

Gebze Technical University
Computer Engineering

CSE 222
2017 Spring

HOMEWORK 02 REPORT

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1) Yazılı Soruların Cevapları

İlk 5 sorunun cevabı ekstra pdf olarak konulmuştur .6. sorunun cevabı rapora eklenmiştir.

06) Array, ArrayList, Linked List Karşılaştırması!

Remove fonksiyonu Linked List / ArrayList Karşılaştırması
LinkedList remove methodu ArrayList'e göre daha hızlıdır.

LinkedList yapısında, listedeki her iki komşu ögesine işaret eden iki işaretçi yeni adres tutar.
Eleman kaldırma işleminde, linked listte kaldırılacak olan düğümün iki elemanında adres değişikliği olurken ArrayList'te tüm ögelerin kaydırılması gerekir.

⇒ ArrayList ve LinkedListte remove ve add methodlarını bu classların hazır methodları olarak kodunda kullandım. Ama Array classının remove ve add fonksiyonları tanımlı olmadığı için kendim implement ettim bu iki fonksiyonu.

Arrayde eleman ekledikçe yeni yer alması gerektiği için new ile alacağımız yer runtime'da ekstra iş yapılması demektir.

2. Problem Solutions Approach

Bilgileri kullanıcıdan olabildiğince saklanmak amaçlanmıştır. Encapsulation amaçlanarak oluşturulan hiyerarşide **interface** kullanılmıştır.

Interface mantığı ile oluşturduğum ödevde methodlar **Override** edilmiştir.

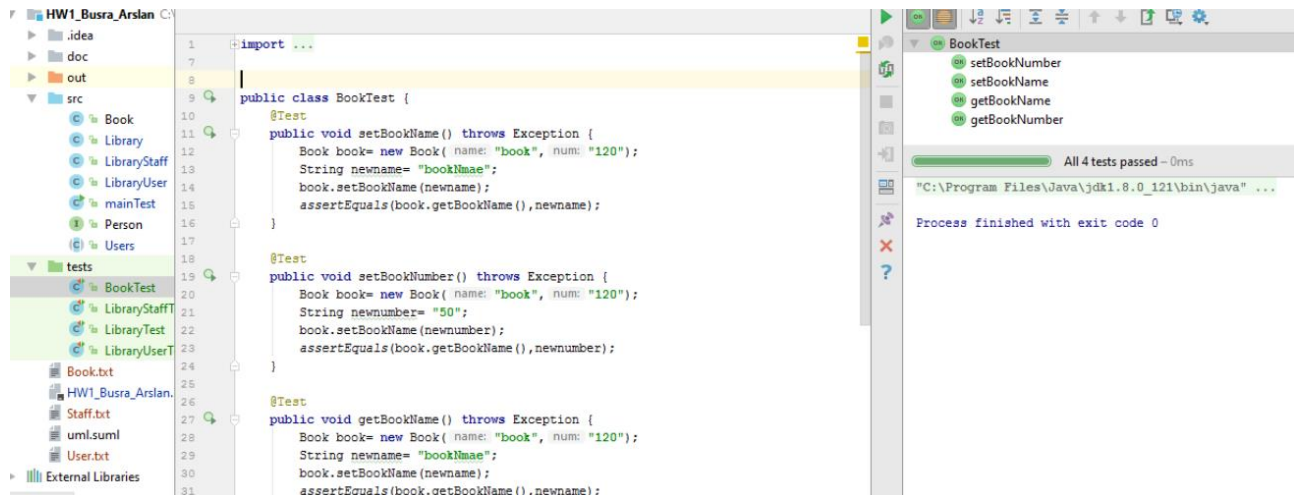
Inheritance ile değişik kullanıcılar eklenebilmesi amaçlanmıştır. Böylelikle sistem üzerinde sonradan değişiklik olur.

Polimorfizm düzeni kullanılarak da encapsulation sağlanmıştır.

