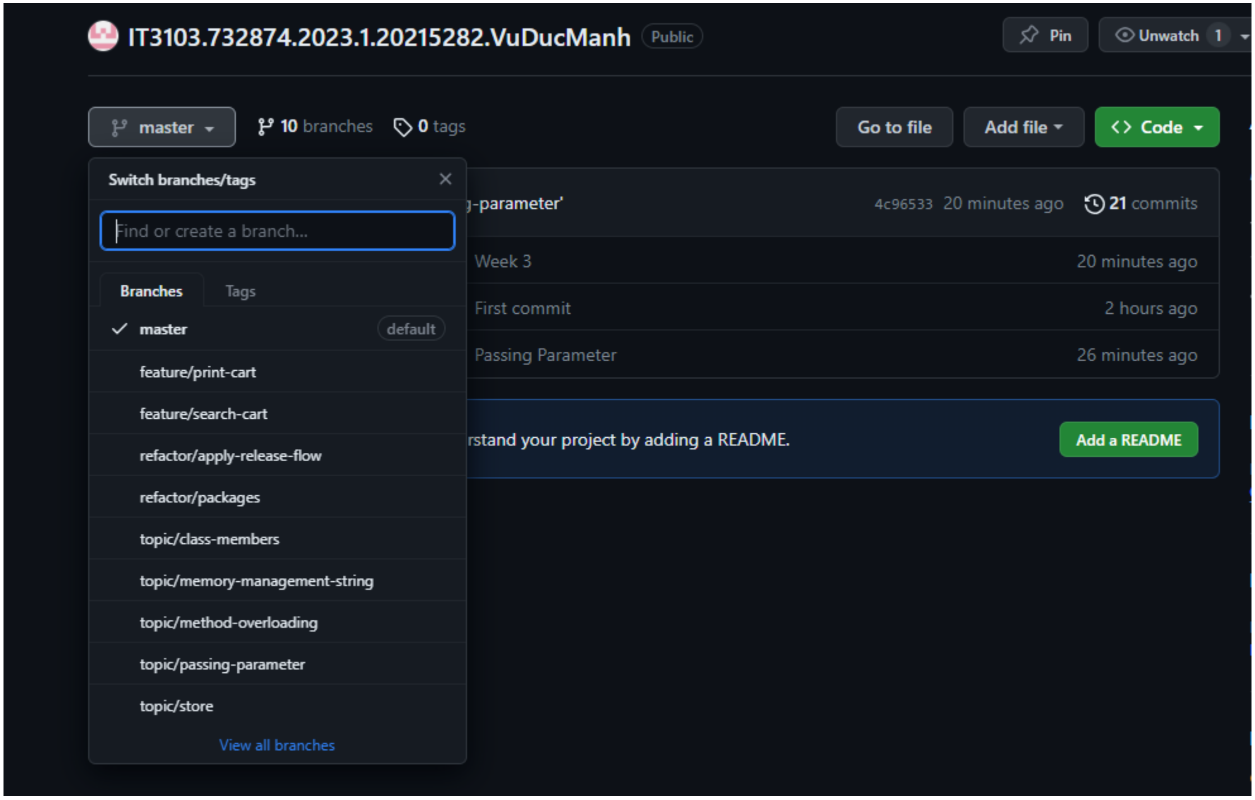
20215282 Vũ Đức Mạnh

BÁO CÁO THỰC HÀNH LAB 2
LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

Table of Contents

Table of figures

1. Các nhánh trong github



IT3103.732874.2023.1.20215282.VuDucManh Public

10 branches 0 tags

- master default
- feature/print-cart
- feature/search-cart
- refactor/apply-release-flow
- refactor/packages
- topic/class-members
- topic/memory-management-string
- topic/method-overloading
- topic/passing-parameter
- topic/store

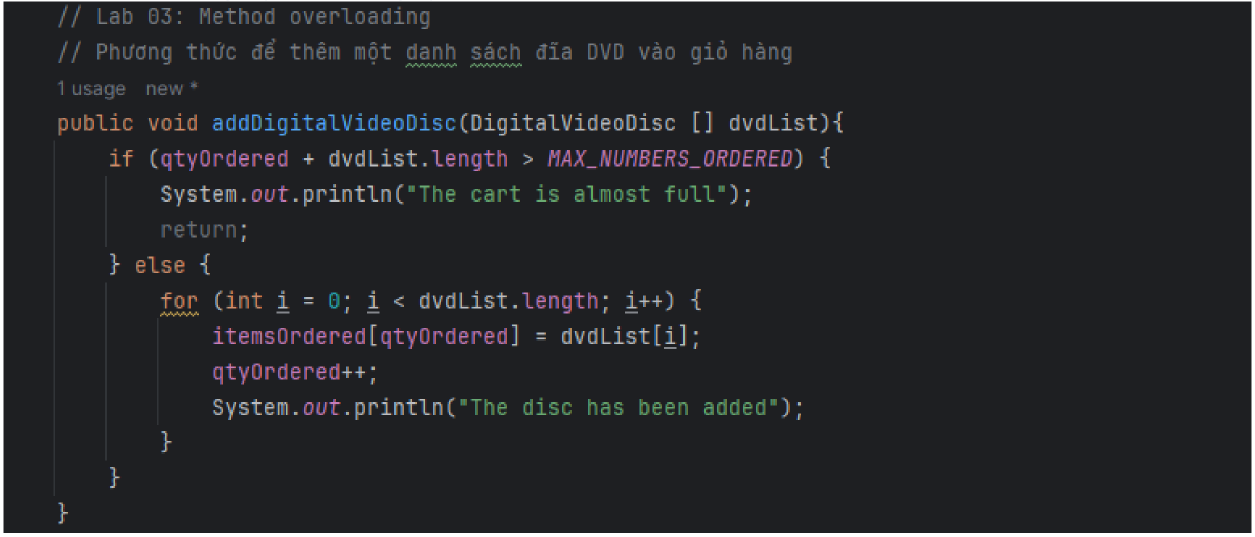
g-parameter'	4c96533 20 minutes ago 21 commits
Week 3	20 minutes ago
First commit	2 hours ago
Passing Parameter	26 minutes ago

rstand your project by adding a README.

Figure 1: Create some branches

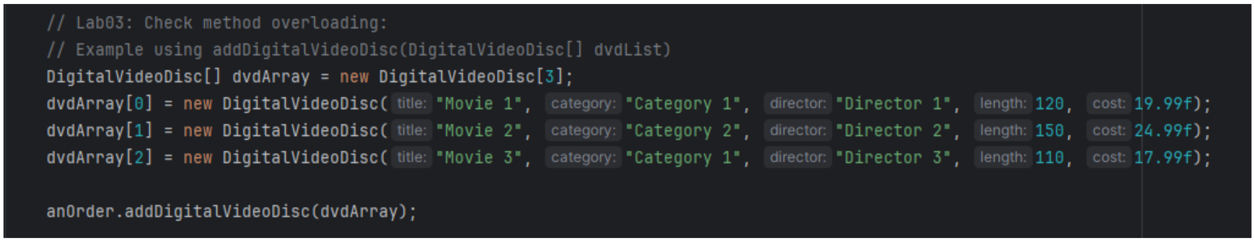
2. Working with method overloading

2.1. Overloading by differing types of parameters

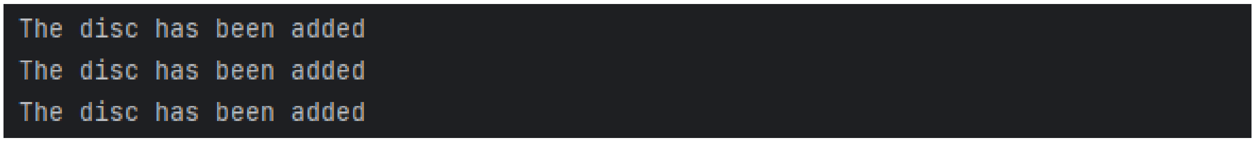


```java
// Lab 03: Method overloading
// Phương thức để thêm một danh sách đĩa DVD vào giỏ hàng
1 usage   new *
public void addDigitalVideoDisc(DigitalVideoDisc [] dvdList){
    if (qtyOrdered + dvdList.length > MAX_NUMBERS_ORDERED) {
        System.out.println("The cart is almost full");
        return;
    } else {
        for (int i = 0; i < dvdList.length; i++) {
            itemsOrdered[qtyOrdered] = dvdList[i];
            qtyOrdered++;
            System.out.println("The disc has been added");
        }
    }
}
```

Figure 2: Method to add a list DVD to cart.



