspi.test.disc;

import hust.soict.hedspi.aims.disc.*;

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());

        //lab3
        SubDigitalVideoDisc subjungleDVD = new SubDigitalVideoDisc(jungleDVD);
        SubDigitalVideoDisc subcinderellaDVD = new SubDigitalVideoDisc(cinderellaDVD);
        swap(subjungleDVD, subcinderellaDVD);
        System.out.println("lab3");
        System.out.println("\nAfter swap:");
        System.out.println("Jungle DVD title: " + subjungleDVD.dvd.getTitle());
        System.out.println("Cinderella DVD title: " + subcinderellaDVD.dvd.getTitle());
    }

    public static void swap(Object o1, Object o2) {
        Object tmp = o1;
        o1 = o2;
        o2 = tmp;
    }
```

Variables | Breakpoints | Expressions

Name	Value
no method return value	
args	String[0] (id=20)
jungleDVD	DigitalVideoDisc (id=21)
cinderellaDVD	DigitalVideoDisc (id=24)

Thay đổi giá trị của jungleDVD:

jungleDVD	DigitalVideoDisc (id=22)
category	null
cost	0.0
director	null
id	0
lenght	0
title	"abc" (id=35)
cinderellaDVD	DigitalVideoDisc (id=25)
category	null
cost	0.0
director	null
id	1
lenght	0
title	"Cinderella" (id=26)

Kết quả thu được:

Console | Problems | Debug Shell

TestPassingParameter (1) [Java Application] C:\Users\A

```
jungle dvd title: abc
cinderella dvd title: Cinderella
```

III. UML Diagram

IV. Answer Question

1. Passing parameter

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

➔ Java is considered a pass-by-value language. When you pass variables to methods, Java passes a copy of the variable:
For primitive types, the actual value is copied.
For object references, a copy of the reference to the object is passed, not the object itself.
This means that while you can modify the object's internal state, you cannot change the reference to point to a different object.

2. **Passing parameter**

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

➔ The swap method defined in your code takes two parameters of type Object. When you pass jungleDVD and cinderellaDVD to this method, Java passes copies of the references to these objects. However, within the swap method, you are only swapping the copies of the references (i.e., o1 and o2), not the actual objects they point to. Therefore, after the method call, the original references (jungleDVD and cinderellaDVD) in the main method remain unchanged, and their titles stay the same.

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

➔ In the changeTitle method, you are passing jungleDVD as a parameter. Since DigitalVideoDisc is an object, the reference to the original object is passed by value (a copy of the reference). Inside the method, you change the title of the dvd object through dvd.setTitle(title), which modifies the original DigitalVideoDisc object that jungleDVD points to. The line dvd = new DigitalVideoDisc(oldTitle); creates a new DigitalVideoDisc object and assigns it to the local variable dvd. However, this change does not affect the jungleDVD reference in the main method, because the reference itself is still pointing to the original object. Thus, the title of jungleDVD is changed to the new title passed into the method, while the local variable dvd now points to a new object that does not affect the original reference.

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

- The return type of the toString() method is String.
- It provides a convenient way to display object information, which can be particularly useful for debugging and logging.