

**GIT Department of Computer Engineering**  
**CSE 222/505 - Spring 2020**  
**Homework 1 Report**

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# 1. System Requirements

From the problem definition we see that we need a Log-in system for user authentication to permit user to manipulate parts of the “Database”.

Here I refer the in-memory fake database system as Database. It utilizes the database object sets with the DbArray and DbController system which I designed.

The system is similar to MVC Architecture. I tried to implement it primarily using Dependency Injection techniques.

To compile the system use the provided Makefile.

- make all
- make javadoc
- make run

```
pionix@PioDesk-Linux | ~/Codeshop/share
make
mkdir -p ./build; \
javac -d ./build ./src/com/pionix/*.java;
```

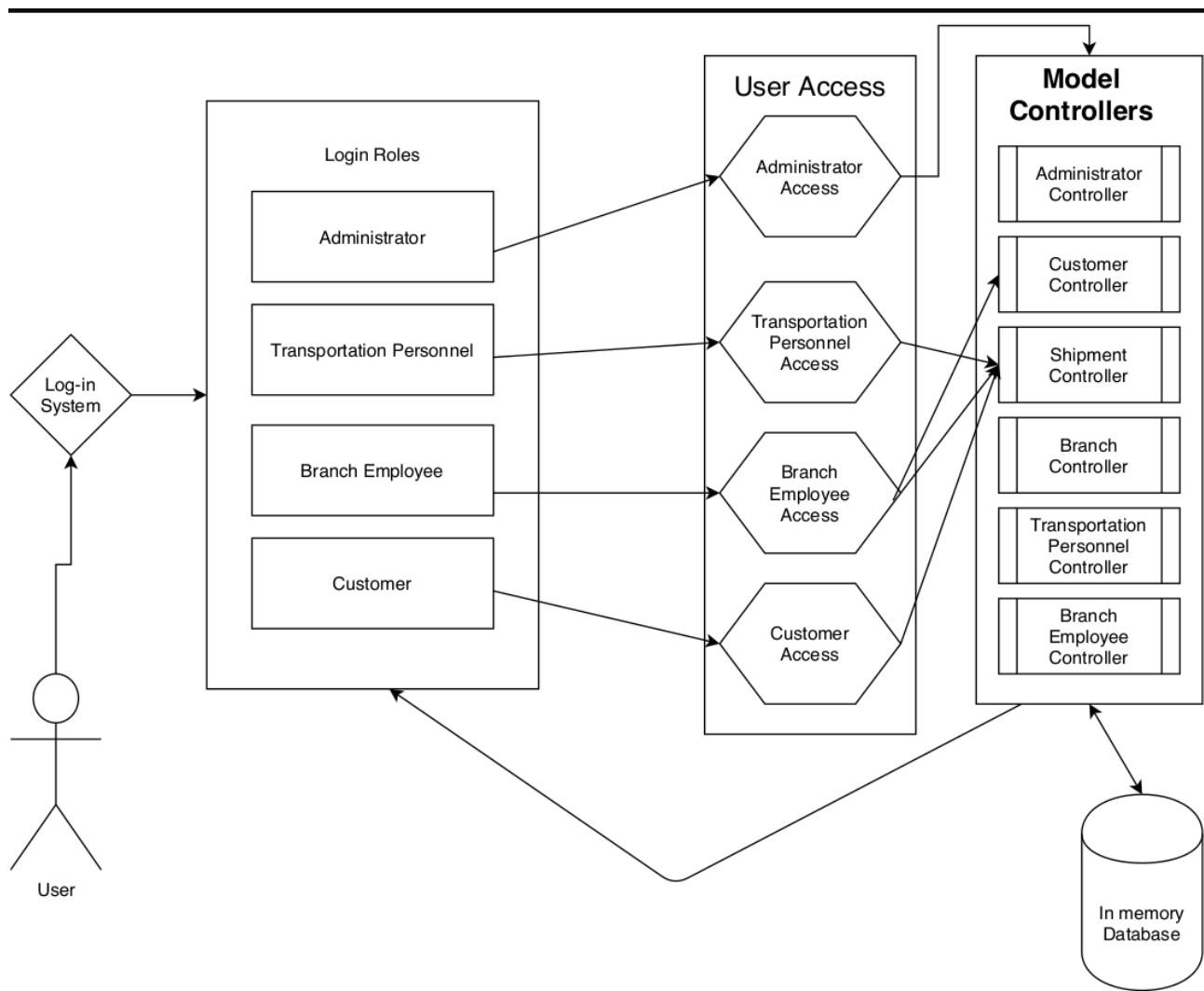
```
pionix@PioDesk-Linux | ~/Codeshop/sharedfoo/grade2-semester2/HW1-Things/SUBMIT | master
make run
java -cp ./build com.pionix.Main;
===== LOG-IN =====
Example users: Admin(Pionix), BranchEmployee(Haydar), TPEmployee(Ali), Customer(Asya), Customer(Kerem)
Check the seeder of database at Database class!
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
```

```
pionix@PioDesk-Linux | ~/Codeshop/sharedfoo/grade2-semester2/HW1-Things/SUBMIT | master
make run
java -cp ./build com.pionix.Main;
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Example users: Admin(Pionix), BranchEmployee(Haydar), TPEmployee(Ali), Customer(Asya), Customer(Kerem)
Check the seeder of database at Database class!
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
```