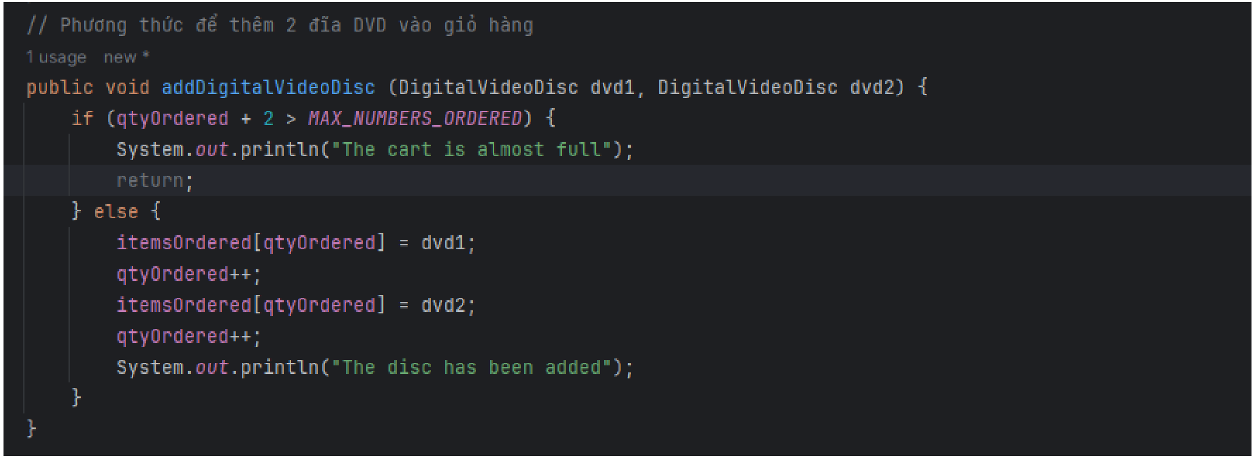
```
// Lab03: Check method overloading:
// Example using addDigitalVideoDisc(DigitalVideoDisc[] dvdList)
DigitalVideoDisc[] dvdArray = new DigitalVideoDisc[3];
dvdArray[0] = new DigitalVideoDisc( title: "Movie 1",  category: "Category 1",  director: "Director 1",  length: 120,  cost: 19.99f);
dvdArray[1] = new DigitalVideoDisc( title: "Movie 2",  category: "Category 2",  director: "Director 2",  length: 150,  cost: 24.99f);
dvdArray[2] = new DigitalVideoDisc( title: "Movie 3",  category: "Category 1",  director: "Director 3",  length: 110,  cost: 17.99f);

anOrder.addDigitalVideoDisc(dvdArray);
```



```
The disc has been added
The disc has been added
The disc has been added
```

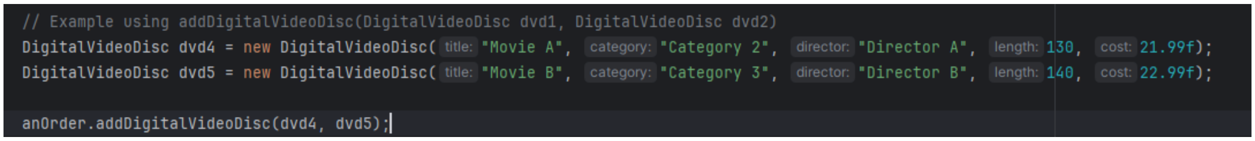
Figure 3: Check method to add a list DVD.

2.2. Overloading by differing the number of parameters.



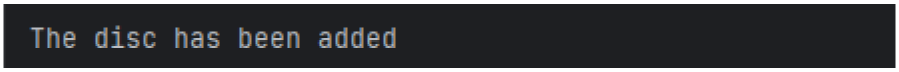
```
// Phương thức để thêm 2 đĩa DVD vào giỏ hàng
1 usage  new *
public void addDigitalVideoDisc (DigitalVideoDisc dvd1, DigitalVideoDisc dvd2) {
    if (qtyOrdered + 2 > MAX_NUMBERS_ORDERED) {
        System.out.println("The cart is almost full");
        return;
    } else {
        itemsOrdered[qtyOrdered] = dvd1;
        qtyOrdered++;
        itemsOrdered[qtyOrdered] = dvd2;
        qtyOrdered++;
        System.out.println("The disc has been added");
    }
}
```

Figure 4: Method to add 2 DVDs to cart.



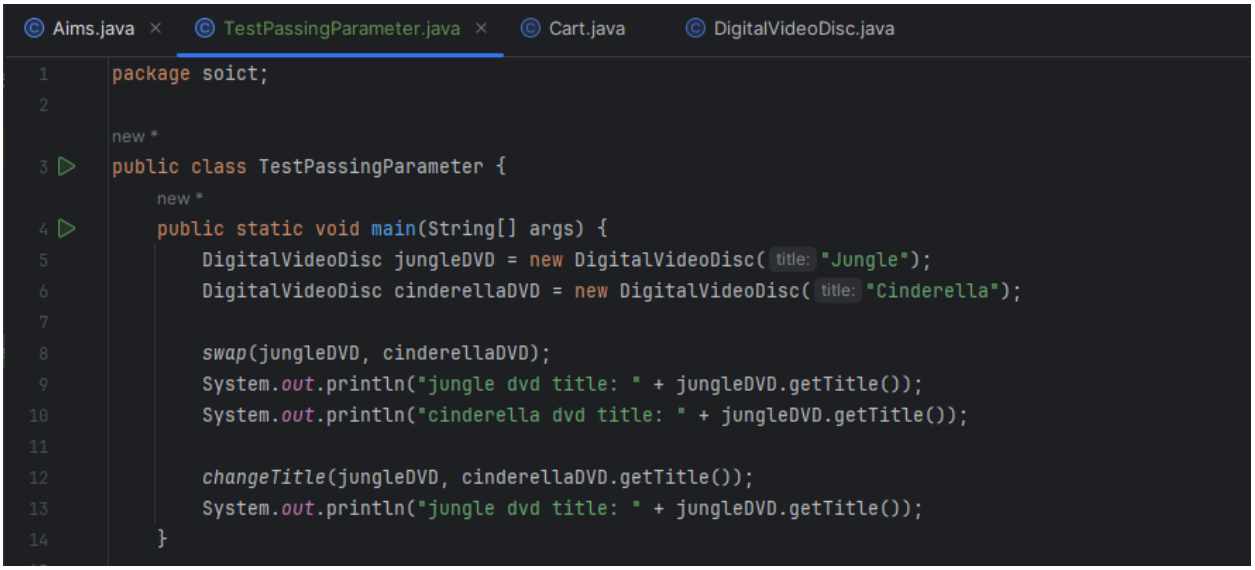
```
// Example using addDigitalVideoDisc(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2)
DigitalVideoDisc dvd4 = new DigitalVideoDisc( title: "Movie A",  category: "Category 2",  director: "Director A",  length: 130,  cost: 21.99f);
DigitalVideoDisc dvd5 = new DigitalVideoDisc( title: "Movie B",  category: "Category 3",  director: "Director B",  length: 140,  cost: 22.99f);

anOrder.addDigitalVideoDisc(dvd4, dvd5);
```

Figure 5: Check method to add 2 DVDs.



