

BÁO CÁO THỰC HÀNH LAB 03

THỰC HÀNH LẬP TRÌNH HƯỚNG ĐỐI TƯỢNG

Contents

1. Working with method overloading.....	2
1.1. Overloading by differing types of parameter	2
Code	2
Result.....	2
1.2. Overloading by differing the number of parameters	3
Code	3
Result.....	5
2. Passing parameter	6
Code	6
Result.....	6
3. Class Member and Instance Member.....	7
Code	7
Result.....	9
4. Open the Cart class.....	9
Code	9
Result.....	11
5. Implement the Store class.....	12
Code	12
Result.....	13
6. String, StringBuilder and StringBuffer.....	14
Code	14
Result.....	14
7 Class Diagram	16
Table of Figures	17

1. Working with method overloading

1.1. Overloading by differing types of parameters

Code

```
// thêm 1 list danh sách đĩa mới vào cart
// Overload
public void addDigitalVideoDisc(DigitalVideoDisc [] dvdList) { no usages
    for (DigitalVideoDisc disc : dvdList) {
        if (this.numberOfItemsOrdered == 0) {
            this.itemsOrdered[0] = disc;
            this.numberOfItemsOrdered++;
            System.out.println("Le Quang Khai - 20225638 - The disc " + disc.getTitle() + " has been added");
        } else if (this.numberOfItemsOrdered >= MAX_NUMBERS_ORDERED) {
            System.out.println("Le Quang Khai - 20225638 - The cart is full!!!");
        } else {
            this.itemsOrdered[this.numberOfItemsOrdered] = disc;
            this.numberOfItemsOrdered++;
            System.out.println("Le Quang Khai - 20225638 - The disc " + disc.getTitle() + " has been added");
        }
    }
}
```

Figure 1 Method addDigitalVideoDisc(DigitalVideoDisc [] dvdList)

```
public class Aims {
    public static void main(String[] args) {
        System.out.println("Lê Quang Khải - 20225638");
        Cart anOrder = new Cart();
        // Create new dvd objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc(
            title: "Your Name", category: "Animation", director: "Roger Allers", length: 87, cost: 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc(
            title: "Smile", category: "Science Fiction", director: "George Lucas", length: 87, cost: 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc(
            category: "Animation", title: "Inside Out", cost: 18.99f);
        DigitalVideoDisc[] dvdList = {dvd1, dvd2, dvd3};
        anOrder.addDigitalVideoDisc(dvdList);
        anOrder.printAllDisc();
    }
}
```

Figure 2 Aims Class

Result

```

"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ
Lê Quang Khải - 20225638
Le Quang Khai - 20225638 - The disc Your Name has been added
Le Quang Khai - 20225638 - The disc Smile has been added
Le Quang Khai - 20225638 - The disc Inside Out has been added

-----CART-----
Ordered Items:
1. Your Name
2. Smile
3. Inside Out
Total cost: 63.89 $
-----

Process finished with exit code 0

```

Figure 3 Result

1.2. Overloading by differing the number of parameters

Code

```

public class Cart { 2 usages
    //Overload voi 2 tham so dau vao
    public void addDigitalVideoDisc(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2) { no usages
        if (this.numberOfItemsOrdered == 0) {
            this.itemsOrdered[0] = dvd1;
            this.numberOfItemsOrdered++;
            System.out.println("Le Quang Khai - 20225638 - The disc " + dvd1.getTitle() + " has been added");

            // Check if there is space for the second disc
            if (this.numberOfItemsOrdered < MAX_NUMBERS_ORDERED) {
                this.itemsOrdered[this.numberOfItemsOrdered] = dvd2;
                this.numberOfItemsOrdered++;
                System.out.println("Le Quang Khai - 20225638 - The disc " + dvd2.getTitle() + " has been added");
            } else {
                System.out.println("Le Quang Khai - 20225638 - The cart is full!!!");
            }
        }
        else if (this.numberOfItemsOrdered >= MAX_NUMBERS_ORDERED) {
            System.out.println("Le Quang Khai - 20225638 - The cart is full!!!");
        }
        else {
            this.itemsOrdered[this.numberOfItemsOrdered] = dvd1;
            this.numberOfItemsOrdered++;
            System.out.println("Le Quang Khai - 20225638 - The disc " + dvd1.getTitle() + " has been added");

            // Check if there is space for the second disc
            if (this.numberOfItemsOrdered < MAX_NUMBERS_ORDERED) {
                this.itemsOrdered[this.numberOfItemsOrdered] = dvd2;
                this.numberOfItemsOrdered++;
                System.out.println("Le Quang Khai - 20225638 - The disc " + dvd2.getTitle() + " has been added");
            } else {
                System.out.println("Le Quang Khai - 20225638 - The cart is full!!!");
            }
        }
    }
}

