

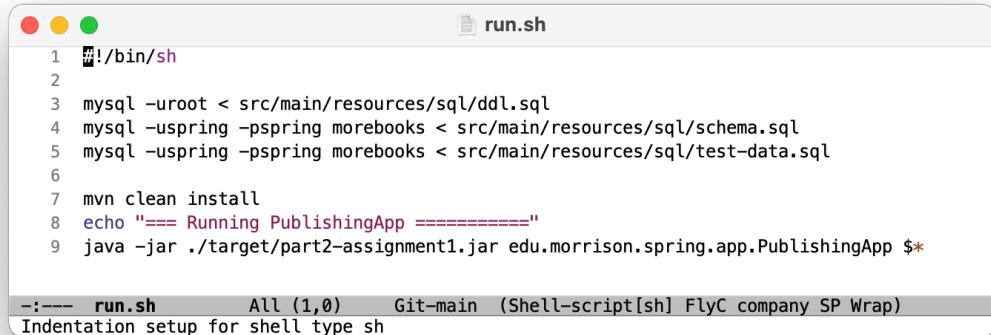
27 March 2022

Christopher Sean Morrison
Term Project Part 2

TERM PROJECT PART 2

In this overview, we show the steps taken to implement a Book Publishing Enterprise Application, for Assignment's 2.1 (Spring JPA2), 2.2 (Spring Data JPA2), 2.3 (Spring MVC Core Features), and 2.4 (Spring MVC Security).

Continuing with the same technologies from Part 1, all the specified tools including the latest Java (OpenJDK), Eclipse, Hibernate, Maven, Tomcat, and MySQL were used for Part 2. I use Mac OS X for all development, Emacs for coding, POSIX shell scripting for automation, and Eclipse IDE for interactive debugging. Homebrew was used to install most, except for Eclipse and Java which were installed manually. Maven was used for all Java dependencies. For all assignments, I created a wrapper shell script to run Maven and facilitate development iterations.



```
#!/bin/sh
1 mysql -uroot < src/main/resources/sql/ddl.sql
2 mysql -uspring -pspring morebooks < src/main/resources/sql/schema.sql
3 mysql -uspring -pspring morebooks < src/main/resources/sql/test-data.sql
4
5 mvn clean install
6 echo "==== Running PublishingApp ====="
7 java -jar ./target/part2-assignment1.jar edu.morrison.spring.app.PublishingApp $*
```

-:--- run.sh All (1,0) Git-main (Shell-script[sh] FlyC company SP Wrap)
Indentation setup for shell type sh

The first two assignments of part 2 support passing an argument representing the specific demo condition outlined in the instructions. This was done in lieu of using the Maven shade plug-in order to have just one main() entry point and less code overall. To further facilitate development, the database is re-initialized on each invocation to ensure consistency.

All four assignments of part 2 were successfully implemented.
The results are showcased in following.

```

./assignment1
./assignment1/target
./assignment1/pom.xml
./assignment1/run.sh
./assignment1/src
./assignment1/src/main
./assignment1/src/main/resources
./assignment1/src/main/resources/log4j.properties
./assignment1/src/main/resources/spring
./assignment1/src/main/resources/spring/app-context-annotation.xml
./assignment1/src/main/resources/sql
./assignment1/src/main/resources/sql/ddl.sql
./assignment1/src/main/resources/sql/test-data.sql
./assignment1/src/main/resources/sql/schema.sql
./assignment1/src/main/java
./assignment1/src/main/java/edu
./assignment1/src/main/java/edu/morrison
./assignment1/src/main/java/edu/morrison/spring
./assignment1/src/main/java/edu/morrison/spring/app
./assignment1/src/main/java/edu/morrison/spring/beans
./assignment1/src/main/java/edu/morrison/spring/beans/Category.java
./assignment1/src/main/java/edu/morrison/spring/beans/Author.java
./assignment1/src/main/java/edu/morrison/spring/beans/Book.java
./assignment1/src/main/java/edu/morrison/spring/beans/AbstractEntity.java
./assignment1/src/main/java/edu/morrison/spring/service
./assignment1/src/main/java/edu/morrison/spring/service/BookServiceImpl.java
./assignment1/src/main/java/edu/morrison/spring/service/BookService.java

```

1. ASSIGNMENT 2.1

No issues were encountered implementing the first Spring JPA2 assignment. An outline of the files and directory structure are provided for reference.

```

mysql> show tables;
+-----+
| Tables_in_morebooks |
+-----+
| AUTHOR          |
| AUTHOR_BOOK     |
| BOOK            |
| CATEGORY        |
+-----+
4 rows in set (0.00 sec)

mysql> select * from category;
+----+----+
| ID | NAME |
+----+----+
| 2 | Java  |
| 1 | Novels |
| 4 | Poetry |
| 3 | Programming |
+----+----+
4 rows in set (0.00 sec)

mysql> select * from author;
+----+----+----+----+
| ID | FIRST_NAME | LAST_NAME | DESCRIPTION           |
+----+----+----+----+
| 1 | Leo       | Tolstoy    | Count Lev Nikolayevich Tolstoy is regarded as one of the greatest novelists in history, and is also known for his work as a public figure and political activist. He is best known for his novels "War and Peace" and "Anna Karenina", which are considered some of the greatest works of literature ever written. |
| 2 | Harper     | Lee         | Nelle Harper Lee was an American novelist best known for her novel "To Kill a Mockingbird", which won the Pulitzer Prize for Fiction in 1961. |
| 3 | Thomas     | Eliot       | Thomas Stearns Eliot OM was a poet, essayist, publisher, and literary critic. He is best known for his poem "The Waste Land", which is considered one of the most important poems of the 20th century. |
| 4 | Maya       | Angelou    | Maya Angelou was an American poet, memoirist, and civil rights activist. She is best known for her memoir "I Know Why the Caged Bird Sings", which has sold millions of copies worldwide. |
| 5 | Parr       | Matt        | Matt Pharr is a Software Engineer at Google, responsible for developing the Ray tracing engine used in Google's VR products. |
| 6 | Jakob      | Wenzel     | Wenzel Jakob is an assistant professor at École polytechnique fédérale de Lausanne (EPFL) in Switzerland, where he researches computer graphics and rendering. |
| 7 | Humphreys | Greg        | Greg Humphreys is a Software Lead at NVIDIA, responsible for developing the Physically Based Rendering engine used in NVIDIA's VR products. |
+----+----+----+----+
7 rows in set (0.00 sec)

mysql> select * from book;
+----+----+----+----+
| ID | CATEGORY_ID | ISBN          | TITLE                | PRICE   |
+----+----+----+----+
| 1  | 1            | 978-0075536321 | Anna Karenina        | 17.57   |
| 2  | 1            | 978-0060194994 | To Kill A Mockingbird | 25.95   |
| 3  | 2            | 978-0137150021 | Effective Java       | 43.86   |
| 4  | 3            | 978-0132350884 | Clean Code            | 25.33   |
| 5  | 4            | 978-0571096343 | The Waste Land by T.S. Eliot | 99.99   |
| 6  | 4            | 978-0375505966 | Still I Rise by Maya Angelou | 30.29   |
| 7  | 4            | 978-0156332255 | Four Quartets        | 8.99    |
| 8  | 4            | 978-1400079988 | War and Peace         | 21.00   |
| 9  | 3            | 978-0128006450 | Physically Based Rendering | 109.95 |
+----+----+----+----+
9 rows in set (0.00 sec)

mysql> select * from author_book;
+----+----+
| AUTHOR_ID | BOOK_ID |
+----+----+
| 1          | 1        |
| 2          | 2        |
| 3          | 5        |
| 4          | 6        |
| 3          | 7        |
| 1          | 8        |
| 5          | 9        |
| 6          | 9        |
| 7          | 9        |
+----+----+
9 rows in set (0.00 sec)

```

As before, this assignment began by matching the prescribe database schema, using the same structure as in Part 1 Assignment 4

We include in our dataset authors with more than one book and books with more than one author.

Here we see the first task, to look up a book by its ID, obtaining its category and authors automatically. A book with three authors is used as an example.

```

03:26:21,317 INFO edu.morrison.spring.app.PublishingApp: 32 - Book Publishing JPA2 Demo
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 33 - v0.0.1 by C.S. Morrison
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 34 -
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 35 - Usage: edu.morrison.spring.app.PublishingApp[1234]
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 36 -
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 37 - This is a demonstration of persisting entities via Spring JPA 2.
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 38 - Specify number to run each specific demo in succession (allowing database inspection).
03:26:21,318 INFO edu.morrison.spring.app.PublishingApp: 39 -
03:26:21,319 INFO edu.morrison.spring.app.PublishingApp: 49 - ===== Start of Publishing Demo =====
03:26:21,320 INFO edu.morrison.spring.app.PublishingApp: 129 - ----- Demo 1: Find a book by id
03:26:21,403 INFO edu.morrison.spring.app.PublishingApp: 137 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:26:21,403 INFO edu.morrison.spring.app.PublishingApp: 140 - Category - id: 3, Name: Programming
03:26:21,406 INFO edu.morrison.spring.app.PublishingApp: 142 - Author - Id: 5, First name: Parr, Last name: Matt, Description: Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering.
03:26:21,406 INFO edu.morrison.spring.app.PublishingApp: 142 - Author - Id: 7, First name: Humphreys, Last name: Greg, Description: Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, & received an Academy Award for Physically Based Rendering.
03:26:21,406 INFO edu.morrison.spring.app.PublishingApp: 142 - Author - Id: 6, First name: Jakob, Last name: Wenzel, Description: Wenzel Jakob is an assistant professor at École polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering.
03:26:21,406 INFO edu.morrison.spring.app.PublishingApp: 60 - ===== End of Publishing Demo =====
morrison@agua assignment1 %

```

Here for the second task we create and save a new book with category and author. To make it more interesting, the new book's category is specified by name, and any existing matching category is looked up on insertion.

```

03:39:16,573 INFO org.hibernate.dialect.Dialect: 157 - HHH000400: Using dialect: org.hibernate.dialect.MySQL5Dialect
03:39:16,880 INFO rmate.hql.internal.QueryTranslatorFactoryInitiator: 47 - HHH000397: Using ASTQueryTranslatorFactory
03:39:16,944 INFO ork.orm.jpa.LocalContainerEntityManagerFactoryBean: 415 - Initialized JPA EntityManagerFactory for persistence unit 'default'
03:39:16,998 INFO edu.morrison.spring.app.PublishingApp: 32 - Book Publishing JPA2 Demo
03:39:16,998 INFO edu.morrison.spring.app.PublishingApp: 33 - v0.0.1 by C.S. Morrison
03:39:16,998 INFO edu.morrison.spring.app.PublishingApp: 34 -
03:39:16,999 INFO edu.morrison.spring.app.PublishingApp: 35 - Usage: edu.morrison.spring.app.PublishingApp[1234]
03:39:16,999 INFO edu.morrison.spring.app.PublishingApp: 36 -
03:39:16,999 INFO edu.morrison.spring.app.PublishingApp: 37 - This is a demonstration of persisting entities via Spring JPA2.
03:39:16,999 INFO edu.morrison.spring.app.PublishingApp: 38 - Specify number to run each specific demo in succession (allowing database inspection).
03:39:16,999 INFO edu.morrison.spring.app.PublishingApp: 39 -
03:39:16,999 INFO edu.morrison.spring.app.PublishingApp: 49 - ===== Start of Publishing Demo =====
03:39:17,000 INFO edu.morrison.spring.app.PublishingApp: 102 - ----- Demo 2: Create a new book with a new author(s)
03:39:17,000 INFO edu.morrison.spring.app.PublishingApp: 104 - ... listing books before ...
03:39:17,088 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 4, Category Id: 3, ISBN: 978-0132350884, Title: Clean Code, Price: 25.33
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 6, Category Id: 4, ISBN: 978-0375505966, Title: Still I Rise by Maya Angelou, Price: 30.29
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 108 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 129 - ... adding this book:
03:39:17,087 INFO edu.morrison.spring.app.PublishingApp: 130 - Book - Id: null, Category Id: null, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:39:17,089 INFO edu.morrison.spring.service.BookServiceImpl: 98 - Saving book with id: null
03:39:17,105 INFO edu.morrison.spring.service.BookServiceImpl: 116 - Book saved with id: 10
03:39:17,171 INFO edu.morrison.spring.app.PublishingApp: 134 - ... successfully added book
03:39:17,171 INFO edu.morrison.spring.app.PublishingApp: 135 - ... listing books after ...
03:39:17,180 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 4, Category Id: 3, ISBN: 978-0132350884, Title: Clean Code, Price: 25.33
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 6, Category Id: 4, ISBN: 978-0375505966, Title: Still I Rise by Maya Angelou, Price: 30.29
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:39:17,181 INFO edu.morrison.spring.app.PublishingApp: 138 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:39:17,182 INFO edu.morrison.spring.app.PublishingApp: 60 - ===== End of Publishing Demo =====
morrison@agua assignment1 %

