Assignment 2.3
The initial content of database tables after initialization:

```
mysql> select * from category;
+----+-----------------+
| ID | NAME            |
+----+-----------------+
|  1 | Java            |
|  2 | Design Patterns |
|  3 | C/C++           |
|  4 | Python          |
|  5 | Scala           |
|  6 | JavaScript      |
+----+-----------------+
6 rows in set (0.00 sec)

mysql> select * from book;
+----+-------------+------------+-------------------------------------------------+-------+
| ID | CATEGORY_ID | ISBN       | TITLE                                           | PRICE |
+----+-------------+------------+-------------------------------------------------+-------+
|  1 |           1 | 0764543857 | Expert one-on-one J2EE Design and Development   | 59.99 |
|  2 |           1 | 0321349807 | The Java Programming Language                   | 31.75 |
|  3 |           1 | 0321349808 | Head First Java                                 |  18.3 |
|  4 |           1 | 0321349809 | Murach Java Programming (5th Edition)           | 50.14 |
|  5 |           2 | 0321127420 | Patterns of Enterprise Application Architecture | 52.49 |
|  6 |           3 | 0321349524 | The C Programming Language(2nd Edition)         | 31.83 |
|  7 |           3 | 0321349529 | C++ Primer(5th Edition)                         | 55.56 |
|  8 |           3 | 0321349528 | Murach C++ Programming                          |  59.5 |
|  9 |           4 | 0321349810 | Python Crash Course                             | 21.24 |
| 10 |           5 | 1935182706 | Scala in Depth                                  | 32.48 |
| 11 |           6 | 0321349819 | Eloquent JavaScript                             |    25 |
+----+-------------+------------+-------------------------------------------------+-------+
11 rows in set (0.00 sec)

mysql> select * from author;
+----+------------+-----------+-----------------------------------------------------------------------------------------+
| ID | FIRST_NAME | LAST_NAME | DESCRIPTION                                                                             |
+----+------------+-----------+-----------------------------------------------------------------------------------------+
|  1 | Rod        | Johnson   | an Australian computer specialist who created the Spring Framework and co-founded SpringSource |
|  2 | Ken        | Arnold    | an American computer programmer well known as one of the developers of the 1980s        |
|  3 | Kathy      | Sierra    | She created the award-winning Head First programming book series that has sold over 1 million copies. |
|  4 | Joel       | Murach    | He has written extensively on a wide range of Java, .NET, web, and database technologies. |
|  5 | Martin     | Fowler    | a British software developer, author and international public speaker on software development |
|  6 | Brian      | Kernighan | a computer scientist who worked at Bell Labs alongside Unix creators                    |
|  7 | Stanley    | Lippman   | He has worked with Bjarne Stroustrup in Bell Laboratories during early stages of C++    |
|  8 | Eric       | Matthes   | He teaches high school math and science at a small school in southeast Alaska.          |
|  9 | Josh       | Suereth   | a Staff Software Engineer at Google LLC                                                 |
| 10 | Marijn     | Haverbeke | a programmer and tech writer in Berlin                                                  |
| 11 | Martin     | Odersky   | a German computer scientist and professor of programming methods                       |
+----+------------+-----------+-----------------------------------------------------------------------------------------+
11 rows in set (0.00 sec)

mysql> select * from author_book;
+-----------+---------+
| AUTHOR_ID | BOOK_ID |
+-----------+---------+
|         1 |       1 |
|         2 |       2 |
|         3 |       3 |
|         4 |       4 |
|         5 |       5 |
|         6 |       6 |
|         4 |       7 |
|         7 |       8 |
|         8 |       9 |
|         9 |      10 |
|        11 |      10 |
|        10 |      11 |
+-----------+---------+
12 rows in set (0.00 sec)
```

1. Find all books without authors and categories:
   java -jar .\target\find-all-books-demo.jar edu.lix8.spring.jpa2.app.FindAllBooksDemo

```
C:\CSCIE57\assignments\Assignment2.3>java -jar .\target\find-all-books-demo.jar edu.lix8.spring.jpa2.app.FindAllBooksDemo
22:33:53,640  INFO rg.hibernate.jpa.internal.util.LogHelper:  31 - HHH000204: Processing PersistenceUnitInfo [
       name: default
       ...]