```

Figure 4 Method addDigitalVideoDisc(DigitalVideoDisc [] dvdList)

```
public class Aims {
    public static void main(String[] args) {
        System.out.println("Lê Quang Khải - 20225638");
        Cart anOrder = new Cart();
        // Create new dvd objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc(
            title: "Your Name", category: "Animation", director: "Roger Allers", length: 87, cost: 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc(
            title: "Smile", category: "Science Fiction", director: "George Lucas", length: 87, cost: 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc(
            category: "Animation", title: "Inside Out", cost: 18.99f);
        // DigitalVideoDisc[] dvdList = {dvd1, dvd2, dvd3};
        // anOrder.addDigitalVideoDisc(dvdList);
        anOrder.addDigitalVideoDisc(dvd1, dvd2);
        anOrder.printAllDisc();
    }
}
```

Figure 5 Aims Class

Result

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\Jet
Lê Quang Khải - 20225638
Le Quang Khai - 20225638 - The disc Your Name has been added
Le Quang Khai - 20225638 - The disc Smile has been added

-----CART-----
Ordered Items:
1. Your Name
2. Smile
Total cost: 44.9 $
-----

Process finished with exit code 0
```

Figure 6 Result

2. Passing parameter

Trả lời câu hỏi:

Sau khi gọi `swap(jungleDVD, cinderellaDVD)`, tiêu đề của 2 đối tượng vẫn giữ nguyên bởi vì trong java, các phương thức được truyền vào với các tham số truyền tham trị, tức là chỉ truyền vào đó bản sao của các đối tượng sẵn có, nên chúng không ảnh hưởng gì đến những đặc tính sẵn có của đối tượng đó.

Sau khi gọi `changeTitle(jungleDVD, cinderellaDVD.getTitle())`, tiêu đề của `jungleDVD` bị thay đổi bởi vì method này thực hiện gọi method `setTitle()`, tức là sẽ thay đổi tiêu đề của nó. Bên dưới là một phép gán, tuy nhiên trong java chỉ là phép gán trên bản sao nên không làm ảnh hưởng đến những thuộc tính vốn có của đối tượng

-Kết luận: Java luôn truyền tham trị cho các hàm sử dụng ngôn ngữ này để lập trình (pass value programming)

Code

Chưa thay đổi

```
// Lê Quang Khải - 20225638

public class TestPassingParameter {

    public static void main(String[] args) {

        DigitalVideoDisc jungleDVD = new DigitalVideoDisc( title: "Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc( title: "Cinderella");
        System.out.println("Sau khi swap\n");
        swap(jungleDVD, cinderellaDVD);

        System.out.println("Jungle title: " + jungleDVD.getTitle()+"\n");
        System.out.println("Cinderella title: " + cinderellaDVD.getTitle()+"\n");

        System.out.println("Sau khi gọi change title\n");
        changeTitle(jungleDVD, cinderellaDVD.getTitle());
        System.out.println("Jungle title: " + jungleDVD.getTitle()+"\n");
    }
}
```

```
public static void swap(Object o1, Object o2) { 1 usage
    Object tmp=o1;
    o1=o2;
    o2=tmp;
}

public static void changeTitle(DigitalVideoDisc disc, String title) { 1 usage
    String oldTitle = disc.getTitle();
    disc.setTitle(title);
    disc = new DigitalVideoDisc(oldTitle);
}
```

Đã thay đổi:

```
public class TestPassingParameter {  
    public static void main(String[] args) {  
        DigitalVideoDisc jungleDVD = new DigitalVideoDisc( title: "Jungle");  
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc( title: "Cinderella");  
        System.out.println("Sau khi swap\n");  
        swap(jungleDVD, cinderellaDVD);  
  
