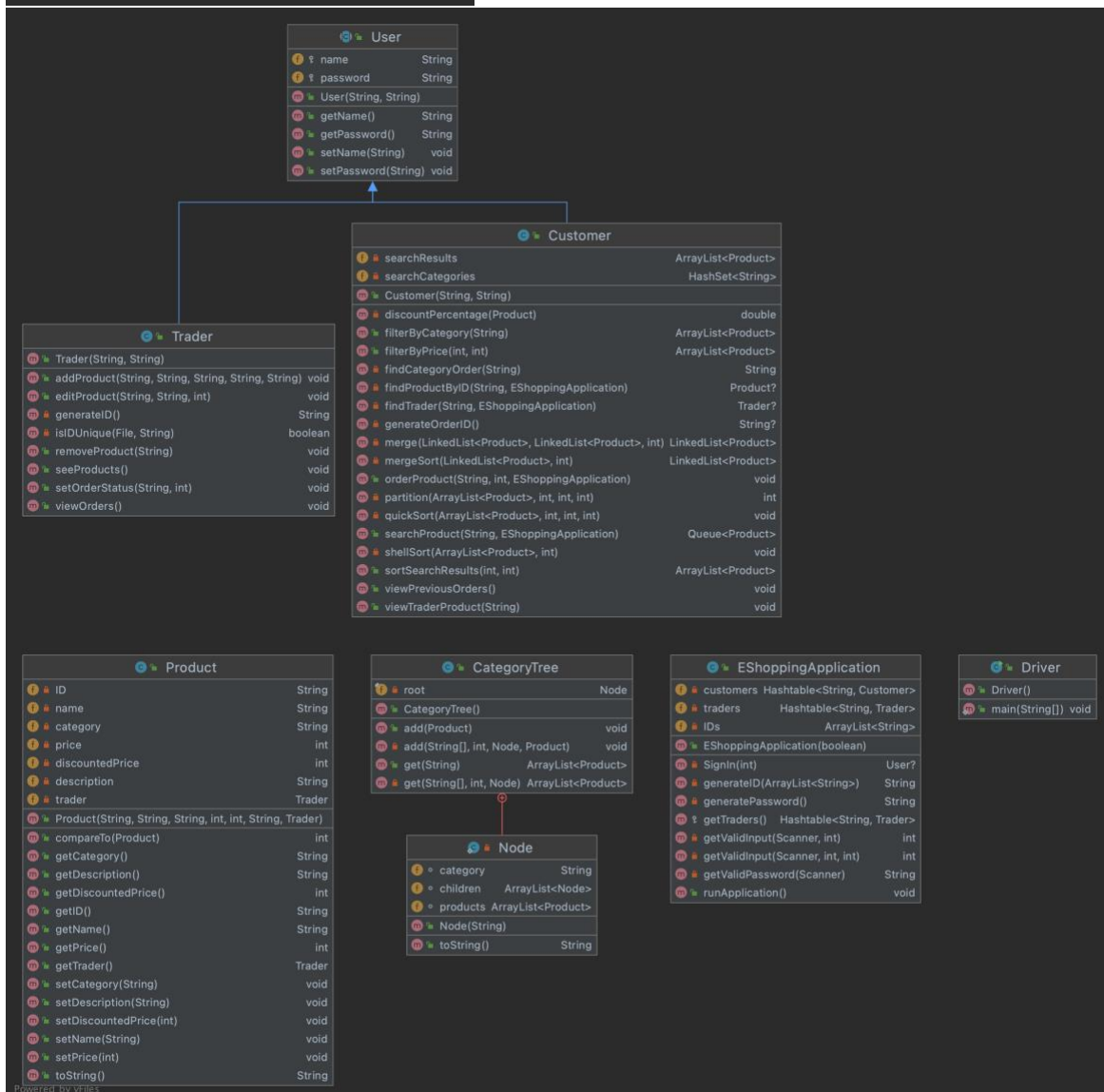
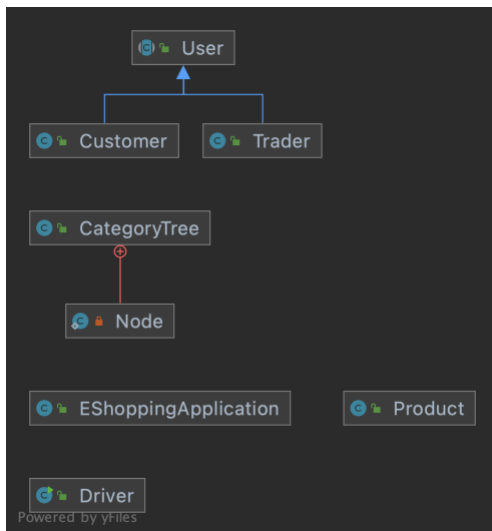