22:33:53,682  INFO                    org.hibernate.Version:  45 - HHH000412: Hibernate Core {[WORKING]}
22:33:53,684  INFO              org.hibernate.cfg.Environment: 211 - HHH000206: hibernate.properties not found
22:33:53,716  INFO org.hibernate.annotations.common.Version:  66 - HCANN000001: Hibernate Commons Annotations {5.0.1.Final}
22:33:54,874  INFO          org.hibernate.dialect.Dialect: 157 - HHH000400: Using dialect: org.hibernate.dialect.MySQL5Dialect
22:33:55,198  INFO internal.QueryTranslatorFactoryInitiator:  47 - HHH000397: Using ASTQueryTranslatorFactory
22:33:55,263  INFO a.LocalContainerEntityManagerFactoryBean: 415 - Initialized JPA EntityManagerFactory for persistence unit 'default'
22:33:55,303  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  20 - ============== Listing books without authors and categories ==============
22:33:55,427  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=1, isbn='0764543857', title='Expert one-on-one J2EE Design and Development', pric
e=59.99}
22:33:55,427  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,429  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=2, isbn='0321349807', title='The Java Programming Language', price=31.75}

22:33:55,432  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,433  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=3, isbn='0321349808', title='Head First Java', price=18.3}

22:33:55,433  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,433  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=4, isbn='0321349809', title='Murach Java Programming (5th Edition)', price=50.14}

22:33:55,434  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,435  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=5, isbn='0321127420', title='Patterns of Enterprise Application Architecture', pr
ice=52.49}
22:33:55,435  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,436  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=6, isbn='0321349524', title='The C Programming Language(2nd Edition)', price=31.8
3}
22:33:55,436  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,436  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=7, isbn='0321349529', title='C++ Primer(5th Edition)', price=55.56}

22:33:55,437  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,437  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=8, isbn='0321349528', title='Murach C++ Programming', price=59.5}

22:33:55,437  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,438  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=9, isbn='0321349810', title='Python Crash Course', price=21.24}

22:33:55,438  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,439  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=10, isbn='1935182706', title='Scala in Depth', price=32.48}

22:33:55,439  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
22:33:55,440  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  27 - Book{id=11, isbn='0321349819', title='Eloquent JavaScript', price=25.0}

22:33:55,441  INFO du.lix8.spring.jpa2.app.FindAllBooksDemo:  28 - -------------------------------------------
```

2. Find all books with authors and categories.

java -jar .\target\find-all-books-authors-and-categories-demo.jar
edu.lix8.spring.jpa2.app.FindAllBooksAuthorsCategoriesDemo

```
22:38:43,880  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  20 - ============== Listing books with authors and category names ==============
22:38:44,014  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=1, isbn='0764543857', title='Expert one-on-one J2EE Design and Development', pric
e=59.99}

22:38:44,020  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Java', id=1}
22:38:44,021  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=1, first_name='Rod', last_name='Johnson', description='an Australian compu
ter specialist who created the Spring Framework and co-founded SpringSource'}
22:38:44,022  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,022  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=2, isbn='0321349807', title='The Java Programming Language', price=31.75}

22:38:44,023  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Java', id=1}
22:38:44,024  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=2, first_name='Ken', last_name='Arnold', description='an American computer
 programmer well known as one of the developers of the 1980s'}
22:38:44,024  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,025  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=3, isbn='0321349808', title='Head First Java', price=18.3}

22:38:44,026  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Java', id=1}
22:38:44,026  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=3, first_name='Kathy', last_name='Sierra', description='She created the aw
ard-winning Head First programming book series that has sold over 1 million copies.'}
22:38:44,027  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,032  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=4, isbn='0321349809', title='Murach Java Programming (5th Edition)', price=50.14}

22:38:44,032  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Java', id=1}
22:38:44,033  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written exte
nsively on a wide range of Java, .NET, web, and database technologies.'}
22:38:44,033  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,034  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=5, isbn='0321127420', title='Patterns of Enterprise Application Architecture', pr
ice=52.49}

22:38:44,035  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Design Patterns', id=2}