        System.out.println("Jungle title: " + jungleDVD.getTitle()+"\n");  
        System.out.println("Cinderella title: " + cinderellaDVD.getTitle()+"\n");  
  
        // Sau khi goi change title\n        // changeTitle(jungleDVD, cinderellaDVD.getTitle());  
        System.out.println("Jungle title: " + jungleDVD.getTitle()+"\n");  
        // Le Quang Khai - 20225638  
        System.out.println("Sau khi goi ham correct swap\n");  
        correctSwap(jungleDVD, cinderellaDVD);  
  
        System.out.println("Jungle title: " + jungleDVD.getTitle()+"\n");  
        System.out.println("Cinderella title: " + cinderellaDVD.getTitle()+"\n");  
    }  
}
```

```
//correct swap  
public static void correctSwap(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2) { 1 usage  
    String oldTitle = dvd1.getTitle();  
    dvd1.setTitle(dvd2.getTitle());  
    dvd2.setTitle(oldTitle);  
}
```

Figure 7 Passing parameter code

Result

```
Sau khi swap  
  
Jungle title: Jungle  
  
Cinderella title: Cinderella  
  
Sau khi goi change title  
  
Jungle title: Cinderella
```

```
Sau khi goi ham correct swap  
  
Jungle title: Cinderella  
  
Cinderella title: Jungle
```

Figure 8 Passing parameter result

3. Class Member and Instance Member Code

```
// Lê Quang Khải 20225638

public class DigitalVideoDisc { 23 usages  📌 KhaiLe190904 *

    private static int nbDigitalVideoDiscs = 0; 4 usages
    private int id; 4 usages
    private String title; 6 usages
    private String category; 4 usages
    private String director; 3 usages
    private int length; 2 usages
    private float cost; 4 usages

    public void setTitle(String title) { 3 usages  📌 KhaiLe190904
        this.title = title;
    }

    public String getTitle() { 21 usages  📌 KhaiLe190904
        return title;
    }

    public String getCategory() { return category; }

    public String getDirector() { return director; }

    public int getLength() { return length; }
```

```
public class DigitalVideoDisc { 23 usages  📌 KhaiLe190904 *
    public DigitalVideoDisc(String title) { 3 usages  📌 KhaiLe190904 *
        this.title = title;
        this.id = ++nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String category, String title, float cost) { 1 usage  📌 KhaiLe190904 *
        this.category = category;
        this.title = title;
        this.cost = cost;
        this.id = ++nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String director, String category, String title, float cost) { no usages  📌 KhaiLe190904 *
        this.director = director;
        this.category = category;
        this.title = title;
        this.cost = cost;
        this.id = ++nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String title, String category, String director, int length, float cost) { 2 usages  📌 Khai
        this.title = title;
        this.category = category;
        this.director = director;
        this.length = length;
```

```

        this.category = category;
        this.title = title;
        this.cost = cost;
        this.id = ++nbDigitalVideoDiscs;
    }

    public DigitalVideoDisc(String title, String category, String director, int length, float cost) { 2 usages
        this.title = title;
        this.category = category;
        this.director = director;
        this.length = length;
        this.cost = cost;
        this.id = ++nbDigitalVideoDiscs;
    }

    public boolean equals(DigitalVideoDisc disc) { return this.getTitle() == disc.getTitle(); }
}

```

Figure 9 Class member and Instance member

Result

The screenshot shows the IntelliJ IDEA IDE with the following components:

- Project View:** Shows the project structure with folders like .idea, Design, out, Report, Requirement, and src. The src folder contains files Aims, Cart, DigitalVideoDisc, and TestPassingParamet.
- Code Editor:** Displays the Aims.java file with the following code:


```

public class Aims {
    public static void main(String[] args) {
        Cart anOrder = new Cart();
        // Create new dvd objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc(
            title: "Your Name", category: "Animation", director: "Roger Allers", length: 87, cost: 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc(
            title: "Smile", category: "Science Fiction", director: "George Lucas", length: 87, cost: 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc(
            category: "Animation", title: "Inside Out", cost: 18.99f);
        DigitalVideoDisc[] dvdList = {dvd1, dvd2, dvd3};
        anOrder.addDigitalVideoDisc(dvdList);
        anOrder.addDigitalVideoDisc(dvd1, dvd2);
        anOrder.printAllDisc();
        System.out.println("Id of dvd1: " + dvd1.getId());
        System.out.println("Id of dvd2: " + dvd2.getId());
        System.out.println("Id of dvd3: " + dvd3.getId());
    }
}

```
- Run Console:** Shows the execution output:


```

"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2024.1.1\lib\idea_rt.jar=2353:C:\Pro
Lê Quang Khải - 20225638
Id of dvd1: 1
Id of dvd2: 2
Id of dvd3: 3

```

Figure 10 Result

4. Open the Cart class

Code

```
//Method toString
public String toString(){ new *
    return String.format("DVD - %s - %s - %s -%d : %.2f $",title, category, director, length, cost);
}
```

```
// In ra toàn bộ thông tin về cart gồm các đĩa trong cart và tổng tiền
public void printAllDisc() { 1 usage  🧑 KhaiLe190904 *
    System.out.println("\n*****CART*****");
    System.out.println("Ordered Items:");
    for (int i = 0; i < this.numberOfItemsOrdered ; i++) {
        System.out.println((i + 1) + ". " + this.itemsOrdered[i].toString());
    }
    System.out.println("Total cost: " + totalCost() + " $");
    System.out.println("*****");
}
```

Figure 11 Code method to print the content in Cart

```
// Search Cart by id
public DigitalVideoDisc searchById(int id) { 1 usage new *
    for (int i = 0; i < this.numberOfItemsOrdered; ++i) {
        if (this.itemsOrdered[i].getId() == id) {
            return this.itemsOrdered[i];
        }
    }
    return null;
}
```

Figure 12 Code method search by id

```
// Search Cart by title
public DigitalVideoDisc searchByTitle(String title) { 1 usage new *
    for (int i = 0; i < this.numberOfItemsOrdered; ++i) {
        if (this.itemsOrdered[i].getTitle().equals(title)) {
            return this.itemsOrdered[i];
        }
    }
    return null;
}
```

Figure 13 Code method search by title

```
public boolean isMatch(String title) { 1 usage new *
    if (title == null || this.title == null) {
        return false; // Prevent null pointer exceptions
    }
    return this.title.toLowerCase().contains(title.toLowerCase());
}
```

Figure 14 IsMatch() in DigitalVideoDisc class

```

public class CartTest {
    // KhaiLe190904 *
    public static void main(String[] args) {
        // KhaiLe190904 *
        System.out.println("Lê Quang Khải - 20225638");
        Cart cart = new Cart();
        // Create new dvd objects and add them to the cart
        DigitalVideoDisc dvd1 = new DigitalVideoDisc(
            title: "Your Name", category: "Animation", director: "Roger Allers", length: 87, cost: 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc(
            title: "Smile", category: "Science Fiction", director: "George Lucas", length: 87, cost: 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc(
            category: "Animation", title: "Inside Out", cost: 18.99f);
        cart.addDigitalVideoDisc(dvd1, dvd2);
        // System.out.println("Id of dvd1: " + dvd1.getId());
        // System.out.println("Id of dvd2: " + dvd2.getId());
        // System.out.println("Id of dvd3: " + dvd3.getId());
        DigitalVideoDisc[] dvdList = {dvd1, dvd2, dvd3};
        cart.addDigitalVideoDisc(dvdList);

        // print
        cart.printAllDisc();
        // search by id
        DigitalVideoDisc dvd4 = cart.searchById(1);
        if(dvd4 == null){
            System.out.println("Không tìm thấy id của dvd");
        } else System.out.println("Search by id: " + dvd4.toString());

        // search by title
        DigitalVideoDisc dvd5 = cart.searchByTitle("Smile");
        if(dvd5 == null){
            System.out.println("Không tìm thấy title nào phù hợp");
        } else System.out.println("Search by title: " + dvd5.toString());

        System.out.println(dvd4.isMatch( title: "your"));
    }
}

```

Figure 15 CartTest class

Result

```

Le Quang Khai - 20225638 - The disc Your Name has been added
Le Quang Khai - 20225638 - The disc Smile has been added
Le Quang Khai - 20225638 - The disc Inside Out has been added

*****CART*****
Ordered Items:
1. DVD - Your Name - Animation - Roger Allers - 87 minutes : 19.95 $
2. DVD - Smile - Science Fiction - George Lucas - 87 minutes : 24.95 $
3. DVD - Inside Out - Animation - null - 0 minutes : 18.99 $
Total cost: 63.89 $