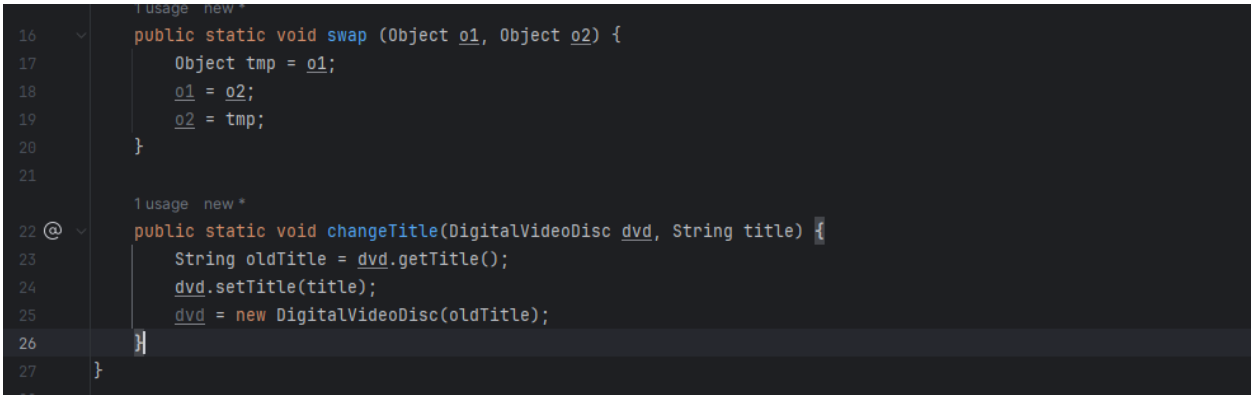
```
The disc has been added
```

3. Passing parameter



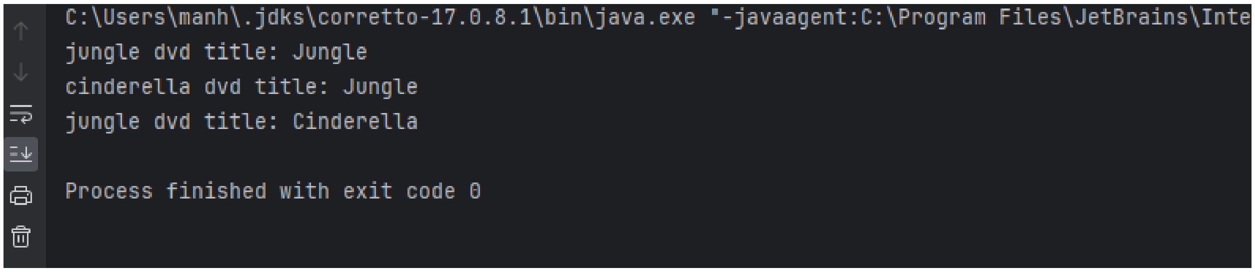
```java
package soict;

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: " + jungleDVD.getTitle());

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

Figure 6: Create java class named TestPassingParameter



```java
    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);
    }
}
```

Figure 7: Swap method and changeTitle method



```
C:\Users\manh\.jdks\corretto-17.0.8.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\Inte
jungle dvd title: Jungle
cinderella dvd title: Jungle
jungle dvd title: Cinderella

Process finished with exit code 0
```

Figure 8: Result for running TestPassingParameter

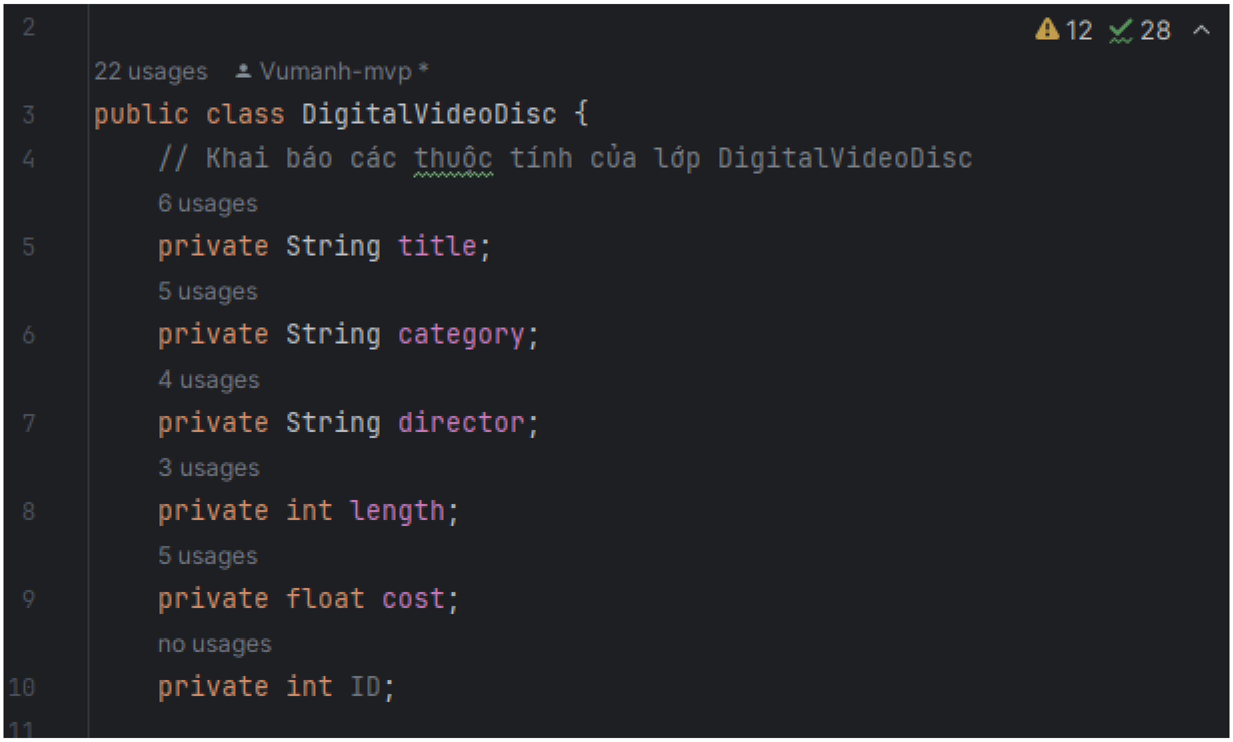
4. Use debug run

- Làm theo các bước trong hướng dẫn lab03:

- Setting, deleting & deactivate breakpoints
- Run in Debug mode

- Step Into, Step Over, Step Return, Resume
- Investigate value of variables
- Change value of variables

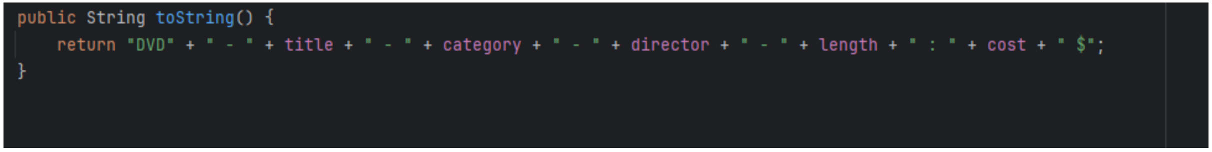
5. Classifier Member and Instance Member