## 2. Use Case Diagrams

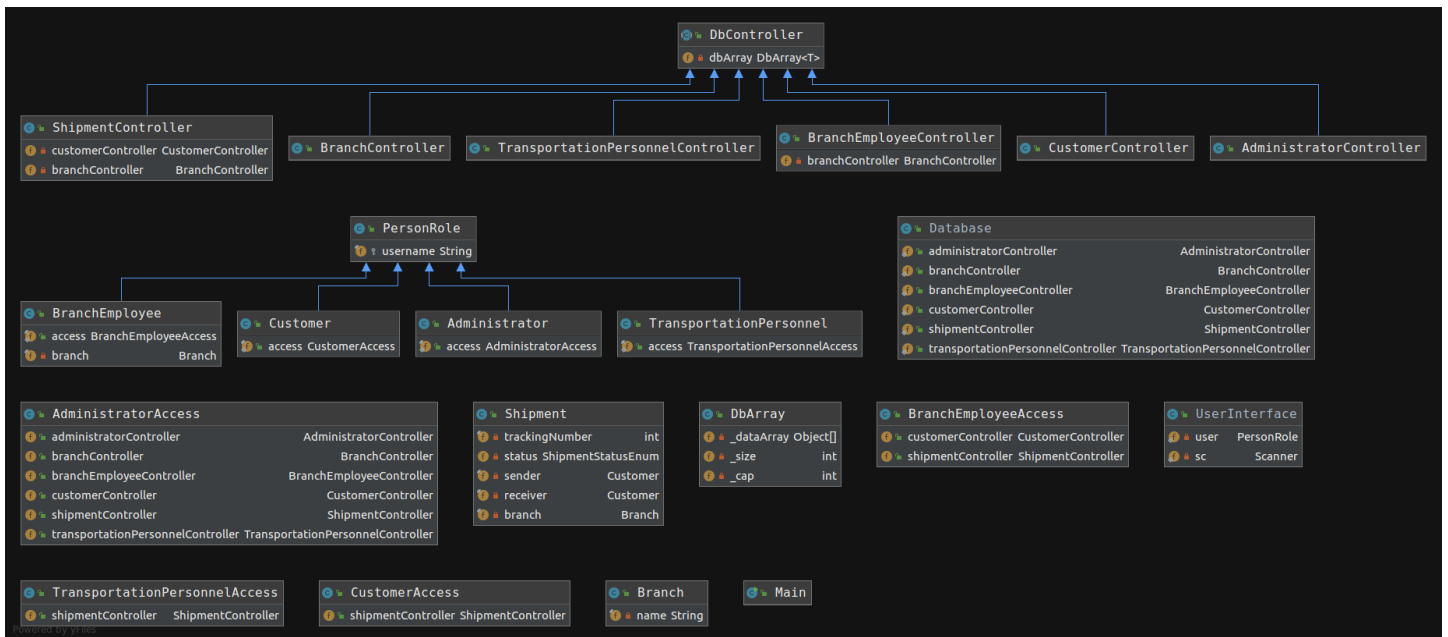
The user can login as 4 roles. Every role has different access levels to Model Controllers. Model Controllers control and manipulates the Models in Database.