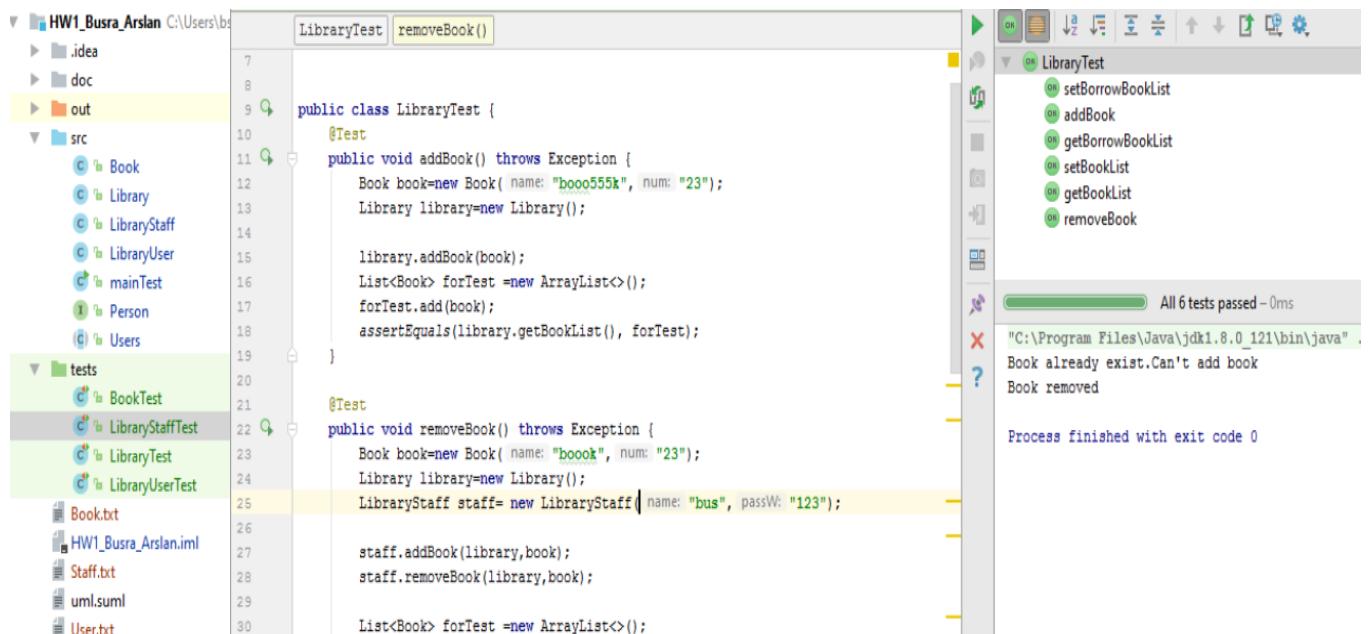
- ArrayList ilk ödevimde yaptığım şekildi.
- ArrayListi LinkedList'e çevirerek LinkedList'te de mevcut olan remove ve add fonksiyonlarını kullandım. LinkedList'in remove gibi bazı fonksiyonları ArrayList'ten hızlı çalışır.
- Array kullanabilmek için kitap ekleme ve çıkarma işlemlerinde kullandığım remove ve add fonksiyonlarını kendim yazmam gerekti ve bu fonksiyonları iki ayrı class için implement ettim.
- Ayrıca get(index) fonksiyonu yerine [] index kullanıldı.
- Array'e eleman ekledikçe yerimizi arttırmamız yada bu size dan sonra ekleme işlemi yapamazsın şeklinde uyarı vermemiz gerekiyordu. Bunların kontrolleri sağlandı.
- Performans analizi yapıldı.
- İlk ödevdeki polimorfizm inheritance ve encapsulation mantığı array ve linkedList içinde uygulandı.

[illegible]

Book Class Test



Library Class Test



LibraryStaff Class Test

The screenshot shows the IntelliJ IDEA IDE with the `LibraryStaffTest` class open. The class contains two test methods: `addBook()` and `removeBook()`. The `addBook()` method tests the `addBook()` method of the `LibraryStaff` class. The `removeBook()` method tests the `removeBook()` method of the `LibraryStaff` class. The test results panel on the right shows that all 6 tests passed in 0ms. The test output shows the following messages:

- User added by staff
- Book added
- Book already exist.Can't add book
- Book removed

Process finished with exit code 0

LibraryUser Class Test

The screenshot shows the IntelliJ IDEA IDE with the `LibraryUserTest` class open. The class contains two test methods: `borrowBook()` and `returnBook()`. The `borrowBook()` method tests the `borrowBook()` method of the `LibraryUser` class. The `returnBook()` method tests the `returnBook()` method of the `LibraryUser` class. The test results panel on the right shows that all 2 tests passed in 16ms. The test output shows the following messages:

- Book returned
- Book already exist.Can't return book
- Book borrowed

Process finished with exit code 0

Book Class Test



Library Class Test

The screenshot shows the IntelliJ IDEA IDE with the `LibraryTest` class open. The class is located in the `test` directory under `hw2_linkedList`. The code defines two test methods: `addBook()` and `setBorrowBookList()`. The `addBook()` method creates a `Book` object with name "booo555k" and number "23", adds it to a `Library` object, and asserts that the `getBookList()` returns the expected list. The `setBorrowBookList()` method creates a `Book` object with name "boook" and number "23", adds it to a `Library` object, sets the `Library` object's `setBorrowBookList()` method to return the expected list, and asserts that the `getBorrowBookList()` returns the expected list.

```
1 import ...
2
3 /**
4  * Created by bs on 5.3.2017.
5  */
6
7 public class LibraryTest {
8     @Test
9     public void addBook() throws Exception {
10         Book book=new Book( name: "booo555k", num: "23");
11         Library library=new Library();
12
13         library.addBook(book);
14         LinkedList<Book> forTest =new LinkedList<>();
15         forTest.add(book);
16         assertEquals(library.getBookList(), forTest);
17     }
18
19     @Test
20     public void setBorrowBookList() throws Exception {
21         Book book=new Book( name: "boook", num: "23");
22         Library library= new Library();
23         int i=0;
24
25         LinkedList<Book> forTest =new LinkedList<>();
26         forTest.add(book);
27         library.setBorrowBookList(forTest);
28         assertEquals(library.getBorrowBookList(), forTest);
29     }
30 }
31
32 @Test
```

The test results panel on the right shows that all 5 tests passed in 5ms. The process finished with exit code 0.