*****
Search by id: DVD - Your Name - Animation - Roger Allers - 87 minutes : 19.95 $
Search by title: DVD - Smile - Science Fiction - George Lucas - 87 minutes : 24.95 $
true

```

Figure 16 Result

5. Implement the Store class

Code

```
// Le Quang Khai 20225638

import java.util.ArrayList;
import java.util.List;

public class Store { 2 usages
    private List<DigitalVideoDisc> itemsInStore; 6 usages

    // Constructor
    public Store() { 1 usage
        itemsInStore = new ArrayList<>();
    }

    // Method to add a DVD to the store
    public void addDVD(DigitalVideoDisc dvd) { 4 usages
        if (dvd == null) {
            System.out.println("Cannot add a null DVD to the store.");
            return;
        }
        itemsInStore.add(dvd);
        System.out.println("Le Quang Khai - 20225638 - Added DVD: " + dvd.getTitle());
    }
}
```

```
// Method to remove a DVD from the store
public void removeDVD(DigitalVideoDisc dvd) { 2 usages
    if (dvd == null || !itemsInStore.contains(dvd)) {
        System.out.println("DVD not found in the store.");
        return;
    }
    itemsInStore.remove(dvd);
    System.out.println("Le Quang Khai - 20225638 - Removed DVD: " + dvd.getTitle());
}

// Method to display all DVDs in the store
public void displayStore() { 2 usages
    System.out.println("\nLe Quang Khai - 20225638 - Current DVDs in Store:");
    if (itemsInStore.isEmpty()) {
        System.out.println("The store is empty.");
    } else {
        for (DigitalVideoDisc dvd : itemsInStore) {
            System.out.println(dvd);
        }
    }
}
}
```

Figure 17 Store Class

```
// Le Quang Khai - 20225638
public class StoreTest {
    public static void main(String[] args) {
        Store store = new Store();
        // Create some DVDs
        DigitalVideoDisc dvd1 = new DigitalVideoDisc(
            title: "Your Name", category: "Animation", director: "Roger Allers", length: 87, cost: 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc(
            title: "Smile", category: "Science Fiction", director: "George Lucas", length: 87, cost: 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc(
            title: "Inside Out", category: "Animation", director: "Le Quang Khai", length: 100, cost: 18.99f);
        DigitalVideoDisc dvd4 = new DigitalVideoDisc(
            title: "Inception", category: "Action", director: "Christopher Nolan", length: 148, cost: 29.95f);
        // Test addDVD
        store.addDVD(dvd1);
        store.addDVD(dvd2);
        store.addDVD(dvd3);
        store.addDVD(dvd4);
        // Display store items
        store.displayStore();
        // Test removeDVD
        store.removeDVD(dvd2);
        // Display store items again
        store.displayStore();
        // Test removing a DVD not in store
        store.removeDVD(dvd2);
    }
}
```

Figure 18 StoreTest class

Result

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:C:\Program Files\JetBrains
Le Quang Khai - 20225638 - Added DVD: Your Name
Le Quang Khai - 20225638 - Added DVD: Smile
Le Quang Khai - 20225638 - Added DVD: Inside Out
Le Quang Khai - 20225638 - Added DVD: Inception

Le Quang Khai - 20225638 - Current DVDs in Store:
DVD - Your Name - Animation - Roger Allers - 87 minutes : 19.95 $
DVD - Smile - Science Fiction - George Lucas - 87 minutes : 24.95 $
DVD - Inside Out - Animation - Le Quang Khai - 100 minutes : 18.99 $
DVD - Inception - Action - Christopher Nolan - 148 minutes : 29.95 $
Le Quang Khai - 20225638 - Removed DVD: Smile

Le Quang Khai - 20225638 - Current DVDs in Store:
DVD - Your Name - Animation - Roger Allers - 87 minutes : 19.95 $
DVD - Inside Out - Animation - Le Quang Khai - 100 minutes : 18.99 $
DVD - Inception - Action - Christopher Nolan - 148 minutes : 29.95 $
DVD not found in the store.

Process finished with exit code 0
```

