

# PROJECT 2 REPORT

## Overview:

Our project is a Library management system which is used to maintain the record of the library. This helps to maintain a database that is useful to enter new books and records of the books in the library borrowed by the customers, with the respective submission dates. It allows the staff to maintain library resources in a more operative manner that will help to save their time. It is also convenient for the staff to manage the process of book allotting and making payment.

## Tables creation:

```
create table book(book_id int, book_name varchar(40), author_name  
varchar(40), category varchar(25), price int, numofcopies int, primary  
key(book_id));
```

```
create table staff(staff_id int, staff_name varchar(40), staff_phno  
varchar(15), staff_email varchar(50), staff_add varchar(100), primary  
key(staff_id));
```

```
create table customer(cust_id int, cust_name varchar(40), cust_phno  
varchar(15), cust_email varchar(50), primary key(cust_id));
```

```
create table bookcode(book_id int, isbn_num varchar(20), primary  
key(isbn_num), foreign key(book_id) references book(book_id));
```

```
create table records(cust_id int, isbn_num varchar(20), staff_id int,  
issue_date varchar(20), return_date varchar(20), pay_status varchar(20),  
paid_amount int, foreign key (cust_id) references customer(cust_id), foreign  
key (isbn_num) references bookcode(isbn_num),foreign key (staff_id)  
references staff(staff_id));
```

```
tejaswini@tejaswini-VirtualBox:~$ mysql -u dbmsproject -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.26-ubuntu0.20.04.2 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use lms;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> select * from book;
+----+-----+-----+-----+-----+
| book_id | book_name | author_name | category | price | numofcopies |
+----+-----+-----+-----+-----+
| 1001 | My Journey | A.P.J. Abdul Kalam | Autobiography | 195 | 15 |
| 1002 | The Overstory | Richard Powers | Environmental fiction | 599 | 10 |
| 1003 | The 3 Mistakes of My Life | Chetan Bhagat | Fiction | 250 | 12 |
| 1004 | Dracula | Bram Stoker | Horror | 199 | 3 |
+----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql> select * from customer;
+----+-----+-----+-----+
| cust_id | cust_name | cust_phno | cust_email |
+----+-----+-----+-----+
| 3001 | Park Jimin | 9000003001 | jimin3001@gmail.com |
| 3002 | Jessica | 9000003002 | jessi3002@gmail.com |
+----+-----+-----+-----+
```

```
tejaswini@tejaswini-VirtualBox:~$ 
| 3003 | Mina Agarwal | 9000003003 | mina3003@gmail.com |
+----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> select * from staff;
+----+-----+-----+-----+
| staff_id | staff_name | staff_phno | staff_email | staff_addr |
+----+-----+-----+-----+
| 2001 | Riya Varna | 9000002001 | riyav2001@gmail.com | Belur, Dharwad |
| 2002 | Taehyung Kim | 9000002002 | ktntae2002@gmail.com | Seoul, South Korea |
| 2003 | Gourt Khan | 9000002003 | gourtkhan2003@gmail.com | Mumbai, India |
+----+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> select * from records;
+----+-----+-----+-----+-----+-----+
| cust_id | isbn_num | staff_id | issue_date | return_date | pay_status | paid_amount |
+----+-----+-----+-----+-----+-----+
| 3001 | 1004002 | 2002 | 30-10-2021 | 2-11-2021 | complete | 100 |
+----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> select * from bookcode;
+----+-----+
| book_id | isbn_num |
+----+-----+
| 1001 | 1001001 |
| 1001 | 10010010 |
| 1001 | 10010011 |
| 1001 | 10010012 |
| 1001 | 10010013 |
| 1001 | 10010014 |
| 1001 | 10010015 |
| 1001 | 1001002 |
| 1001 | 1001003 |
| 1001 | 1001004 |
+----+-----+
```

```
tejaswini@tejaswini-VirtualBox:~$ 
| 1001 | 1001003 |
| 1001 | 1001004 |
| 1001 | 1001005 |
| 1001 | 1001006 |
| 1001 | 1001007 |
| 1001 | 1001008 |
| 1001 | 1001009 |
| 1002 | 1002001 |
| 1002 | 10020010 |
| 1002 | 1002002 |
| 1002 | 1002003 |
| 1002 | 1002004 |
| 1002 | 1002005 |
| 1002 | 1002006 |
| 1002 | 1002007 |
| 1002 | 1002008 |
| 1002 | 1002009 |
| 1003 | 1003001 |
| 1003 | 10030010 |
| 1003 | 10030011 |
| 1003 | 10030012 |
| 1003 | 1003002 |
| 1003 | 1003003 |
| 1003 | 1003004 |
| 1003 | 1003005 |
| 1003 | 1003006 |
| 1003 | 1003007 |
| 1003 | 1003008 |
| 1003 | 1003009 |
| 1004 | 1004001 |
| 1004 | 1004002 |
| 1004 | 1004003 |
+----+-----+
40 rows in set (0.00 sec)

mysql>
```