22:38:44,035  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=5, first_name='Martin', last_name='Fowler', description='a British softwar
e developer, author and international public speaker on software development'}
22:38:44,036  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,036  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=6, isbn='0321349524', title='The C Programming Language(2nd Edition)', price=31.8
3}

22:38:44,037  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='C/C++', id=3}
22:38:44,037  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=6, first_name='Brian', last_name='Kernighan', description='a computer scie
ntist who worked at Bell Labs alongside Unix creators'}
22:38:44,038  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,038  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=7, isbn='0321349529', title='C++ Primer(5th Edition)', price=55.56}

22:38:44,039  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='C/C++', id=3}
22:38:44,039  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written exte
nsively on a wide range of Java, .NET, web, and database technologies.'}
22:38:44,040  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,040  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=8, isbn='0321349528', title='Murach C++ Programming', price=59.5}

22:38:44,041  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='C/C++', id=3}
22:38:44,041  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=7, first_name='Stanley', last_name='Lippman', description='He has worked w
ith Bjarne Stroustrup in Bell Laboratories during early stages of C++'}
22:38:44,041  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,044  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=9, isbn='0321349810', title='Python Crash Course', price=21.24}

22:38:44,046  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Python', id=4}
22:38:44,047  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=8, first_name='Eric', last_name='Matthes', description='He teaches high sc
hool math and science at a small school in southeast Alaska.'}
22:38:44,047  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,047  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=10, isbn='1935182706', title='Scala in Depth', price=32.48}

22:38:44,048  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='Scala', id=5}
22:38:44,049  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=9, first_name='Josh', last_name='Suereth', description='a Staff Software E
ngineer at Google LLC'}
22:38:44,049  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=11, first_name='Martin', last_name='Odersky', description='a German comput
er scientist and professor of programming methods'}
22:38:44,049  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
22:38:44,050  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  27 - Book{id=11, isbn='0321349819', title='Eloquent JavaScript', price=25.0}

22:38:44,051  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 -     Category{name='JavaScript', id=6}
22:38:44,052  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  31 -     Author{id=10, first_name='Marijn', last_name='Haverbeke', description='a programmer
and tech writer in Berlin'}
22:38:44,052  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  32 - -----------------------------------------
```

3. Find a book with authors and category by book's ID.

java -jar .\target\find-book-author-category-by-bookid-demo.jar
edu.lix8.spring.jpa2.app.FindBookAuthorsCategoryByBookIdDemo

```
22:41:41,321  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  18 - ============== Listing books with authors and category names ==============
22:41:41,370  INFO pring.jpa2.service.PublishingServiceImpl:  50 - Find Book with Authors And Category By Book Id
using JPA 2 Criteria API
22:41:41,449  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  24 - Book{id=10, isbn='1935182706', title='Scala in Depth', price=32.48}

22:41:41,455  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  26 -     Category{name='Scala', id=5}
22:41:41,456  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  28 -     Author{id=9, first_name='Josh', last_name='Suereth', description='a Staff Software E
ngineer at Google LLC'}
22:41:41,457  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  28 -     Author{id=11, first_name='Martin', last_name='Odersky', description='a German comput
er scientist and professor of programming methods'}
22:41:41,457  INFO a2.app.FindAllBooksAuthorsCategoriesDemo:  29 - -----------------------------------------
```

4. Create and save in your database a new book with an author(s). The screenshot below
shows the saved book **Modern Java in Action**(at the bottom).

java -jar .\target\insert-book-with-author-demo.jar
edu.lix8.spring.jpa2.app.InsertBookWithAuthorDemo

```
23:20:44,028  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  23 - ============= Create a new book with new authors not yet persisted =============
23:20:44,142  INFO pring.jpa2.service.PublishingServiceImpl:  96 - Insert a new book
23:20:44,157  INFO pring.jpa2.service.PublishingServiceImpl: 102 - Book saved with id: 12
23:20:44,207  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=1, isbn='0764543857', title='Expert one-on-one J2EE Design and Development', pric
e=59.99}

23:20:44,214  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Java', id=1}
23:20:44,215  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=1, first_name='Rod', last_name='Johnson', description='an Australian compu
ter specialist who created the Spring Framework and co-founded SpringSource'}