```

If we look at the database, we can confirm it added the new book (Fundamentals of Computer Graphics), its author (Peter Shirley), the association table entry, and that it was added to the appropriate category id despite being added by category name.

```
mysql> select * from author_book where author_id = 10;
Empty set (0.00 sec)

mysql> select* from author_book;
+-----+-----+
| AUTHOR_ID | BOOK_ID |
+-----+-----+
| 1          | 1        |
| 2          | 2        |
| 3          | 5        |
| 4          | 6        |
| 3          | 7        |
| 1          | 8        |
| 5          | 9        |
| 6          | 9        |
| 7          | 9        |
| 8          | 10       |
+-----+-----+
10 rows in set (0.00 sec)

mysql> select * from book;
+-----+-----+-----+-----+
| ID   | CATEGORY_ID | ISBN    | TITLE          | PRICE |
+-----+-----+-----+-----+
| 1    | 1            | 978-0075536321 | Anna Karenina | 17.57 |
| 2    | 1            | 978-00660194994 | To Kill A Mockingbird | 25.95 |
| 3    | 2            | 978-0137150021 | Effective Java | 43.86 |
| 4    | 3            | 978-0132350884 | Clean Code     | 25.33 |
| 5    | 4            | 978-0571096343 | The Waste Land by T.S. Eliot | 99.99 |
| 6    | 4            | 978-0375505966 | Still I Rise by Maya Angelou | 30.29 |
| 7    | 4            | 978-0156332255 | Four Quartets | 8.99 |
| 8    | 4            | 978-1400079988 | War and Peace | 21.00 |
| 9    | 3            | 978-0128006450 | Physically Based Rendering | 109.95 |
| 10   | 3            | 978-0367505035 | Fundamentals of Computer Graphics | 126.00 |
+-----+-----+-----+-----+
10 rows in set (0.00 sec)

mysql> select * from author_book where book_id = 10;
+-----+-----+
| AUTHOR_ID | BOOK_ID |
+-----+-----+
| 8          | 10       |
+-----+-----+
1 row in set (0.00 sec)

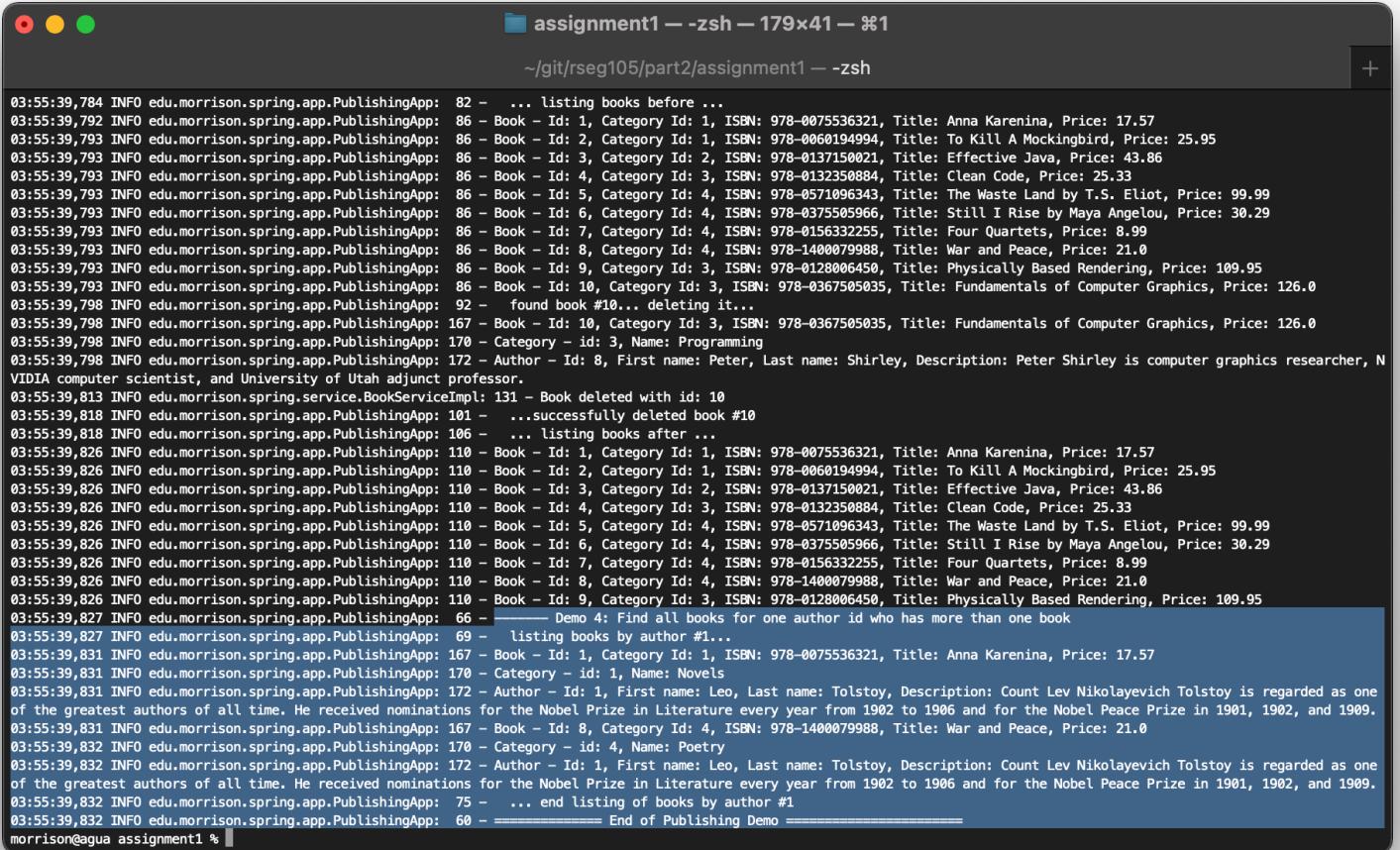
mysql> select * from author where id = 8;
+-----+-----+-----+
| ID   | FIRST_NAME | LAST_NAME | DESCRIPTION           |
+-----+-----+-----+
| 8    | Peter      | Shirley   | Peter Shirley is computer graphics researcher, NVIDIA computer scientist, and University of Utah adjunct professor. |
+-----+-----+
1 row in set (0.00 sec)

mysql>
```

Next, we can delete that same book from the database.

```
03:55:39,783 INFO edu.morrison.spring.app.PublishingApp: 153 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:55:39,783 INFO edu.morrison.spring.app.PublishingApp: 153 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:55:39,783 INFO edu.morrison.spring.app.PublishingApp: 80 - ----- Demo 3: Delete a saved book and author(s) from the database
03:55:39,784 INFO edu.morrison.spring.app.PublishingApp: 82 - ... listing books before ...
03:55:39,792 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 4, Category Id: 3, ISBN: 978-0132350884, Title: Clean Code, Price: 25.33
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 6, Category Id: 4, ISBN: 978-0375505966, Title: Still I Rise by Maya Angelou, Price: 30.29
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 92 - found book #10... deleting it...
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 167 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 170 - Category - id: 3, Name: Programming
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 172 - Author - Id: 8, First name: Peter, Last name: Shirley, Description: Peter Shirley is computer graphics researcher, NVIDIA computer scientist, and University of Utah adjunct professor.
03:55:39,813 INFO edu.morrison.service.BookServiceImpl: 131 - Book deleted with id: 10
03:55:39,818 INFO edu.morrison.spring.app.PublishingApp: 101 - ...successfully deleted book #10
03:55:39,818 INFO edu.morrison.spring.app.PublishingApp: 106 - ... listing books after ...
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 4, Category Id: 3, ISBN: 978-0132350884, Title: Clean Code, Price: 25.33
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 6, Category Id: 4, ISBN: 978-0375505966, Title: Still I Rise by Maya Angelou, Price: 30.29
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:55:39,827 INFO edu.morrison.spring.app.PublishingApp: 66 - ----- Demo 4: Find all books for one author id who has more than one book
03:55:39,827 INFO edu.morrison.spring.app.PublishingApp: 69 - ... listing books by author #1...
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 167 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 170 - Category - id: 1, Name: Novels
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 172 - Author - Id: 1, First name: Leo, Last name: Tolstoy, Description: Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909.
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 167 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:55:39,832 INFO edu.morrison.spring.app.PublishingApp: 170 - Category - id: 4, Name: Poetry
03:55:39,832 INFO edu.morrison.spring.app.PublishingApp: 172 - Author - Id: 1, First name: Leo, Last name: Tolstoy, Description: Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909.
```

Lastly, we can trivially list all books for some author that has more than one book in the database. In our example, we have two books by Tolstoy.



```
assignment1 — -zsh — 179x41 — %1
~/git/rseg105/part2/assignment1 — -zsh

03:55:39,784 INFO edu.morrison.spring.app.PublishingApp: 82 - ... listing books before ...
03:55:39,792 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 4, Category Id: 3, ISBN: 978-0132350884, Title: Clean Code, Price: 25.33
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 6, Category Id: 4, ISBN: 978-0375505966, Title: Still I Rise by Maya Angelou, Price: 30.29
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:55:39,793 INFO edu.morrison.spring.app.PublishingApp: 86 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 92 - found book #10... deleting it...
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 167 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 170 - Category - id: 3, Name: Programming
03:55:39,798 INFO edu.morrison.spring.app.PublishingApp: 172 - Author - Id: 8, First name: Peter, Last name: Shirley, Description: Peter Shirley is computer graphics researcher, N VIDIA computer scientist, and University of Utah adjunct professor.
03:55:39,813 INFO edu.morrison.spring.service.BookServiceImpl: 131 - Book deleted with id: 10
03:55:39,818 INFO edu.morrison.spring.app.PublishingApp: 101 - ...successfully deleted book #10
03:55:39,818 INFO edu.morrison.spring.app.PublishingApp: 106 - ... listing books after ...
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 4, Category Id: 3, ISBN: 978-0132350884, Title: Clean Code, Price: 25.33
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 6, Category Id: 4, ISBN: 978-0375505966, Title: Still I Rise by Maya Angelou, Price: 30.29
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:55:39,826 INFO edu.morrison.spring.app.PublishingApp: 110 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
03:55:39,827 INFO edu.morrison.spring.app.PublishingApp: 66 - ----- Demo 4: Find all books for one author id who has more than one book
03:55:39,827 INFO edu.morrison.spring.app.PublishingApp: 69 - listing books by author #...
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 167 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 170 - Category - id: 1, Name: Novels
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 172 - Author - Id: 1, First name: Leo, Last name: Tolstoy, Description: Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909.
03:55:39,831 INFO edu.morrison.spring.app.PublishingApp: 167 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
03:55:39,832 INFO edu.morrison.spring.app.PublishingApp: 170 - Category - id: 4, Name: Poetry
03:55:39,832 INFO edu.morrison.spring.app.PublishingApp: 172 - Author - Id: 1, First name: Leo, Last name: Tolstoy, Description: Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909.
03:55:39,832 INFO edu.morrison.spring.app.PublishingApp: 75 - ... end listing of books by author #1
03:55:39,832 INFO edu.morrison.spring.app.PublishingApp: 60 - ===== End of Publishing Demo =====
```

```

assignment2/run.sh
1#!/bin/sh
2
3 mysql -uroot < src/main/resources/sql/ddl.sql
4 mysql -uspring -pspring morebooks < src/main/resources/sql/schema.sql
5 mysql -uspring -pspring morebooks < src/main/resources/sql/test-data.sql
6
7 mvn clean install
8 echo "==== Running PublishingApp ====="
9 java -jar ./target/part2-assignment2.jar edu.morrison.spring.PublishingApp $*

```

-:---- assignment2/run.sh All (1,0) Git-main (Shell-script[sh] FlyC company SP Wrap)

2. ASSIGNMENT 2.2

For the Spring Data JPA2 assignment, no problems were encountered implementing the solution as specified.

