

## Báo cáo Lab 3 OOP

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### 2. Working with method overloading

Đoạn code bổ sung:

```
public void addDigitalVideoDisc(DigitalVideoDisc disc) {
    if (qtyOrdered < 20) {
        itemsOrdered[qtyOrdered] = disc;
        qtyOrdered += 1;
        System.out.println("This disc has been added!");
    } else {
        System.out.println("This cart is almost full!");
    }
}

public void addDigitalVideoDisc(DigitalVideoDisc [] dvdList) {
    if (dvdList == null || dvdList.length == 0) {
        System.out.println("No disc has been added because the list is null or
empty!");
        return;
    }
    int n = dvdList.length;
    int d = 0;
    for (int i = 0; i < n; i++) {
        if (dvdList[i] != null && qtyOrdered < 20) {
            itemsOrdered[qtyOrdered] = dvdList[i];
            qtyOrdered += 1;
            d += 1;
        }
    }
    if (d == 0) {
        System.out.println("No disc has been added!");
    } else {
        System.out.println(d + (d == 1 ? " disc has been added!" : " discs have
been added!"));
    }
}
```

```

    }

    public void addDigitalVideoDisc(DigitalVideoDisc dvd1, DigitalVideoDisc
dvd2){
        addDigitalVideoDisc(dvd1);
        addDigitalVideoDisc(dvd2);
    }

```

Kết quả:

Đoạn code sửa ở Aims:

```

DigitalVideoDisc[] dvdList = {dvd1, dvd2, dvd3};
anOrder.addDigitalVideoDisc(dvdList);
anOrder.listDisc();

```

3 discs have been added!  
 ID: 1, title: The Lion King, category: Animation, director: Roger Allers, length: 87, cost: 19.95.  
 ID: 2, title: Star Wars, category: Science Fiction, director: George Lucas, length: 87, cost: 24.95.  
 ID: 3, title: Aladin, category: Animation, director: null, length: 0, cost: 18.99.

### 3. Passing Parameter

Code:

**package** Package;

**public class** TestPassingParameter {

**public static void** main(String[] args) {

```

        DigitalVideoDisc jungleDVD = new DigitalVideoDisc("Jungle");
        DigitalVideoDisc cinderellaDVD = new DigitalVideoDisc("Cinderella");
    
```

```

        System.out.println("jungle dvd title: " + jungleDVD.getTitle());
        System.out.println("cinderella dvd title: " + cinderellaDVD.getTitle());
        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 swap(DigitalVideoDisc dvd1, DigitalVideoDisc dvd2) {
    String tmpTitle = dvd1.getTitle();
    dvd1.setTitle(dvd2.getTitle());
    dvd2.setTitle(tmpTitle);

    String tmpCategory = dvd1.getcategory();
    dvd1.setcategory(dvd2.getcategory());
    dvd2.setcategory(tmpCategory);

    String tmpDirector = dvd1.getDirector();
    dvd1.setDirector(dvd2.getDirector());
    dvd2.setDirector(tmpDirector);

    int tmpLength = dvd1.getLength();
    dvd1.setLength(dvd2.getLength());
    dvd2.setLength(tmpLength);

    float tmpCost = dvd1.getCost();
    dvd1.setCost(dvd2.getCost());
    dvd2.setCost(tmpCost);
}

public static void changeTitle(DigitalVideoDisc dvd, String title) {
    String oldTitle = dvd.getTitle();
    dvd.setTitle(title);
    dvd = new DigitalVideoDisc(oldTitle);
}
}

```

Trả lời câu hỏi:

❑ **swap()**: Không làm thay đổi nội dung hai đối tượng vì chỉ thao tác trên tham chiếu cục bộ.

□ **changeTitle()**: Thay đổi nội dung của jungleDVD vì nó thao tác trực tiếp lên đối tượng mà tham chiếu gốc trỏ tới.

Đã thay đổi swap như trong code để hoạt động đúng.

Kết quả:

```
<terminated> TestPassingParameter [Java Application] C:\Users\Adr
jungle dvd title: Jungle
cinderella dvd title: Cinderella
jungle dvd title: Cinderella
cinderella dvd title: Jungle
jungle dvd title: Jungle
```

## 5. Classifier Member and Instance Member

Bổ sung và thay đổi code theo yêu cầu:

```
private static int nbDigitalVideoDiscs = 0;
private int id;
```

```
public DigitalVideoDisc(String title) {
    super();
    this.title = title;
    nbDigitalVideoDiscs++;
    this.id = nbDigitalVideoDiscs;
}
```

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

```
public DigitalVideoDisc(String title, String category, String director, float
cost) {
    super();
    this.title = title;
```

```

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

```

```

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

    public int getId() {
        return id;
    }

```

Kết quả khi chạy đã có ID:

```

3 discs have been added!
ID: 1, title: The Lion King, category: Animation, director: Roger Allers, length: 87, cost: 19.95.
ID: 2, title: Star Wars, category: Science Fiction, director: George Lucas, length: 87, cost: 24.95.
ID: 3, title: Aladin, category: Animation, director: null, length: 0, cost: 18.99.