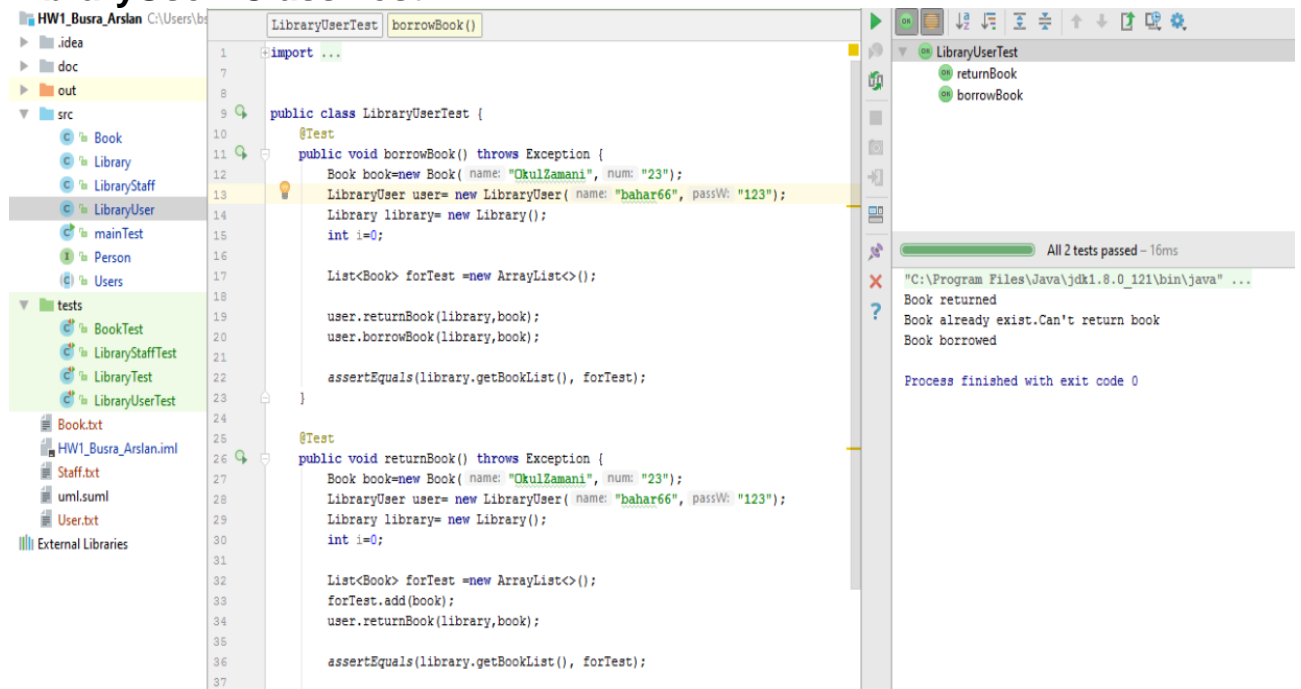
LibraryUser Class Test

The screenshot shows the IntelliJ IDEA IDE with the `LibraryUserTest` class open. The class is located in the `test` directory under `hw2_linkedList`. The code defines two test methods: `borrowBook()` and `returnBook()`. The `borrowBook()` method creates a `Book` object with name "OkulZamani" and number "23", creates a `LibraryUser` object with name "bahar66" and password "123", adds the `Book` object to the `Library` object, and asserts that the `Library` object's `getBookList()` returns the expected list. The `returnBook()` method creates a `Book` object with name "OkulZamani" and number "23", creates a `LibraryUser` object with name "bahar66" and password "123", and asserts that the `Library` object's `getBookList()` returns the expected list.

```
1 import org.junit.Test;
2
3 import java.util.LinkedList;
4
5 import static org.junit.Assert.*;
6
7 /**
8  * Created by bs on 5.3.2017.
9  */
10
11 public class LibraryUserTest {
12     @Test
13     public void borrowBook() throws Exception {
14         Book book=new Book( name: "OkulZamani", num: "23");
15         LibraryUser user= new LibraryUser( name: "bahar66", passW: "123");
16         Library library= new Library();
17         int i=0;
18
19         LinkedList<Book> forTest =new LinkedList<>();
20
21         user.returnBook(library,book);
22         user.borrowBook(library,book);
23
24         assertEquals(library.getBookList(), forTest);
25     }
26
27     @Test
28     public void returnBook() throws Exception {
29         Book book=new Book( name: "OkulZamani", num: "23");
30         LibraryUser user= new LibraryUser( name: "bahar66", passW: "123");
31         Library library= new Library();
32         int i=0;
```

The test results panel on the right shows that all 2 tests passed in 0ms. The process finished with exit code 0.