We again inspect the database setup after initialization.

```

./assignment2
./assignment2/target
./assignment2/pom.xml
./assignment2/run.sh
./assignment2/src
./assignment2/src/main
./assignment2/src/main/resources
./assignment2/src/main/resources/log4j.properties
./assignment2/src/main/resources/spring
./assignment2/src/main/resources/spring/app-context-annotation.xml
./assignment2/src/main/resources/sql
./assignment2/src/main/resources/sql/ddl.sql
./assignment2/src/main/resources/sql/test-data.sql
./assignment2/src/main/resources/sql/schema.sql
./assignment2/src/main/java
./assignment2/src/main/java/edu
./assignment2/src/main/java/edu/morrison
./assignment2/src/main/java/edu/morrison/spring
./assignment2/src/main/java/edu/morrison/spring/repository
./assignment2/src/main/java/edu/morrison/spring/repository/AuthorRepository.java
./assignment2/src/main/java/edu/morrison/spring/repository/BookRepository.java
./assignment2/src/main/java/edu/morrison/spring/app
./assignment2/src/main/java/edu/morrison/spring/app/PublishingApp.java
./assignment2/src/main/java/edu/morrison/spring/beans
./assignment2/src/main/java/edu/morrison/spring/beans/Category.java
./assignment2/src/main/java/edu/morrison/spring/beans/Author.java
./assignment2/src/main/java/edu/morrison/spring/beans/Book.java
./assignment2/src/main/java/edu/morrison/spring/service
./assignment2/src/main/java/edu/morrison/spring/service/BookServiceImpl.java
./assignment2/src/main/java/edu/morrison/spring/service/BookService.java

```

```

assignment2 — 131x81
~/git/rseg105/part2/assignment2

mysql> show tables;
+-----+
| Tables_in_morebooks |
+-----+
| AUTHOR           |
| AUTHOR_BOOK      |
| BOOK             |
| CATEGORY         |
+-----+
4 rows in set (0.01 sec)

mysql> select * from author;
+-----+
| ID | FIRST_NAME | LAST_NAME | DESCRIPTION |
+-----+
| 1  | Leo        | Tolstoy   | Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909. |
| 2  | Harper     | Lee        | Nelle Harper Lee was an American novelist best known for her 1960 novel To Kill a Mockingbird. It won the 1961 Pulitzer Prize and has become a classic of modern American literature. |
| 3  | Thomas     | Eliot      | Thomas Stearns Eliot was a poet, essayist, publisher, playwright, literary critic and editor. Considered one of the 20th century's major poets, he is a central figure in English-language Modernist poetry. |
| 4  | Maya        | Angelou    | Maya Angelou was an American poet, memoirist, and civil rights activist. She received dozens of awards and more than 50 honorary degrees. |
| 5  | Parr        | Matt       | Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering. |
| 6  | Jakob       | Wenzel    | Jakob Wenzel Jakob is an assistant professor at École polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering. |
| 7  | Humphreys  | Greg       | Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, & received an Academy Award for Physically Based Rendering. |
+-----+
7 rows in set (0.00 sec)

mysql> select * from book;
+-----+
| ID | CATEGORY_ID | ISBN          | TITLE          | PRICE |
+-----+
| 1  | 1            | 978-0075358291 | Anna Karenina  | 17.51  |
| 2  | 1            | 978-0075354994 | To Kill A Mockingbird | 25.95  |
| 3  | 2            | 978-0137080021 | Effective Java | 48.86  |
| 4  | 3            | 978-0132350884 | Clean Code     | 25.33  |
| 5  | 3            | 978-0571096343 | The Waste Land by T.S. Eliot | 99.99  |
| 6  | 4            | 978-0375585966 | Still I Rise by Maya Angelou | 30.29  |
| 7  | 4            | 978-0156332255 | Four Quartets | 8.99   |
| 8  | 4            | 978-1400079988 | War and Peace | 21.00  |
| 9  | 3            | 978-0128006450 | Physically Based Rendering | 109.95 |
+-----+
9 rows in set (0.00 sec)

mysql> select * from category;
+-----+
| ID | NAME        |
+-----+
| 2  | Java         |
| 1  | Novels      |
| 3  | Poetry       |
| 3  | Programming |
+-----+
4 rows in set (0.00 sec)

mysql> select * from author_book
-> ;
+-----+
| AUTHOR_ID | BOOK_ID |
+-----+
| 1          | 1        |
| 2          | 2        |
| 3          | 5        |
| 4          | 6        |
| 3          | 7        |
| 1          | 8        |
| 5          | 9        |
| 6          | 9        |
| 7          | 9        |
+-----+
9 rows in set (0.00 sec)

mysql>

```

Next, we find a book with author(s) and category by the book id. We choose a book with three authors.

```

assignment2 -- zsh -- 179x41 -- %1
~/git/rseg105/part2/assignment2 -- zsh

04:07:59,324 INFO org.hibernate.dialect.Dialect: 157 - HHH000400: Using dialect: org.hibernate.dialect.MySQL5Dialect
04:07:59,633 INFO rnote.hql.internal.QueryTranslatorFactoryInitiator: 47 - HHH000397: Using ASTQueryTranslatorFactory
04:07:59,707 INFO org.orm.jpa.LocalContainerEntityManagerFactoryBean: 415 - Initialized JPA EntityManagerFactory for persistence unit 'default'
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 30 - Book Publishing Spring Data JPA2 Demo
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 31 - v0.0.1 by C.S. Morrison
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 32 -
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 33 - Usage: edu.morrison.spring.PublishingApp[1234]
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 34 -
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 35 - This is a demonstration of persisting entities via Spring Data JPA2,
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 36 - Specify number to run each specific demo in succession (allowing database inspection).
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 37 -
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 47 - ===== Start of Publishing Demo =====
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 75 - ----- Demo 1: Find a book by id
04:08:00,059 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 67 - Category - id: 3, Name: Programming
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 6, First name: Jakob, Last name: Wenzel, Description: Wenzel Jakob is an assistant professor at École polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering.
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 5, First name: Parr, Last name: Matt, Description: Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering.
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 7, First name: Humphreys, Last name: Greg, Description: Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering.
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 85 - ----- Demo 2: Find all books without details
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 2, Category Id: 1, ISBN: 978-0666194994, Title: To Kill A Mockingbird, Price: 25.95
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 4, Category Id: 3, ISBN: 978-0132338884, Title: Clean Code, Price: 25.33
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 6, Category Id: 4, ISBN: 978-0375569566, Title: Still I Rise by Maya Angelou, Price: 30.29
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 8, Category Id: 4, ISBN: 978-1400799888, Title: War and Peace, Price: 21.0
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 94 - ----- Demo 2: Create a new book with a new author(s)
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 117 - ... looking up added book #10 ...
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 67 - Category - id: 3, Name: Programming
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 8, First name: Peter, Last name: Shirley, Description: Peter Shirley is computer graphics researcher, NVIDIA A computer scientist, and University of Utah adjunct professor.
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 132 - ----- Demo 3: Delete a saved book and author(s) from the database
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 135 - ... books before delete:
04:08:00,168 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57

```

Next, we find all books without their details.

```

assignment2 -- zsh -- 179x41 -- %1
~/git/rseg105/part2/assignment2 -- zsh

04:07:59,324 INFO org.hibernate.dialect.Dialect: 157 - HHH000400: Using dialect: org.hibernate.dialect.MySQL5Dialect
04:07:59,633 INFO rnote.hql.internal.QueryTranslatorFactoryInitiator: 47 - HHH000397: Using ASTQueryTranslatorFactory
04:07:59,707 INFO org.orm.jpa.LocalContainerEntityManagerFactoryBean: 415 - Initialized JPA EntityManagerFactory for persistence unit 'default'
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 30 - Book Publishing Spring Data JPA2 Demo
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 31 - v0.0.1 by C.S. Morrison
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 32 -
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 33 - Usage: edu.morrison.spring.PublishingApp[1234]
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 34 -
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 35 - This is a demonstration of persisting entities via Spring Data JPA2,
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 36 - Specify number to run each specific demo in succession (allowing database inspection).
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 37 -
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 47 - ===== Start of Publishing Demo =====
04:07:59,988 INFO edu.morrison.spring.PublishingApp: 75 - ----- Demo 1: Find a book by id
04:08:00,059 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 67 - Category - id: 3, Name: Programming
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 6, First name: Jakob, Last name: Wenzel, Description: Wenzel Jakob is an assistant professor at École polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering.
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 5, First name: Parr, Last name: Matt, Description: Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering.
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 7, First name: Humphreys, Last name: Greg, Description: Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering.
04:08:00,063 INFO edu.morrison.spring.PublishingApp: 85 - ----- Demo 2: Find all books without details
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 2, Category Id: 1, ISBN: 978-0666194994, Title: To Kill A Mockingbird, Price: 25.95
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 3, Category Id: 2, ISBN: 978-0137150021, Title: Effective Java, Price: 43.86
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 4, Category Id: 3, ISBN: 978-0132338884, Title: Clean Code, Price: 25.33
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 6, Category Id: 4, ISBN: 978-0375569566, Title: Still I Rise by Maya Angelou, Price: 30.29
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 8, Category Id: 4, ISBN: 978-1400799888, Title: War and Peace, Price: 21.0
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 69 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 94 - ----- Demo 2: Create a new book with a new author(s)
04:08:00,181 INFO edu.morrison.spring.PublishingApp: 117 - ... looking up added book #10 ...
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 67 - Category - id: 3, Name: Programming
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 8, First name: Peter, Last name: Shirley, Description: Peter Shirley is computer graphics researcher, NVIDIA A computer scientist, and University of Utah adjunct professor.
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 132 - ----- Demo 3: Delete a saved book and author(s) from the database
04:08:00,129 INFO edu.morrison.spring.PublishingApp: 135 - ... books before delete:
04:08:00,168 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 1, Category Id: 1, ISBN: 978-0075536321, Title: Anna Karenina, Price: 17.57