## ER Model:

	Table name	Attribute Names
Entity	book	book_id, book_name, author_name, category, price, numofcopies
Entity	staff	staff_id, staff_name, staff_phno, staff_email, staff_add
Entity	customer	cust_id, cust_name, cust_phno, cust_email
Entity	bookcode	book_id, isbn_num
Relationship	records	cust_id, isbn_num, staff_id, issue_date, return_date, pay_status, paid_amount

## Keys:

Table name	Primary Key	Foriegn Key
book	book_id	-
staff	staff_id	-
customer	cust_id	-
bookcode	isbn_num	book_id references book
records	cust_id, isbn_num, issue_date	cust_id references customer, isbn_num references bookcode, staff_id references staff

```

tejaswini@tejaswini-VirtualBox: ~
mysql> describe book;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| book_id | int   | NO   | PRI | NULL    |       |
| book_name | varchar(40) | YES  |     | NULL    |       |
| author_name | varchar(40) | YES  |     | NULL    |       |
| category | varchar(25) | YES  |     | NULL    |       |
| price | int   | YES  |     | NULL    |       |
| numofcopies | int   | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+
6 rows in set (0.02 sec)

mysql> describe staff;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| staff_id | int   | NO   | PRI | NULL    |       |
| staff_name | varchar(40) | YES  |     | NULL    |       |
| staff_phno | varchar(15) | YES  |     | NULL    |       |
| staff_email | varchar(50) | YES  |     | NULL    |       |
| staff_addr | varchar(100) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+
5 rows in set (0.01 sec)

mysql> describe customer;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| cust_id | int   | NO   | PRI | NULL    |       |
| cust_name | varchar(40) | YES  |     | NULL    |       |
| cust_phno | varchar(15) | YES  |     | NULL    |       |
| cust_email | varchar(50) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql> describe records;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| cust_id | int   | YES  | MUL | NULL    |       |
| isbn_num | varchar(20) | YES  | MUL | NULL    |       |
| staff_id | int   | YES  | MUL | NULL    |       |
| issue_date | varchar(20) | YES  |     | NULL    |       |
| return_date | varchar(20) | YES  |     | NULL    |       |
| pay_status | varchar(20) | YES  |     | NULL    |       |
| paid_amount | int   | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+
7 rows in set (0.01 sec)

mysql> describe bookcode;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| book_id | int   | YES  | MUL | NULL    |       |
| isbn_num | varchar(20) | NO   | PRI | NULL    |       |
+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>

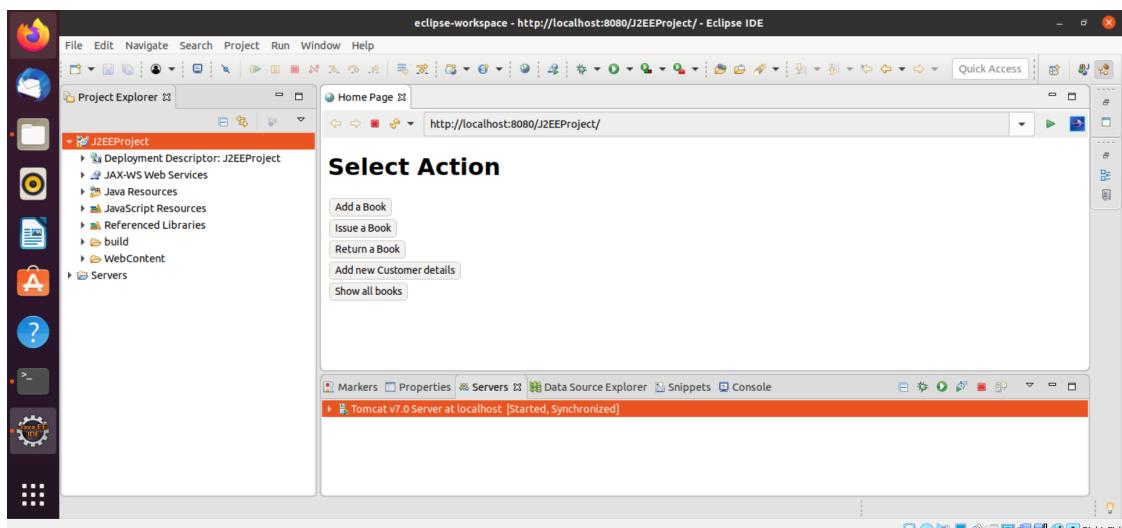
```