Figure 19 Result

6. String, StringBuilder and StringBuffer

Code

```
package hust.soict.hedspi.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.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);
    }
}
```

```
"C:\Program
423
3
```

Figure 20 So sánh String và StringBuilder

```
package hust.soict.hedspi.garbage;
> import ...

public class GarbageCreator {

    public static void main(String[] args) throws IOException {

        String filename = "D:\\Workspace\\Forlearning\\Java\\IT3103.744527.2024.1.20225638.LeQ
        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);

    }

}
```

Figure 21 GarbageCreator class

Result

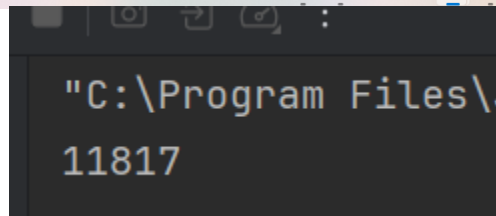
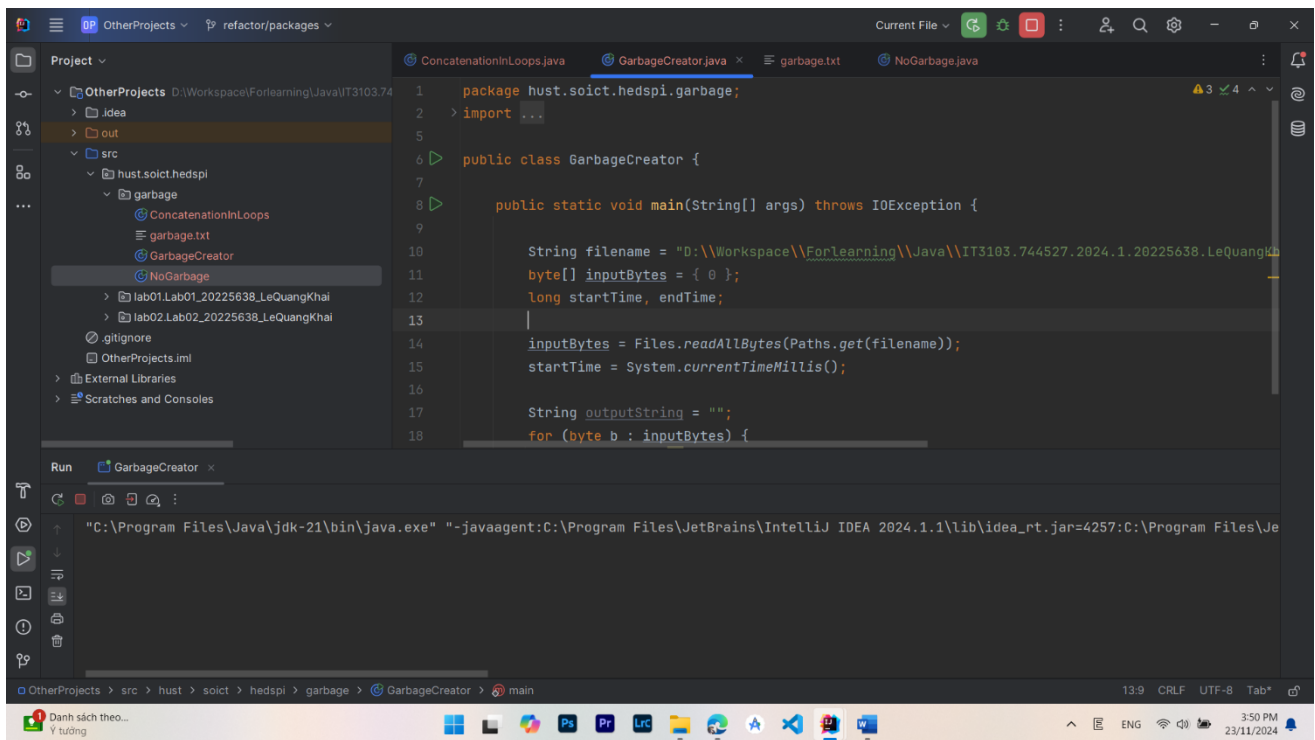