**GIT Department of Computer Engineering**  
**CSE 222/505 - Spring 2021**  
**Homework 6 Report**

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## 1. CLASS DIAGRAMS



## 2. PROBLEM SOLUTION APPROACH

I used merge sort for sorting by name, Shell sort for sorting by price, quick sort for sorting by discount percentage. The reason I used these sorting algorithms is because average running times of these algorithms are lower compared to the other algorithms and since there is a big data set of products, I preferred the algorithms with lower running times.

I used LinkedList in merge sort algorithm because removing the first element in LinkedList is constant time.

I used PriorityQueue as Queue when search results are sorted by name in decreasing order by default and returned it to the menu.

I used Hashtable to store customers and traders with IDs as their key.

I used Tree as CategoryTree to store search results according to their categories.

I used ArrayList most of the homework because it is easy to implement and its methods are mostly constant time.

## 3. TEST CASES

### Customer Methods

#### Searching

```
System.out.println("searching a non-existing product");
try {
    customer.searchProduct( target: "non-existing", app);
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\nsearching an existing product(Sicons)");
Queue<Product> searchResults = customer.searchProduct( target: "Sicons", app);
while (!searchResults.isEmpty()){
    System.out.print(searchResults.poll());
}
```

## Sorting

```
System.out.println("sorting search result by name in increasing order");
ArrayList<Product> sorted = customer.sortSearchResults( mode: 1, order: 1);
for(Product product : sorted){
    System.out.print(product);
}

System.out.println("sorting search result by name in decreasing order");
sorted = customer.sortSearchResults( mode: 1, order: -1);
for(Product product : sorted){
    System.out.print(product);
}

System.out.println("sorting search result by price in increasing order");
sorted = customer.sortSearchResults( mode: 2, order: 1);
for(Product product : sorted){
    System.out.print(product);
}

System.out.println("sorting search result by price in decreasing order");
sorted = customer.sortSearchResults( mode: 2, order: -1);
for(Product product : sorted){
    System.out.print(product);
}

System.out.println("sorting search result by discount percentage in increasing order");
sorted = customer.sortSearchResults( mode: 3, order: 1);
for(Product product : sorted){
    System.out.print(product);
}

System.out.println("sorting search result by discount percentage in decreasing order");
sorted = customer.sortSearchResults( mode: 3, order: -1);
for(Product product : sorted){
    System.out.print(product);
}
```

## Filtering

```
System.out.println("filtering search results by a non-existing category");
try {
    ArrayList<Product> filtered = customer.filterByCategory("non-existing");
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\nfiltering search results by an existing category(Sicons All Purpose Arnica Dog Shampoo (500 ml))");
ArrayList<Product> filtered = customer.filterByCategory("Sicons All Purpose Arnica Dog Shampoo (500 ml)");
for(Product product : filtered){
    System.out.print(product);
}

System.out.println("filtering search results by price(100 - 200)");
filtered = customer.filterByPrice( upperLimit: 200, lowerLimit: 100);
for(Product product : filtered){
    System.out.print(product);
}
```