```

Here, we create and add a new book with its authors to the database.

```

assignment2 — zsh — 179x18 — %1
~/git/rseg105/part2/assignment2 — zsh

04:24:51,364 INFO edu.morrison.spring.PublishingApp: 30 - Book Publishing Spring Data JPA2 Demo
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 31 - v0.0.1 by C.S. Morrison
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 32 -
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 33 - Usage: edu.morrison.spring.PublishingApp[1234]
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 34 -
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 35 - This is a demonstration of persisting entities via Spring Data JPA2.
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 36 - Specify number to run each specific demo in succession (allowing database inspection).
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 37 -
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 47 - ===== Start of Publishing Demo =====
04:24:51,364 INFO edu.morrison.spring.PublishingApp: 94 - Demo 3: Create a new book with a new author(s)
04:24:51,410 INFO edu.morrison.spring.PublishingApp: 117 - ... looking up added book #10 ...
04:24:51,452 INFO edu.morrison.spring.PublishingApp: 123 - book #10 FOUND:
04:24:51,450 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 10, Category Id: 3, ISBN: 978-0367505035, Title: Fundamentals of Computer Graphics, Price: 126.0
04:24:51,459 INFO edu.morrison.spring.PublishingApp: 67 - Category - Id: 3, Name: Programming
04:24:51,463 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 8, First name: Peter, Last name: Shirley, Description: Peter Shirley is computer graphics researcher, NVIDIA computer scientist, and University of Utah adjunct professor.
04:24:51,463 INFO edu.morrison.spring.PublishingApp: 58 - ===== End of Publishing Demo =====
morrison@aguva assignment2 %

```

We then review the database to confirm.

```

assignment2 — 131x81
~/git/rseg105/part2/assignment2

| 1 | 6 | 9 |
| 1 | 7 | 9 |
+-----+
9 rows in set (0.00 sec)

mysql> mysql> select * from author;
+----+----+----+----+
| ID | FIRST_NAME | LAST_NAME | DESCRIPTION |
+----+----+----+----+
| 1 | Leo | Tolstoy | Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909. |
| 2 | Harper | Lee | Nelle Harper Lee was an American novelist best known for her 1960 novel To Kill a Mockingbird. It won the 1961 Pulitzer Prize and has become a classic of modern American literature. |
| 3 | Thomas | Eliot | Thomas Stearns Eliot OM was a poet, essayist, publisher, playwright, literary critic and editor. Considered one of the 20th century's major poets, he is a central figure in English-language Modernist poetry. |
| 4 | Maya | Angelou | Maya Angelou was an American poet, memoirist, and civil rights activist. She received dozens of awards and more than 50 honorary degrees. |
| 5 | Parr | Matt | Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering. |
| 6 | Jakob | Wenzel | Jakob Wenzel is an assistant professor at École polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering. |
| 7 | Humphreys | Greg | Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, & received an Academy Award for Physically Based Rendering. |
| 8 | Peter | Shirley | Peter Shirley is computer graphics researcher, NVIDIA computer scientist, and University of Utah adjunct professor. |
+----+----+----+----+
8 rows in set (0.00 sec)

mysql> select * from book;
+----+----+----+----+
| ID | CATEGORY_ID | ISBN | TITLE | PRICE |
+----+----+----+----+
| 1 | 1 | 978-0075536321 | Anna Karenina | 17.57 |
| 2 | 1 | 978-0060194994 | To Kill A Mockingbird | 25.95 |
| 3 | 2 | 978-0137150021 | Effective Java | 43.86 |
| 4 | 3 | 978-0132350884 | Clean Code | 25.33 |
| 5 | 4 | 978-0571096343 | The Waste Land by T.S. Eliot | 99.99 |
| 6 | 4 | 978-0375505966 | Still I Rise by Maya Angelou | 30.29 |
| 7 | 4 | 978-0156332255 | Four Quartets | 8.99 |
| 8 | 4 | 978-1400079988 | War and Peace | 21.00 |
| 9 | 3 | 978-0128006450 | Physically Based Rendering | 109.95 |
| 10 | 3 | 978-0367505035 | Fundamentals of Computer Graphics | 126.00 |
+----+----+----+----+
10 rows in set (0.00 sec)

mysql> select * from category;
+----+----+
| ID | NAME |
+----+----+
| 2 | Java |
| 1 | Novels |
| 4 | Poetry |
| 3 | Programming |
+----+----+
4 rows in set (0.00 sec)

mysql> select * from author_book;
+----+----+
| AUTHOR_ID | BOOK_ID |
+----+----+
| 1 | 1 |
| 2 | 2 |
| 3 | 5 |
| 4 | 6 |
| 3 | 7 |
| 1 | 8 |
| 5 | 9 |
| 6 | 9 |
| 7 | 9 |
| 8 | 10 |
+----+----+
10 rows in set (0.00 sec)

mysql>

```

Finally, we delete the added book and author from the database.

```

assignment2 -- zsh -- 179x62 -- %1
~/git/rseg105/part2/assignment2 -- zsh

04:30:17, 622 INFO edu.morrison.spring.PublishingApp: 30 - Book Publishing Spring Data JPA2 Demo
04:30:17, 622 INFO edu.morrison.spring.PublishingApp: 31 - v0.0.1 by C.S. Morrison
04:30:17, 622 INFO edu.morrison.spring.PublishingApp: 32 -
04:30:17, 623 INFO edu.morrison.spring.PublishingApp: 33 - Usage: edu.morrison.spring.PublishingApp[1234]
04:30:17, 623 INFO edu.morrison.spring.PublishingApp: 34 -
04:30:17, 623 INFO edu.morrison.spring.PublishingApp: 35 - This is a demonstration of persisting entities via Spring Data JPA2.
04:30:17, 623 INFO edu.morrison.spring.PublishingApp: 36 - Specify number to run each specific demo in succession (allowing database inspection).
04:30:17, 624 INFO edu.morrison.spring.PublishingApp: 37 -
04:30:17, 624 INFO edu.morrison.spring.PublishingApp: 47 - ===== Start of Publishing Demo =====
04:30:17, 624 INFO edu.morrison.spring.PublishingApp: 75 - ===== Demo 1: Find a book by id
04:30:17, 694 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:30:17, 694 INFO edu.morrison.spring.PublishingApp: 67 - Category - Id: 3, Name: Programming
04:30:17, 697 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 6, First name: Jakob, Last name: Wenzel, Description: Wenzel Jakob is an assistant professor at Ecole polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering.
04:30:17, 697 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 5, First name: Parr, Last name: Matt, Description: Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering.
04:30:17, 697 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 7, First name: Humphreys, Last name: Greg, Description: Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, & received an Academy Award for Physically Based Rendering.
04:30:17, 697 INFO edu.morrison.spring.PublishingApp: 85 - ===== Demo 2: Find all books without details
04:30:17, 731 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 1, Category Id: 1, ISBN: 978-007536321, Title: Anna Karenina, Price: 17.57
04:30:17, 731 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
04:30:17, 731 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 3, Category Id: 2, ISBN: 978-0373150202, Title: Effective Java, Price: 43.86
04:30:17, 732 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 4, Category Id: 3, ISBN: 978-0132358844, Title: Clean Code, Price: 25.33
04:30:17, 732 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
04:30:17, 732 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 6, Category Id: 4, ISBN: 978-0375509526, Title: Still I Rise by Maya Angelou, Price: 30.29
04:30:17, 732 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
04:30:17, 732 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
04:30:17, 732 INFO edu.morrison.spring.PublishingApp: 89 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:30:17, 757 INFO edu.morrison.spring.PublishingApp: 117 - ... looking up added book #10 ...
04:30:17, 763 INFO edu.morrison.spring.PublishingApp: 123 - book #10 FOUND:
04:30:17, 764 INFO edu.morrison.spring.PublishingApp: 64 - Book - Id: 10, Category Id: 3, ISBN: 978-0367580535, Title: Fundamentals of Computer Graphics, Price: 126.0
04:30:17, 764 INFO edu.morrison.spring.PublishingApp: 67 - Category - Id: 3, Name: Programming
04:30:17, 764 INFO edu.morrison.spring.PublishingApp: 69 - Author - Id: 8, First name: Peter, Last name: Shirley, Description: Peter Shirley is computer graphics researcher, NVIDIA A computer scientist, and University of Utah adjunct professor.
04:30:17, 764 INFO edu.morrison.spring.PublishingApp: 132 - ===== Demo 4: Delete a saved book and author(s) from the database
04:30:17, 764 INFO edu.morrison.spring.PublishingApp: 135 - ... books before delete:
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 1, Category Id: 1, ISBN: 978-007536321, Title: Anna Karenina, Price: 17.57
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 3, Category Id: 2, ISBN: 978-0373150202, Title: Effective Java, Price: 43.86
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 4, Category Id: 3, ISBN: 978-0132358844, Title: Clean Code, Price: 25.33
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 6, Category Id: 4, ISBN: 978-0375509526, Title: Still I Rise by Maya Angelou, Price: 30.29
04:30:17, 791 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
04:30:17, 792 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
04:30:17, 792 INFO edu.morrison.spring.PublishingApp: 138 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:30:17, 806 INFO edu.morrison.spring.PublishingApp: 144 - ... deleting book #10 ...
04:30:17, 816 INFO edu.morrison.spring.PublishingApp: 151 - ... books after delete:
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 14 - Book - Id: 1, Category Id: 1, ISBN: 978-007536321, Title: Anna Karenina, Price: 17.57
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 2, Category Id: 1, ISBN: 978-0060194994, Title: To Kill A Mockingbird, Price: 25.95
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 3, Category Id: 2, ISBN: 978-0373150202, Title: Effective Java, Price: 43.86
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 4, Category Id: 3, ISBN: 978-0132358844, Title: Clean Code, Price: 25.33
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 5, Category Id: 4, ISBN: 978-0571096343, Title: The Waste Land by T.S. Eliot, Price: 99.99
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 6, Category Id: 4, ISBN: 978-0375509526, Title: Still I Rise by Maya Angelou, Price: 30.29
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 7, Category Id: 4, ISBN: 978-0156332255, Title: Four Quartets, Price: 8.99
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 8, Category Id: 4, ISBN: 978-1400079988, Title: War and Peace, Price: 21.0
04:30:17, 839 INFO edu.morrison.spring.PublishingApp: 154 - Book - Id: 9, Category Id: 3, ISBN: 978-0128006450, Title: Physically Based Rendering, Price: 109.95
04:30:17, 840 INFO edu.morrison.spring.PublishingApp: 157 - ... confirming book #10 deleted ...
04:30:17, 843 INFO edu.morrison.spring.PublishingApp: 160 - ... successfully deleted book #10
04:30:17, 843 INFO edu.morrison.spring.PublishingApp: 58 - ===== End of Publishing Demo =====
morrison@agu assignment2 % 