Figure 22 Result: program hangs

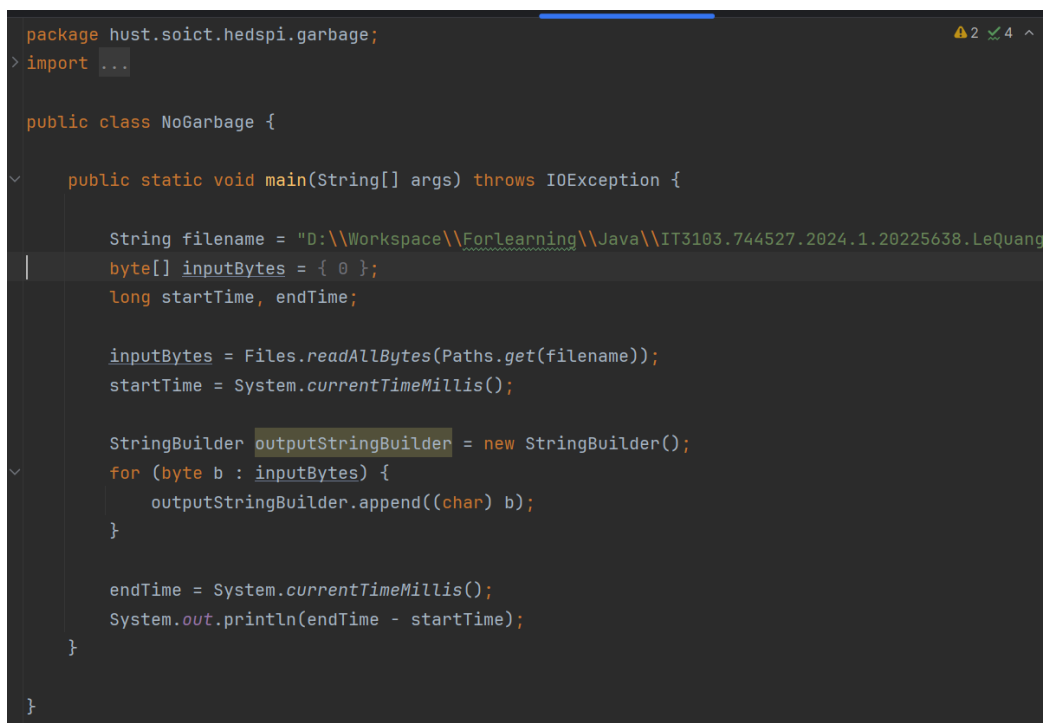
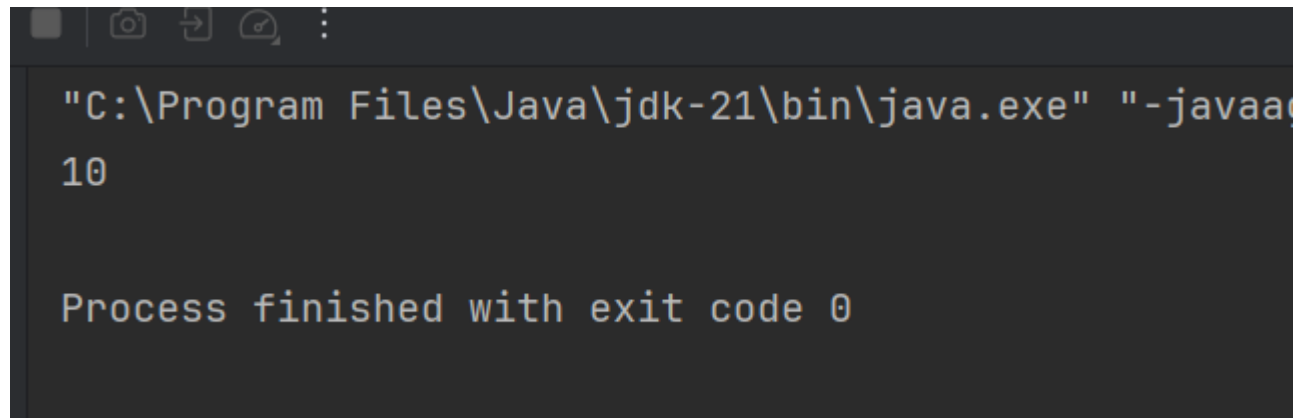