23:20:44,215  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,216  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=2, isbn='0321349807', title='The Java Programming Language', price=31.75}

23:20:44,216  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Java', id=1}
23:20:44,218  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=2, first_name='Ken', last_name='Arnold', description='an American computer
 programmer well known as one of the developers of the 1980s'}
23:20:44,218  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,219  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=3, isbn='0321349808', title='Head First Java', price=18.3}

23:20:44,219  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Java', id=1}
23:20:44,220  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=3, first_name='Kathy', last_name='Sierra', description='She created the aw
ard-winning Head First programming book series that has sold over 1 million copies.'}
23:20:44,221  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,221  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=4, isbn='0321349809', title='Murach Java Programming (5th Edition)', price=50.14}

23:20:44,222  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Java', id=1}
23:20:44,222  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written exte
nsively on a wide range of Java, .NET, web, and database technologies.'}
23:20:44,223  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,223  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=5, isbn='0321127420', title='Patterns of Enterprise Application Architecture', pr
ice=52.49}

23:20:44,228  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Design Patterns', id=2}
23:20:44,231  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=5, first_name='Martin', last_name='Fowler', description='a British softwar
e developer, author and international public speaker on software development'}
23:20:44,232  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,233  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=6, isbn='0321349524', title='The C Programming Language(2nd Edition)', price=31.8
3}

23:20:44,233  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='C/C++', id=3}
23:20:44,234  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=6, first_name='Brian', last_name='Kernighan', description='a computer scie
ntist who worked at Bell Labs alongside Unix creators'}
23:20:44,234  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,235  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=7, isbn='0321349529', title='C++ Primer(5th Edition)', price=55.56}

23:20:44,236  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='C/C++', id=3}
23:20:44,236  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written exte
nsively on a wide range of Java, .NET, web, and database technologies.'}
23:20:44,237  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,238  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=8, isbn='0321349528', title='Murach C++ Programming', price=59.5}

23:20:44,239  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='C/C++', id=3}
23:20:44,239  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=7, first_name='Stanley', last_name='Lippman', description='He has worked w
ith Bjarne Stroustrup in Bell Laboratories during early stages of C++'}
23:20:44,240  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,245  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=9, isbn='0321349810', title='Python Crash Course', price=21.24}

23:20:44,245  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Python', id=4}
23:20:44,246  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=8, first_name='Eric', last_name='Matthes', description='He teaches high sc
hool math and science at a small school in southeast Alaska.'}
23:20:44,246  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,247  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=10, isbn='1935182706', title='Scala in Depth', price=32.48}

23:20:44,248  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Scala', id=5}
23:20:44,248  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=11, first_name='Martin', last_name='Odersky', description='a German comput
er scientist and professor of programming methods'}
23:20:44,248  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=9, first_name='Josh', last_name='Suereth', description='a Staff Software E
ngineer at Google LLC'}
23:20:44,249  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,249  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=11, isbn='0321349819', title='Eloquent JavaScript', price=25.0}

23:20:44,249  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='JavaScript', id=6}
23:20:44,250  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=10, first_name='Marijn', last_name='Haverbeke', description='a programmer
and tech writer in Berlin'}
23:20:44,250  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
23:20:44,251  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  45 - Book{id=12, isbn='0321349812', title='Modern Java in Action', price=48.18}

23:20:44,251  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  47 -     Category{name='Java', id=1}
23:20:44,251  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=12, first_name='Mario', last_name='Fusco', description='a senior software
engineer at Red Hat'}
23:20:44,252  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  49 -     Author{id=13, first_name='Raoul-Gabriel', last_name='Urma', description='a PhD candi
date in Computer Science at the University of Cambridge'}
23:20:44,252  INFO spring.jpa2.app.InsertBookWithAuthorDemo:  50 - ------------------------------------------
```

Below you see this book and its author added to the database.