```

```

assignment2 -- zsh -- 131x63
~/git/rseg105/part2/assignment2

mysql>
<c>
mysql> select * from book;
+----+CATEGORY_ID | ISBN          | TITLE           | PRICE |
| 1  | 1           | 978-007536321 | Anna Karenina   | 17.57 |
| 1  | 1           | 978-0060194994 | To Kill A Mockingbird | 25.95 |
| 3  | 2           | 978-0137150202 | Effective Java   | 43.86 |
| 4  | 3           | 978-0132358844 | Clean Code       | 25.33 |
| 5  | 4           | 978-0571096343 | The Waste Land by T.S. Eliot | 99.99 |
| 5  | 4           | 978-0375509526 | Still I Rise by Maya Angelou | 30.29 |
| 6  | 5           | 978-0156332255 | Four Quartets    | 8.99 |
| 7  | 6           | 978-1400079988 | War and Peace    | 21.0  |
| 8  | 7           | 978-0128006450 | Physically Based Rendering | 109.95 |
| 9  | 3           | 978-0367580535 | Fundamentals of Computer Graphics | 126.0 |

9 rows in set (0.00 sec)

mysql> select * from author;
+----+FIRST_NAME | LAST_NAME | DESCRIPTION
| 1  | Leo       | Tolstoy   | Count Lev Nikolayevich Tolstoy is regarded as one of the greatest authors of all time. He received nominations for the Nobel Prize in Literature every year from 1902 to 1906 and for the Nobel Peace Prize in 1901, 1902, and 1909. | 
| 1  | Leo       | Tolstoy   | Leo Tolstoy was a Russian novelist and philosopher, best known for his 1860 novel To Kill a Mockingbird. It won the 1961 Pulitzer Prize and became a classic of American literature. |
| 3  | Thomas   | Eliot     | Thomas Stearns Eliot was a poet, essayist, publisher, playwright, literary critic and editor. Considered one of the 20th century's major poets, he is a central figure in English-language Modernist poetry. |
| 3  | Thomas   | Eliot     | Thomas Stearns Eliot OM was a poet, essayist, publisher, playwright, literary critic and editor. Considered one of the 20th century's major poets, he is a central figure in English-language Modernist poetry. |
| 4  | Matt      | Pharr    | Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering. |
| 4  | Matt      | Pharr    | Matt Pharr is a Software Engineer at Google, received his PhD from the Stanford Graphics Lab, and received an Academy Award for Physically Based Rendering. |
| 6  | Jakob    | Wenzel   | Wenzel Jakob is an assistant professor at Ecole polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering. |
| 6  | Jakob    | Wenzel   | Wenzel Jakob is an assistant professor at Ecole polytechnique fédérale de Lausanne (EPFL). He received an Academy Award for Physically Based Rendering. |
| 7  | Greg     | Humphreys | Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, & received an Academy Award for Physically Based Rendering. |
| 7  | Greg     | Humphreys | Greg Humphreys is a Software Lead at NVIDIA, received his PhD from the Stanford Graphics Lab, & received an Academy Award for Physically Based Rendering. |

7 rows in set (0.00 sec)

mysql> select * from author_book;
+----+AUTHOR_ID | BOOK_ID |
| 1  | 1           | 1        |
| 2  | 1           | 2        |
| 3  | 1           | 3        |
| 4  | 1           | 6        |
| 3  | 1           | 7        |
| 1  | 1           | 8        |
| 5  | 1           | 9        |
| 6  | 1           | 9        |
| 7  | 1           | 9        |

9 rows in set (0.00 sec)

mysql> mysql>
```

We can indeed confirm that book ID = 10 with author ID = 8 have been deleted.

This assignment gave me the most difficulty due to various debugging issue. The Lazy Initialization error mentioned in the assignment text was particularly challenging to resolve. Even with SQL statements being printed in Hibernate debug mode, the issue and solution were non-obvious. The fix was a simple adjustment to an annotation to say the ManyToMany relationship should utilize (fetch = FetchType.EAGER). This helped ensure that the author entities were loaded while the session was still active.



The screenshot shows an Emacs window titled "assignment2 — emacs -nw . — 82x42 — %1". The buffer contains Java code for a "Book" class. The code includes static final strings for database queries, a Long id field with annotations (@Id, @GeneratedValue(strategy = IDENTITY), @Column(name = "ID")), and private fields for category, isbn, title, and price. A significant portion of the code is for a ManyToMany relationship with the "Author" entity, starting at line 73. The annotation @ManyToMany(fetch = FetchType.EAGER) is present, along with @JoinTable(name = "AUTHOR_BOOK"), @JoinColumn(name = "BOOK_ID"), and @InverseJoinColumn(name = "AUTHOR_ID"). A Set<Author> authors field is declared. The code is color-coded for syntax highlighting. The status bar at the bottom shows "-UU-----F1 Book.java 34% (73,0) Git-main (Java/l FlyC- company SP Wrap".

```
41 public class Book implements Serializable {
42
43     public static final String FIND_ALL_BOOKS_BY_AUTHOR_ID =
44         "Book.findAllBooksByAuthorId";
45     public static final String FIND_BOOK_WITH_AUTHOR_CATEGORY_BY_ID =
46         "Book.findBookWithAuthorCategoryById";
47     public static final String FIND_BOOK_BY_TITLE = "Book.findBookByTitle";
48
49     @Id
50     @GeneratedValue(strategy = IDENTITY)
51     @Column(name = "ID")
52     protected Long id;
53
54     public Long getId() {
55         return id;
56     }
57     public void setId(Long id) {
58         this.id = id;
59     }
60
61     @ManyToOne
62     @JoinColumn(name = "CATEGORY_ID")
63     private Category category;
64
65     @Column
66     private String isbn;
67
68     @Column
69     private String title;
70
71     @Column
72     private Float price;
73     @ManyToMany(fetch = FetchType.EAGER)
74     @JoinTable(name = "AUTHOR_BOOK",
75                 joinColumns = @JoinColumn(name = "BOOK_ID"),
76                 inverseJoinColumns = @JoinColumn(name = "AUTHOR_ID"))
77     private Set<Author> authors = new HashSet<>();
78
```

3. ASSIGNMENT 2.3

For the first Spring MVC Core Features assignment, I was successful in implementing the solution as specified in the assignment, following the same pattern as presented. Even with the vastly reduced database model, this assignment was considerably more complicated as it involved getting Tomcat and a complicated UI setup.

```
assignment3 — zsh — 108x18 — %1
~/git/rseg105/part2/assignment3 — zsh

assignment3]
[INFO] Processing war project
[INFO] Copying webapp resources [/Users/morrison/git/rseg105/part2/assignment3/src/main/webapp]
[INFO] Building war: /usr/local/Cellar/tomcat/10.0.18/libexec/webapps-javee/part2-assignment3.war
[INFO]
[INFO] --- maven-install-plugin:2.4:install (default-install) @ part2.assignment3 ---
[INFO] Installing /usr/local/Cellar/tomcat/10.0.18/libexec/webapps-javee/part2-assignment3.war to /Users/morrison/.m2/repository/edu/morrison/spring/part2.assignment3/1.0-SNAPSHOT/part2.assignment3-1.0-SNAPSHOT.war
[INFO] Installing /Users/morrison/git/rseg105/part2/assignment3/pom.xml to /Users/morrison/.m2/repository/edu/morrison/spring/part2.assignment3/1.0-SNAPSHOT/part2.assignment3-1.0-SNAPSHOT.pom
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 3.803 s
[INFO] Finished at: 2022-03-27T04:51:34-04:00
[INFO]
== Running BookWebApp =====
morrison@agua assignment3 %

./assignment3/target
./assignment3/bin
./assignment3/run.sh
./assignment3/src
./assignment3/src/main
./assignment3/src/main/resources
./assignment3/src/main/resources/logback.xml
./assignment3/src/main/resources/standard.properties
./assignment3/src/main/resources/log4j.properties
./assignment3/src/main/resources/spring
./assignment3/src/main/resources/spring/security-context.xml
./assignment3/src/main/resources/spring/datasource-tx-jpa.xml
./assignment3/src/main/resources/sql
./assignment3/src/main/resources/sql/d1.sql
./assignment3/src/main/resources/sql/test-data.sql
./assignment3/src/main/webapp
./assignment3/src/main/webapp/images
./assignment3/src/main/webapp/images/banner.png
./assignment3/src/main/webapp/images/icon
./assignment3/src/main/webapp/styles
./assignment3/src/main/webapp/WEB-INF
./assignment3/src/main/webapp/WEB-INF/layouts
./assignment3/src/main/webapp/WEB-INF/layouts/default.jspx
./assignment3/src/main/webapp/WEB-INF/layouts/layouts.xml
./assignment3/src/main/webapp/WEB-INF/web.xml
./assignment3/src/main/webapp/WEB-INF/118n
./assignment3/src/main/webapp/WEB-INF/118n/messages_es_PA.properties
./assignment3/src/main/webapp/WEB-INF/118n/application_es_PA.properties
./main/webapp/WEB-INF/118n/application.properties
./main/webapp/WEB-INF/118n/messages.properties
./main/webapp/WEB-INF/views
./main/webapp/WEB-INF/views/menu.jspx
./main/webapp/WEB-INF/views/books
./main/webapp/WEB-INF/views/books/show.jspx
./main/webapp/WEB-INF/views/books/views.xml
./main/webapp/WEB-INF/views/books/list.jspx
./main/webapp/WEB-INF/views/books/edit.jspx
./main/webapp/WEB-INF/views/header.jspx
./main/webapp/WEB-INF/views/footer.jspx
./main/webapp/WEB-INF/spring
./main/webapp/WEB-INF/spring/appServlet
./main/webapp/WEB-INF/spring/appServlet/servlet-context.xml
./main/webapp/WEB-INF/spring/appServlet/root-context.xml
./main/webapp/scripts
./main/webapp/scripts/jquery-ui.min.js
./main/webapp/scripts/jquery-1.12.4.js
./main/webapp/jqgrid
./main/java
./main/java/edu
./main/java/edu/morrison
./main/java/edu/morrison/spring
./main/java/edu/morrison/spring/init
./main/java/edu/morrison/spring/init/WebInitializer.java
./main/java/edu/morrison/spring/repository
./main/java/edu/morrison/spring/app/BookRepository.java
./main/java/edu/morrison/spring/app/BookWebApp.java
./main/java/edu/morrison/spring/util
./main/java/edu/morrison/spring/util/UrUtil.java
./main/java/edu/morrison/spring/util/Message.java
./main/java/edu/morrison/spring/util/BookGrid.java
./assignment3/src/main/java/edu/morrison/spring/web
./assignment3/src/main/java/edu/morrison/spring/web/init
./assignment3/src/main/java/edu/morrison/spring/web/form
./assignment3/src/main/java/edu/morrison/spring/web/util
./assignment3/src/main/java/edu/morrison/spring/web/controller
./assignment3/src/main/java/edu/morrison/spring/web/BookController.java
./assignment3/src/main/java/edu/morrison/spring/web/SecurityController.java
./assignment3/src/main/java/edu/morrison/spring/beans
./assignment3/src/main/java/edu/morrison/spring/beans/Book.java
./assignment3/src/main/java/edu/morrison/spring/service
./assignment3/src/main/java/edu/morrison/spring/service/BookServiceImpl.java
./assignment3/src/main/java/edu/morrison/spring/service/BookService.java
./assignment3/src/main/java/edu/morrison/spring/domain
```