```java
public class DigitalVideoDisc {
    // Khai báo các thuộc tính của lớp DigitalVideoDisc
    private String title;
    private String category;
    private String director;
    private int length;
    private float cost;
    private int ID;
```

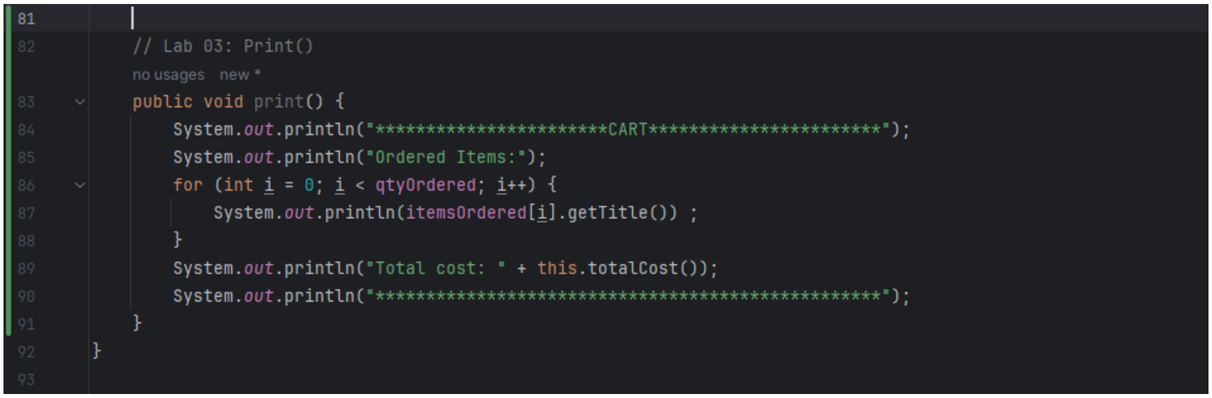
Figure 9: Create attrbute ID

6. Open the Cart class



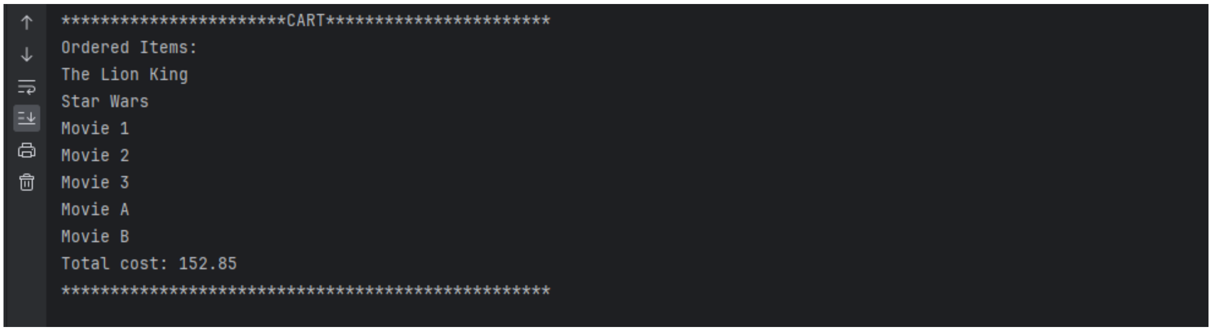
```java
public String toString() {
    return "DVD" + " - " + title + " - " + category + " - " + director + " - " + length + " : " + cost + " $";
}
```

Figure 10: Write a method toString()



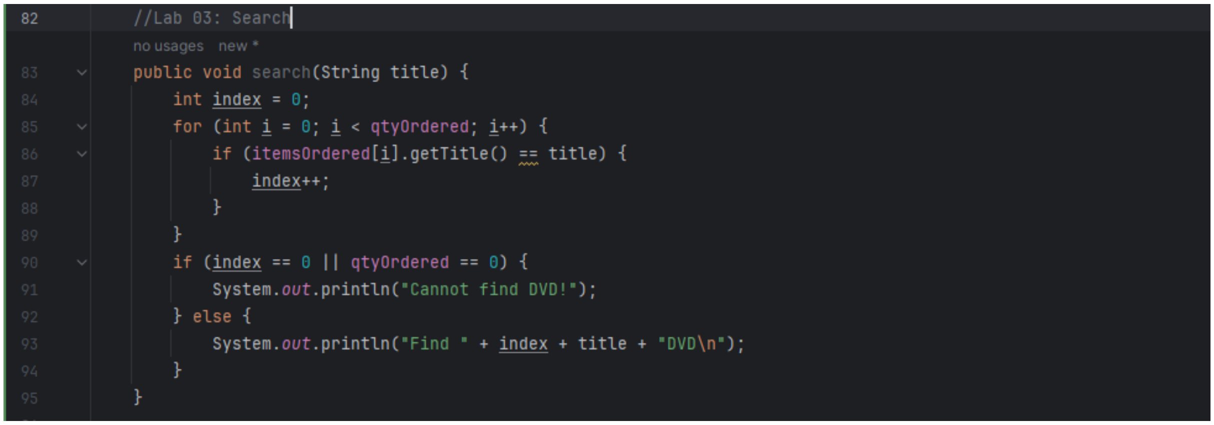
```java

    // Lab 03: Print()
    no usages   new *
    public void print() {
        System.out.println("***********************CART***********************");
        System.out.println("Ordered Items:");
        for (int i = 0; i < qtyOrdered; i++) {
            System.out.println(itemsOrdered[i].getTitle()) ;
        }
        System.out.println("Total cost: " + this.totalCost());
        System.out.println("**************************************************");
    }
}
```

Figure 11: Method to print



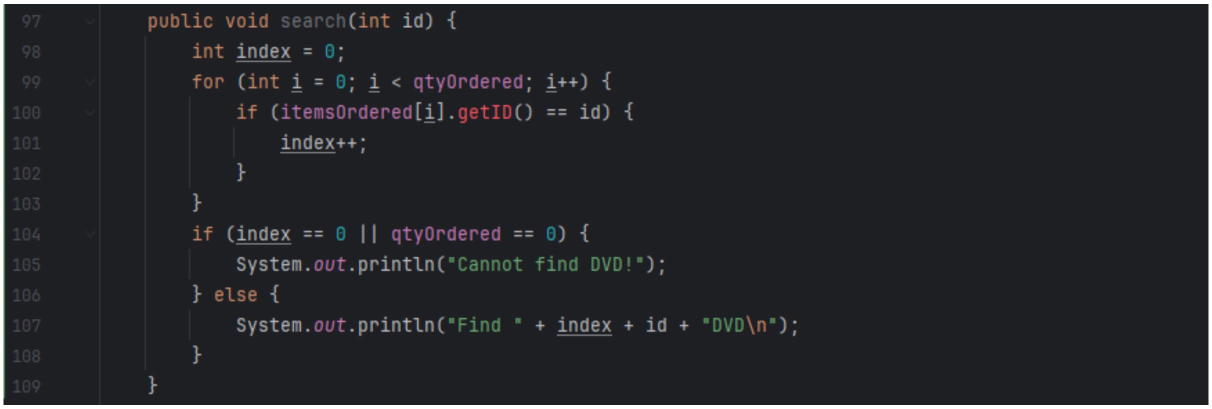
```
***********************CART***********************
Ordered Items:
The Lion King
Star Wars
Movie 1
Movie 2
Movie 3
Movie A
Movie B
Total cost: 152.85
**************************************************
```

Figure 12: Result for printing the cart



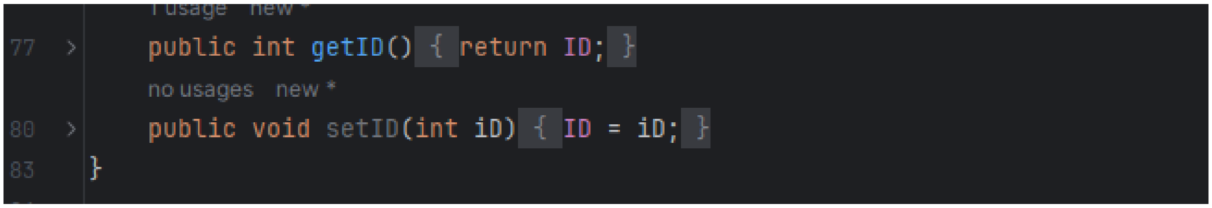
```java
    //Lab 03: Search
    no usages   new *
    public void search(String title) {
        int index = 0;
        for (int i = 0; i < qtyOrdered; i++) {
            if (itemsOrdered[i].getTitle() == title) {
                index++;
            }
        }
        if (index == 0 || qtyOrdered == 0) {
            System.out.println("Cannot find DVD!");
        } else {
            System.out.println("Find " + index + title + "DVD\n");
        }
    }
```

Figure 13: Method to search by title



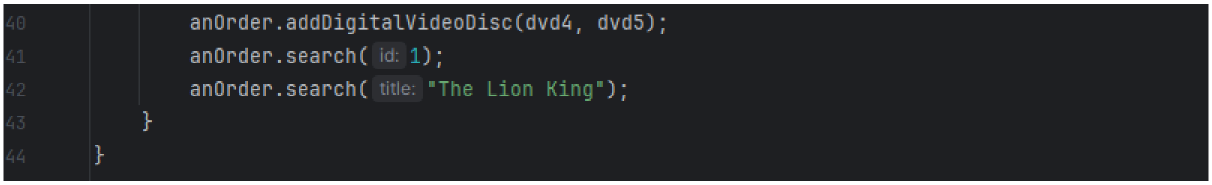
```
    public void search(int id) {
        int index = 0;
        for (int i = 0; i < qtyOrdered; i++) {
            if (itemsOrdered[i].getID() == id) {
                index++;
            }
        }
        if (index == 0 || qtyOrdered == 0) {
            System.out.println("Cannot find DVD!");
        } else {
            System.out.println("Find " + index + id + "DVD\n");
        }
    }
```

Figure 14: Method search by ID

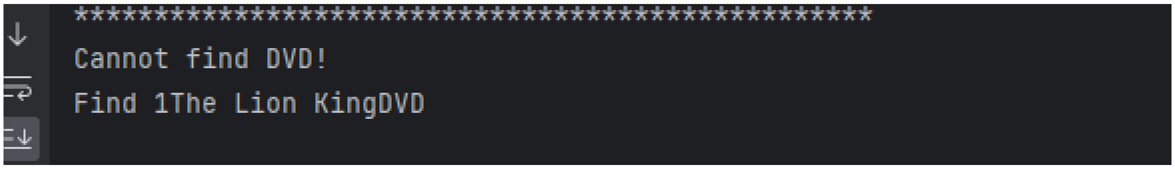