Book: **Modern Java in Action**
Authors: **Raoul-Gabriel Urma and Mario Fusco**

```
mysql> select * from book;
+----+-------------+------------+----------------------------------------------+--------+
| ID | CATEGORY_ID | ISBN       | TITLE                                        | PRICE  |
+----+-------------+------------+----------------------------------------------+--------+
|  1 |           1 | 0764543857 | Expert one-on-one J2EE Design and Development | 59.99  |
|  2 |           1 | 0321349807 | The Java Programming Language                 | 31.75  |
|  3 |           1 | 0321349808 | Head First Java                              | 18.3   |
|  4 |           1 | 0321349809 | Murach Java Programming (5th Edition)         | 50.14  |
|  5 |           2 | 0321127420 | Patterns of Enterprise Application Architecture | 52.49 |
|  6 |           3 | 0321349524 | The C Programming Language(2nd Edition)        | 31.83  |
|  7 |           3 | 0321349529 | C++ Primer(5th Edition)                       | 55.56  |
|  8 |           3 | 0321349528 | Murach C++ Programming                        | 59.5   |
|  9 |           4 | 0321349810 | Python Crash Course                          | 21.24  |
| 10 |           5 | 1935182706 | Scala in Depth                               | 32.48  |
| 11 |           6 | 0321349819 | Eloquent JavaScript                          | 25     |
| 12 |           1 | 0321349812 | Modern Java in Action                        | 48.18  |
+----+-------------+------------+----------------------------------------------+--------+
12 rows in set (0.00 sec)

mysql> select * from author;
+----+--------------+-----------+--------------------------------------------------------------------------------------+
| ID | FIRST_NAME   | LAST_NAME | DESCRIPTION                                                                           |
+----+--------------+-----------+--------------------------------------------------------------------------------------+
|  1 | Rod          | Johnson   | an Australian computer specialist who created the Spring Framework and co-founded SpringSource |
|  2 | Ken          | Arnold    | an American computer programmer well known as one of the developers of the 1980s     |
|  3 | Kathy        | Sierra    | She created the award-winning Head First programming book series that has sold over 1 million copies. |
|  4 | Joel         | Murach    | He has written extensively on a wide range of Java, .NET, web, and database technologies. |
|  5 | Martin       | Fowler    | a British software developer, author and international public speaker on software development |
|  6 | Brian        | Kernighan | a computer scientist who worked at Bell Labs alongside Unix creators                  |
|  7 | Stanley      | Lippman   | He has worked with Bjarne Stroustrup in Bell Laboratories during early stages of C++  |
|  8 | Eric         | Matthes   | He teaches high school math and science at a small school in southeast Alaska.        |
|  9 | Josh         | Suereth   | a Staff Software Engineer at Google LLC                                               |
| 10 | Marijn       | Haverbeke | a programmer and tech writer in Berlin                                                |
| 11 | Martin       | Odersky   | a German computer scientist and professor of programming methods                     |
| 12 | Raoul-Gabriel| Urma      | a PhD candidate in Computer Science at the University of Cambridge                    |
| 13 | Mario        | Fusco     | a senior software engineer at Red Hat                                                 |
+----+--------------+-----------+--------------------------------------------------------------------------------------+
13 rows in set (0.00 sec)

mysql> select * from author_book;
+-----------+---------+
| AUTHOR_ID | BOOK_ID |
+-----------+---------+
|         1 |       1 |
|         2 |       2 |
|         3 |       3 |
|         4 |       4 |
|         5 |       5 |
|         6 |       6 |
|         4 |       7 |
|         7 |       8 |
|         8 |       9 |
|         9 |      10 |
|        11 |      10 |
|        10 |      11 |
|        12 |      12 |
|        13 |      12 |
+-----------+---------+
14 rows in set (0.00 sec)
```

5. Delete the newly created book and the author(s) from your database. You will not see that book in the screenshot below.

```
23:34:26,526  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  20 - ============= Delete the saved book and authors from database =============
23:34:26,572  INFO pring.jpa2.service.PublishingServiceImpl:  50 - Find Book with Authors And Category By Book Id
using JPA 2 Criteria API
23:34:26,695  INFO pring.jpa2.service.PublishingServiceImpl: 111 - Book with id: 12 deleted successfully
23:34:26,751  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=1, isbn='0764543857', title='Expert one-on-one J2EE Design and Development', price=59.99}

23:34:26,759  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Java', id=1}
23:34:26,760  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=1, first_name='Rod', last_name='Johnson', description='an Australian computer specialist who created the Spring Framework and co-fo
unded SpringSource'}
23:34:26,761  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,761  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=2, isbn='0321349807', title='The Java Programming Language', price=31.75}

23:34:26,762  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Java', id=1}
23:34:26,763  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=2, first_name='Ken', last_name='Arnold', description='an American computer programmer well known as one of the developers of the 19
80s'}
23:34:26,763  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,764  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=3, isbn='0321349808', title='Head First Java', price=18.3}

23:34:26,765  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Java', id=1}
23:34:26,765  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=3, first_name='Kathy', last_name='Sierra', description='She created the award-winning Head First programming book series that has s