## Technologies used:

Technologies used for this project are Eclipse IDE, Apache Tomcat v7.0, JSP, Java, Mysql.

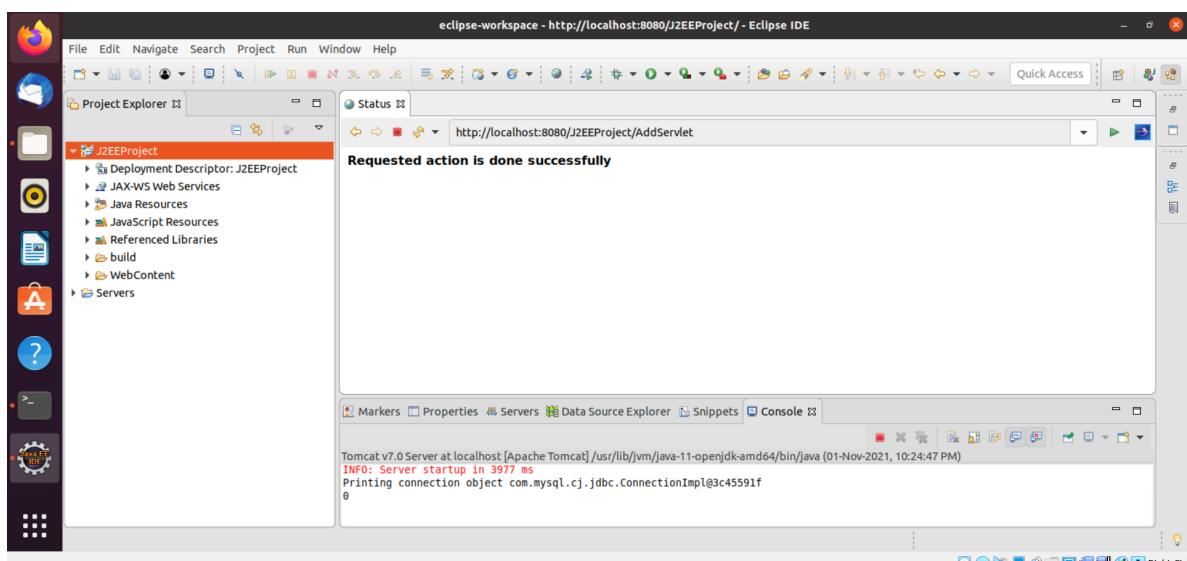
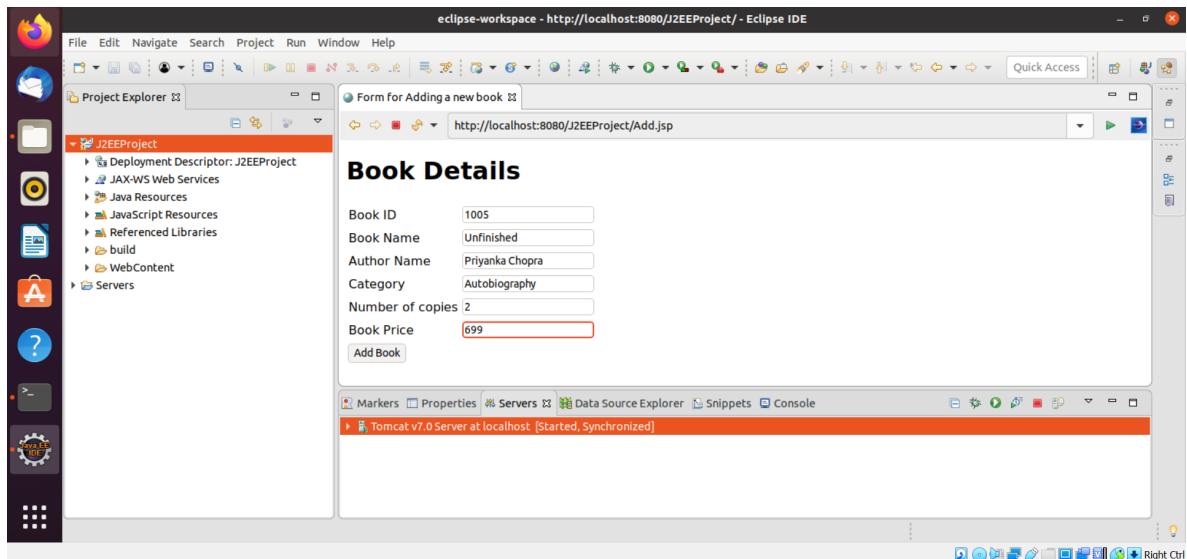
## Workflow and pages:

Home contains 5 actions.



## Action 1. Adding a book

By selecting the add a book option, it directs the user to Add.jsp where the user can enter details of the book we want to add. After clicking on the 'Add Book' button, it goes to AddServlet.java. Addservlet.java connects to the database and adds a new tuple in the book table with the given inputs in Add.jsp. And it also adds the book id and isbn number in bookcode table using the numofcopies attribute in book table.



```
mysql> select * from book;
+-----+-----+-----+-----+-----+
| book_id | book_name | author_name | category | price | numofcopies |
+-----+-----+-----+-----+-----+
| 1001 | My Journey | A.P.J. Abdul Kalam | Autobiography | 195 | 15 |
| 1002 | The Overstory | Richard Powers | Environmental fiction | 599 | 10 |
| 1003 | The 3 Mistakes of My Life | Chetan Bhagat | Fiction | 250 | 12 |
| 1004 | Dracula | Bram Stoker | Horror | 199 | 3 |
| 1005 | Unfinished | Priyanka Chopra | Autobiography | 699 | 2 |
+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> select * from bookcode where book_id=1005;
+-----+-----+
| book_id | isbn_num |
+-----+-----+
| 1005 | 1005001 |
| 1005 | 1005002 |
+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

## Action 2. Issuing a book

By selecting the Issue a book option, it directs the user to Issue.jsp where the user can enter details of the customer who is taking the book, the staff who is incharge, ISBN number of the book, issue date, payment status and paid amount before taking the book.

After clicking on the 'Issue Book' button, it goes to IssueServlet.java where it connects to the database and adds a new tuple in the records table.

The screenshot shows the Eclipse IDE interface with two tabs open:

- Issue Book**: A form titled "Issuing Book Details" with fields for Customer Id (3003), Book ISBN number (1005001), Staff Id (2001), Issue Date (24-10-2021), Return Date (empty), Payment Status (half complete), and Paid Amount (50). Below the form is a "Issue Book" button.
- Issuing Book Status**: A confirmation message stating "Issued A Book Successfully!!!!".

Both tabs show the URL <http://localhost:8080/J2EProject/Issue.jsp>.

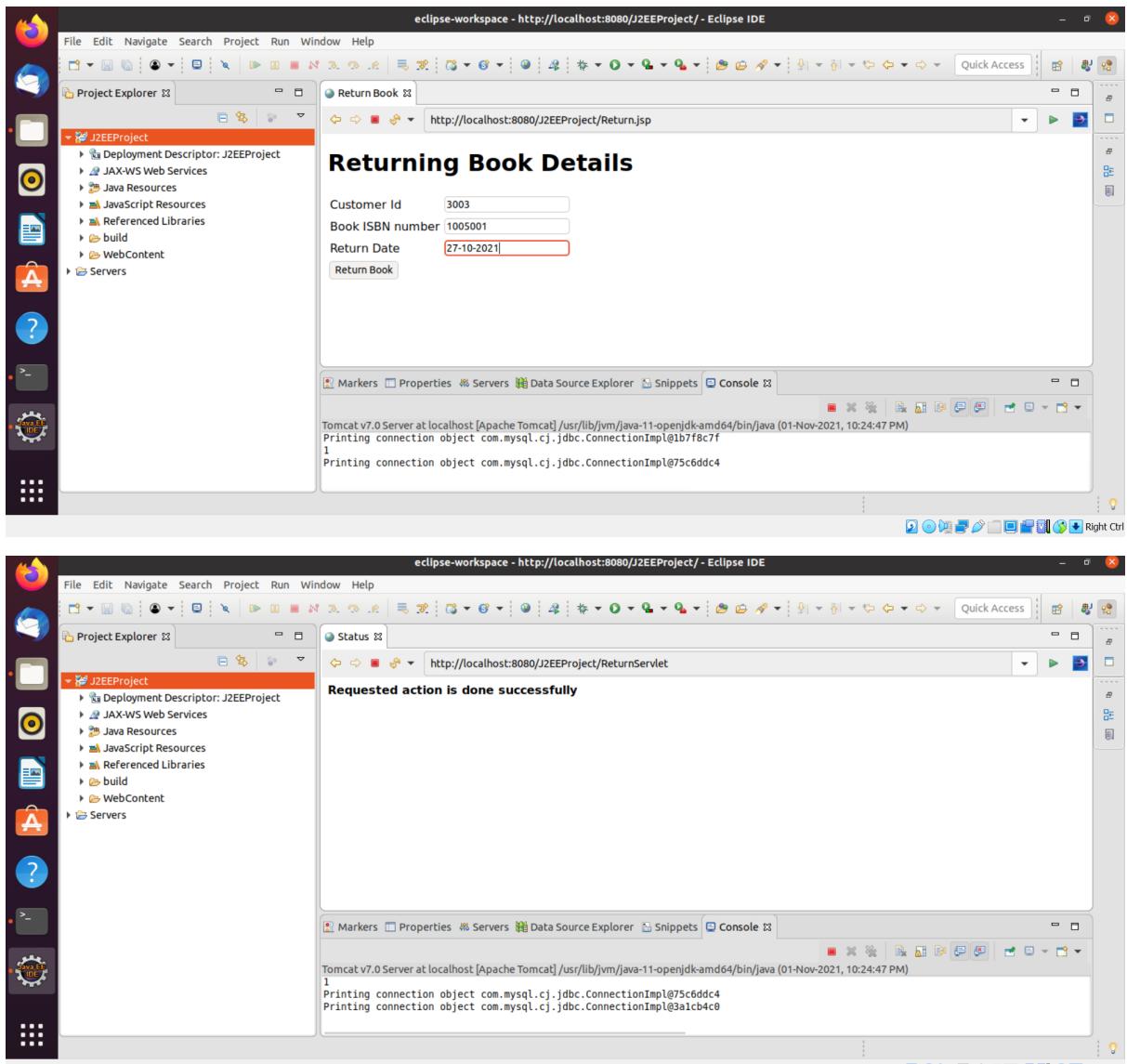
In the bottom right corner of the IDE, there is a terminal window showing MySQL command-line output:

```
mysql> select * from records;
+-----+-----+-----+-----+-----+-----+
| cust_id | isbn_num | staff_id | issue_date | return_date | pay_status | paid_amount |
+-----+-----+-----+-----+-----+-----+
| 3001 | 1004002 | 2002 | 30-10-2021 | 2-11-2021 | complete | 100 |
| 3003 | 1005001 | 2001 | 24-10-2021 | NULL | half complete | 50 |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

### Action 3. Return a book

By selecting the return a book option, it directs the staff to Return.jsp where the staff enters the return date, customer ID and isbn number of the book. After clicking on the 'Return Book' button, it goes to ReturnServlet.java in which it connects to the database and updates the records table.



The screenshot shows two consecutive views of the Eclipse IDE interface. In the first view, the 'Project Explorer' shows a project named 'J2EEProject'. A browser window displays 'http://localhost:8080/J2EEProject/Return.jsp', titled 'Returning Book Details'. It contains input fields for Customer Id (3003), Book ISBN number (1005001), and Return Date (27-10-2021). A 'Return Book' button is present. The 'Console' tab at the bottom shows Tomcat output: 'Tomcat v7.0 Server at localhost [Apache Tomcat] /usr/lib/jvm/java-11-openjdk-amd64/bin/java (01-Nov-2021, 10:24:47 PM)', 'Printing connection object com.mysql.cj.jdbc.ConnectionImpl@1b7f8c7f', and '1'. The second view shows the same interface after the action has been completed. The browser window now displays 'http://localhost:8080/J2EEProject/ReturnServlet' with the message 'Requested action is done successfully'. The 'Console' tab shows the same Tomcat output as before.