```
    1 usage  new *
    public int getID() { return ID; }
    no usages  new *
    public void setID(int iD) { ID = iD; }
}
```

Figure 15: Create getter and setter for ID

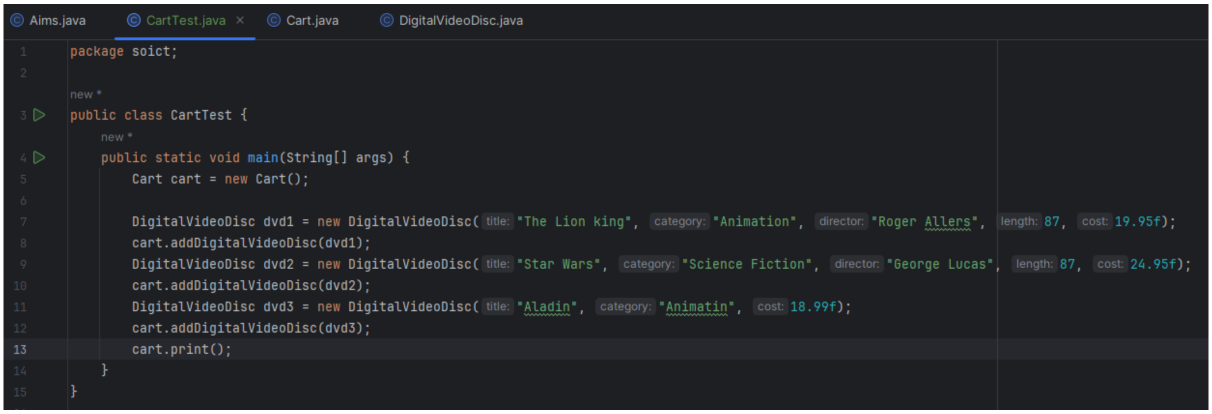


```
        anOrder.addDigitalVideoDisc(dvd4, dvd5);
        anOrder.search( id: 1);
        anOrder.search( title: "The Lion King");
    }
}
```



```
*************************************************
Cannot find DVD!
Find 1The Lion KingDVD
```

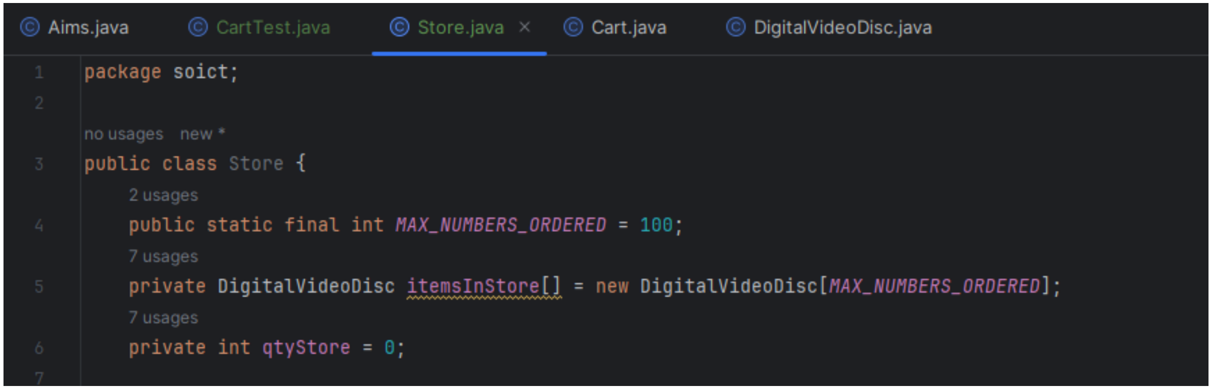
Figure 16: Result for finding DVD



```
package soict;

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: "Animatin",  cost: 18.99f);
        cart.addDigitalVideoDisc(dvd3);
        cart.print();
    }
}
```

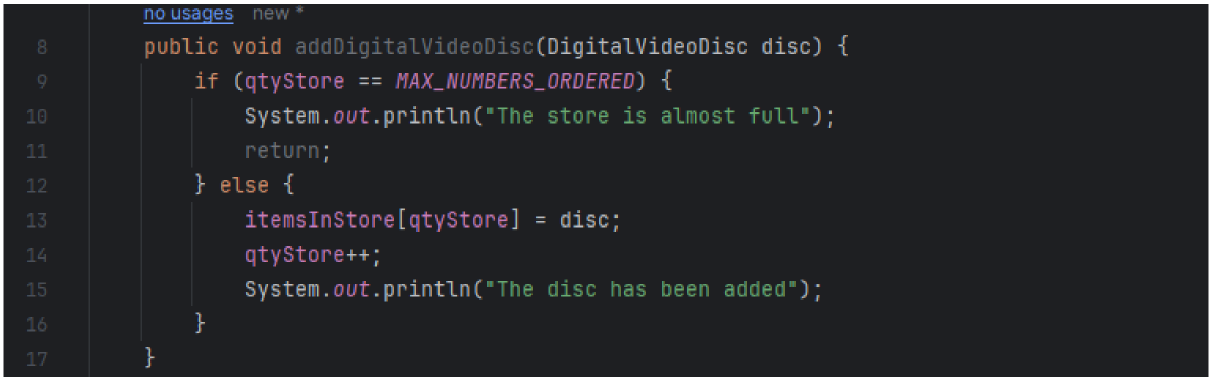
Figure 17: CartTest class

7. Implement the Store class



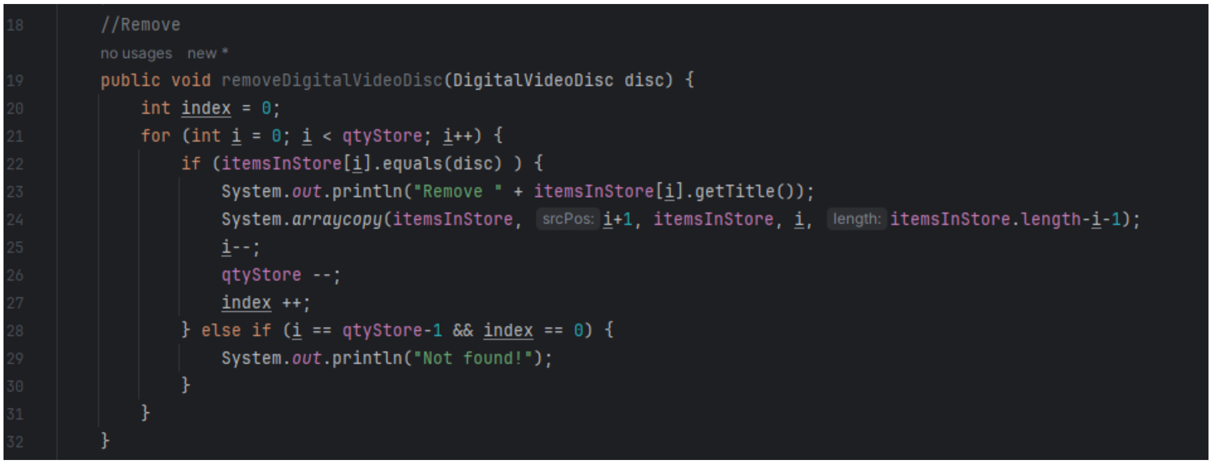
```java
package soict;