old over 1 million copies.'}
23:34:26,766  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,766  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=4, isbn='0321349809', title='Murach Java Programming (5th Edition)', price=50.14}

23:34:26,767  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Java', id=1}
23:34:26,767  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written extensively on a wide range of Java, .NET, web, and database
technologies.'}
23:34:26,768  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,769  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=5, isbn='0321127420', title='Patterns of Enterprise Application Architecture', price=52.49}

23:34:26,769  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Design Patterns', id=2}
23:34:26,774  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=5, first_name='Martin', last_name='Fowler', description='a British software developer, author and international public speaker on s
oftware development'}
23:34:26,774  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,775  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=6, isbn='0321349524', title='The C Programming Language(2nd Edition)', price=31.83}

23:34:26,775  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='C/C++', id=3}
23:34:26,776  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=6, first_name='Brian', last_name='Kernighan', description='a computer scientist who worked at Bell Labs alongside Unix creators'}
23:34:26,776  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,777  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=7, isbn='0321349529', title='C++ Primer(5th Edition)', price=55.56}

23:34:26,777  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='C/C++', id=3}
23:34:26,778  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written extensively on a wide range of Java, .NET, web, and database
technologies.'}
23:34:26,779  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,779  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=8, isbn='0321349528', title='Murach C++ Programming', price=59.5}

23:34:26,780  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='C/C++', id=3}
23:34:26,781  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=7, first_name='Stanley', last_name='Lippman', description='He has worked with Bjarne Stroustrup in Bell Laboratories during early s
tages of C++'}
23:34:26,781  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,782  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=9, isbn='0321349810', title='Python Crash Course', price=21.24}

23:34:26,782  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Python', id=4}
23:34:26,783  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=8, first_name='Eric', last_name='Matthes', description='He teaches high school math and science at a small school in southeast Alas
ka.'}
23:34:26,783  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,784  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=10, isbn='1935182706', title='Scala in Depth', price=32.48}

23:34:26,785  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='Scala', id=5}
23:34:26,790  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=11, first_name='Martin', last_name='Odersky', description='a German computer scientist and professor of programming methods'}
23:34:26,791  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=9, first_name='Josh', last_name='Suereth', description='a Staff Software Engineer at Google LLC'}
23:34:26,792  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -------------------------------------------
23:34:26,792  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  29 - Book{id=11, isbn='0321349819', title='Eloquent JavaScript', price=25.0}

23:34:26,793  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  31 -     Category{name='JavaScript', id=6}
23:34:26,793  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  33 -     Author{id=10, first_name='Marijn', last_name='Haverbeke', description='a programmer and tech writer in Berlin'}
23:34:26,793  INFO jpa2.app.DeleteInsertedBookAndAuthorDemo:  34 - -----------------------------█-----------
```

The book and authors also delete from the database

```
mysql> select * from book;
+----+-------------+------------+----------------------------------------------------+-------+
| ID | CATEGORY_ID | ISBN       | TITLE                                              | PRICE |
+----+-------------+------------+----------------------------------------------------+-------+
|  1 |           1 | 0764543857 | Expert one-on-one J2EE Design and Development      | 59.99 |
|  2 |           1 | 0321349807 | The Java Programming Language                      | 31.75 |
|  3 |           1 | 0321349808 | Head First Java                                    |  18.3 |
|  4 |           1 | 0321349809 | Murach Java Programming (5th Edition)              | 50.14 |
|  5 |           2 | 0321127420 | Patterns of Enterprise Application Architecture    | 52.49 |
|  6 |           3 | 0321349524 | The C Programming Language(2nd Edition)            | 31.83 |
|  7 |           3 | 0321349529 | C++ Primer(5th Edition)                            | 55.56 |
|  8 |           3 | 0321349528 | Murach C++ Programming                             |  59.5 |
|  9 |           4 | 0321349810 | Python Crash Course                                | 21.24 |
| 10 |           5 | 1935182706 | Scala in Depth                                     | 32.48 |
| 11 |           6 | 0321349819 | Eloquent JavaScript                                |    25 |
+----+-------------+------------+----------------------------------------------------+-------+
11 rows in set (0.00 sec)

mysql> select * from author;
+----+------------+-----------+----------------------------------------------------------------------------------------------+
| ID | FIRST_NAME | LAST_NAME | DESCRIPTION                                                                                   |
+----+------------+-----------+----------------------------------------------------------------------------------------------+