## Viewing All The Products Of A Trader

```
System.out.println("viewing all the products of a non-existing trader");
try {
    customer.viewTraderProduct( traderName: "non-existing");
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\nviewing all the products of an existing trader(Alisha)");
customer.viewTraderProduct( traderName: "Alisha");
```

## Viewing Previous Orders

```
System.out.println("viewing previous orders");
customer.viewPreviousOrders();
```

## Trader Methods

### Adding Products

```
System.out.println("adding product");
System.out.println("before adding");
trader.seeProducts();
System.out.println("after adding");
trader.addProduct( productName: "new product", productCategory: "new category", productPrice: "2", productDiscountedPrice: "1",
    productDescription: "new description");
trader.seeProducts();
String ID = "";
try {
    BufferedReader IDReader = new BufferedReader(new FileReader( fileName: "products.txt"));
    BufferedReader nameReader = new BufferedReader(new FileReader( fileName: "products.txt"));
    nameReader.readLine();
    while ((ID = IDReader.readLine()) != null){
        if(nameReader.readLine().contains("Name: new product")){
            break;
        }
        else{
            for(int i = 0; i < 7; i++){
                IDReader.readLine();
                nameReader.readLine();
            }
        }
    }
    IDReader.close();
    nameReader.close();
    ID = ID.split( regex: ":" )[1];
} catch (IOException e) {
    System.out.println("An error occurred");
}
```

## Editing Product

```
System.out.println("editing a non-existing product");
try {
    trader.editProduct( ID: "non-existing", newData: "non-existing", mode: 1);
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\nediting an existing product's name(" + ID + ")");
System.out.println("before editing");
trader.seeProducts();
trader.editProduct(ID, newData: "edited name", mode: 1);
System.out.println("after editing");
trader.seeProducts();

System.out.println("editing an existing product's category(" + ID + ")");
System.out.println("before editing");
trader.seeProducts();
trader.editProduct(ID, newData: "edited category", mode: 2);
System.out.println("after editing");
trader.seeProducts();

System.out.println("editing an existing product's price(" + ID + ")");
System.out.println("before editing");
trader.seeProducts();
trader.editProduct(ID, newData: "10000000", mode: 3);
System.out.println("after editing");
trader.seeProducts();

System.out.println("editing an existing product's discounted price(" + ID + ")");
System.out.println("before editing");
trader.seeProducts();
trader.editProduct(ID, newData: "99999", mode: 4);
System.out.println("after editing");
trader.seeProducts();

System.out.println("editing an existing product's description(" + ID + ")");
System.out.println("before editing");
trader.seeProducts();
trader.editProduct(ID, newData: "edited description", mode: 5);
System.out.println("after editing");
trader.seeProducts();
```

## Viewing Orders

```
customer.orderProduct(ID, amount: 2, app);
customer.orderProduct(ID, amount: 5, app);
System.out.println("viewing orders(added 2 orders for testing)");
trader.viewOrders();
```

## Meeting Order

```
System.out.println("meeting a non-existing order");
try {
    trader.setOrderStatus( orderId: "non-existing", mode: 1);
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\nmeeting an existing order(ID: 00000002)");
System.out.println("before meeting");
trader.viewOrders();
System.out.println("after meeting");
trader.setOrderStatus( orderId: "00000002", mode: 1);
trader.viewOrders();
```

## Cancelling Order

```
System.out.println("\ncancelling a non-existing order");
try {
    trader.setOrderStatus( orderId: "non-existing", mode: 2);
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\ncancelling an existing order(ID: 00000003)");
System.out.println("before cancelling");
trader.viewOrders();
System.out.println("after cancelling");
trader.setOrderStatus( orderId: "00000003", mode: 2);
trader.viewOrders();
```



#### Viewing Products Of Current Trader

```
System.out.println("viewing products of this trader");
trader.seeProducts();
```