no usages   new *
public class Store {
    2 usages
    public static final int MAX_NUMBERS_ORDERED = 100;
    7 usages
    private DigitalVideoDisc itemsInStore[] = new DigitalVideoDisc[MAX_NUMBERS_ORDERED];
    7 usages
    private int qtyStore = 0;

```

Figure 18: Attribultes of the store class



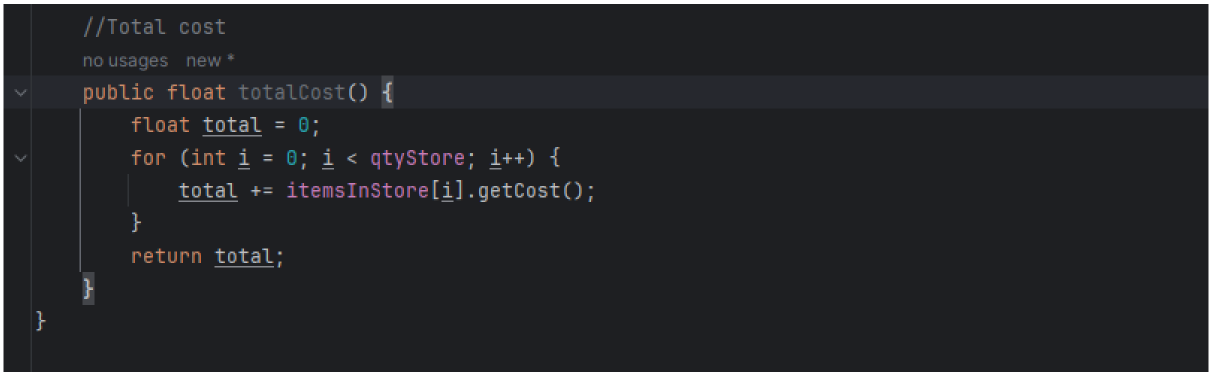
```java
    no usages   new *
    public void addDigitalVideoDisc(DigitalVideoDisc disc) {
        if (qtyStore == MAX_NUMBERS_ORDERED) {
            System.out.println("The store is almost full");
            return;
        } else {
            itemsInStore[qtyStore] = disc;
            qtyStore++;
            System.out.println("The disc has been added");
        }
    }
```

Figure 19: Method addDigitalVideoDisc



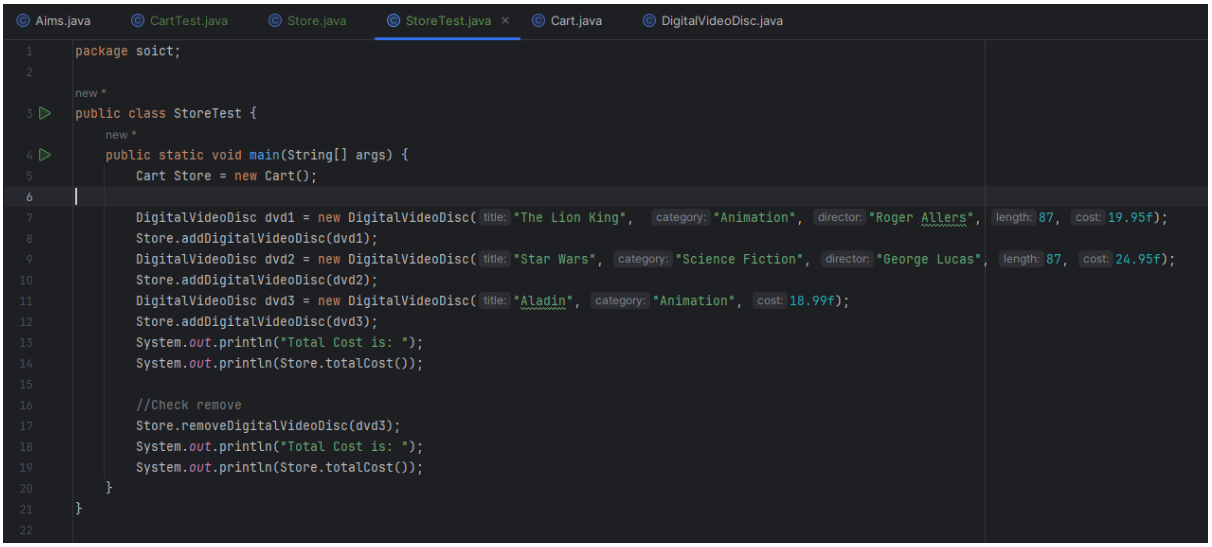
```java
    //Remove
    no usages   new *
    public void removeDigitalVideoDisc(DigitalVideoDisc disc) {
        int index = 0;
        for (int i = 0; i < qtyStore; i++) {
            if (itemsInStore[i].equals(disc) ) {
                System.out.println("Remove " + itemsInStore[i].getTitle());
                System.arraycopy(itemsInStore, srcPos: i+1, itemsInStore, i, length: itemsInStore.length-i-1);
                i--;
                qtyStore --;
                index ++;
            } else if (i == qtyStore-1 && index == 0) {
                System.out.println("Not found!");
            }
        }
    }
```

Figure 20: Method removeDigitalVideoDisc