For example a Branch Employee has User Access of a BranchEmployeeAccess. Which this access level has the access to ShipmentController and CustomerController. This way a BranchEmployee can manipulate shipments and customers in database.

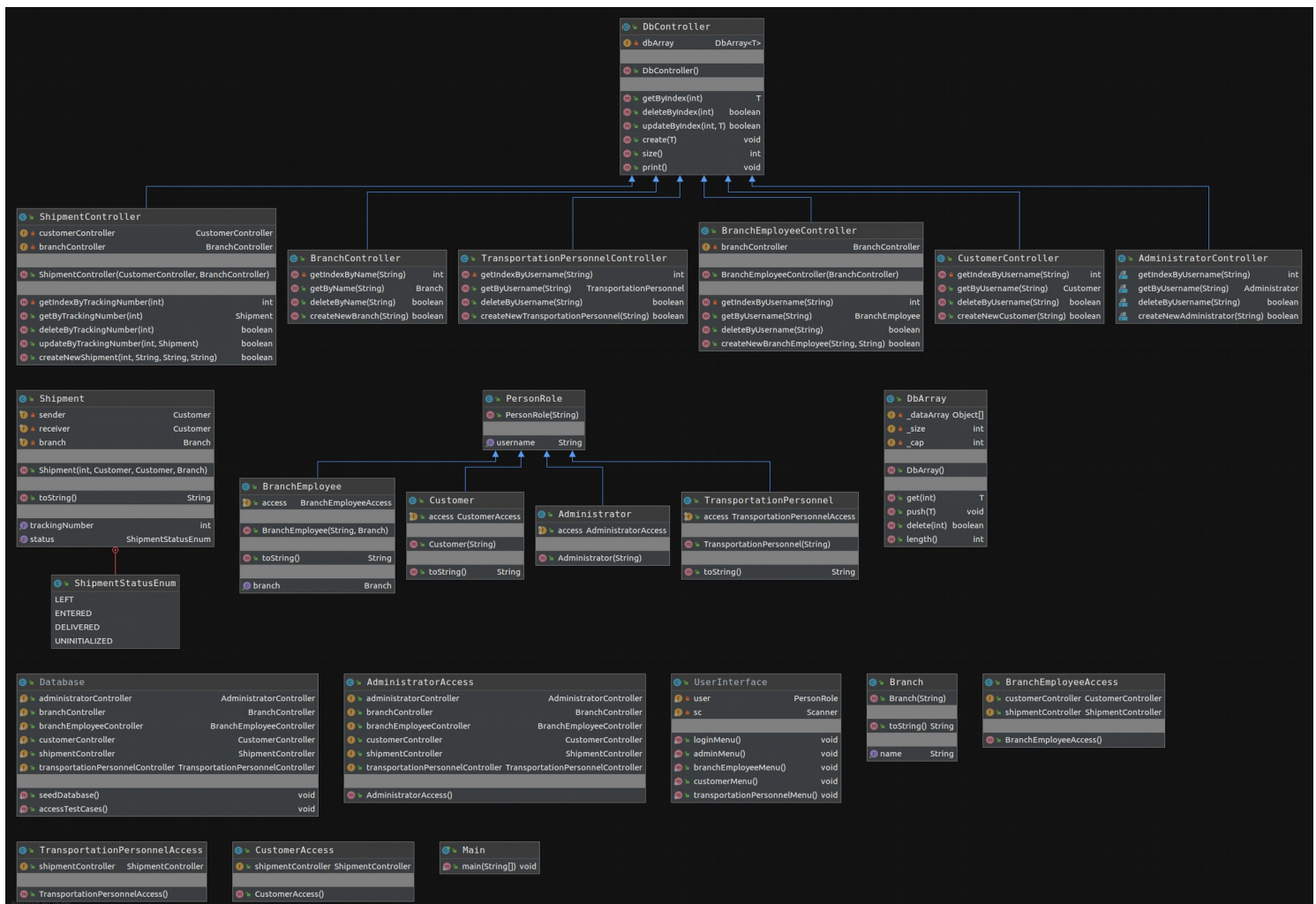


### 3. Class Diagrams

#### Minimal Class UML



#### Full Class UML



## 4. Problem Solution Approach

Problem was requiring me to somehow authorize users and restrict their access to the Database according to their roles. So I tried to make a system like MVC database architecture.