#### Removing Product

```
System.out.println("removing a non-existing product");
try {
    trader.removeProduct( ID: "non-existing");
} catch (NoSuchElementException e) {
    System.out.println(e);
}

System.out.println("\nremoving an existing product(" + ID + ")");
System.out.println("before removal");
trader.seeProducts();
trader.removeProduct(ID);
System.out.println("after removal");
trader.seeProducts();
```

#### 4. RUNNING COMMAND AND RESULTS

```
----Customer Methods----
searching a non-existing product
java.util.NoSuchElementException

searching an existing product(Sicons)
ID: PS0EH3ZXRTZJUVXM
Name: Sicons Conditioning Conditoner Dog Shampoo
Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >> Sicons Conditioning Conditoner Dog Shampoo (200 ml)
Price: 110
Discounted Price: 100
Description: Specifications of Sicons Conditioning Conditoner Dog Shampoo (200 ml) General Pet Type Dog Brand Sicons Quan
Trader: Sicons

ID: PS0EH3ZYDMSYARJ5
Name: Sicons All Purpose Arnica Dog Shampoo
Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >> Sicons All Purpose Arnica Dog Shampoo (500 ml)
Price: 220
Discounted Price: 210
Description: Specifications of Sicons All Purpose Arnica Dog Shampoo (500 ml) General Pet Type Dog Brand Sicons Quantity
Trader: Sicons
```



sorting search result by name in increasing order

ID: PS0EH3ZYDMSYARJ5

Name: Sicons All Purpose Arnica Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoos

Price: 220

Discounted Price: 210

Description: Specifications of Sicons All Purpose Arnica Dog Shampoo

Trader: Sicons

ID: PS0EH3ZXRTZJUVXM

Name: Sicons Conditioning Conditoner Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoos

Price: 110

Discounted Price: 100

Description: Specifications of Sicons Conditioning Conditoner Dog Shampoo

Trader: Sicons

sorting search result by name in decreasing order

ID: PS0EH3ZXRTZJUVXM

Name: Sicons Conditioning Conditoner Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoos

Price: 110

Discounted Price: 100

Description: Specifications of Sicons Conditioning Conditoner Dog Shampoo

Trader: Sicons

ID: PS0EH3ZYDMSYARJ5

Name: Sicons All Purpose Arnica Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoos

Price: 220

Discounted Price: 210

Description: Specifications of Sicons All Purpose Arnica Dog Shampoo

Trader: Sicons

sorting search result by price in increasing order

ID: PS0EH3ZXRTZJUVXM

Name: Sicons Conditioning Conditoner Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat C

Price: 110

Discounted Price: 100

Description: Specifications of Sicons Conditioning

Trader: Sicons

ID: PS0EH3ZYDMSYARJ5

Name: Sicons All Purpose Arnica Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat C

Price: 220

Discounted Price: 210

Description: Specifications of Sicons All Purpose A

Trader: Sicons

sorting search result by price in decreasing order

ID: PS0EH3ZYDMSYARJ5

Name: Sicons All Purpose Arnica Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat C

Price: 220

Discounted Price: 210

Description: Specifications of Sicons All Purpose A

Trader: Sicons

ID: PS0EH3ZXRTZJUVXM

Name: Sicons Conditioning Conditoner Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat C

Price: 110

Discounted Price: 100

Description: Specifications of Sicons Conditioning

Trader: Sicons

sorting search result by discount percentage in increasing order

ID: PS0EH3ZYDMSYARJ5

Name: Sicons All Purpose Arnica Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >

Price: 220

Discounted Price: 210

Description: Specifications of Sicons All Purpose Arnica Dog Shampoo

Trader: Sicons

ID: PS0EH3ZXRTZJUVXM

Name: Sicons Conditioning Conditoner Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >

Price: 110

Discounted Price: 100

Description: Specifications of Sicons Conditioning Conditoner Dog S

Trader: Sicons

sorting search result by discount percentage in decreasing order

ID: PS0EH3ZXRTZJUVXM

Name: Sicons Conditioning Conditoner Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >

Price: 110

Discounted Price: 100

Description: Specifications of Sicons Conditioning Conditoner Dog S

Trader: Sicons

ID: PS0EH3ZYDMSYARJ5

Name: Sicons All Purpose Arnica Dog Shampoo

Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >

Price: 220

Discounted Price: 210

Description: Specifications of Sicons All Purpose Arnica Dog Shampoo

Trader: Sicons

```
filtering search results by a non-existing category  
java.util.NoSuchElementException
```

```
filtering search results by an existing category(Sicons All Purpose Arnica Dog Shampoo (500 ml))  
ID: PS0EH3ZYDMSYARJ5  
Name: Sicons All Purpose Arnica Dog Shampoo  
Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >> Sicons All Purpose Arnica Dog Shampoo (500 ml)  
Price: 220  
Discounted Price: 210  
Description: Specifications of Sicons All Purpose Arnica Dog Shampoo (500 ml) General Pet Type Dog Brand Sicons Quantity 5  
Trader: Sicons
```

```
filtering search results by price(100 - 200)  
ID: PS0EH3ZXRTZJUVXM  
Name: Sicons Conditioning Conditoner Dog Shampoo  
Category: Pet Supplies >> Grooming >> Skin & Coat Care >> Shampoo >> Sicons Conditioning Conditoner Dog Shampoo (200 ml)  
Price: 110  
Discounted Price: 100  
Description: Specifications of Sicons Conditioning Conditoner Dog Shampoo (200 ml) General Pet Type Dog Brand Sicons Quant  
Trader: Sicons
```

```
viewing all the products of a non-existing trader  
java.util.NoSuchElementException
```

```
viewing all the products of an existing trader(Alisha)
ID: SRTEH2FF9KEDEF6F
Name: Alisha Solid Women's Cycling Shorts
Category: Clothing >> Women's Clothing >> Lingerie, Sleep & Swimwear >> Shorts >> Alisha Shorts >> Alisha Solid Women's Cycling Shorts
Price: 999
Discounted Price: 379
Description: Key Features of Alisha Solid Women's Cycling Shorts Cotton Lycra Navy, Red, Navy,Specifications of Alisha Solid Women's Cyclin

ID: SRTEH2F6HUZMQ6SJ
Name: Alisha Solid Women's Cycling Shorts
Category: Clothing >> Women's Clothing >> Lingerie, Sleep & Swimwear >> Shorts >> Alisha Shorts >> Alisha Solid Women's Cycling Shorts
Price: 699
Discounted Price: 267
Description: Key Features of Alisha Solid Women's Cycling Shorts Cotton Lycra Black, Red,Specifications of Alisha Solid Women's Cycling Sho

ID: SRTEH2FVVKRBAXHB
Name: Alisha Solid Women's Cycling Shorts
Category: Clothing >> Women's Clothing >> Lingerie, Sleep & Swimwear >> Shorts >> Alisha Shorts >> Alisha Solid Women's Cycling Shorts
Price: 1199
Discounted Price: 479
Description: Key Features of Alisha Solid Women's Cycling Shorts Cotton Lycra Navy, Red, White, Red,Specifications of Alisha Solid Women's

ID: SRTEH2FVUHAAPH9X
Name: Alisha Solid Women's Cycling Shorts
Category: Clothing >> Women's Clothing >> Lingerie, Sleep & Swimwear >> Shorts >> Alisha Shorts >> Alisha Solid Women's Cycling Shorts
Price: 1199
Discounted Price: 479
Description: Key Features of Alisha Solid Women's Cycling Shorts Cotton Lycra White, Black, Red, Black,Specifications of Alisha Solid Women

ID: SRTEH2FGBDJGX8FW
Name: Alisha Solid Women's Cycling Shorts
Category: Clothing >> Women's Clothing >> Lingerie, Sleep & Swimwear >> Shorts >> Alisha Shorts >> Alisha Solid Women's Cycling Shorts
Price: 999
Discounted Price: 379
Description: Key Features of Alisha Solid Women's Cycling Shorts Cotton Lycra Black, White, Black,Specifications of Alisha Solid Women's Cy

ID: SRTEH2FECMGNZJXJ
Name: Alisha Solid Women's Cycling Shorts
Category: Clothing >> Women's Clothing >> Lingerie, Sleep & Swimwear >> Shorts >> Alisha Shorts >> Alisha Solid Women's Cycling Shorts
Price: 999
Discounted Price: 379
Description: Key Features of Alisha Solid Women's Cycling Shorts Cotton Lycra Black, White, White,Specifications of Alisha Solid Women's Cy
```

```
ordering a non-existing product
java.util.NoSuchElementException

ordering an existing product(ID: SRTEH2FF9KEDEF6F)
order
ID: 00000001
Trader: Alisha
Customer: customer
Product: Alisha Solid Women's Cycling Shorts
Amount: 2
Status: Pending

viewing previous orders
ID: 00000001
Trader: Alisha
Customer: customer
Product: Alisha Solid Women's Cycling Shorts
Amount: 2
Status: Pending
```