```java
    //Total cost
    no usages   new *
    public float totalCost() {
        float total = 0;
        for (int i = 0; i < qtyStore; i++) {
            total += itemsInStore[i].getCost();
        }
        return total;
    }
}
```

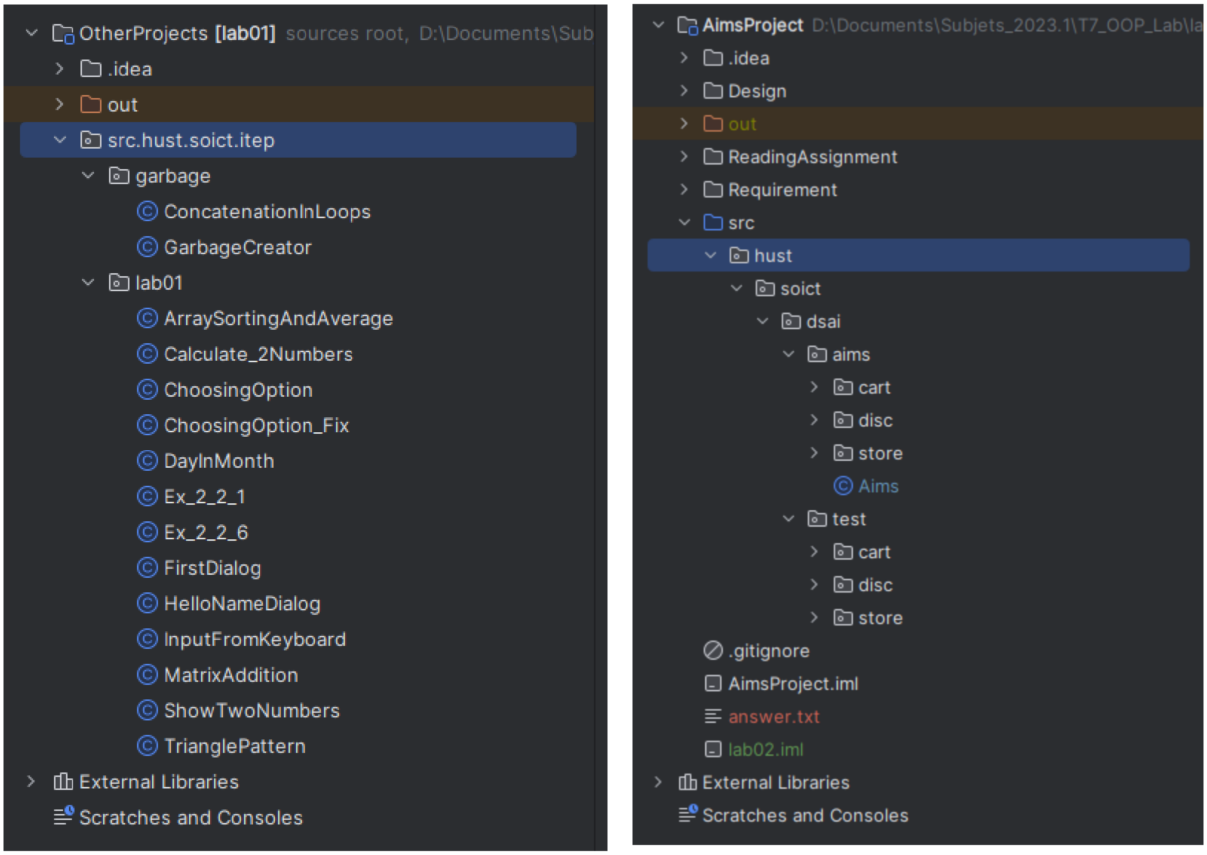
Figure 21: Method to caculate totalCost



```java
package soict;

new *
public class StoreTest {
    new *
    public static void main(String[] args) {
        Cart Store = new Cart();

        DigitalVideoDisc dvd1 = new DigitalVideoDisc( title: "The Lion King",  category: "Animation",  director: "Roger Allers",  length: 87,  cost: 19.95f);
        Store.addDigitalVideoDisc(dvd1);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc( title: "Star Wars",  category: "Science Fiction",  director: "George Lucas",  length: 87,  cost: 24.95f);
        Store.addDigitalVideoDisc(dvd2);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc( title: "Aladin",  category: "Animation",  cost: 18.99f);
        Store.addDigitalVideoDisc(dvd3);
        System.out.println("Total Cost is: ");
        System.out.println(Store.totalCost());

        //Check remove
        Store.removeDigitalVideoDisc(dvd3);
        System.out.println("Total Cost is: ");
        System.out.println(Store.totalCost());
    }
}
```

Figure 22: The StoreTest Class

8. Re-organize your projects

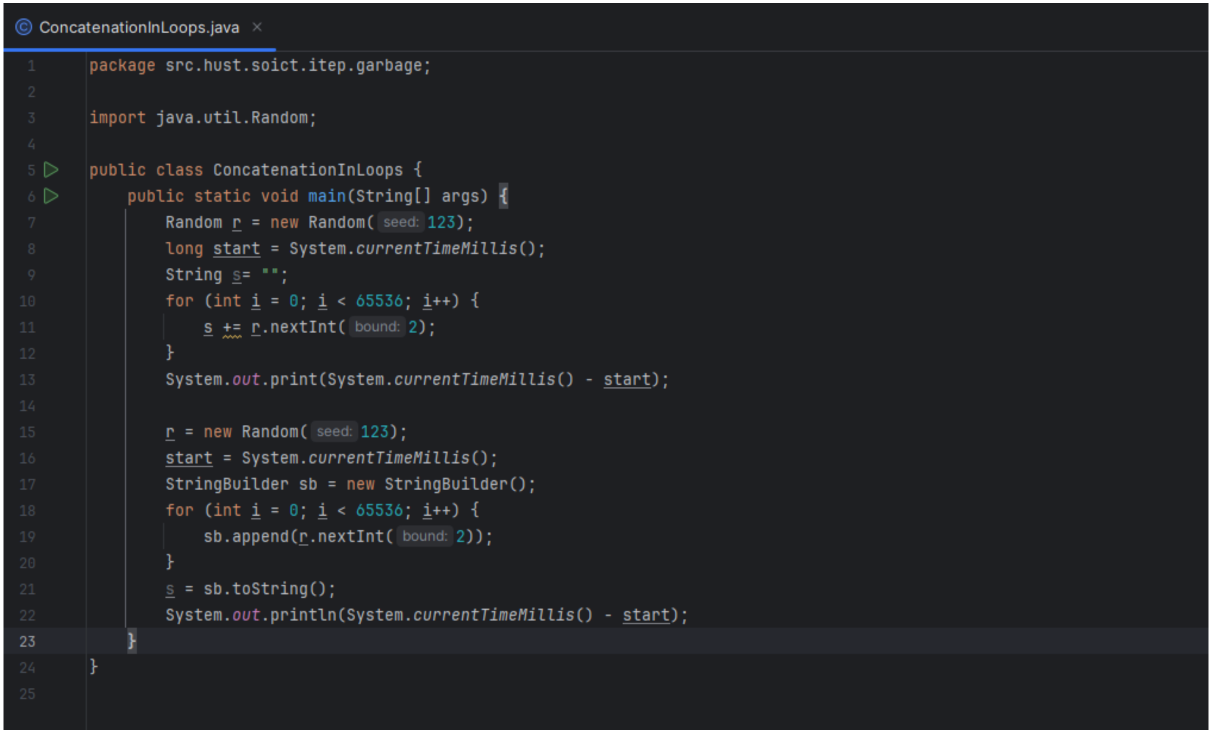