```

## 6. Open the Cart class

Phương thức mới ở Cart class:

```

    public void findID(int id) {
        for (int i = 0; i < qtyOrdered; i++) {
            if (itemsOrdered[i].getId() == id) {
                System.out.println(itemsOrdered[i].toString());
                return;
            }
        }
    }

```

```

        System.out.println(String.format("Disc with id %d does not
exist!", id));
    }

    public void findTitle(String title) {
        boolean found = false;

        for (int i = 0; i < qtyOrdered; i++) {
            if (itemsOrdered[i].isMatch(title)) {
                System.out.println(itemsOrdered[i].toString());
                found = true;
            }
        }

        if (!found) {
            System.out.println("No match found for the title: " + title);
        }
    }
}

```

Phương thức mới trong DigitalVideoDisc class:

```

    public boolean isMatch(String title) {
        if (this.title == null || title == null) {
            return false;
        }
        return this.title.toLowerCase().contains(title.toLowerCase());
    }

    public String toString(){
        return String.format("ID: %d, title: %s, category: %s, director: %s,
length: %d, cost: %.2f.",
        this.id, this.title, this.category, this.director, this.length, this.cost);
    }
}

```

CartTest class:

```

public class CartTest {
    public static void main(String[] args) {
        Cart cart = new Cart();

        DigitalVideoDisc dvd1 = new DigitalVideoDisc("The Lion King",

```

```

        "Animation", "Roger Allers", 87, 19.95f);
cart.addDigitalVideoDisc(dvd1);

DigitalVideoDisc dvd2 = new DigitalVideoDisc("Star Wars",
        "Science Fiction", "George Lucas", 87, 24.95f);
cart.addDigitalVideoDisc(dvd2);

DigitalVideoDisc dvd3 = new DigitalVideoDisc("Aladin",
        "Animation", 18.99f);
cart.addDigitalVideoDisc(dvd3);

cart.listDisc();

cart.findID(1);
cart.findID(4);
cart.findTitle("Star Wars");
cart.findTitle("Arcane");
    }
}

```

Kết quả:

```

<terminated> CartTest [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_23.0.0.v20.
This disc has been added!
This disc has been added!
This disc has been added!
ID: 1, title: The Lion King, category: Animation, director: Roger Allers, length: 87, cost: 19.95.
ID: 2, title: Star Wars, category: Science Fiction, director: George Lucas, length: 87, cost: 24.95.
ID: 3, title: Aladin, category: Animation, director: null, length: 0, cost: 18.99.
ID: 1, title: The Lion King, category: Animation, director: Roger Allers, length: 87, cost: 19.95.
Disc with id 4 does not exist!
ID: 2, title: Star Wars, category: Science Fiction, director: George Lucas, length: 87, cost: 24.95.
No match found for the title: Arcane

```

## 7. Implement the Store class

Store class:

**package** Package;

```

public class Store {
    public static final int MAX_NUMBERS_INSTORE = 100;
    private DigitalVideoDisc[] itemsInStore = new
DigitalVideoDisc[MAX_NUMBERS_INSTORE];
    private int qtyInStore = 0;

    public void addDigitalVideoDisc(DigitalVideoDisc disc) {
        if (qtyInStore < MAX_NUMBERS_INSTORE) {
            itemsInStore[qtyInStore] = disc;
            qtyInStore += 1;
            System.out.println("This disc has been added!");
        } else {
            System.out.println("This store is almost full!");
        }
    }

    public void removeDigitalVideoDisc(DigitalVideoDisc disc) {
        boolean found = false;
        for (int i = 0; i < qtyInStore; i++) {
            if (itemsInStore[i] != null && itemsInStore[i].equals(disc)) {
                found = true;
                for (int j = i; j < qtyInStore - 1; j++) {
                    itemsInStore[j] = itemsInStore[j + 1];
                }
                itemsInStore[qtyInStore - 1] = null;
                qtyInStore -= 1;
                System.out.println("This disc has been removed!");
                break;
            }
        }
        if (!found) {
            System.out.println("This disc hasn't ever existed in store!");
        }
    }

    public void printStore() {
        System.out.println("Current DVDs in the store:");
        for (int i = 0; i < qtyInStore; i++) {
            System.out.println((i + 1) + ". " + itemsInStore[i].toString());
        }
    }
}