Book Class Test



LibraryStaff Class Test

The screenshot shows the IntelliJ IDEA IDE with the `LibraryStaffTest` class open. The left sidebar displays the project structure, including the `src` and `tests` folders. The `tests` folder contains `BookTest`, `LibraryStaffTest`, `LibraryTest`, and `LibraryUserTest`. The `LibraryStaffTest` class is selected, and the `removeBook()` method is highlighted. The code in the editor is as follows:

```
48 assertEquals(staff.getLibraryUserList(), forTest);
49 }
50
51 @Test
52 public void addBook() throws Exception {
53     Book book=new Book( name: "boook", num: "23");
54     LibraryStaff staff= new LibraryStaff( name: "bulut", passW: "123");
55     Library library= new Library();
56     int i=0;
57
58     staff.addBook(library,book);
59     List<Book> forTest =new ArrayList<>();
60     forTest.add(book);
61
62     assertEquals(library.getBookList(), forTest);
63 }
64
65 @Test
66 public void removeBook() throws Exception {
67
68     Book book=new Book( name: "boook", num: "23");
69     LibraryStaff staff= new LibraryStaff( name: "bulut", passW: "123");
70     Library library= new Library();
71
72     List<Book> forTest =new ArrayList<>();
73
74     staff.addBook(library,book);
75     staff.removeBook(library,book);
76     assertEquals(library.getBookList(), forTest);
77 }
78
```

The right sidebar shows the test results for `LibraryStaffTest`. The tests passed are:

- registerUser
- setLibraryUserList
- addBook
- registerUserList
- removeBook
- getLibraryUserList

The test results summary shows "All 6 tests passed - 0ms". The output window displays the following messages:

```
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
User added by staff
Book added
Book already exist.Can't add book
Book removed
Process finished with exit code 0
```

Library Class Test

The screenshot shows the IntelliJ IDEA IDE with the `LibraryTest` class open. The left sidebar displays the project structure, including the `src` and `tests` folders. The `tests` folder contains `BookTest`, `LibraryStaffTest`, `LibraryTest`, and `LibraryUserTest`. The `LibraryTest` class is selected, and the `removeBook()` method is highlighted. The code in the editor is as follows:

```
7
8
9 public class LibraryTest {
10     @Test
11     public void addBook() throws Exception {
12         Book book=new Book( name: "booo555k", num: "23");
13         Library library=new Library();
14
15         library.addBook(book);
16         List<Book> forTest =new ArrayList<>();
17         forTest.add(book);
18         assertEquals(library.getBookList(), forTest);
19     }
20
21     @Test
22     public void removeBook() throws Exception {
23         Book book=new Book( name: "boook", num: "23");
24         Library library=new Library();
25         LibraryStaff staff= new LibraryStaff( name: "bus", passW: "123");
26
27         staff.addBook(library,book);
28         staff.removeBook(library,book);
29
30         List<Book> forTest =new ArrayList<>();
31     }
32 }
```

The right sidebar shows the test results for `LibraryTest`. The tests passed are:

- setBorrowBookList
- addBook
- getBorrowBookList
- setBookList
- getBookList
- removeBook

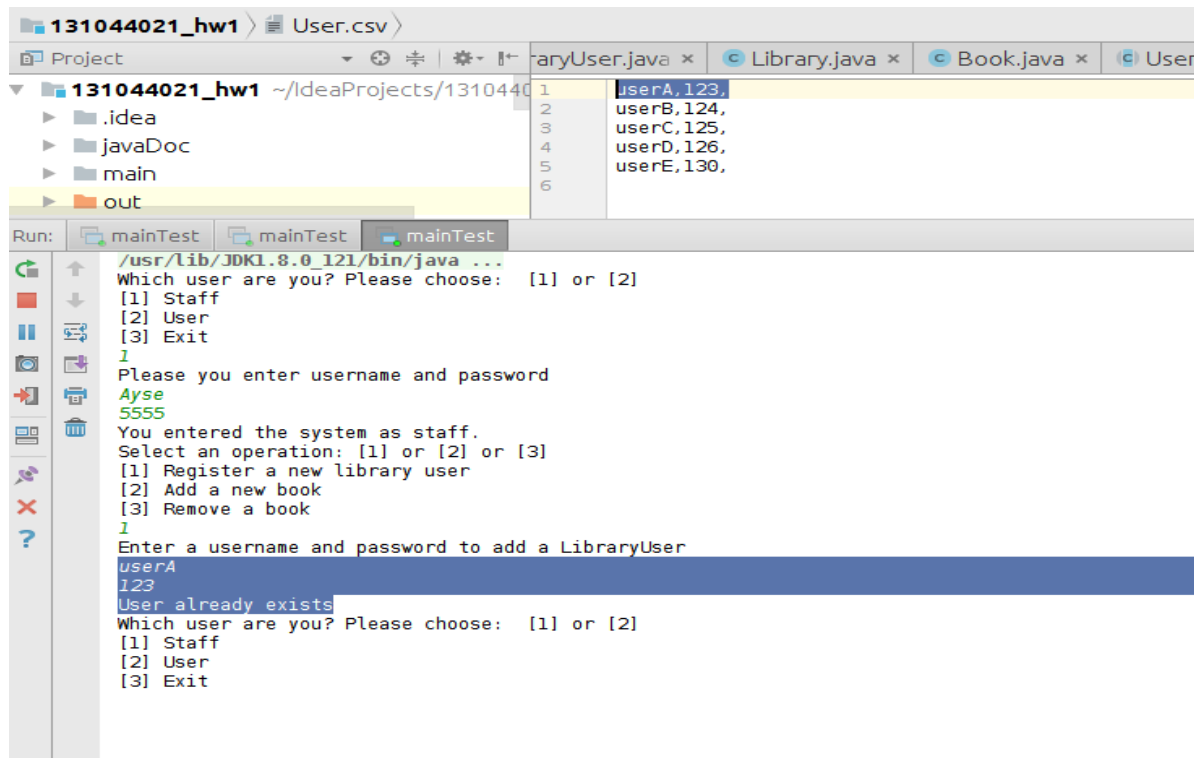
The test results summary shows "All 6 tests passed - 0ms". The output window displays the following messages:

```
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
Book already exist.Can't add book
Book removed
Process finished with exit code 0
```

4. Running and Results

ArrayList

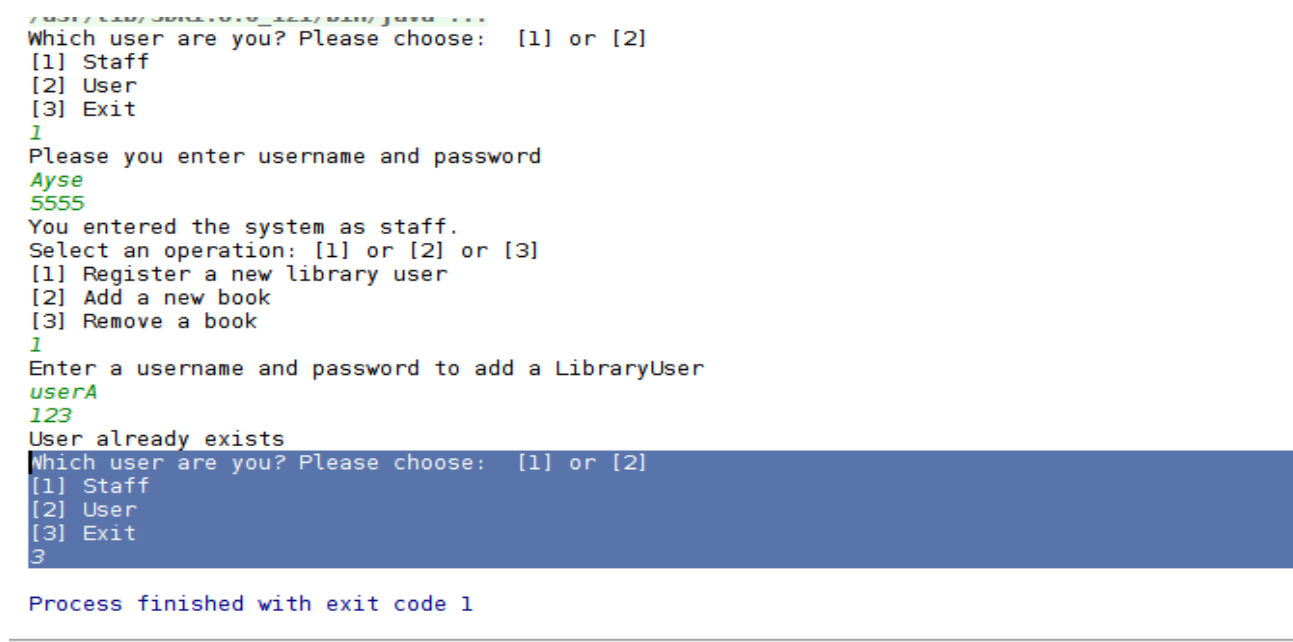
- Eklencek user eğer dosyada yani listemizde varsa listede mevcuttur bilgisi verir.



The screenshot shows an IDE with a project named '131044021_hw1'. The 'User.csv' file is open, displaying a list of users: 'userA,123,', 'userB,124,', 'userC,125,', 'userD,126,', and 'userE,130,'. The console output shows the application running. It prompts the user to choose a user type (Staff, User, Exit) and then asks for a username and password. The user enters 'Ayse' and '5555', and the application confirms they entered as staff. It then prompts for an operation (Register, Add, Remove) and the user chooses to register a new library user. It asks for a username and password to add a new user. The user enters 'userA' and '123', and the application displays 'User already exists'.

```
131044021_hw1 > User.csv
Project
131044021_hw1 ~/IdeaProjects/131044021_hw1
  .idea
  javaDoc
  main
  out
Run: mainTest mainTest mainTest
/usr/lib/jdk1.8.0_121/bin/java ...
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
1
Please you enter username and password
Ayse
5555
You entered the system as staff.
Select an operation: [1] or [2] or [3]
[1] Register a new library user
[2] Add a new book
[3] Remove a book
1
Enter a username and password to add a LibraryUser
userA
123
User already exists
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
```

- Exit komutu ile sistemden çıkılır.Exit denmediği sürece sistem işlem bittikten sonra sistemi en baştan çalıştırarak menüye devam eder.