Given the complexity of the stack and various technologies involved, the course Singer MVC example was heavily leveraged both in terms of overall approach, code structure, and implementation logic. Even with that, the task still took longer than estimated and numerous bugs had to be overcome, some unexpected. The first was a Maven compilation exception, shown here.

```
assignment3 — zsh — 141x61 — %1
~/git/rseg105/part2/assignment3 — zsh

at org.apache.maven.cli.MavenCli.main (MavenCli.java:293)
at org.apache.maven.cli.MavenCli.main (MavenCli.java:196)
at jdk.internal.reflect.NativeMethodAccessorImpl.invoke0 (Native Method)
at jdk.internal.reflect.NativeMethodAccessorImpl.invoke (NativeMethodAccessorImpl.java:77)
at jdk.internal.reflect.DelegatingMethodAccessorImpl.invoke (DelegatingMethodAccessorImpl.java:43)
at java.lang.reflect.Method.invoke (Method.java:588)
at org.codehaus.plexus.classworlds.launcher.Launcher.launchEnhanced (Launcher.java:282)
at org.codehaus.plexus.classworlds.launcher.Launcher.launch (Launcher.java:225)
at org.codehaus.plexus.classworlds.launcher.Launcher.mainWithExitCode (Launcher.java:406)
at org.codehaus.plexus.classworlds.launcher.Launcher.main (Launcher.java:347)
[INFO]
[INFO] BUILD FAILURE
[INFO] Total time: 2.468 s
[INFO] Finished at: 2022-03-27T05:01:54-04:00
[INFO]
[ERROR] Failed to execute goal org.apache.maven.plugins:maven-war-plugin:3.0.0:war (default-war) on project part2.assignment3: Execution default-war of goal org.apache.maven.plugins:maven-war-plugin:3.0.0:war failed: Unable to load the mojo 'war' in the plugin 'org.apache.maven.plugins:maven-war-plugin:3.0.0' due to an API incompatibility: org.codehaus.plexus.component.repository.exception.ComponentLookupException: null
[ERROR]
[ERROR] realm = plugin>org.apache.maven.plugins:maven-war-plugin:3.0.0
[ERROR] strategy = org.codehaus.plexus.classworlds.strategy.SelfFirstStrategy
[ERROR] urls[0] = file:/Users/morrison/.m2/repository/org/apache/maven/plugins/maven-war-plugin/3.0.0/maven-war-plugin-3.0.0.jar
[ERROR] urls[1] = file:/Users/morrison/.m2/repository/org/sisu/sisu-inject-bean/1.4.2/sisu-inject-bean-1.4.2.jar
[ERROR] urls[2] = file:/Users/morrison/.m2/repository/org/sisu/sisu-guice/2.1.7/sisu-guice-2.1.7-noop.jar
[ERROR] urls[3] = file:/Users/morrison/.m2/repository/org/sonatype/ether/ether-util/1.7/ether-util-1.7.jar
[ERROR] urls[4] = file:/Users/morrison/.m2/repository/org/plexus/component-annotations/1.6/plexus-component-annotations-1.6.jar
[ERROR] urls[5] = file:/Users/morrison/.m2/repository/org/plexus/plexus-dispatcher/1.3/plexus-dispatcher-1.3.jar
[ERROR] urls[6] = file:/Users/morrison/.m2/repository/org/sonatype/plexus/plexus-cipher/1.4/plexus-cipher-1.4.jar
[ERROR] urls[7] = file:/Users/morrison/.m2/repository/org/sonatype/plexus/plexus-maven/plexus-maven/3.1.1/plexus-maven-3.1.1.jar
[ERROR] urls[8] = file:/Users/morrison/.m2/repository/org/sonatype/plexus/plexus-archiver/3.0.1/plexus-archiver-3.0.1.jar
[ERROR] urls[9] = file:/Users/morrison/.m2/repository/commons-io/commons-io/2.5/commons-io-2.5.jar
[ERROR] urls[10] = file:/Users/morrison/.m2/repository/org/cechais/plexus/plexus-archiver/3.4/plexus-archiver-3.4.jar
[ERROR] urls[11] = file:/Users/morrison/.m2/repository/org/cechais/plexus/plexus-archiver/3.4/plexus-archiver-3.4.jar
[ERROR] urls[12] = file:/Users/morrison/.m2/repository/commons/compress/1.11/commons-compress-1.11.jar
[ERROR] urls[13] = file:/Users/morrison/.m2/repository/org/cechais/plexus/plexus-archiver/3.4/plexus-archiver-3.4.jar
[ERROR] urls[14] = file:/Users/morrison/.m2/repository/org/cechais/plexus/plexus-archiver/3.4/plexus-archiver-3.4.jar
[ERROR] urls[15] = file:/Users/morrison/.m2/repository/org/cechais/plexus/plexus-interpolation/1.22/plexus-interpolation-1.22.jar
[ERROR] urls[16] = file:/Users/morrison/.m2/repository/com/thoughtworks/xstream/xstream/1.4.9/xstream-1.4.9.jar
[ERROR] urls[17] = file:/Users/morrison/.m2/repository/xpp3/xpp3/1.1.3.2/xpp3-1.1.3.2.jar
[ERROR] urls[18] = file:/Users/morrison/.m2/repository/org/plexus/plexus-utils/3.0.24/plexus-utils-3.0.24.jar
[ERROR] urls[19] = file:/Users/morrison/.m2/repository/org/cechais/plexus/plexus-utils/3.0.24/plexus-utils-3.0.24.jar
[ERROR] urls[20] = file:/Users/morrison/.m2/repository/org/apache/maven/shared/maven-filtering/3.1.1/maven-filtering-3.1.1.jar
[ERROR] urls[21] = file:/Users/morrison/.m2/repository/org/sonatype/plexus/plexus-build-api/0.0.7/plexus-build-api-0.0.7.jar
[ERROR] urls[22] = file:/Users/morrison/.m2/repository/org/apache/maven/shared/maven-mapping/3.0.0/maven-mapping-3.0.0.jar
[ERROR] Number of Foreign Imports: 1
[ERROR] Import: EntryImport{ from real ClassRealm[maven.api, parent: null]}
[ERROR]
[ERROR] : ExceptionInitializerError: Unable to make field private final java.util.Comparator java.util.TreeMap.comparator accessible: module plexus-base does not "opens java.util" to unnamed module @cc3f13e
[ERROR] [ERROR] > [Help 1]
[ERROR]
[ERROR] To see the full stack trace of the errors, re-run Maven with the -e switch.
[ERROR] Re-run Maven using the -X switch to enable full debug logging.
[ERROR]
[ERROR] For more information about the errors and possible solutions, please read the following articles:
[ERROR] [Help 1] http://cwiki.apache.org/confluence/display/MAVEN/PluginContainerException
== Running BookWebApp =====
morrison@agua assignment3 %
```

This issue was eerily similar to an issue debugged for days for Part 1, so dependencies were reviewed for upgrades. That was indeed the fix needed, as it was necessary to upgrade the war plugin in the pom.xml from 3.0.0 to a newer version:

```
<maven.war.plugin.version>3.3.0</maven.war.plugin.version>
```

With that fixed, there was another issue encountered running Tomcat where it was throwing an exception if run as a service. Fortunately, it ran in debug mode when invoked manually, so that was utilized for both assignments 3 and 4. As I was running Tomcat 10, it also became necessary to configure the pom.xml to install into the webapps-javaee directory, which causes Tomcat to automatically migrate the .war from JavaEE to Jakarta.

```
<outputDirectory>/usr/local/Cellar/tomcat/10.0.18/libexec/webapps-javaee</outputDirectory>
```

With those issues resolved, work on the task was concluded successfully. First, the simplified database table was constructed and populated with 12 entries.

```
1 CREATE TABLE BOOK (
2   ID INT(11) NOT NULL AUTO_INCREMENT,
3   CATEGORY_NAME VARCHAR(100),
4   ISBN VARCHAR(14),
5   TITLE VARCHAR(500),
6   PUBLISHER VARCHAR(100),
7   PRICE DECIMAL(5,2),
8   UNIQUE UQ_BOOK_1 (ISBN, TITLE),
9   PRIMARY KEY (ID)
10 );
```

```
[mysql]> show tables;
+-----+
| Tables_in_mvcbooks |
+-----+
| BOOK |
+-----+
1 row in set (0.00 sec)

[mysql]> select * from book;
+----+-----+-----+-----+-----+-----+
| ID | CATEGORY_NAME | ISBN      | TITLE                | PUBLISHER          | PRICE    |
+----+-----+-----+-----+-----+-----+
| 1  | Novel        | 978-0075536321 | Anna Karenina        | McGraw-Hill        | 17.57   |
| 2  | Novel        | 978-0060194994 | To Kill A Mockingbird | Harper Collins     | 25.95   |
| 3  | Programming  | 978-0134685991 | Effective Java       | Addison-Wesley Professional | 43.86   |
| 4  | Poetry       | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber    | 99.99   |
| 5  | Novel        | 978-1400079988 | War and Peace        | Vintage            | 21.00   |
| 6  | Programming  | 978-0128006450 | Physically Based Rendering | Morgan Kaufmann    | 109.95  |
| 7  | Novel        | 978-0012336321 | Kanna Arenina        | McGraw-Hill        | 71.75   |
| 8  | Novel        | 978-0060191234 | To Hug A Mockingbird | Carper Hollins     | 52.59   |
| 9  | Programming  | 978-0132185991 | Ineffective B-        | Addison-Wesley Professional | 34.68   |
| 10 | Poetry       | 978-0591296343 | MacBeth              | Billy Shakespeare  | 0.99    |
| 11 | Novel        | 978-1422279988 | Peas and Warts       | Vintage            | 12.00   |
| 12 | Programming  | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann    | 910.95  |
+----+-----+-----+-----+-----+-----+
12 rows in set (0.00 sec)
```

At this point, implementing a BookService that can find all books, find a book by ID, and save a book was straightforward. The existing code was referenced and adapted accordingly for our Book Web App. A Book List View was implemented with paging and internationalization (to Spanish).

Welcome to Book Web App

Book Listing

| Category | ISBN | Title | Publisher | Price |
|-------------|----------------|------------------------------|------------------------|--------|
| Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |
| Programming | 978-0134685991 | Effective Java | Addison-Wesley Profess | 43.86 |
| Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |
| Programming | 978-0132185991 | Ineffective B- | Addison-Wesley Profess | 34.68 |
| Novel | 978-0012336321 | Kanna Arenina | McGraw-Hill | 71.75 |
| Poetry | 978-0591296343 | MacBeth | Billy Shakespeare | 0.99 |
| Novel | 978-1422279988 | Peas and Warts | Vintage | 12 |
| Programming | 978-0128006450 | Physically Based Rendering | Morgan Kaufmann | 109.95 |
| Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |
| Novel | 978-0060191234 | To Hug A Mockingbird | Carper Hollins | 52.59 |

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Bienvenido a Libro Aplicación Web

Lista de Libros

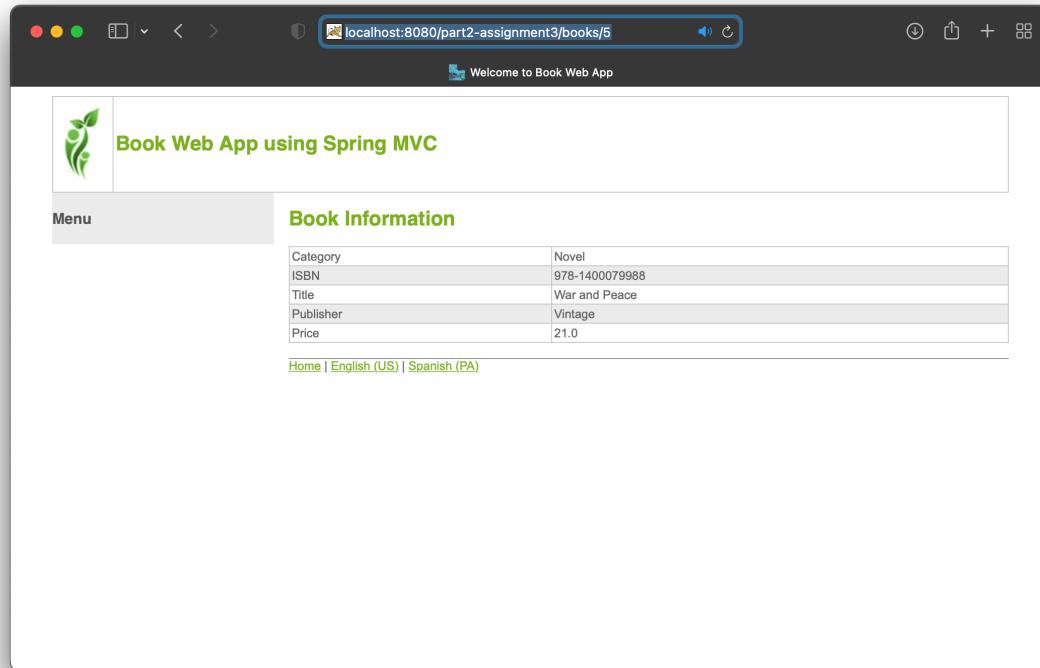
| Categoría | ISBN | Título | Editora | Precio |
|-------------|----------------|------------------------------|------------------------|--------|
| Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |
| Programming | 978-0134685991 | Effective Java | Addison-Wesley Profess | 43.86 |
| Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |
| Programming | 978-0132185991 | Ineffective B- | Addison-Wesley Profess | 34.68 |
| Novel | 978-0012336321 | Kanna Arenina | McGraw-Hill | 71.75 |
| Poetry | 978-0591296343 | MacBeth | Billy Shakespeare | 0.99 |
| Novel | 978-1422279988 | Peas and Warts | Vintage | 12 |
| Programming | 978-0128006450 | Physically Based Rendering | Morgan Kaufmann | 109.95 |
| Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |
| Novel | 978-0060191234 | To Hug A Mockingbird | Carper Hollins | 52.59 |

View 1 - 10 of 12

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It took a lot of effort to get Tomcat to correctly display the UTF-8 diacriticals (accents), with the fix being that the i18n messages needed to NOT be encoded in UTF-8 themselves. The files needed to be encoded in ISO-8859-1 in order to display properly in UTF-8.