I started with building access units to database for every model. First I write every available model. Then made a Database Set class **DbArray** which holds the data as an array, can delete, add, get the data.

After that I made a Database controller class **DbController** which utilizes the given **DbArray** to manipulate the data inside it more.

So these classes are all abstract and we need the actual controllers so I started writing down every controller for every available model. Generally every model needs a specific way of get, set, delete and update.

For example **Shipment** model needs to be created with a tracking number, sender, receiver and an operating branch. So when creating this model I need to check if the sender is actually available in **Customers** database or the branch is an actual branch. These type of data checks are made in the controllers.

After writing controllers, I write access classes for roles. For instance Branch Employee person role needs to access Shipment and Customer controllers so I give that access to these access classes, **BranchEmployeeAccess**.

To Mimic a real life database I made the Database class which has the seedData function and Controllers as **Singleton classes**.

After that it was all about dependency injecting these access classes into Role classes. For example injectin **BranchEmployeeAccess** class into **BranchEmployee** class.

## 5. Test Cases

Test case for user access authorizations.

```
PersonRole user;

// Get the BranchEmployee named Mehmet from database
user = Database.branchEmployeeController.getByUsername("Mehmet");

// Down-case user object to role
BranchEmployee employee = (BranchEmployee) user;

// Access the employees abilities
// Just examples
// Wont create anything because there is no such customer named Foo and Goo
// No such branch named FooBranch
employee.access.customerController.getByUsername("Foo");

// No such tracking number
employee.access.shipmentController.getByTrackingNumber(123);

// Get the TPEmployee named Ali from database
user = Database.transportationPersonnelController.getByUsername("Ali");

// Down-case user object to role
TransportationPersonnel tPersonnel = (TransportationPersonnel) user;

// Access the tPersonnels abilities
tPersonnel.access.shipmentController.getByIndex(0);

user = Database.administratorController.getByUsername("AdminName");
Administrator admin = (Administrator) user;
admin.access.
```

- ⊞ administratorController... AdministratorAccess...
- ⊞ branchController : BranchController
- ⊞ branchEmployeeController : BranchEmployeeCont...
- ⊞ customerController : CustomerController
- ⊞ shipmentController : ShipmentController
- ⊞ transportationPersonnelController : Transport...
- ⊞ equals(Object obj) : boolean
- ⊞ getClass() : Class<?>
- ⊞ hashCode() : int
- ⊞ notify() : void
- ⊞ notifyAll() : void
- ⊞ toString() : String



## 6. Running and Results

### Admin menu example

```
└─ make run
java -cp ./build com.pionix.Main;
===== LOG-IN =====
Example users: Admin(Pionix), BranchE
Check the seeder of database at Datab
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
1
Username: Pionix
===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
3
Branch name: Ankara
Branch name: Istanbul
Branch name: Izmir
Branch name: Adana
Operation was successful!
```

### Adding branch employee to existing branch

```
===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
4
Enter username of the new employee: Batu
Enter name of the branch to station employee: Giresun
Operation was successful!
```

### Trying to add a duplicate branch

```
===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
1
Enter name of the new branch: Ankara
Branch name duplicate when creating new branch!
Operation was NOT successful!
```

### Adding new branch

```
===== ADMIN ===== Liberation Serial 16
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
1
Enter name of the new branch: Giresun
Operation was successful!

===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
3
Branch name: Ankara
Branch name: Istanbul
Branch name: Izmir
Branch name: Adana
Branch name: Giresun
Operation was successful!
```

## Trying to add a employee to non existing branch

```
===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
4
Enter username of the new employee: JohnDoe
Enter name of the branch to station employee: NonExisting
Branch not found when creating new Branch Employee!
Operation was NOT successful!
```

## Listing shipments

```
===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
10
100001: [Hakan] --> [Fatma]
        shipment entered the Ankara branch.
100002: [Asya] --> [Kerem]
        shipment entered the Izmir branch.
Operation was successful!
```