```



```

        if (qtyInStore == 0) {
            System.out.println("The store is empty.");
        }
    }
}

```

StoreTest class:

**package** Package;

```

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

        DigitalVideoDisc dvd1 = new DigitalVideoDisc("The Lion King",
            "Animation", "Roger Allers", 87, 19.95f);
        DigitalVideoDisc dvd2 = new DigitalVideoDisc("Star Wars",
            "Science Fiction", "George Lucas", 87, 24.95f);
        DigitalVideoDisc dvd3 = new DigitalVideoDisc("Aladin",
            "Animation", 18.99f);
        DigitalVideoDisc dvd4 = new DigitalVideoDisc("Frozen",
            "Animation", 10.99f);
        store.addDigitalVideoDisc(dvd1);
        store.addDigitalVideoDisc(dvd2);
        store.addDigitalVideoDisc(dvd3);

        store.printStore();

        store.removeDigitalVideoDisc(dvd1);

        store.printStore();

        store.removeDigitalVideoDisc(dvd4);
    }
}

```

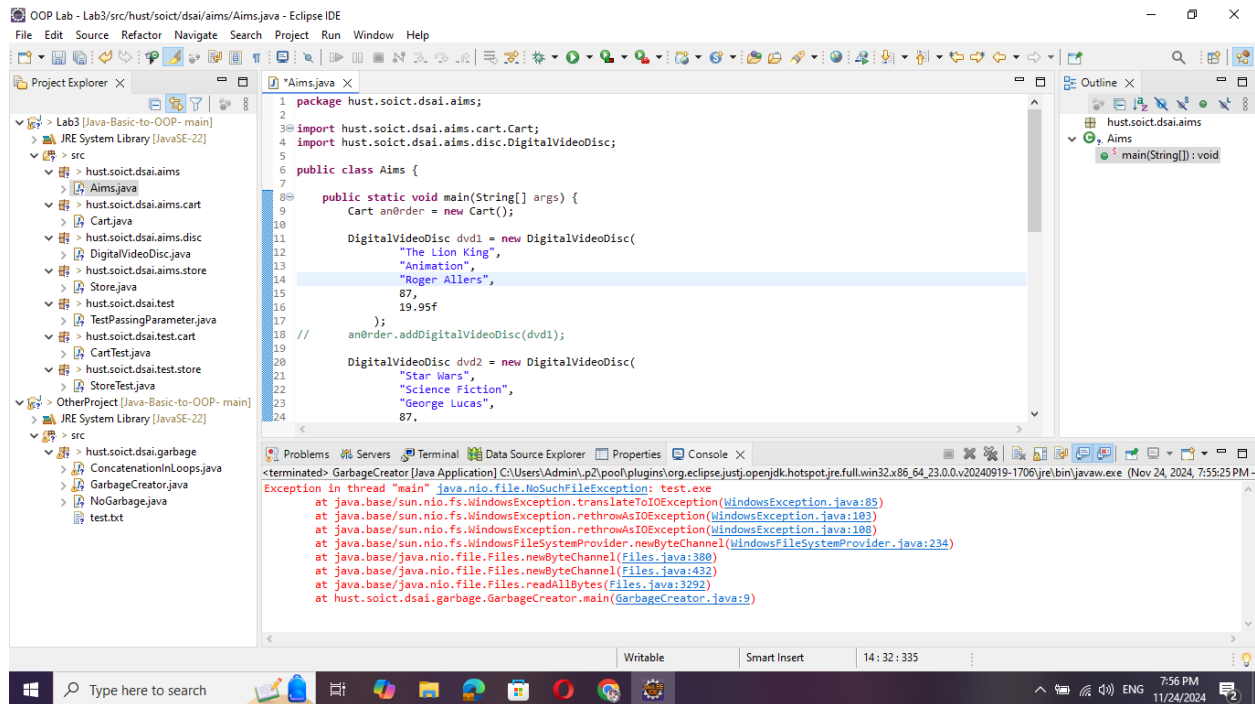
Kết quả:

```

terminated> storeTest puts Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full\win32_x86_64_23.0.0.v20240919-1706\jre\bin\javaw.exe
This disc has been added!
This disc has been added!
This disc has been added!
Current DVDs in the store:
1. ID: 1, title: The Lion King, category: Animation, director: Roger Allers, length: 87, cost: 19.95.
2. ID: 2, title: Star Wars, category: Science Fiction, director: George Lucas, length: 87, cost: 24.95.
3. ID: 3, title: Aladin, category: Animation, director: null, length: 0, cost: 18.99.
This disc has been removed!
Current DVDs in the store:
1. ID: 2, title: Star Wars, category: Science Fiction, director: George Lucas, length: 87, cost: 24.95.
2. ID: 3, title: Aladin, category: Animation, director: null, length: 0, cost: 18.99.
This disc hasn't ever existed in store!

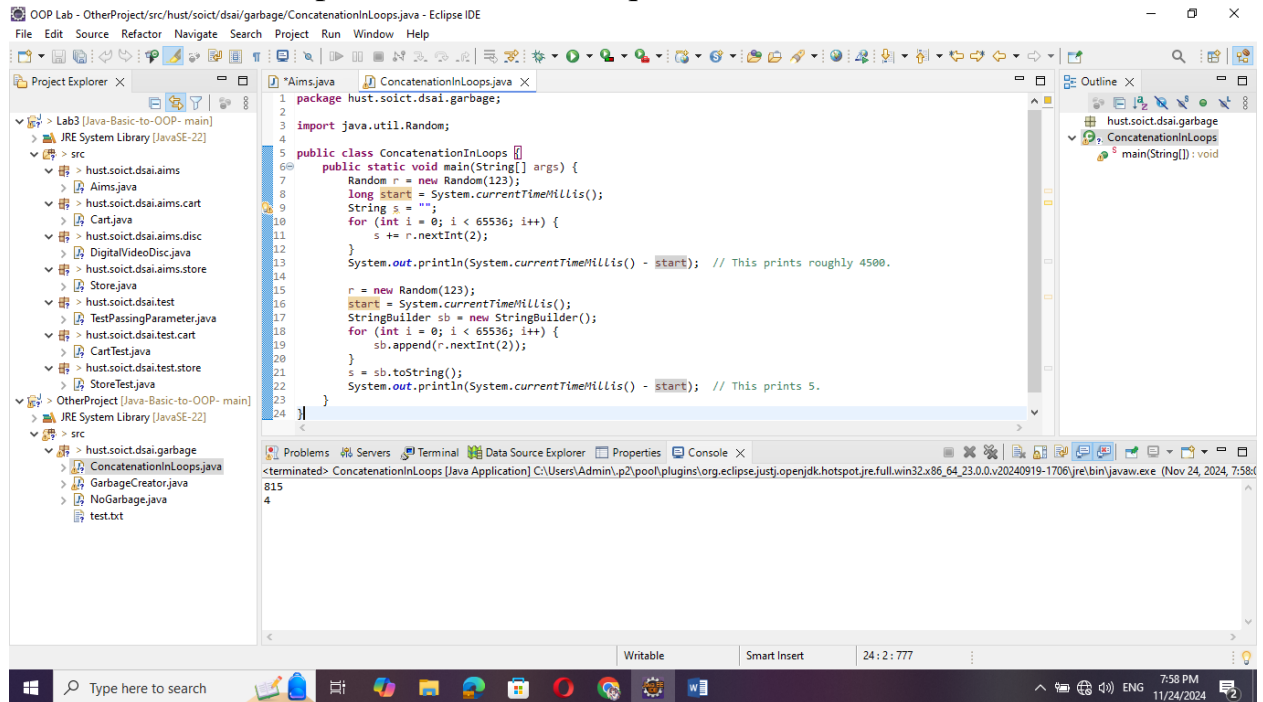
```