|  1 | Rod        | Johnson   | an Australian computer specialist who created the Spring Framework and co-founded SpringSource |
|  2 | Ken        | Arnold    | an American computer programmer well known as one of the developers of the 1980s             |
|  3 | Kathy      | Sierra    | She created the award-winning Head First programming book series that has sold over 1 million copies. |
|  4 | Joel       | Murach    | He has written extensively on a wide range of Java, .NET, web, and database technologies.    |
|  5 | Martin     | Fowler    | a British software developer, author and international public speaker on software development |
|  6 | Brian      | Kernighan | a computer scientist who worked at Bell Labs alongside Unix creators                          |
|  7 | Stanley    | Lippman   | He has worked with Bjarne Stroustrup in Bell Laboratories during early stages of C++          |
|  8 | Eric       | Matthes   | He teaches high school math and science at a small school in southeast Alaska.               |
|  9 | Josh       | Suereth   | a Staff Software Engineer at Google LLC                                                       |
| 10 | Marijn     | Haverbeke | a programmer and tech writer in Berlin                                                        |
| 11 | Martin     | Odersky   | a German computer scientist and professor of programming methods                             |
+----+------------+-----------+----------------------------------------------------------------------------------------------+
11 rows in set (0.00 sec)

mysql> select * from author_book;
+-----------+---------+
| AUTHOR_ID | BOOK_ID |
+-----------+---------+
|         1 |       1 |
|         2 |       2 |
|         3 |       3 |
|         4 |       4 |
|         5 |       5 |
|         6 |       6 |
|         4 |       7 |
|         7 |       8 |
|         8 |       9 |
|         9 |      10 |
|        11 |      10 |
|        10 |      11 |
+-----------+---------+
12 rows in set (0.00 sec)
```

6. Find all books for one author id = 4 who has more than one book in the database.
java -jar .\target\find-book-by-authorid-demo.jar
edu.lix8.spring.jpa2.app.FindBooksByAuthorIdDemo

```
23:38:53,263  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  23 - ============== Display all Boos by the selected Author: ==============
23:38:53,385  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  30 - Book{id=4, isbn='0321349809', title='Murach Java Programming (5th Edition)', price=50.14}

23:38:53,389  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  32 -     Category{name='Java', id=1}
23:38:53,391  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  34 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written extensively on a wide range of Java, .NET, web, and database
technologies.'}
23:38:53,395  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  35 - ------------------------------------------
23:38:53,395  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  30 - Book{id=7, isbn='0321349529', title='C++ Primer(5th Edition)', price=55.56}

23:38:53,396  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  32 -     Category{name='C/C++', id=3}
23:38:53,396  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  34 -     Author{id=4, first_name='Joel', last_name='Murach', description='He has written extensively on a wide range of Java, .NET, web, and database
technologies.'}
23:38:53,397  INFO .spring.jpa2.app.FindBooksByAuthorIdDemo:  35 - ------------------------------------------
```

7. Find all books without category and authors by native query
java -jar .\target\find-all-books-by-native-query-demo.jar
edu.lix8.spring.jpa2.app.FindAllBooksByNativeQueryDemo

```
23:41:38,316  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  20 - ============== Books found by native query ==============
23:41:38,452  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=1, isbn='0764543857', title='Expert one-on-one J2EE Design and Development', price=59.99}

23:41:38,453  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,454  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=2, isbn='0321349807', title='The Java Programming Language', price=31.75}

23:41:38,458  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,458  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=3, isbn='0321349808', title='Head First Java', price=18.3}

23:41:38,459  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,460  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=4, isbn='0321349809', title='Murach Java Programming (5th Edition)', price=50.14}

23:41:38,460  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,461  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=5, isbn='0321127420', title='Patterns of Enterprise Application Architecture', price=52.49}

23:41:38,461  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,462  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=6, isbn='0321349524', title='The C Programming Language(2nd Edition)', price=31.83}

23:41:38,463  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,463  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=7, isbn='0321349529', title='C++ Primer(5th Edition)', price=55.56}

23:41:38,463  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,464  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=8, isbn='0321349528', title='Murach C++ Programming', price=59.5}

23:41:38,464  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,465  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=9, isbn='0321349810', title='Python Crash Course', price=21.24}

23:41:38,465  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,466  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=10, isbn='1935182706', title='Scala in Depth', price=32.48}

23:41:38,466  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
23:41:38,467  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  27 - Book{id=11, isbn='0321349819', title='Eloquent JavaScript', price=25.0}

23:41:38,467  INFO g.jpa2.app.FindAllBooksByNativeQueryDemo:  28 - -------------------------------------------
```