The screenshot shows a terminal window with the application's output. It prompts the user to choose a user type (Staff, User, Exit) and then asks for a username and password. The user enters 'Ayse' and '5555', and the application confirms they entered as staff. It then prompts for an operation (Register, Add, Remove) and the user chooses to register a new library user. It asks for a username and password to add a new user. The user enters 'userA' and '123', and the application displays 'User already exists'. The user then chooses to exit the application by entering '3'. The application finishes with exit code 1.

```
/usr/lib/jdk1.8.0_121/bin/java ...
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
1
Please you enter username and password
Ayse
5555
You entered the system as staff.
Select an operation: [1] or [2] or [3]
[1] Register a new library user
[2] Add a new book
[3] Remove a book
1
Enter a username and password to add a LibraryUser
userA
123
User already exists
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
3
Process finished with exit code 1
```

- User bir kitap ödünç aldığı anda(borrow) dosyada alınan kitap güncellenir. Kitap listesinden silinir ve ödünç alınan kitap listesine eklenir.
- HeidiDagda, 123 numaralı kitap dosyadan silindi ve artık dosyada yok.

- Bir üstteki resimde HeidiDagda isimli 123 numaralı kitabı user ödünç almıştı. Eğer user bir kitabı ödünç aldıktan sonra staff aynı kitabı remove etmek isterse ; o kitap borrowBookList adlı ayrı bir listede tutulduğu için bunun kontrolü yapılır ve uyarı yazısı verilir.

- Staff kitap eklemek isterse ama kitap listede varsa listeye kitap eklenmez.
- Ama listede yani dosyada olmayan bir kitap eklenirse kitap hem listeye hem dosyaya eklenir. (Listede değişen kitap verisi sürekli olarak dosyaya update edilir.)

The screenshot shows an IDE with a project named '131044021_hw1'. The project structure includes a 'main' directory. The 'Book.csv' file is open, showing a list of books with their IDs, names, and prices. The console output shows the program's execution, including adding a new book and logging in as a staff member.

ID	Book Name	Price
1	HeidiDagda	123
2	BurdaMevsimKis	563
3	Shrek	40
4	BuzDevri	30
5	BaliklarNasilYuzer	89

```

Run: mainTest
[2] Add a new book
[3] Remove a book
2
Enter a bookName and number to add a Book
Shrek
40
Book already exist.Can't add book
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
1
Please you enter username and password
Veli 1111
This staff does not exist on the list
Please you repeat entered username and password
Veli 1111
You entered the system as staff.
Select an operation: [1] or [2] or [3]
[1] Register a new library user
[2] Add a new book
[3] Remove a book
2
Enter a bookName and number to add a Book
GTU
36
Book added
Which user are you? Please choose: [1] or [2]
[1] Staff

```

- Staff listede yani dosyada da olmayan bir kitap eklendiğinde dosyayı günceller.Yeni kitabı dosyaya ekler.

The screenshot shows the same IDE with the 'Book.csv' file open. The console output shows the program's execution, including removing a book and logging in as a staff member. A red circle highlights the 'Add a new book' option in the menu.

ID	Book Name	Price
2	BurdaMevsimKis	563
3	Shrek	40
4	BuzDevri	30
5	BaliklarNasilYuzer	89

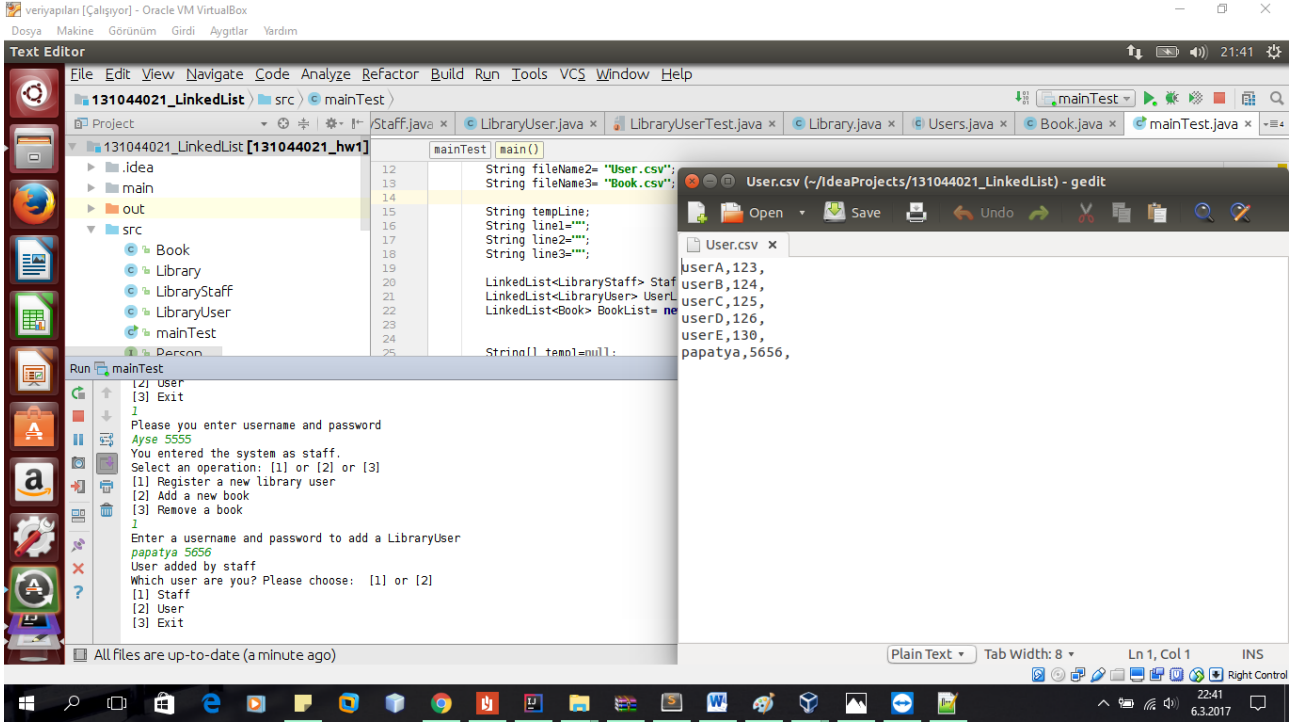
```

mainTest
[3] Remove a book
3
Enter a bookName and number to remove a Book
GTU
36
Book removed
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
1
Please you enter username and password
Ayse 5555
You entered the system as staff.
Select an operation: [1] or [2] or [3]
[1] Register a new library user
[2] Add a new book
[3] Remove a book
2
Enter a bookName and number to add a Book
GTU
36
Book added
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User

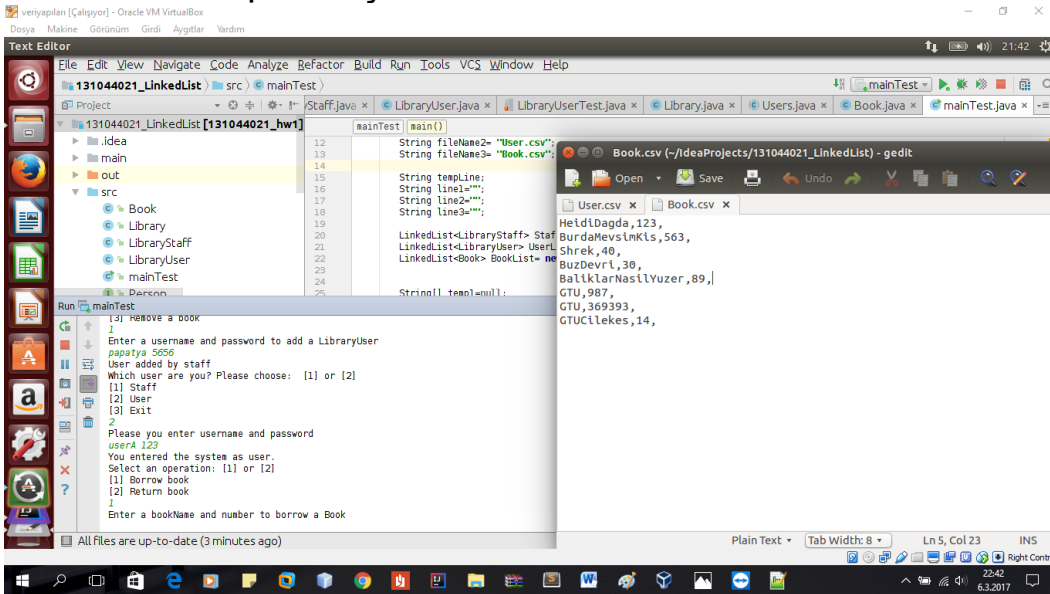
```

LinkedList

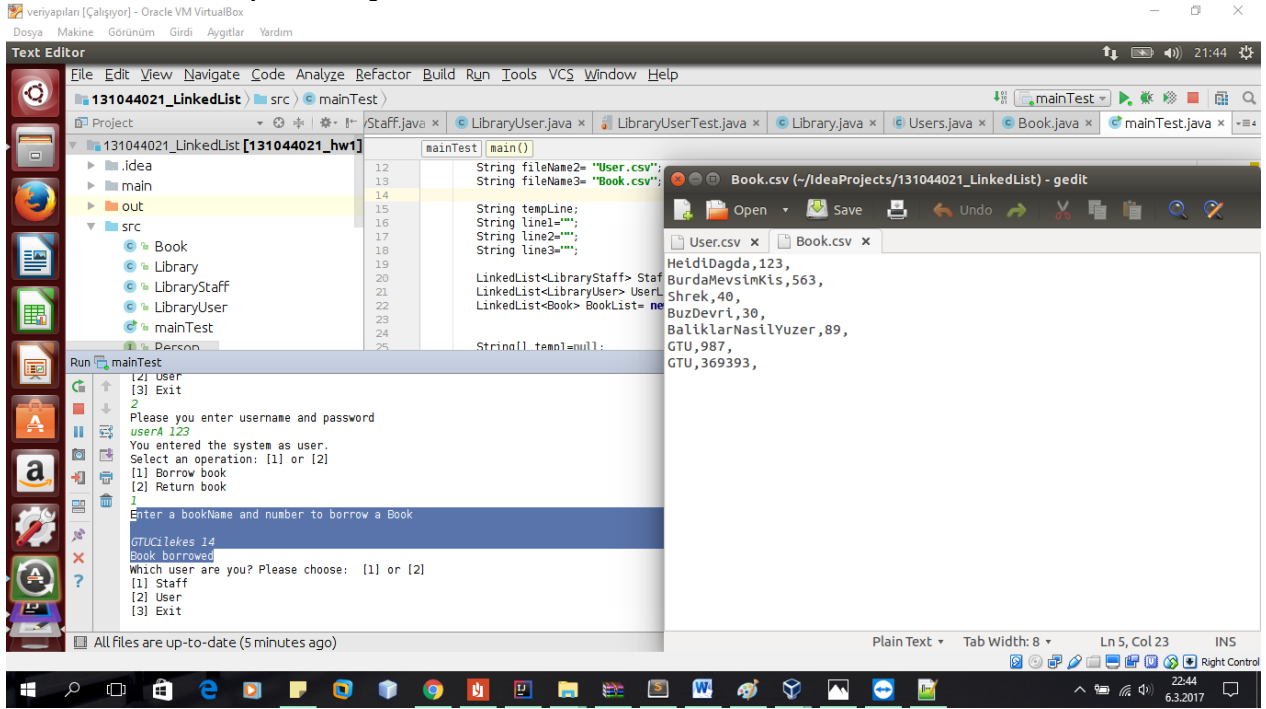
- User ekleme işlemi staff tarafından gerçekleştirildi. Dosyada güncellendi.