----Trader Methods----

adding product

before adding

You don't have any product

after adding

ID: I1LE278YXZCWYE26

Name: new product

Category: new category

Price: 2

Discounted Price: 1

Description: new description

editing a non-existing product

java.util.NoSuchElementException

editing an existing product's name(I1LE278YXZCWYE26)

before editing

ID: I1LE278YXZCWYE26

Name: new product

Category: new category

Price: 2

Discounted Price: 1

Description: new description

after editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: new category

Price: 2

Discounted Price: 1

Description: new description

editing an existing product's category(I1LE278YXZCWYE26)

before editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: new category

Price: 2

Discounted Price: 1

Description: new description

after editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 2

Discounted Price: 1

Description: new description

editing an existing product's price(I1LE278YXZCWYE26)

before editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 2

Discounted Price: 1

Description: new description

after editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 1

Description: new description



editing an existing product's discounted price(I1LE278YXZCWYE26)

before editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 1

Description: new description

after editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 99999

Description: new description

editing an existing product's description(I1LE278YXZCWYE26)

before editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 99999

Description: new description

after editing

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 99999

Description: edited description

viewing orders(added 2 orders for testing)

ID: 00000002

Trader: trader

Customer: customer

Product: edited name

Amount: 2

Status: Pending

ID: 00000003

Trader: trader

Customer: customer

Product: edited name

Amount: 5

Status: Pending

meeting a non-existing order  
java.util.NoSuchElementException

meeting an existing order(ID: 00000002)  
before meeting  
ID: 00000002  
Trader: trader  
Customer: customer  
Product: edited name  
Amount: 2  
Status: Pending

ID: 00000003  
Trader: trader  
Customer: customer  
Product: edited name  
Amount: 5  
Status: Pending

after meeting  
ID: 00000002  
Trader: trader  
Customer: customer  
Product: edited name  
Amount: 2  
Status: Met

ID: 00000003  
Trader: trader  
Customer: customer  
Product: edited name  
Amount: 5  
Status: Pending

cancelling a non-existing order  
java.util.NoSuchElementException

cancelling an existing order(ID: 00000003)

before cancelling

ID: 00000002

Trader: trader

Customer: customer

Product: edited name

Amount: 2

Status: Met

ID: 00000003

Trader: trader

Customer: customer

Product: edited name

Amount: 5

Status: Pending

after cancelling

ID: 00000002

Trader: trader

Customer: customer

Product: edited name

Amount: 2

Status: Met

ID: 00000003

Trader: trader

Customer: customer

Product: edited name

Amount: 5

Status: Cancelled

viewing products of this trader

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 99999

Description: edited description

removing a non-existing product

java.util.NoSuchElementException

removing an existing product(I1LE278YXZCWYE26)

before removal

ID: I1LE278YXZCWYE26

Name: edited name

Category: edited category

Price: 10000000

Discounted Price: 99999

Description: edited description

after removal

You don't have any product