With that resolved, a Show Book View was implemented next where we can view specific books by double-clicking a row or specifying an ID in the URL.



Here what Tomcat's automatic .war conversion from JavaEE to Jakarta EE looks like.

```
rest - 193x55
~/Desktop/RSEG105/Second Half/SpringRest
27-Mar-2022 02:51:56.199 INFO [main] org.apache.catalina.startup.VersionLoggerListener.log Command line argument: -Djava.io.tmpdir=/usr/local/Cellar/tomcat/10.0.18/libexec/temp
27-Mar-2022 02:51:56.220 INFO [main] org.apache.catalina.core.AprLifecycleListener.lifecycleEvent The Apache Tomcat Native library which allows using OpenSSL was not found on the java.library.path: [/Users/morrison/Library/Java/Extensions:/Library/Java/Extensions:/System/Library/Java/Extensions:/usr/lib/java:..]
27-Mar-2022 02:51:56.510 INFO [main] org.apache.coyote.AbstractProtocol.init Initializing ProtocolHandler ["http-nio-8080"]
27-Mar-2022 02:51:56.549 INFO [main] org.apache.catalina.startup.Catalina.load Server initialization in [526] milliseconds
27-Mar-2022 02:51:56.593 INFO [main] org.apache.catalina.core.StandardService.startInternal Starting service [Catalina]
27-Mar-2022 02:51:56.594 INFO [main] org.apache.catalina.core.StandardEngine.startInternal Starting Servlet engine: [Apache Tomcat/10.0.18]
27-Mar-2022 02:51:56.633 INFO [main] org.apache.tomcat.jakartaee.Migration.execute Performing migration from source [/usr/local/Cellar/tomcat/10.0.18/libexec/webapps-javaee/part2-assignment3.war] to destination [/usr/local/Cellar/tomcat/10.0.18/libexec/webapps-javaee/new10367781374089684455.mmp] with Jakarta EE specification profile [TOMCAT]
27-Mar-2022 02:51:56.637 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [part2-assignment3.war] using streaming
27-Mar-2022 02:51:56.938 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/slf4j-log4j12-1.7.26.jar] using streaming
27-Mar-2022 02:51:56.947 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/slf4j-log4j12-1.7.26.jar]
27-Mar-2022 02:51:56.948 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/tiles-template-3.0.8.jar] using streaming
27-Mar-2022 02:51:56.961 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/tiles-template-3.0.8.jar]
27-Mar-2022 02:51:56.991 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/commons-logging-1.2.jar] using streaming
27-Mar-2022 02:51:56.992 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/commons-logging-1.2.jar]
27-Mar-2022 02:51:57.181 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/spring-data-jpa-2.1.9.RELEASE.jar] using streaming
27-Mar-2022 02:51:57.181 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/spring-data-jpa-2.1.9.RELEASE.jar]
27-Mar-2022 02:51:57.183 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/spring-security-acl-5.0.1.RELEASE.jar] using streaming
27-Mar-2022 02:51:57.234 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/spring-security-acl-5.0.1.RELEASE.jar]
27-Mar-2022 02:51:57.234 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/spring-core-5.1.8.RELEASE.jar] using streaming
27-Mar-2022 02:51:57.745 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/spring-core-5.1.8.RELEASE.jar]
27-Mar-2022 02:51:57.745 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/commons-dhcp2-2.6.0.jar] using streaming
27-Mar-2022 02:51:57.843 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/commons-dhcp2-2.6.0.jar]
27-Mar-2022 02:51:57.845 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/tiles-request-api-1.0.7.jar] using streaming
27-Mar-2022 02:51:57.879 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/tiles-request-api-1.0.7.jar]
27-Mar-2022 02:51:57.888 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/activation-1.1.jar] using streaming
27-Mar-2022 02:51:57.913 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/activation-1.1.jar]
27-Mar-2022 02:51:57.913 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/jcl-over-slf4j-1.7.6.jar] using streaming
27-Mar-2022 02:51:57.924 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/jcl-over-slf4j-1.7.6.jar]
27-Mar-2022 02:51:58.565 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/protobuf-java-3.6.1.jar] using streaming
27-Mar-2022 02:51:58.566 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/protobuf-java-3.6.1.jar]
27-Mar-2022 02:51:58.566 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/hibernate-entitymanager-5.3.0.Beta1.jar] using streaming
27-Mar-2022 02:51:58.567 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration finished for archive [WEB-INF/lib/hibernate-entitymanager-5.3.0.Beta1.jar]
27-Mar-2022 02:51:58.567 INFO [main] org.apache.tomcat.jakartaee.Migration.migrateStream Migration starting for archive [WEB-INF/lib/stsl-1.2.jar] using streaming
```

By adding ?form to the URL, we can get to the Edit Book View where edits can be performed and become instantly saved to the database.

Welcome to Book Web App

Edit Book

| | |
|-----------|------------------------|
| Category* | Novel |
| ISBN* | 978-1400079988 |
| Title | War and Peace |
| Publisher | We can edit books too. |
| Price | 21.0 |

[Home](#) | English (US) | Spanish (PA)

Welcome to Book Web App

Book Information

book saved successfully

| | |
|-----------|------------------------|
| Category | Novel |
| ISBN | 978-1400079988 |
| Title | War and Peace |
| Publisher | We can edit books too. |
| Price | 21.0 |

[Home](#) | English (US) | Spanish (PA)

```
mysql> select * from book;
```

| ID | CATEGORY_NAME | ISBN | TITLE | PUBLISHER | PRICE |
|----|---------------|----------------|------------------------------|-----------------------------|--------|
| 1 | Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |
| 2 | Novel | 978-0060194994 | To Kill A Mockingbird | Harper Collins | 25.95 |
| 3 | Programming | 978-0134685991 | Effective Java | Addison-Wesley Professional | 43.86 |
| 4 | Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |
| 5 | Novel | 978-1400079988 | War and Peace | We can edit books too. | 21.00 |
| 6 | Programming | 978-0128006450 | Physically Based Rendering | Morgan Kaufmann | 109.95 |
| 7 | Novel | 978-0012336321 | Kanna Arenina | McGraw-Hill | 71.75 |
| 8 | Novel | 978-0060191234 | To Hug A Mockingbird | Carper Hollins | 52.59 |
| 9 | Programming | 978-0132185991 | Ineffective B- | Addison-Wesley Professional | 34.68 |
| 10 | Poetry | 978-0591296343 | MacBeth | Billy Shakespeare | 0.99 |
| 11 | Novel | 978-1422279988 | Peas and Warts | Vintage | 12.00 |
| 12 | Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |

12 rows in set (0.00 sec)

As I'd implemented it, the security settings don't let the form display for adding books, but this is demonstrated in assignment 4. Instead we show that other optional elements, including being able to sort on any column (by price shown) and pagination.

The screenshot shows a web application titled "Book Web App using Spring MVC". The main content area displays a table titled "Book Listing" with 12 rows of book data. The columns are Category, ISBN, Title, Publisher, and Price. The table includes a sorting icon for the Price column. Below the table is a pagination control with links for "View 1 - 10 of 12".

| Category | ISBN | Title | Publisher | Price |
|-------------|----------------|------------------------------|-------------------------|--------|
| Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |
| Programming | 978-0128006450 | Physically Based Rendering | Morgan Kaufmann | 109.95 |
| Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |
| Novel | 978-0012336321 | Kanna Arena | McGraw-Hill | 71.75 |
| Novel | 978-0060191234 | To Hug A Mockingbird | Carper Hollins | 52.59 |
| Programming | 978-0134685991 | Effective Java | Addison-Wesley Professi | 43.86 |
| Programming | 978-0132185991 | Ineffective B- | Addison-Wesley Professi | 34.68 |
| Novel | 978-0060194994 | To Kill A Mockingbird | Harper Collins | 25.95 |
| Novel | 978-1400079988 | War and Peace | We can edit books too. | 21 |
| Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |

Page 1 of 2 | 10 View 1 - 10 of 12

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The screenshot shows the same web application. The main content area displays a table titled "Book Listing" with 2 rows of book data. The columns are Category, ISBN, Title, Publisher, and Price. The table includes a sorting icon for the Price column. Below the table is a pagination control with links for "View 11 - 12 of 12".

| Category | ISBN | Title | Publisher | Price |
|----------|----------------|----------------|-------------------|-------|
| Novel | 978-1422279988 | Peas and Warts | Vintage | 12 |
| Poetry | 978-0591296343 | MacBeth | Billy Shakespeare | 0.99 |

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4. ASSIGNMENT 2.4

For the second Spring MVC Security assignment, I was also successful in getting login and security working. A simple user login is presented and preloaded with user name “user” and password “user”.