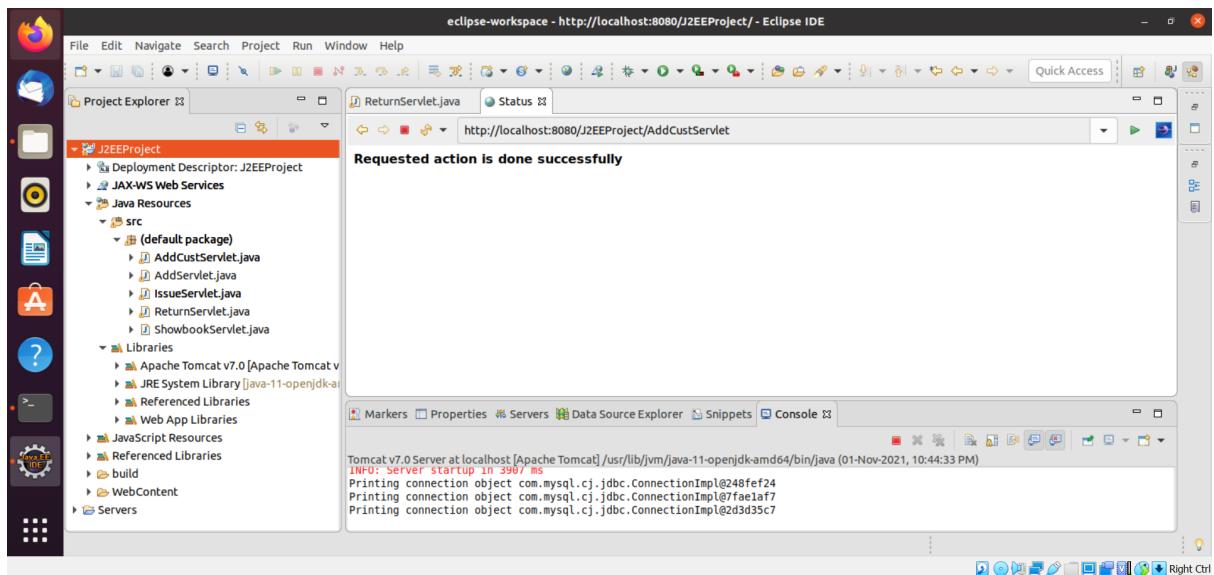
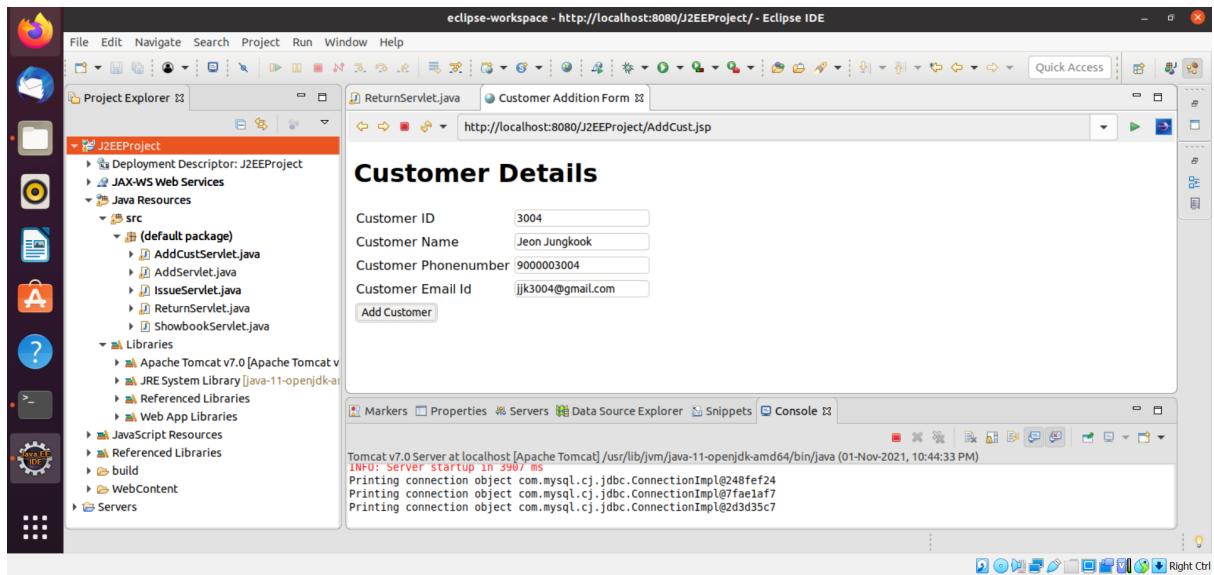
The screenshot shows the MySQL command-line interface. The user has run the command 'select \* from records;'. The output shows two rows of data from the 'records' table:

cust_id	isbn_num	staff_id	issue_date	return_date	pay_status	paid_amount
3001	1004002	2002	30-10-2021	2-11-2021	complete	100
3003	1005001	2001	24-10-2021	NULL	half complete	50

Below this, another 'select \* from records;' command is run, showing identical results. The MySQL prompt 'mysql>' is visible at the bottom.

#### Action 4. Add a new customer details

By selecting this option it directs us to `AddCust.jsp` where the staff can enter the details of the new customer. After clicking on the 'Add Customer' button it goes to `AddCustServlet.java` in which it connects to the database and adds a new tuple in customer table.



```
mysql> select * from customer;
+-----+-----+-----+-----+
| cust_id | cust_name | cust_phno | cust_email |
+-----+-----+-----+-----+
| 3001 | Park Jimin | 9000003001 | jimin3001@gmail.com |
| 3002 | Jessica | 9000003002 | jessi3002@gmail.com |
| 3003 | Mina Agarwal | 9000003003 | mina3003@gmail.com |
| 3004 | Jeon Jungkook | 9000003004 | jjk3004@gmail.com |
+-----+-----+-----+-----+
4 rows in set (0.00 sec)

mysql>
```

The screenshot shows the MySQL command-line interface with the results of a query on the "customer" table. The table has columns for cust\_id, cust\_name, cust\_phno, and cust\_email. It contains four rows of data corresponding to the customers added in the previous steps.

## Action 5. Show all books

By selecting this option it directs us to ShowbookServlet.java where it connects to the database and displays the details of all the books available in the library.

The screenshot shows the Eclipse IDE interface with the following components:

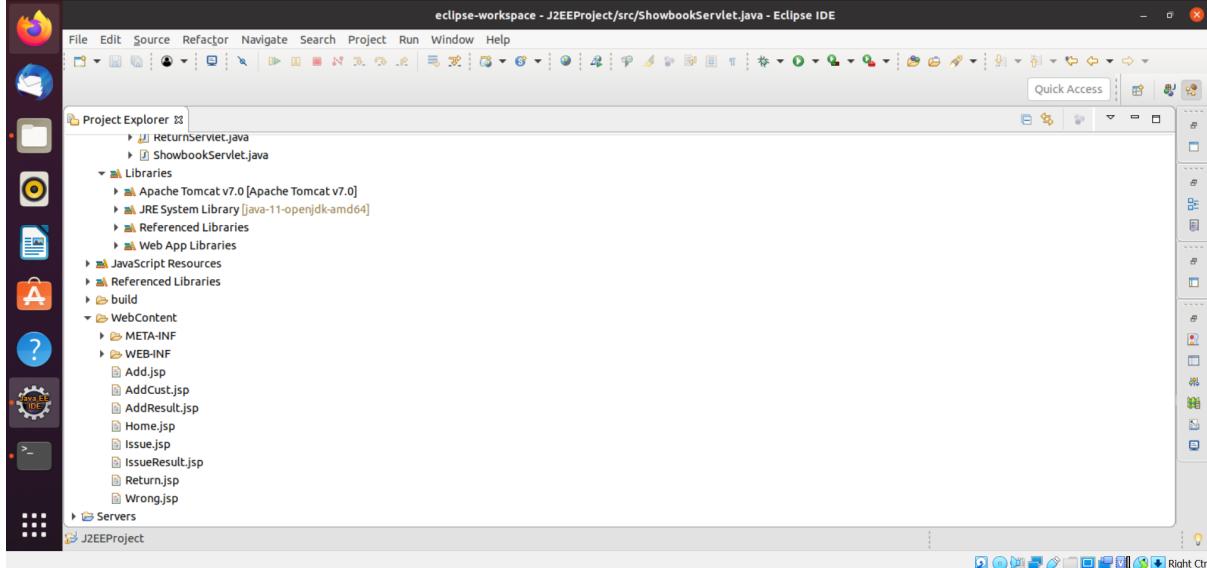
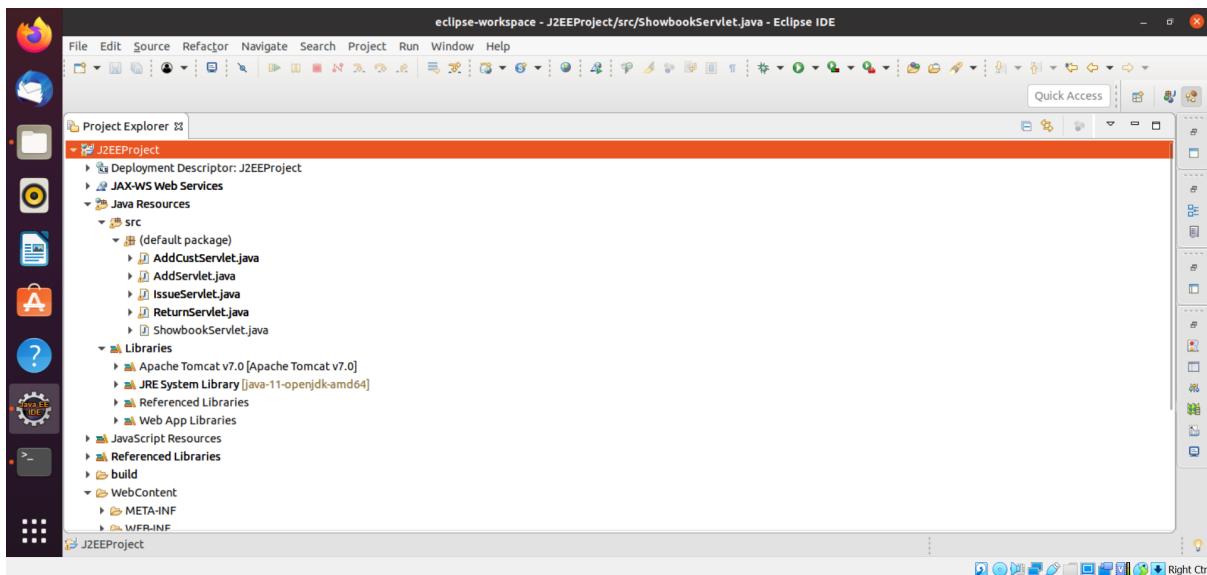
- Project Explorer:** Shows the project structure for "J2EProject". It includes a deployment descriptor, JAX-WS Web Services, Java Resources (src folder containing AddCustServlet.java, AddServlet.java, IssueServlet.java, ReturnServlet.java, and ShowbookServlet.java), Libraries (Apache Tomcat v7.0 [Apache Tomcat v7.0.95], JRE System Library [java-11-openjdk-amd64], Referenced Libraries, and Web App Libraries), JavaScript Resources, Referenced Libraries, build, WebContent, and Servers.
- Browser:** Displays the URL <http://localhost:8080/J2EProject>ShowbookServlet>. The page content is a table showing book details:

book_name	author_name	category
My Journey	A.P.J. Abdul Kalam	Autobiography
The Overstory	Richard Powers	Environmental fiction
The 3 Mistakes of My Life	Chetan Bhagat	Fiction
Dracula	Bram Stoker	Horror
Unfinished	Priyanka Chopra	Autobiography

- Terminal:** Shows the MySQL command-line interface output:

```
mysql> select * from book;
+----+-----+-----+-----+-----+
| book_id | book_name      | author_name    | category       | price | numofcopies |
+----+-----+-----+-----+-----+
| 1001 | My Journey     | A.P.J. Abdul Kalam | Autobiography | 195   | 15          |
| 1002 | The Overstory   | Richard Powers   | Environmental fiction | 599   | 10          |
| 1003 | The 3 Mistakes of My Life | Chetan Bhagat | Fiction        | 250   | 12          |
| 1004 | Dracula         | Bram Stoker     | Horror         | 199   | 3           |
| 1005 | Unfinished      | Priyanka Chopra | Autobiography | 699   | 2           |
+----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql>
```



## Conclusion:

This project makes the librarian organize the records, customer details, and book details effortlessly. By using this we can save time and be accurate.