Figure 23 NoGarbage class



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaa
10

Process finished with exit code 0
```

Figure 24 Result: Program finishes quickly

7 Class Diagram

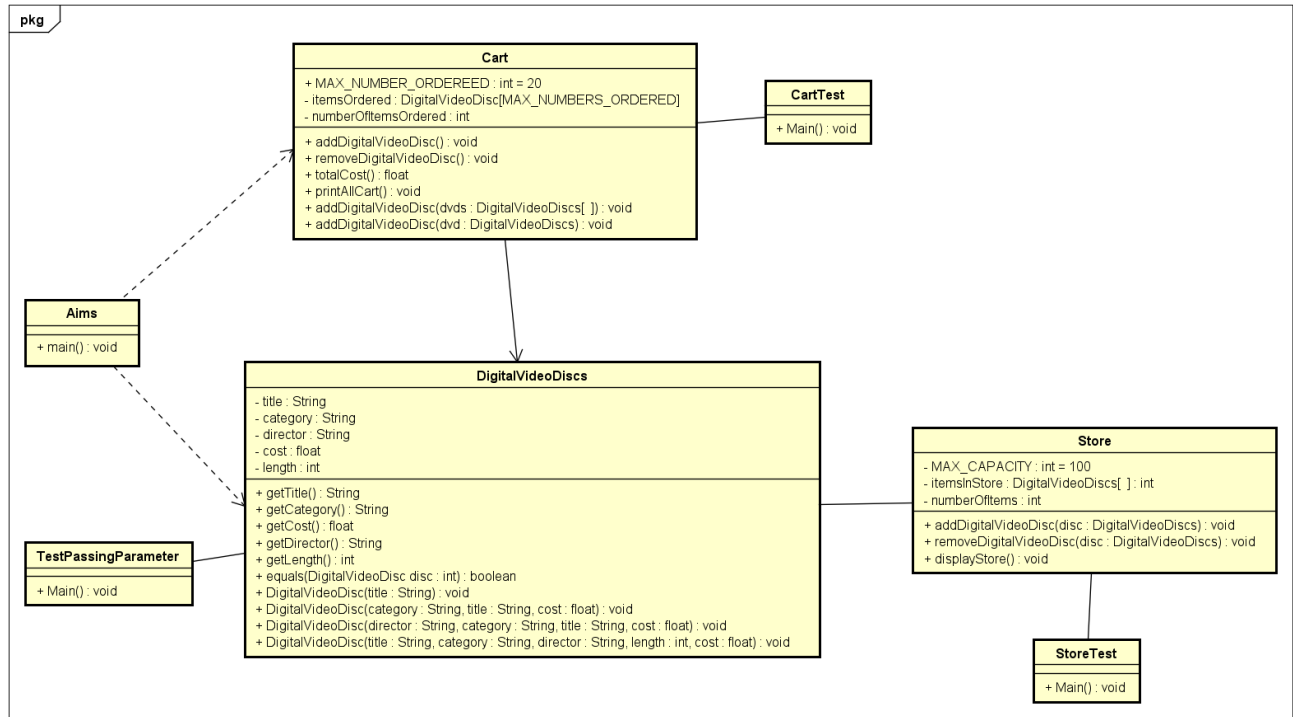


Figure 25 Class Diagram

Table of Figures

Figure 1 Method addDigitalVideoDisc(DigitalVideoDisc [] dvdList).....	2
Figure 2 Aims Class	2
Figure 3 Result.....	3
Figure 4 Method addDigitalVideoDisc(DigitalVideoDisc [] dvdList).....	4
Figure 5 Aims Class	4
Figure 6 Result.....	5
Figure 7 Passing parameter code	6
Figure 8 Passing parameter result.....	6
Figure 9 Class member and Instance member	8
Figure 10 Result.....	9
Figure 11 Code method to print the content in Cart.....	9
Figure 12 Code method search by id.....	10
Figure 13 Code method search by title	10
Figure 14 IsMatch() in DigitalVideoDisc class	10
Figure 15 CartTest class.....	11
Figure 16 Result.....	11
Figure 17 Store Class	12
Figure 18 StoreTest class	13
Figure 19 Result.....	13
Figure 20 So sánh String và StringBuilder	14
Figure 21 GarbageCreator class.....	14
Figure 22 Result: program hangs.....	15
Figure 23 NoGarbage class.....	15
Figure 24 Result: Program finishes quickly.....	15
Figure 25 Class Diagram	16