- User kitap ödünç almadan önce



- User kitap ödünç aldıktan sonra



The screenshot shows an IDE (IntelliJ IDEA) with a project named "131044021_LinkedList". The project structure includes a "src" directory with files "Book", "Library", "LibraryStaff", "LibraryUser", and "mainTest". The "mainTest.java" file is open, showing the main method. The run console shows the program's execution, including user input and output. A gedit window shows the contents of the "Book.csv" file.

```
mainTest [main()
12 String fileName2= "User.csv";
13 String fileName3= "Book.csv";
14
15 String tempLine;
16 String line1="";
17 String line2="";
18 String line3="";
19
20 LinkedList<LibraryStaff> StaffList= new LinkedList<LibraryStaff>();
21 LinkedList<LibraryUser> UserList= new LinkedList<LibraryUser>();
22 LinkedList<Book> BookList= new LinkedList<Book>();
23
24 String[] temp=null;
25
```

Run mainTest

```
[2] User
[3] Exit
2
Please you enter username and password
userA 123
You entered the system as user.
Select an operation: [1] or [2]
[1] Borrow book
[2] Return book
1
Enter a bookName and number to borrow a Book
GTUÇilekes 14
Book borrowed
Which user are you? Please choose: [1] or [2]
[1] Staff
[2] User
[3] Exit
```

Book.csv (~/.IdeaProjects/131044021_LinkedList) - gedit

```
User.csv x Book.csv x
HeidiDagda,123,
BurdaMevstMKIs,563,
Shrek,40,
BuzDevri,30,
BalıklarNasılYuzer,89,
GTU,987,
GTU,369393,
```

Array

- Staff user eklemiştir.

The screenshot shows an IDE with the following components:

- Project Explorer:** Displays the project structure with folders like 'src' and 'out', and files like 'Book', 'Library', 'LibraryStaff', 'LibraryUser', 'mainTest', and 'Person'.
- Code Editor:** Shows the 'mainTest.java' file with the following code:

```
1 import ...
2
3 public class mainTest {
4
5     public static void main(String[])
6     {
7         //Staff Users ve Book için D
8         String fileName1 = "Staff.csv"
9         String fileName2 = "User.csv"
10        String fileName3 = "Book.csv"
11
12        String tempLine;
13        String line1 = "";
14        int tempSizel = 0;
```

- Run Console:** Displays the output of the program:

```
1 Please you enter username and password
2 Ayse 5555
3 You entered the system as staff.
4 Select an operation: [1] or [2] or [3]
5 [1] Register a new library user
6 [2] Add a new book
7 [3] Remove a book
8 1
9 Enter a username and password to add a LibraryUser
10 papatya 555
11 User added by staff
12 Which user are you? Please choose: [1] or [2]
13 [1] Staff
14 [2] User
15 [3] Exit
```

- File Explorer:** Shows the 'User.csv' file with the following content:

```
userA,123,
userB,124,
userC,125,
userD,126,
userE,130,
papatya,555,
```

- Eğer iade edilmek istenen kitap listede varsa kitap mevcuttur der ve ekleme yapmaz.

The screenshot shows the IDE with the following components:

- Code Editor:** Shows the 'mainTest.java' file with the same code as the previous screenshot.
- Run Console:** Displays the output of the program:

```
1 Please you enter username and password
2 userA
3 123
4 You entered the system as user.
5 Select an operation: [1] or [2]
6 [1] Borrow book
7 [2] Return book
8 2
9 Enter a bookName and number to borrow a Book
10 Shrek 40
11 Book already exist.Can't return book
12 Which user are you? Please choose: [1] or [2]
13 [1] Staff
14 [2] User
15 [3] Exit
```

- File Explorer:** Shows the 'Book.csv' file with the following content:

```
HeidiDagda,123,
BurdaMevsimKis,563,
Shrek,40,
BuzDevri,30,
BaltiklarNasilYuzer,89,
GTU,987,
GTU,369393,
```