## Logging out

```
===== ADMIN =====
1- Add Branch
2- Remove Branch
3- List Branches
4- Add Branch Employee
5- Remove Branch Employee
6- List Branch Employees
7- Add Transportation Employee
8- Remove Transportation Personnel
9- List Transportation Personnel
10- List Shipments
11- List Customers
0- Logout
0
Goodbye Pionix.
Operation was successful!

===== LOG-IN =====
Example users: Admin(Pionix), BranchEmployee
Check the seeder of database at DatabaseSeeder.php
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
█
```

## Branch Employee Menu and trying to add shipment with non existing customers

```
===== Branch Employee [at] Ankara=====
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
1
Enter tracking number of the new shipment: 123
Enter username of sender: Foo
Enter username of receiver: Goo
Sender username not found!
Operation was NOT successful!
```

## Adding the non existing customers

```
===== Branch Employee [at] Ankara=====
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
5
Enter username of the new customer: Goo
Operation was successful!

===== Branch Employee [at] Ankara=====
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
7
Customer name: Kerem
Customer name: Eren
Customer name: Asya
Customer name: Fatma
Customer name: Hakan
Customer name: Foo
Customer name: Goo
Operation was successful!
```

## Creating a shipment (its status is “entered the ankara branch”)

```
===== Branch Employee [at] Ankara=====
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
1
Enter tracking number of the new shipment: 123
Enter username of sender: Foo
Enter username of receiver: Goo
Operation was successful!

===== Branch Employee [at] Ankara=====
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
4
100001: [Hakan] --> [Fatma]
        shipment entered the Ankara branch.
100002: [Asya] --> [Kerem]
        shipment entered the Izmir branch.
123: [Foo] --> [Goo]
        shipment entered the Ankara branch.
Operation was successful!
```

**Sending shipment out to transportation personnel (now status is “left the ankara branch”)**

```
D===== Branch Employee [at] Ankara=====16
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
2
Enter tracking number of the shipment to change: 123
Operation was successful!

===== Branch Employee [at] Ankara=====
1- Add Shipment
2- Register Shipment Exit from branch
3- Remove Shipment
4- List Shipments
5- Add Customer
6- Remove Customer
7- List Customers
0- Logout
4
100001: [Hakan] --> [Fatma]
        shipment entered the Ankara branch.
100002: [Asya] --> [Kerem]
        shipment entered the Izmir branch.
123: [Foo] --> [Goo]
        shipment left the Ankara branch.
Operation was successful!
```

**Logout and login as transportation personnel and deliver cargo(now status is “delivered”)**

```
6- Remove Customer
7- List Customers
0- Logout
0
Goodbye Haydar.
Operation was successful!

===== LOG-IN =====
Example users: Admin(Pionix), BranchEmployee(Haydar), TransportationEmployee(Taylan)
Check the seeder of database at Database class!
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
3
Username: Ali
===== Transportation Personnel =====
1- Deliver Shipment
0- Logout
1
Enter tracking number of the shipment: 123
123: [Foo] --> [Goo]
      shipment delivered to the customer from Ankara
Operation was successful!

===== Transportation Personnel =====
1- Deliver Shipment
0- Logout
```

## Logout and login as customer and check the cargo status

```
0- Logout
0
Goodbye Ali.
Operation was successful!

===== LOG-IN =====
Example users: Admin(Pionix), BranchEmployee(Haydar), TPEmployee
Check the seeder of database at Database class!
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
4
Username: Foo
===== Customer =====
1- Check Shipment
0- Logout
1
Enter tracking number of the shipment: 123
123: [Foo] --> [Goo]
        shipment delivered to the customer from  Ankara branch.
Operation was successful!

===== Customer =====
1- Check Shipment
0- Logout
```

## Logout and exit system

```
===== Customer =====
1- Check Shipment
0- Logout
0
Goodbye Foo.
Operation was successful!

===== LOG-IN =====
Example users: Admin(Pionix),
Check the seeder of database a
1- Admin
2- Branch Employee
3- Transportation Employee
4- Customer
5- Exit the system
5
Bye bye..
```