```
OtherProjects [lab01]  sources root,  D:\Documents\Sub
  .idea
  out
  src.hust.soict.itep
    garbage
      ConcatenationInLoops
      GarbageCreator
    lab01
      ArraySortingAndAverage
      Calculate_2Numbers
      ChoosingOption
      ChoosingOption_Fix
      DayInMonth
      Ex_2_2_1
      Ex_2_2_6
      FirstDialog
      HelloNameDialog
      InputFromKeyboard
      MatrixAddition
      ShowTwoNumbers
      TrianglePattern
External Libraries
Scratches and Consoles
```

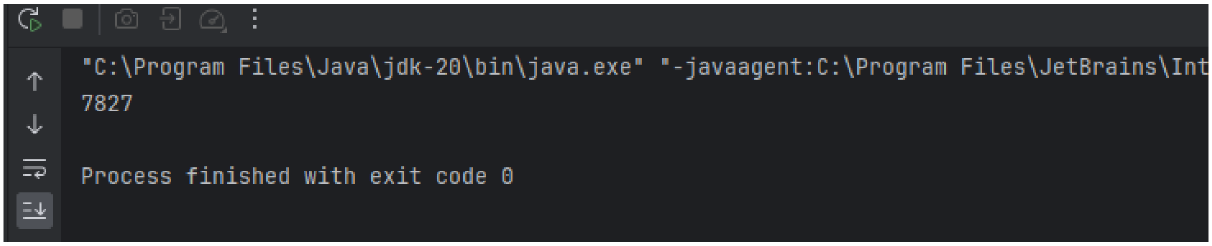
```
AimsProject  D:\Documents\Subjets_2023.1\T7_OOP_Lab\la
  .idea
  Design
  out
  ReadingAssignment
  Requirement
  src
    hust
      soict
        dsai
          aims
            cart
            disc
            store
            Aims
          test
            cart
            disc
            store
  .gitignore
  AimsProject.iml
  answer.txt
  lab02.iml
External Libraries
Scratches and Consoles
```

Figure 23: My project after reorganize

9. String, StringBuilder and StringBuffer

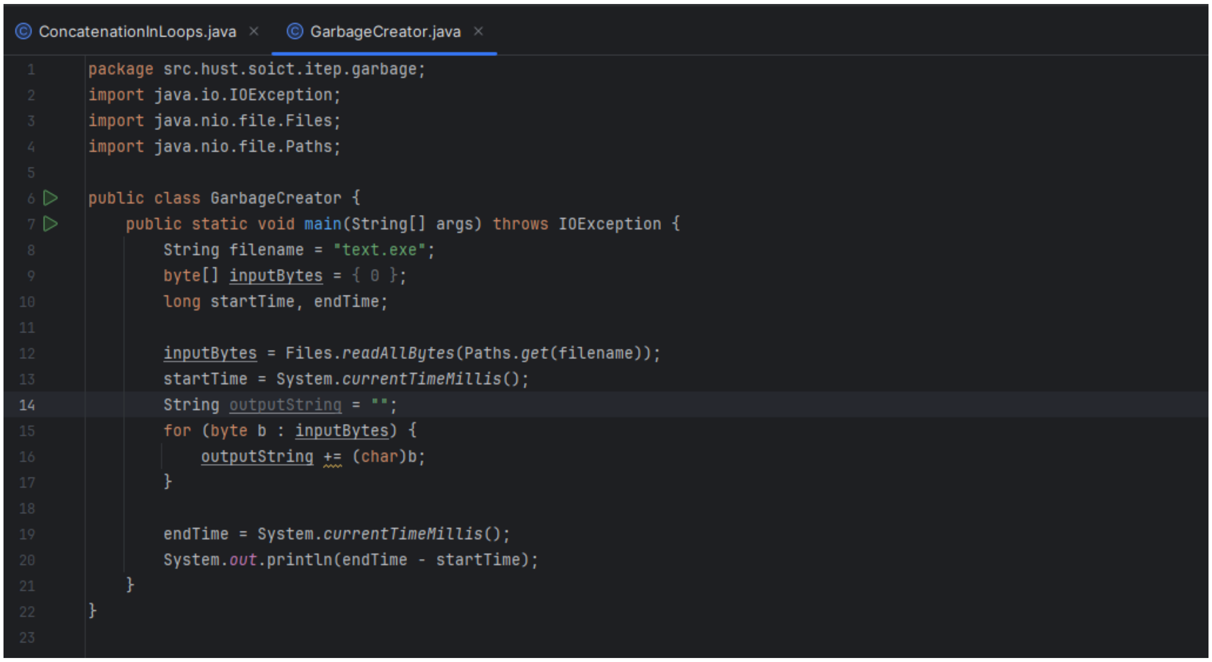


```java
package src.hust.soict.itep.garbage;

import java.util.Random;

public class ConcatenationInLoops {
    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.print(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);
    }
}
```

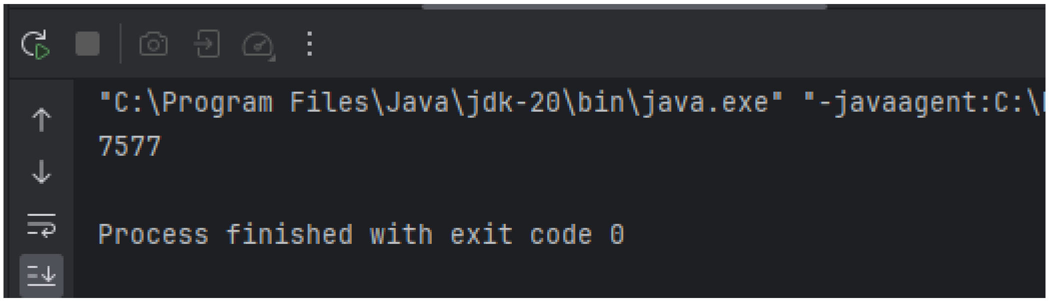


```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\Int
7827

Process finished with exit code 0
```

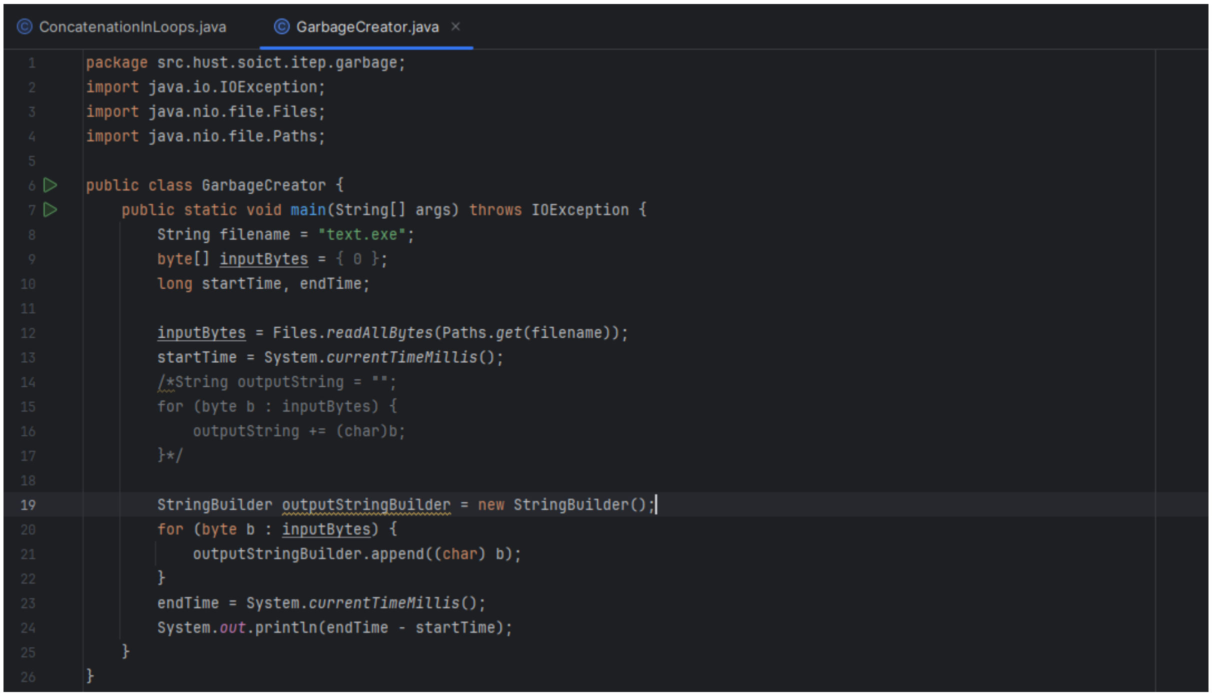
Figure 24: ConcatenationInLoops Class and result



```java
package src.hust.soict.itep.garbage;
import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Paths;

public class GarbageCreator {
    public static void main(String[] args) throws IOException {
        String filename = "text.exe";
        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);
    }
}
```



```
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\
7577

Process finished with exit code 0
```



```
package src.hust.soict.itep.garbage;
import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Paths;

public class GarbageCreator {
    public static void main(String[] args) throws IOException {
        String filename = "text.exe";
        byte[] inputBytes = { 0 };
        long startTime, endTime;

        inputBytes = Files.readAllBytes(Paths.get(filename));
        startTime = System.currentTimeMillis();
        /*String outputString = "";
        for (byte b : inputBytes) {
            outputString += (char)b;
        }*/

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

Figure 25: GaebageCreator Class, result and change code