Entering incorrect login credentials results in an error as expected.

```

./assignment4
./assignment4/target
./assignment4/pom.xml
./assignment4/src/main/resources
./assignment4/src/main/resources/sh
./assignment4/src/main/resources/spring
./assignment4/src/main/resources/spring/security-context.xml
./assignment4/src/main/resources/spring/datasource-tx-jpa.xml
./assignment4/src/main/resources/sql
./assignment4/src/main/resources/sql/ddl.sql
./assignment4/src/main/resources/sql/test-data.sql
./assignment4/src/main/resources/sql/schema.sql
./assignment4/src/main/webapp
./assignment4/src/main/webapp/images
./assignment4/src/main/webapp/images/banner.png
./assignment4/src/main/webapp/ckeditor
./assignment4/src/main/webapp/styles
./assignment4/src/main/webapp/WEB-INF/layouts
./assignment4/src/main/webapp/WEB-INF/layouts/default.jspx
./assignment4/src/main/webapp/WEB-INF/layouts/layouts.xml
./assignment4/src/main/webapp/WEB-INF/web.xml
./assignment4/src/main/webapp/WEB-INF/18n
./assignment4/src/main/webapp/WEB-INF/18n/messages_es_PA.properties
./assignment4/src/main/webapp/WEB-INF/18n/application_es_PA.properties
./assignment4/src/main/webapp/WEB-INF/18n/application.properties
./assignment4/src/main/webapp/WEB-INF/18n/messages.properties
./assignment4/src/main/webapp/WEB-INF/views
./assignment4/src/main/webapp/WEB-INF/views/menu.jspx
./assignment4/src/main/webapp/WEB-INF/views/books
./assignment4/src/main/webapp/WEB-INF/views/books/show.jspx
./assignment4/src/main/webapp/WEB-INF/views/books/views.xml
./assignment4/src/main/webapp/WEB-INF/views/books/list.jspx
./assignment4/src/main/webapp/WEB-INF/views/books/edit.jspx
./assignment4/src/main/webapp/WEB-INF/views/footer.jspx
./assignment4/src/main/webapp/WEB-INF/spring/appServlet
./assignment4/src/main/webapp/WEB-INF/spring/appServlet/servlet-context.xml
./assignment4/src/main/webapp/WEB-INF/spring/root-context.xml
./assignment4/src/main/webapp/WEB-INF/rights
./assignment4/src/main/webapp/scripts/jquery-ui.min.js
./assignment4/src/main/webapp/scripts/jquery-1.12.4.js
./assignment4/src/main/webapp/qgrid
./assignment4/src/main/java
./assignment4/src/main/java/edu
./assignment4/src/main/java/edu/morrison
./assignment4/src/main/java/edu/morrison/spring
./assignment4/src/main/java/edu/morrison/spring/init
./assignment4/src/main/java/edu/morrison/spring/init/WebInitializer.java
./assignment4/src/main/java/edu/morrison/spring/repository
./assignment4/src/main/java/edu/morrison/spring/repository/BookRepository.java
./assignment4/src/main/java/edu/morrison/spring/util
./assignment4/src/main/java/edu/morrison/spring/util/BookWebApp.java
./assignment4/src/main/java/edu/morrison/spring/util/BookUtil
./assignment4/src/main/java/edu/morrison/spring/util/UrUtil.java
./assignment4/src/main/java/edu/morrison/spring/util/Message.java
./assignment4/src/main/java/edu/morrison/spring/util/BookGrid.java

./assignment4/src/main/java/edu/morrison/spring/web
./assignment4/src/main/java/edu/morrison/spring/web/init
./assignment4/src/main/java/edu/morrison/spring/web/form
./assignment4/src/main/java/edu/morrison/spring/web/util
./assignment4/src/main/java/edu/morrison/spring/web/controller
./assignment4/src/main/java/edu/morrison/spring/web/BookController.java
./assignment4/src/main/java/edu/morrison/spring/bean
./assignment4/src/main/java/edu/morrison/spring/service/Book.java
./assignment4/src/main/java/edu/morrison/spring/service
./assignment4/src/main/java/edu/morrison/spring/service/BookServiceImpl.java
./assignment4/src/main/java/edu/morrison/spring/service/BookService.java
./assignment4/src/main/java/edu/morrison/spring/domain

```

Logging in with valid credentials, a menu is presented and the user's login name is welcomed, and selecting Logout reverts back to the previous state as expected.

The screenshot shows a web browser window titled "localhost" displaying the "Book Web App using Spring MVC". The page header includes a logo, the title "Book Web App using Spring MVC", and a welcome message "Welcome user [Logout]". On the left, there is a sidebar with a "Menu" section containing a "New Book" option. The main content area is titled "Book Listing" and contains a table of book data. The table has columns for Category, ISBN, Title, Publisher, and Price. The data includes various books like "Anna Karenina", "Effective Java", and "To Kill a Mockingbird". Below the table is a pagination control with links for "Page 1 of 2" and "View 1 - 10 of 12". At the bottom of the page are links for "Home | English (US) | Spanish (PA)".

Double-clicking one of the books, we now see an Edit Book link when logged in.

The screenshot shows a web browser window titled "localhost" displaying the "Book Web App using Spring MVC". The page header includes a logo, the title "Book Web App using Spring MVC", and a welcome message "Welcome user [Logout]". On the left, there is a sidebar with a "Menu" section containing a "New Book" option. The main content area is titled "Book Information" and displays a table with book details. The table includes rows for Category (Programming), ISBN (978-0128006450), Title (Physically Based Rendering), Publisher (Morgan Kaufmann), and Price (109.95). Below the table is an "Edit Book" link. At the bottom of the page are links for "Home | English (US) | Spanish (PA)".

Selecting the Edit Book link, we can make changes.

The screenshot shows a web browser window titled "localhost" displaying the "Book Web App using Spring MVC". The page has a header with a logo, the title, and a "Logout" link. On the left is a sidebar with a "Menu" section containing a "New Book" link. The main content area is titled "Edit Book" and contains fields for Category (Programming), ISBN (978-0128006450), Title (Physically Based Rendering), Publisher (Editable Publishing), and Price (999.99). At the bottom are "Save" and "Reset" buttons, and a footer with links to Home, English (US), and Spanish (PA).

And they're saved to the database as expected.

This screenshot is identical to the one above, showing the "Edit Book" form with the same data: Category (Programming), ISBN (978-0128006450), Title (Physically Based Rendering), Publisher (Editable Publishing), and Price (999.99). The layout, buttons, and footer links are also the same, indicating that the changes made in the first screenshot have been successfully saved to the database.

Logging out, we no longer see the edit link.

A screenshot of a web browser window displaying a book detail page. The URL in the address bar is `localhost:8080/part2-assignment4/books/6`. The page title is "Welcome to Book Web App". On the left, there is a logo of a stylized green plant and a "Menu" section with "Login" fields for "User Name" and "Password", and a "Login" button. The main content area is titled "Book Information" and contains a table with the following data:

| | |
|-----------|--------------------------------|
| Category | Programming |
| ISBN | 978-0128006450 |
| Title | Physically Based Rendering, v2 |
| Publisher | Editable Publishing |
| Price | 999.99 |

At the bottom of the page are links to "Home", "English (US)", and "Spanish (PA)".

Logging back in, we can select the New Book link on the left menu that takes us to the Add Book view.

A screenshot of a web browser window displaying an "Add Book" form. The URL in the address bar is `localhost:8080/part2-assignment4/books?form`. The page title is "Welcome to Book Web App". In the top right corner, it says "Welcome user" and has a "Logout" link. The left sidebar has a "Menu" section with a "New Book" link. The main content area is titled "Add Book" and contains fields for entering book information:

| | |
|-----------|---------------|
| Category* | Programming |
| ISBN* | 123-123123123 |
| Title | Expert Java |
| Publisher | Vitaly Yurik |
| Price | 100.00 |

At the bottom of the form are "Save" and "Reset" buttons. At the very bottom of the page are links to "Home", "English (US)", and "Spanish (PA)".

Saving the book, we see that our listing now has 13 books, and sorting on Publisher, we find our new book easily.

Welcome to Book Web App

Welcome user
[Logout](#)

Book Web App using Spring MVC

book saved successfully

Book Listing

| Category | ISBN | Title | Publisher | Price |
|-------------|----------------|--------------------------------|------------------------|--------|
| Novel | 978-1400079988 | War and Peace | We can edit books too. | 21 |
| Programming | 123-123123123 | Expert Java | Vitaly Yurik | 100 |
| Novel | 978-1422279988 | Peas and Warts | Vintage | 12 |
| Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |
| Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |
| Novel | 978-0012336321 | Kanna Arenina | McGraw-Hill | 71.75 |
| Novel | 978-0060194994 | To Kill A Mockingbird | Harper Collins | 25.95 |
| Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |
| Programming | 978-0128006450 | Physically Based Rendering, v2 | Editable Publishing | 999.99 |
| Novel | 978-0060191234 | To Hug A Mockingbird | Carper Hollins | 52.59 |

Page 1 of 2 | >> | 10 | View 1 - 10 of 13

[Home](#) | [English \(US\)](#) | [Spanish \(PA\)](#)

Looking at the database, we see that the new book is indeed added to the database.

```
[mysql]> select * from book;
+----+-----+-----+-----+-----+-----+
| ID | CATEGORY_NAME | ISBN | TITLE | PUBLISHER | PRICE |
+----+-----+-----+-----+-----+-----+
| 1 | Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |
| 2 | Novel | 978-0060194994 | To Kill A Mockingbird | Harper Collins | 25.95 |
| 3 | Programming | 978-0134685991 | Effective Java | Addison-Wesley Professional | 43.86 |
| 4 | Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |
| 5 | Novel | 978-1400079988 | War and Peace | We can edit books too. | 21.00 |
| 6 | Programming | 978-0128006450 | Physically Based Rendering, v2 | Editable Publishing | 999.99 |
| 7 | Novel | 978-0012336321 | Kanna Arenina | McGraw-Hill | 71.75 |
| 8 | Novel | 978-0060191234 | To Hug A Mockingbird | Carper Hollins | 52.59 |
| 9 | Programming | 978-0132185991 | Ineffective B- | Addison-Wesley Professional | 34.68 |
| 10 | Poetry | 978-0591296343 | MacBeth | Billy Shakespeare | 0.99 |
| 11 | Novel | 978-1422279988 | Peas and Warts | Vintage | 12.00 |
| 12 | Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |
| 13 | Programming | 123-123123123 | Expert Java | Vitaly Yurik | 100.00 |
+----+-----+-----+-----+-----+-----+
13 rows in set (0.00 sec)
```

Last but not least, if we log out, we are indeed unable to reach the Add Book view at /part2-assignment/books?form

The screenshot shows a web application titled "Book Web App using Spring MVC". On the left, there is a "Menu" section containing a logo and a login form with fields for "User Name" and "Password", and a "Login" button. The main content area is titled "Book Listing" and contains a table with 13 rows of book data. The columns are "Category", "ISBN", "Title", "Publisher", and "Price". The table includes links for each book entry. Below the table is a pagination control with buttons for first, previous, next, last, and page numbers (1 of 2). A link "View 1 - 10 of 13" is also present. At the bottom of the page, there are links for "Home", "English (US)", and "Spanish (PA)".

| Category | ISBN | Title | Publisher | Price |
|-------------|----------------|--------------------------------|-------------------------|--------|
| Novel | 978-0075536321 | Anna Karenina | McGraw-Hill | 17.57 |
| Programming | 978-0134685991 | Effective Java | Addison-Wesley Professi | 43.86 |
| Programming | 123-123123123 | Expert Java | Vitaly Yurik | 100 |
| Programming | 978-0128009110 | Imaginary Publishing | Morgan Kaufmann | 910.95 |
| Programming | 978-0132185991 | Ineffective B- | Addison-Wesley Professi | 34.68 |
| Novel | 978-0012336321 | Kanna Arenina | McGraw-Hill | 71.75 |
| Poetry | 978-0591296343 | MacBeth | Billy Shakespeare | 0.99 |
| Novel | 978-1422279988 | Peas and Warts | Vintage | 12 |
| Programming | 978-0128006450 | Physically Based Rendering, v2 | Editable Publishing | 999.99 |
| Poetry | 978-0571096343 | The Waste Land by T.S. Eliot | Faber And Faber | 99.99 |

Summary:

The third assignment was by far the most complexity and culmination of nearly all topics covered to date. It was definitely the most challenging code, followed somewhat by the second assignment (due to bugs and issues). The third and fourth assignments provided excellent insight into how Spring MVC can be leveraged effectively for enterprise web application development.

Of all the assignments, the second using Spring Data JPA2 provided some of the most interesting insight into Spring's capability as it did well to demonstrate considerable complexity with the least amount of code.

That concludes Part 2 with all objectives met! Thank you for your time and attention on this journey through advanced Java concepts.