## 8.Re-orgnaize your project



## 9. String, StringBuilder and StringBuffer

## ConcatenationInLoops class code và kết quả:



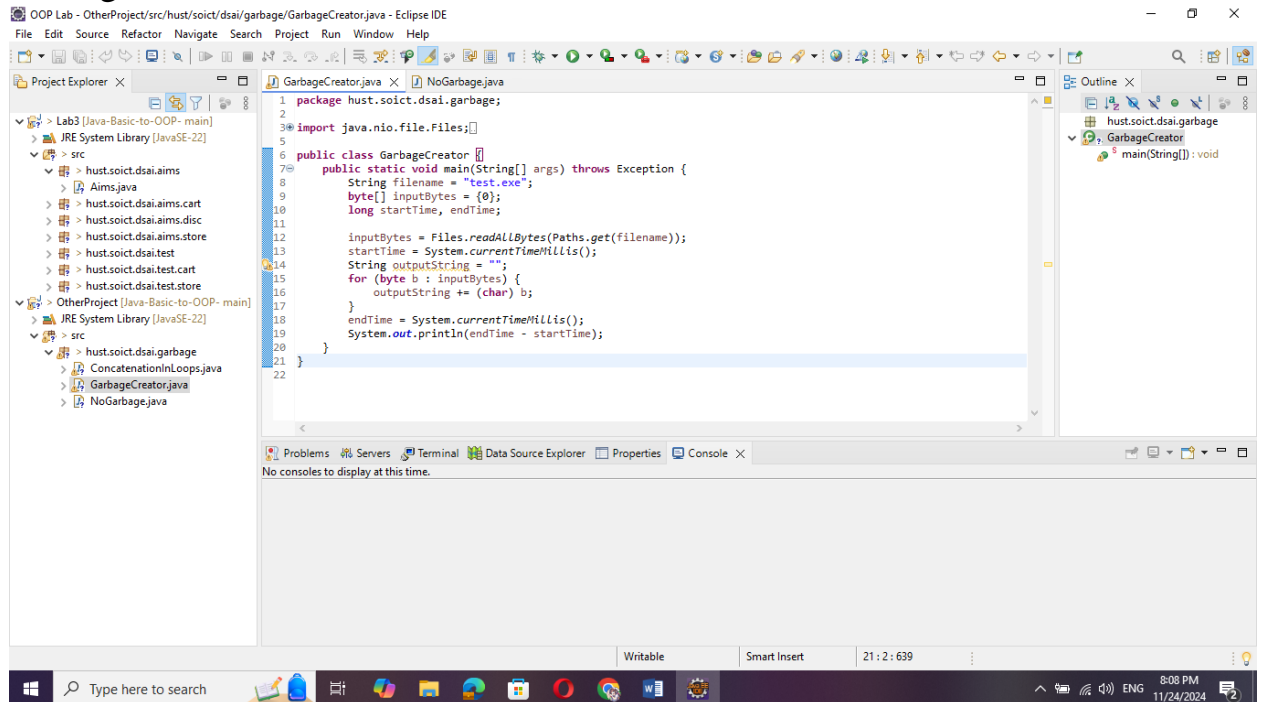
The screenshot shows the Eclipse IDE with the file `ConcatenationInLoops.java` open. The code defines a class `ConcatenationInLoops` with a `main` method. The `main` method uses a `Random` object to generate random integers and concatenates them into a string. It also prints the time taken to generate the string. The console output shows the execution results, including the time taken to generate the string and the final concatenated string.

```
1 package hust.soict.dsai.garbage;
2
3 import java.util.Random;
4
5 public class ConcatenationInLoops {
6     public static void main(String[] args) {
7         Random r = new Random(123);
8         long start = System.currentTimeMillis();
9         String s = "";
10        for (int i = 0; i < 65536; i++) {
11            s += r.nextInt(2);
12        }
13        System.out.println(System.currentTimeMillis() - start); // This prints roughly 4500.
14
15        r = new Random(123);
16        start = System.currentTimeMillis();
17        StringBuilder sb = new StringBuilder();
18        for (int i = 0; i < 65536; i++) {
19            sb.append(r.nextInt(2));
20        }
21        s = sb.toString();
22        System.out.println(System.currentTimeMillis() - start); // This prints 5.
23    }
24 }
```

Console Output:

```
<terminated> ConcatenationInLoops [Java Application] C:\Users\Admin\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_23.0.0.v20240919-1706\jre\bin\javaw.exe (Nov 24, 2024, 7:58:41)
4
615
```

## GarbageCreator class:



The screenshot shows the Eclipse IDE with the file `GarbageCreator.java` open. The code defines a class `GarbageCreator` with a `main` method. The `main` method reads a file named `test.exe` and prints the time taken to read the file. The console output shows the execution results, including the time taken to read the file.

```
1 package hust.soict.dsai.garbage;
2
3 import java.nio.file.Files;
4
5
6 public class GarbageCreator {
7     public static void main(String[] args) throws Exception {
8         String filename = "test.exe";
9         byte[] inputBytes = new byte[1024];
10        long startTime, endTime;
11
12        inputBytes = Files.readAllBytes(Paths.get(filename));
13        startTime = System.currentTimeMillis();
14        String outputString = "";
15        for (byte b : inputBytes) {
16            outputString += (char) b;
17        }
18        endTime = System.currentTimeMillis();
19        System.out.println(endTime - startTime);
20    }
21 }
22 }
```

Console Output:

```
No consoles to display at this time.
```

## NoGarbage class:

