LIBRARY MANAGEMENT SYSTEM

DATABASE DESIGN & SQL

FSDM 2023S

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Submitted to
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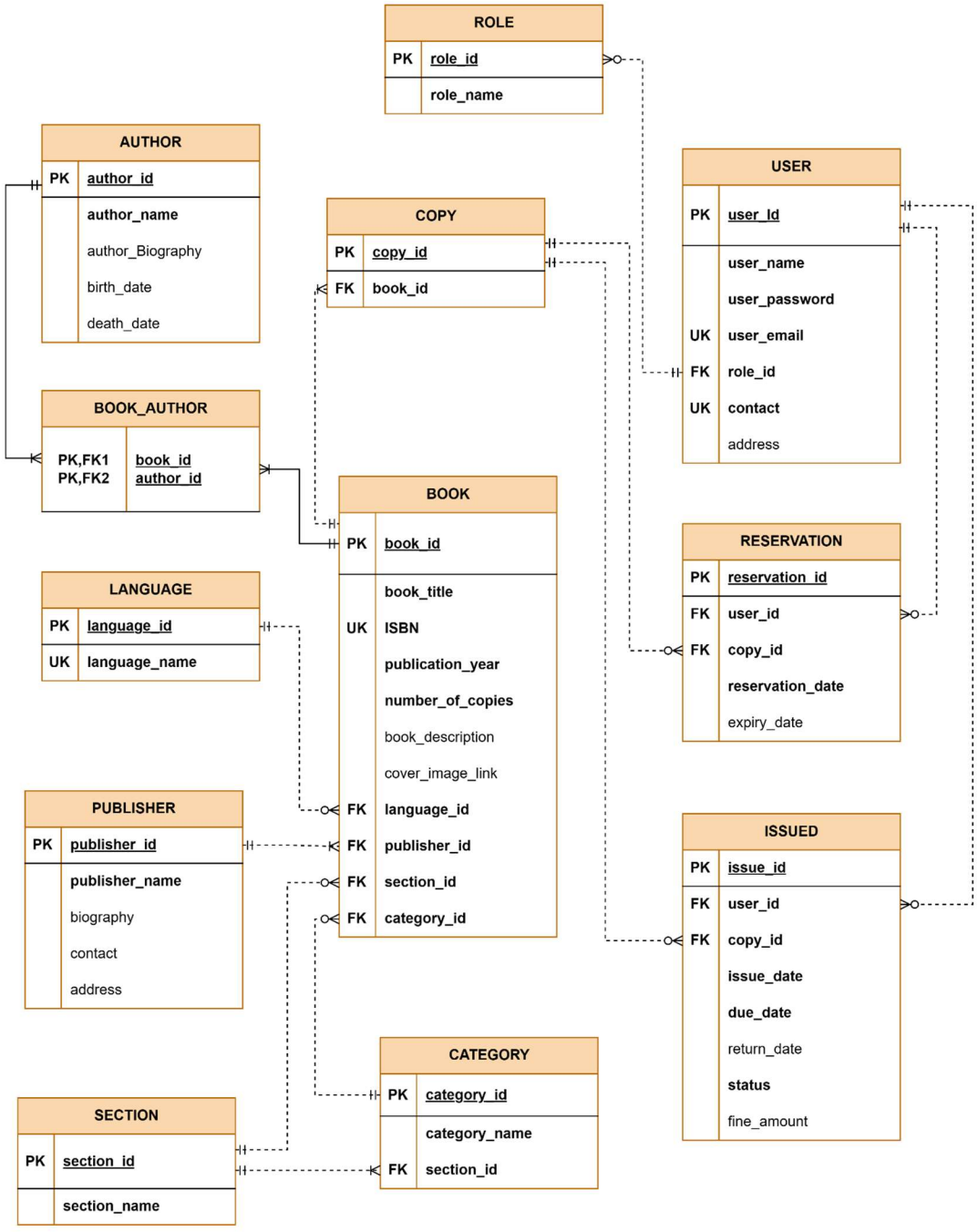
Table of Contents

1. INTRODUCTION

This project report presents the implementation of physical database related to the Library Management System created in the group project. I have added sample records to all the tables and this report contains how SQL queries can be used to query data from those tables based on the knowledge gained in the course. All the scripts used in this individual project is presented in the attached text file.

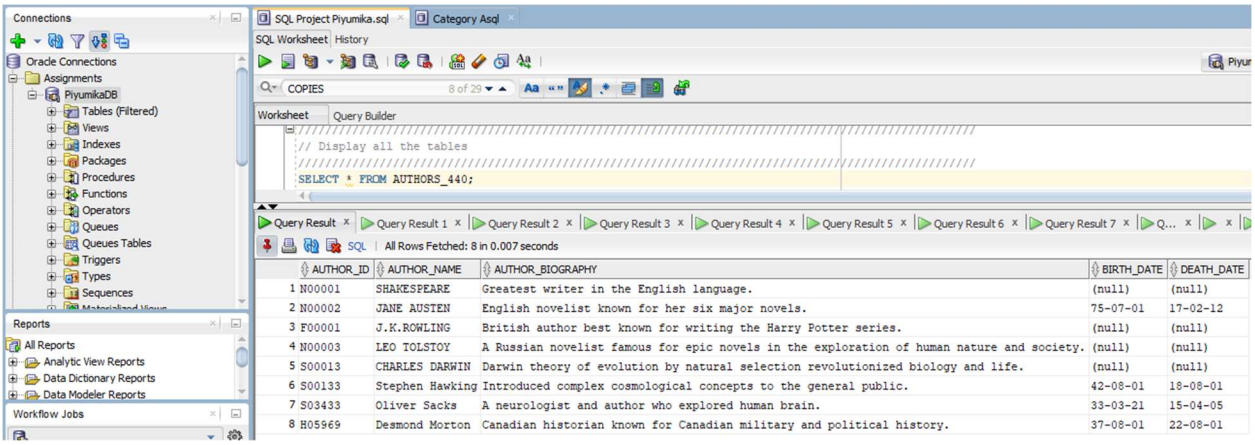
The Entity Relationship Diagram during the group project is as follows.



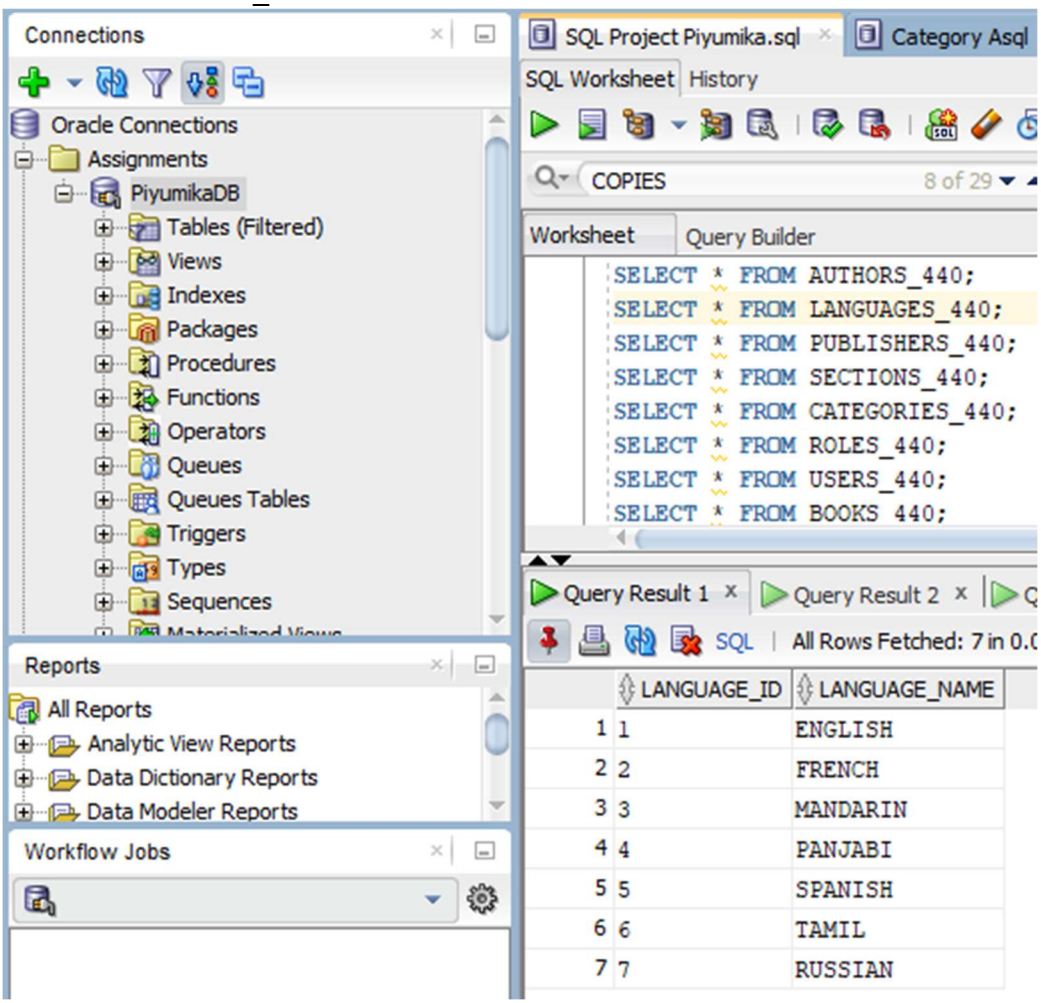
2. Created database tables

The scripts used for creating the database is presented in the text file – database_creation.txt.

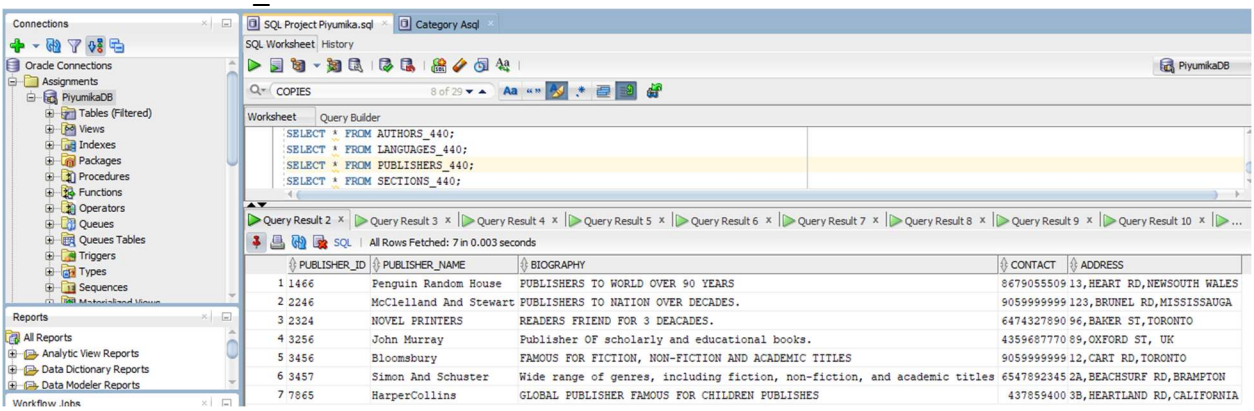
2.1 AUTHORS_440



2.2 LANGUAGES_440



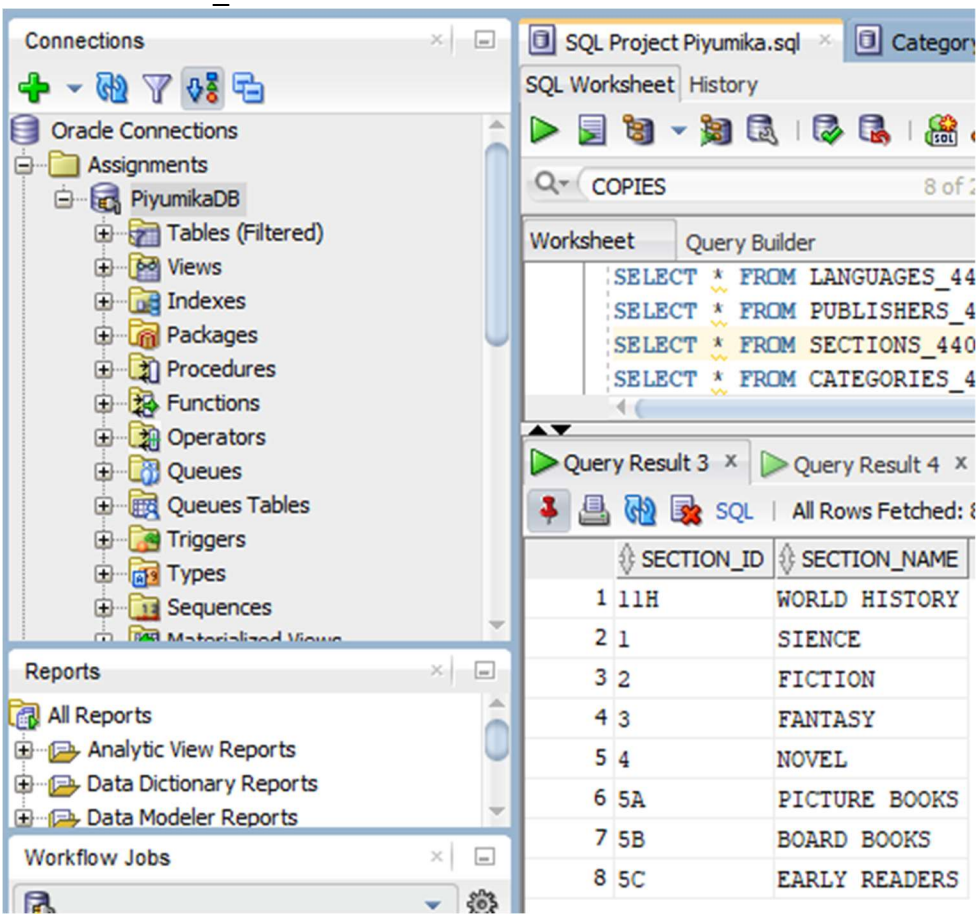
2.3 PUBLISHERS_440



```
SELECT * FROM AUTHORS_440;
SELECT * FROM LANGUAGES_440;
SELECT * FROM PUBLISHERS_440;
SELECT * FROM SECTIONS_440;
```

PUBLISHER_ID	PUBLISHER_NAME	BIOGRAPHY	CONTACT	ADDRESS
1 1466	Penguin Random House	PUBLISHERS TO WORLD OVER 90 YEARS	8679055509	13,HEART RD,NEWSOUTH WALES
2 2246	McClelland And Stewart	PUBLISHERS TO NATION OVER DECADES.	9059999999	123,BRUNEL RD,MISSISSAUGA
3 2324	NOVEL PRINTERS	READERS FRIEND FOR 3 DEACADES.	6474327890	96,BAKER ST,TORONTO
4 3256	John Murray	Publisher OF scholarly and educational books.	4359687770	89,OXFORD ST, UK
5 3456	Bloomsbury	FAMOUS FOR FICTION, NON-FICTION AND ACADEMIC TITLES	9059999999	12,CART RD,TORONTO
6 3457	Simon And Schuster	Wide range of genres, including fiction, non-fiction, and academic titles	6547892345	2A,BEACHSURF RD,BRAMPTON
7 7865	HarperCollins	GLOBAL PUBLISHER FAMOUS FOR CHILDREN PUBLISHES	437859400	3B,HEARTLAND RD,CALIFORNIA

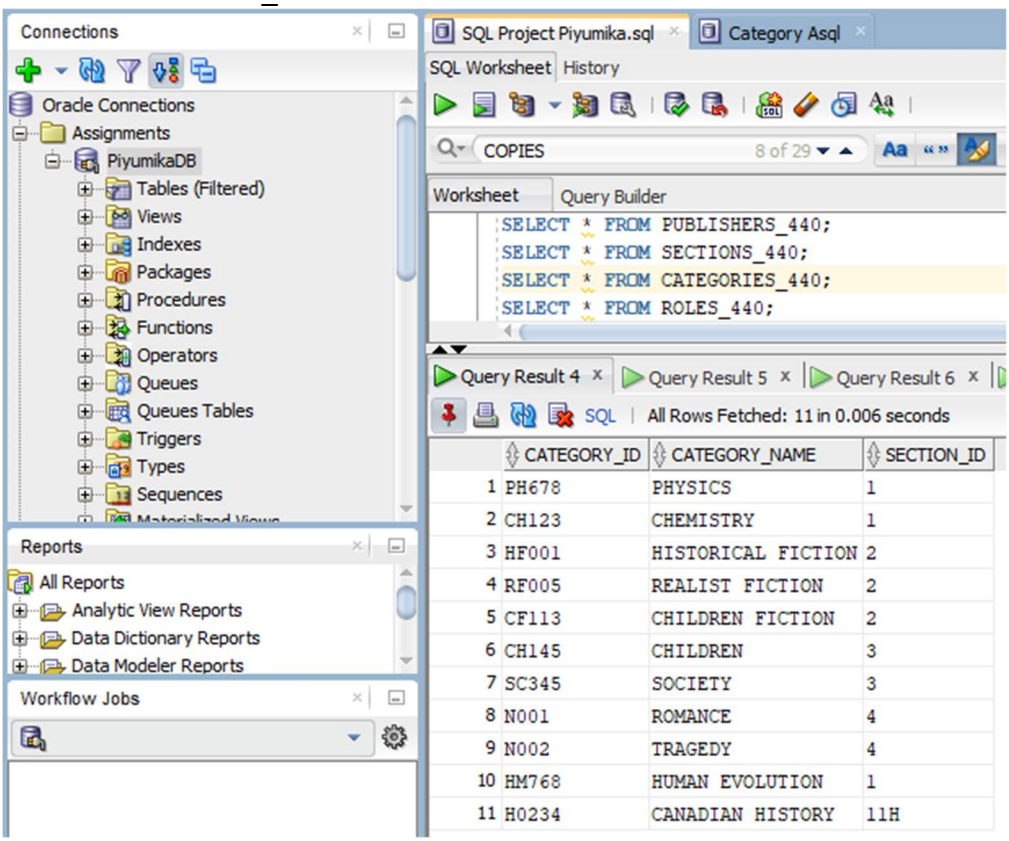
2.4 SECTIONS_440



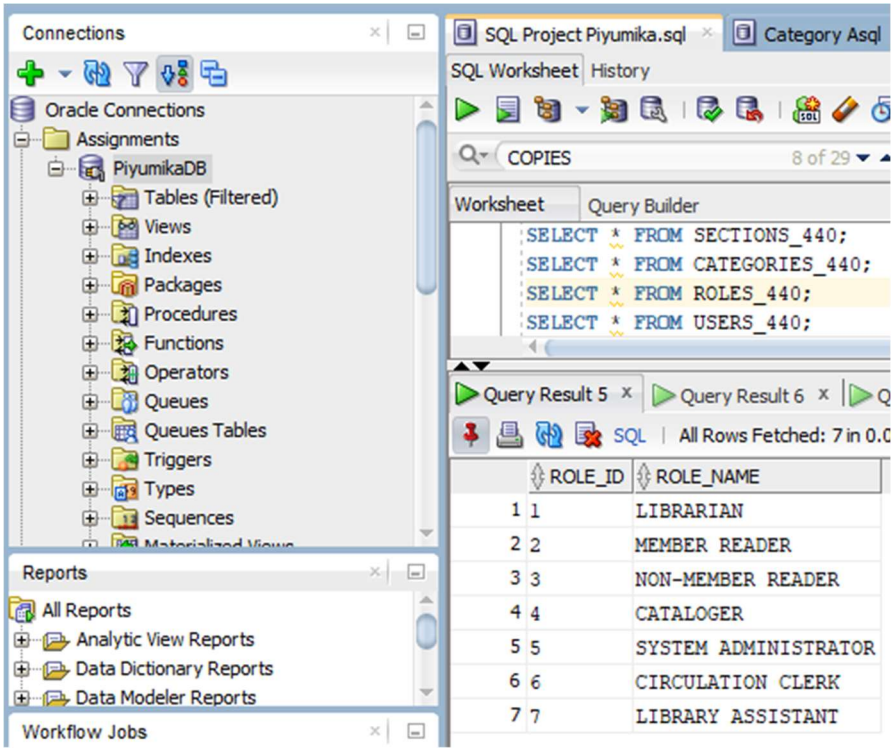
```
SELECT * FROM LANGUAGES_44
SELECT * FROM PUBLISHERS_4
SELECT * FROM SECTIONS_440
SELECT * FROM CATEGORIES_4
```

SECTION_ID	SECTION_NAME
1 11H	WORLD HISTORY
2 1	SIENCE
3 2	FICTION
4 3	FANTASY
5 4	NOVEL
6 5A	PICTURE BOOKS
7 5B	BOARD BOOKS
8 5C	EARLY READERS

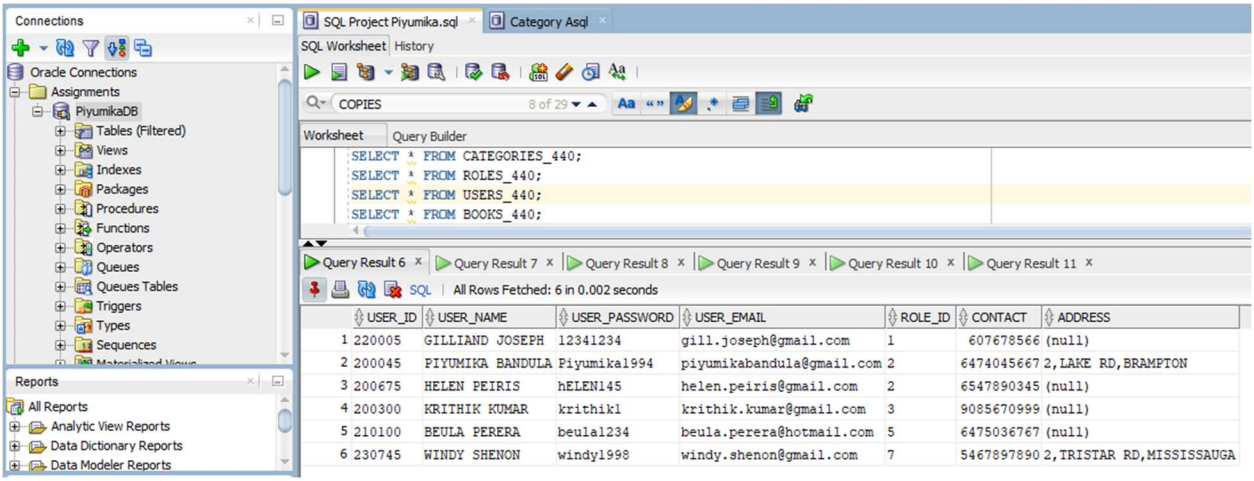
2.5 CATEGORIES_440



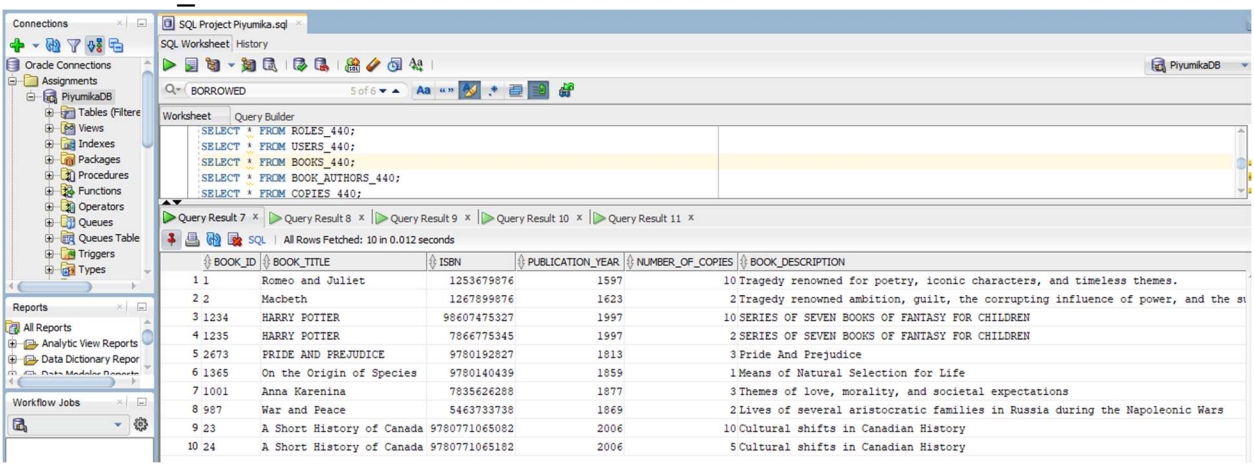
2.6 ROLES_440



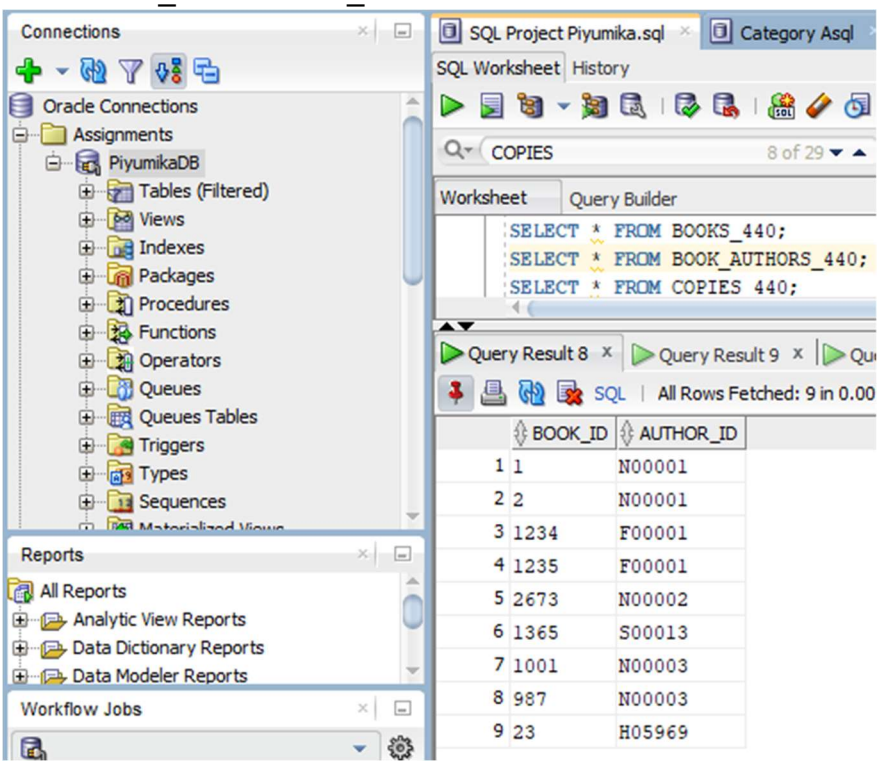
2.7 USERS_440



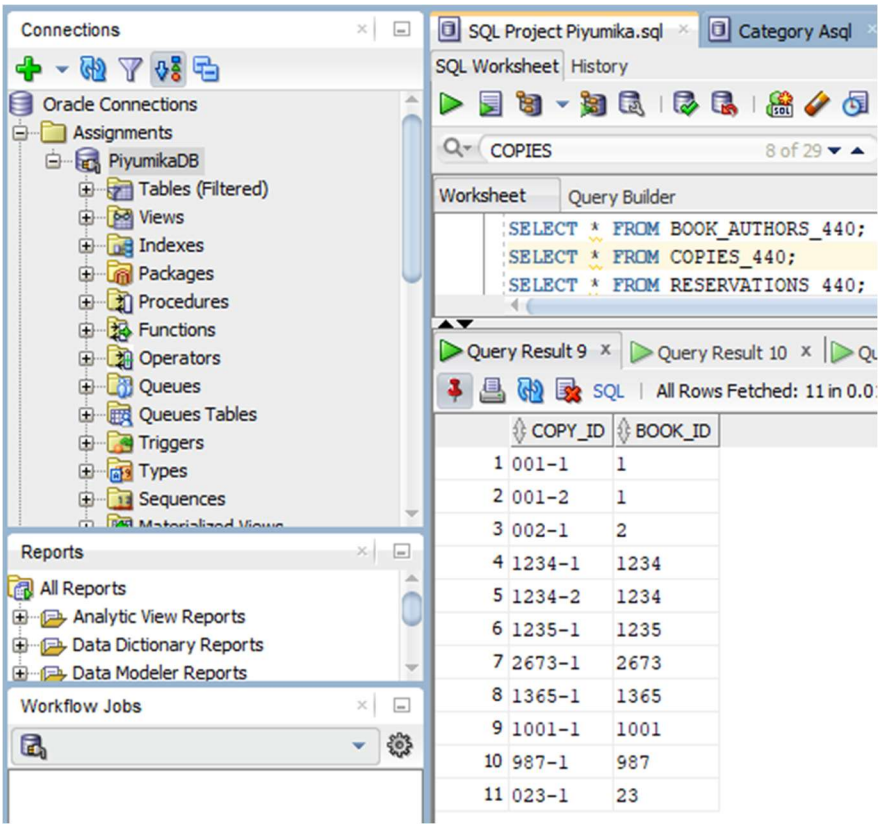
2.8 BOOKS_440



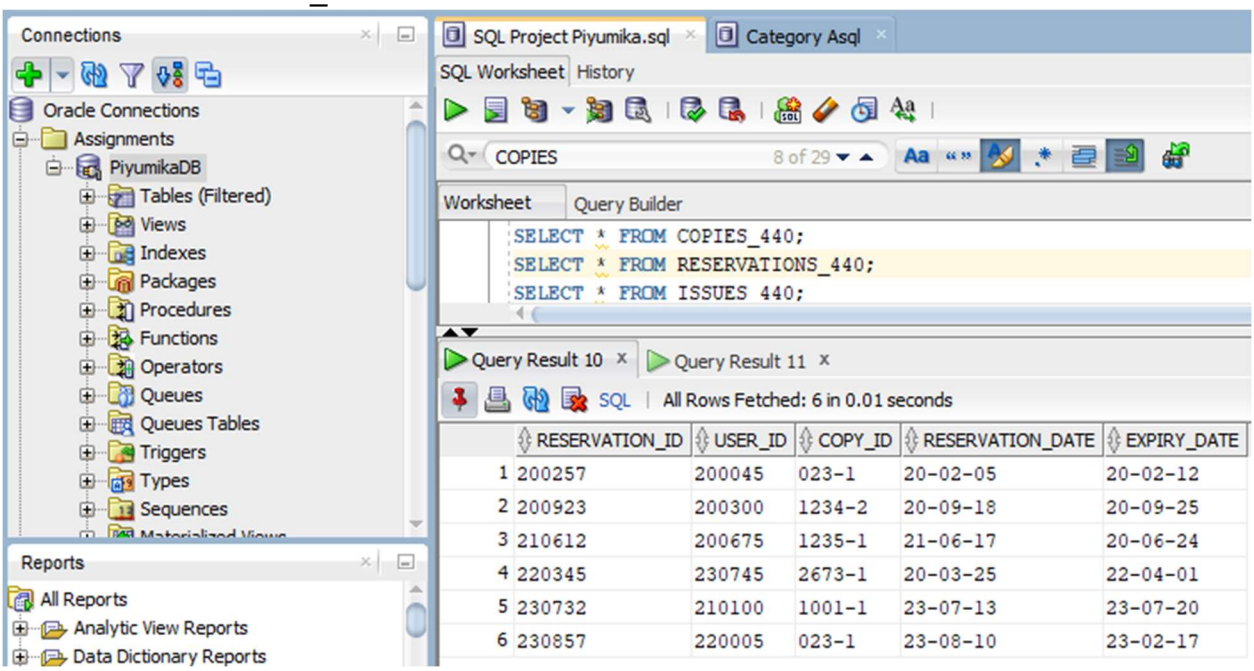
2.9 BOOK_AUTHORS_440



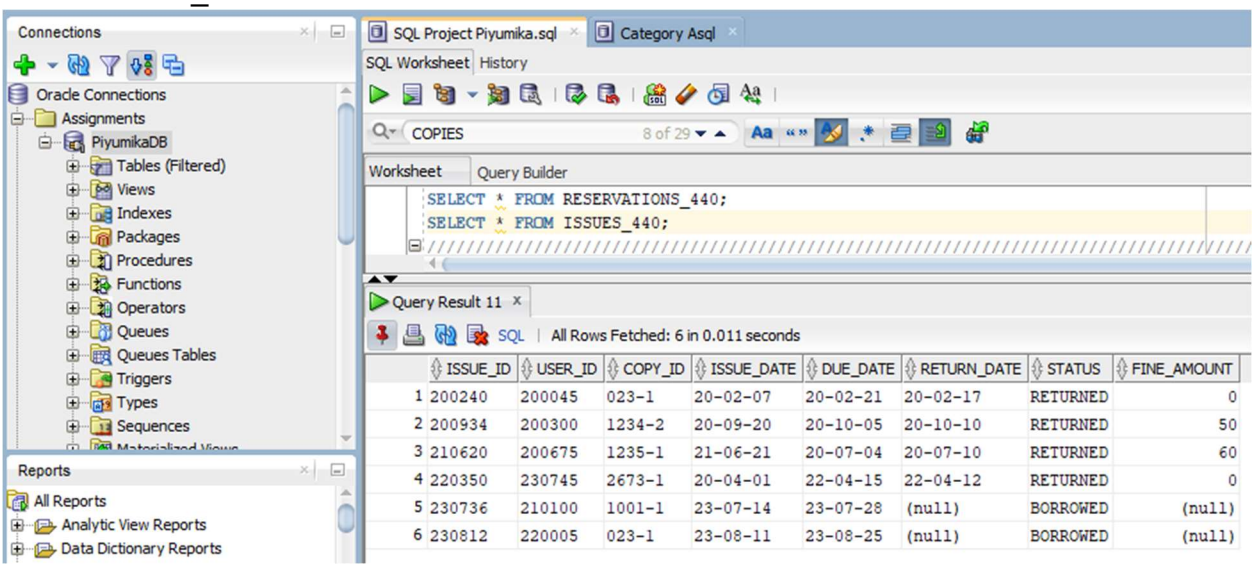
2.10 COPIES_440



2.11 RESERVATIOS_440



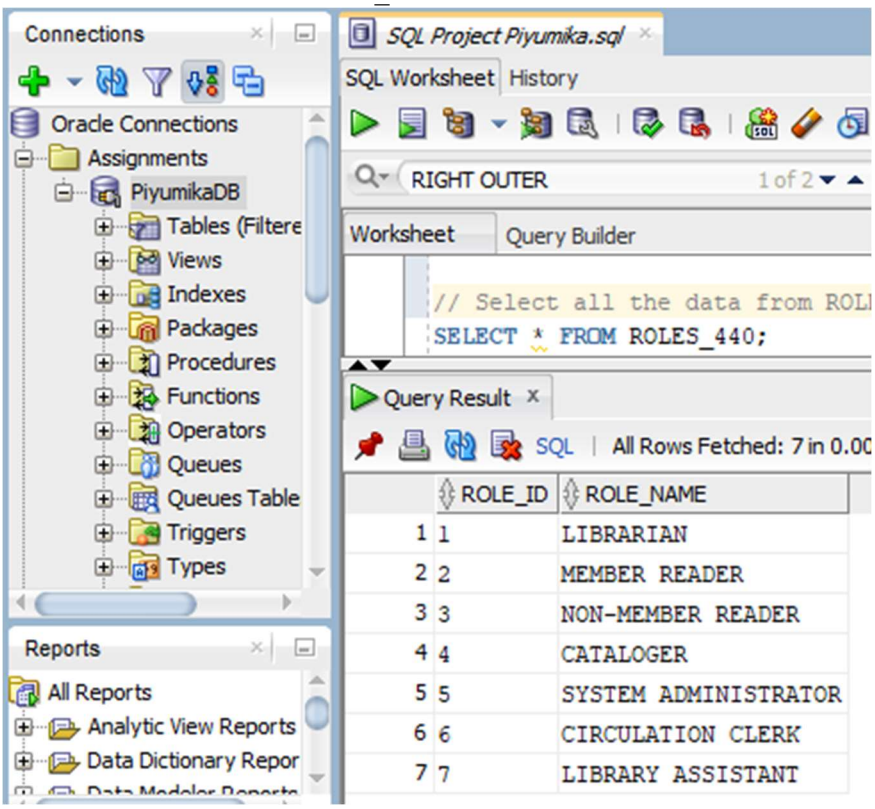
2.12 ISSUES_440



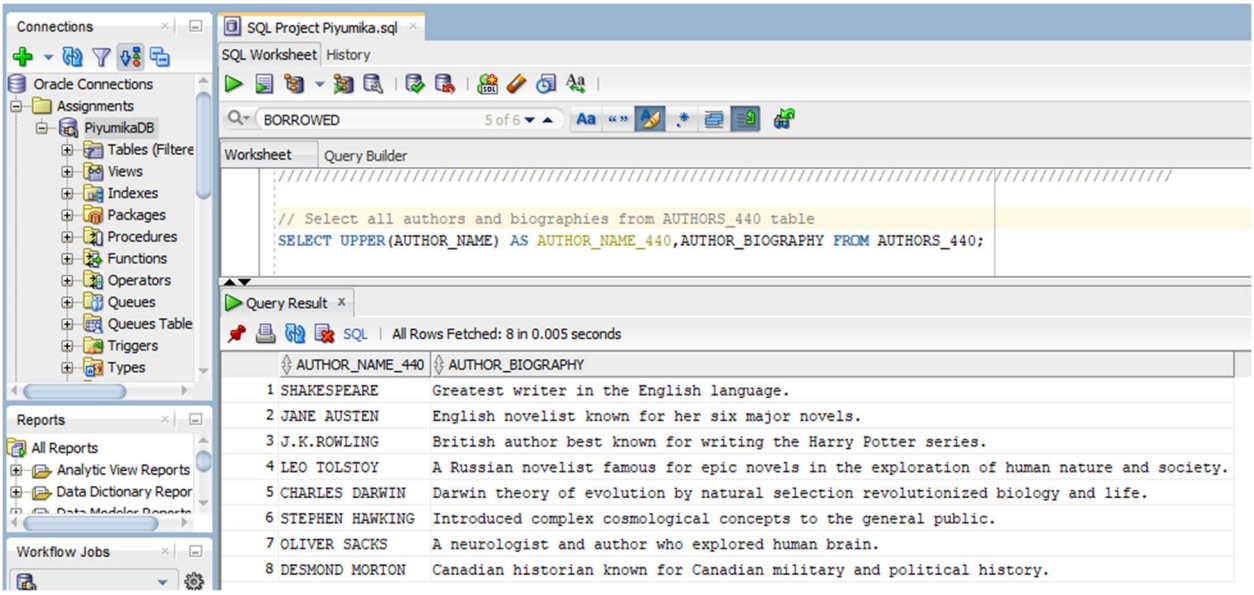
3. SQL QUERIES

3.1 Category A

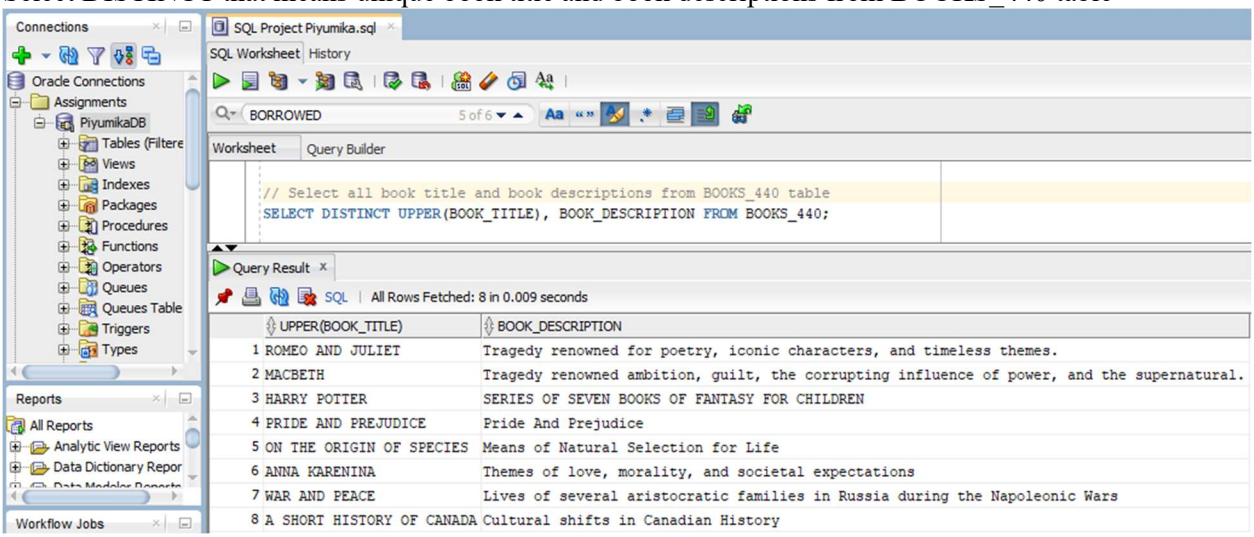
1. Select all the data from ROLES_440 table.



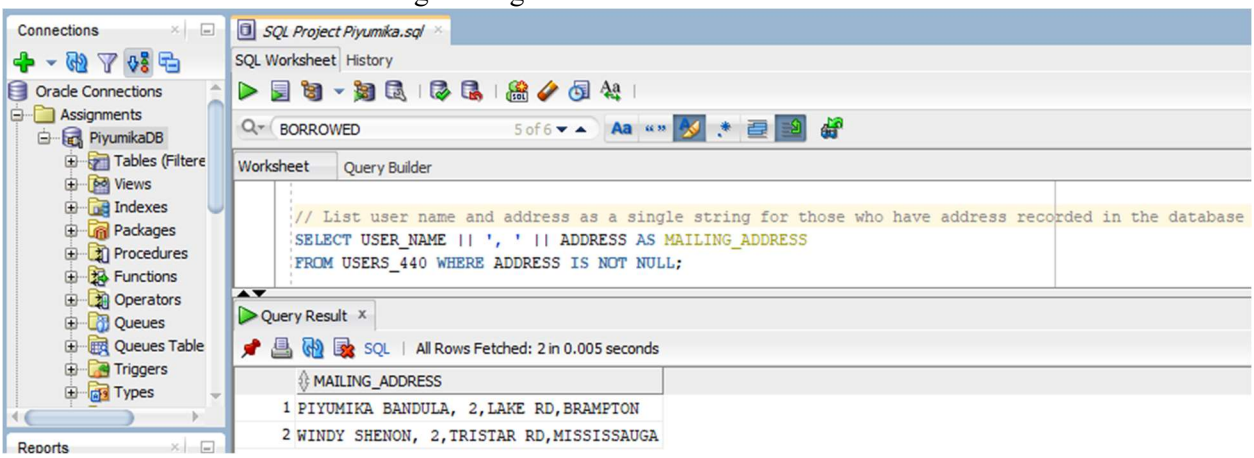
2. Select all records from selected columns - authors and biographies from AUTHORS_440 table. Here I have used aliases to rename the Author name column.



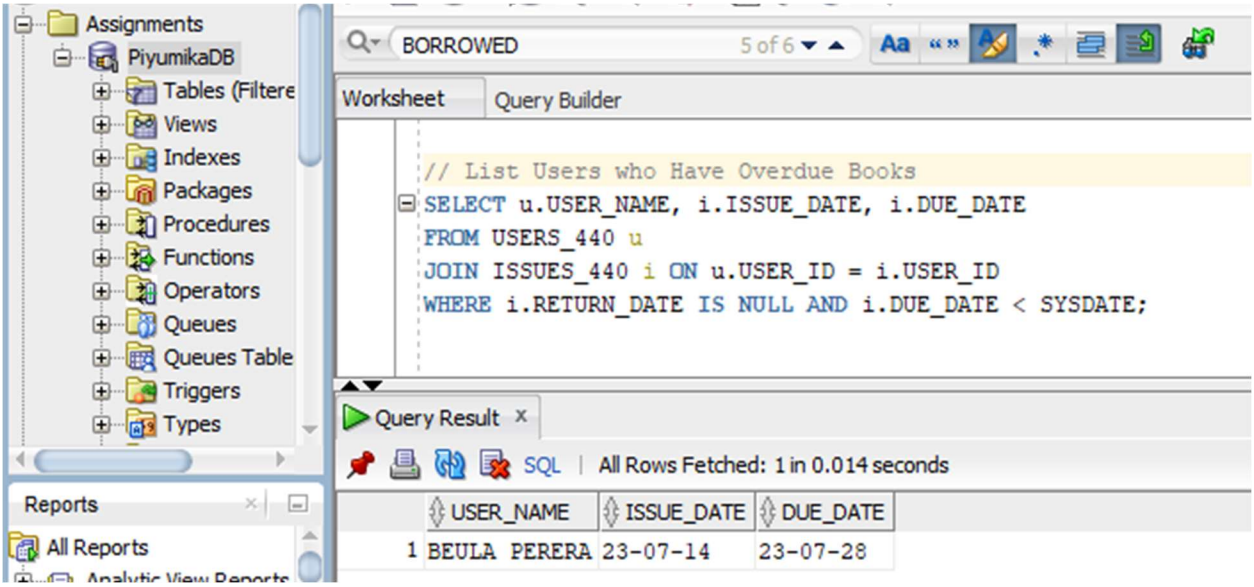
3. Select DISTINCT that means unique book title and book descriptions from BOOKS_440 table



4. List user name and address as a single string for those who have address recorded in the database.

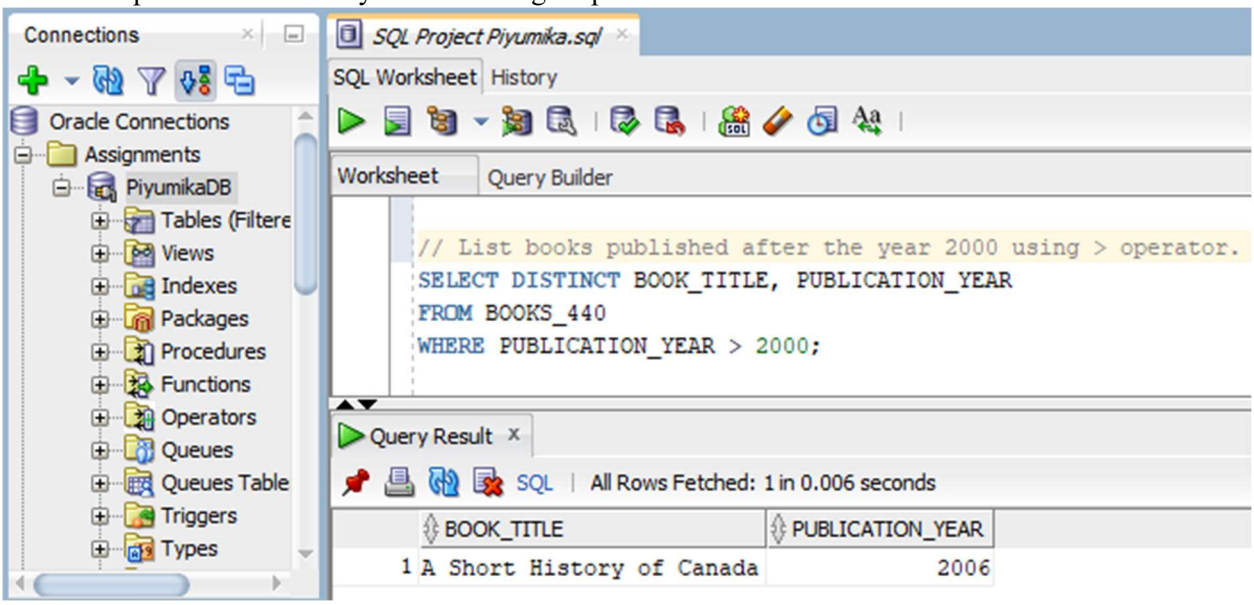


5. List Users who Have Overdue Books

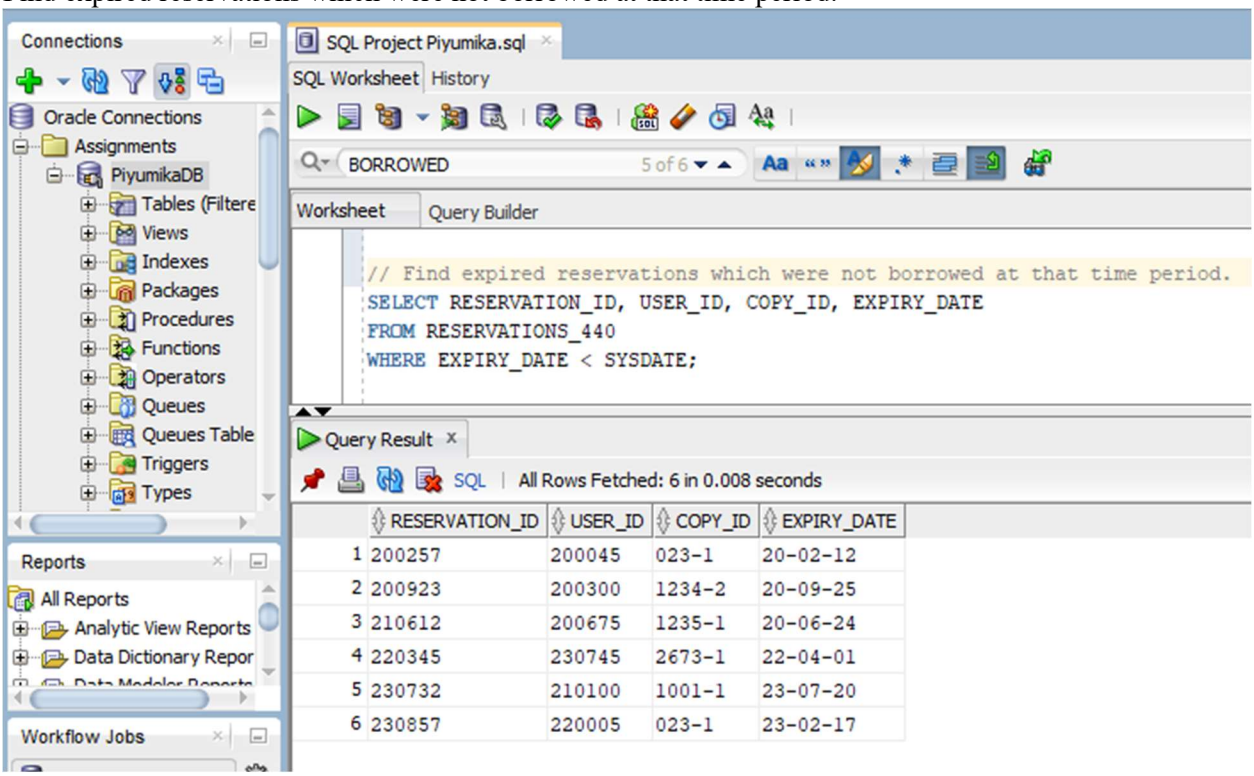


3.2 Category B

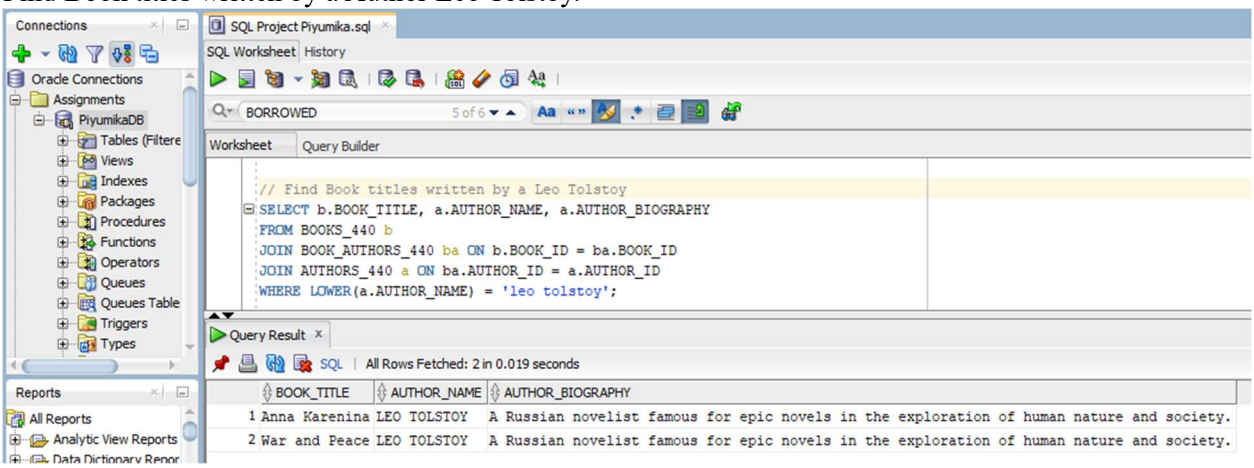
1. List books published after the year 2000 using > operator.



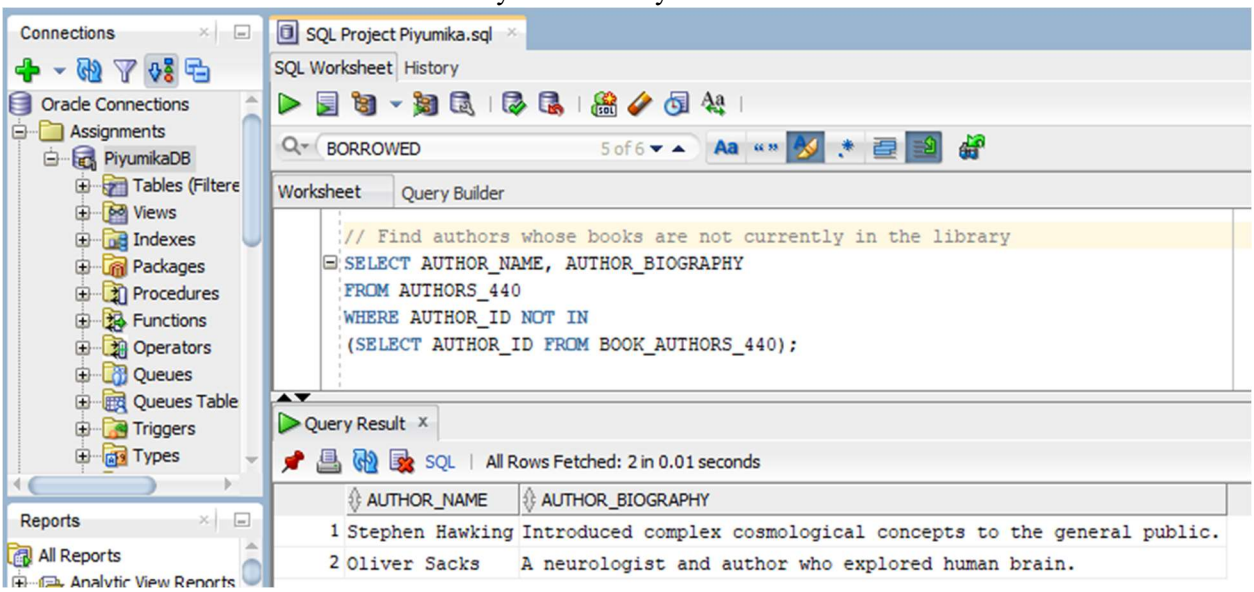
2. Find expired reservations which were not borrowed at that time period.



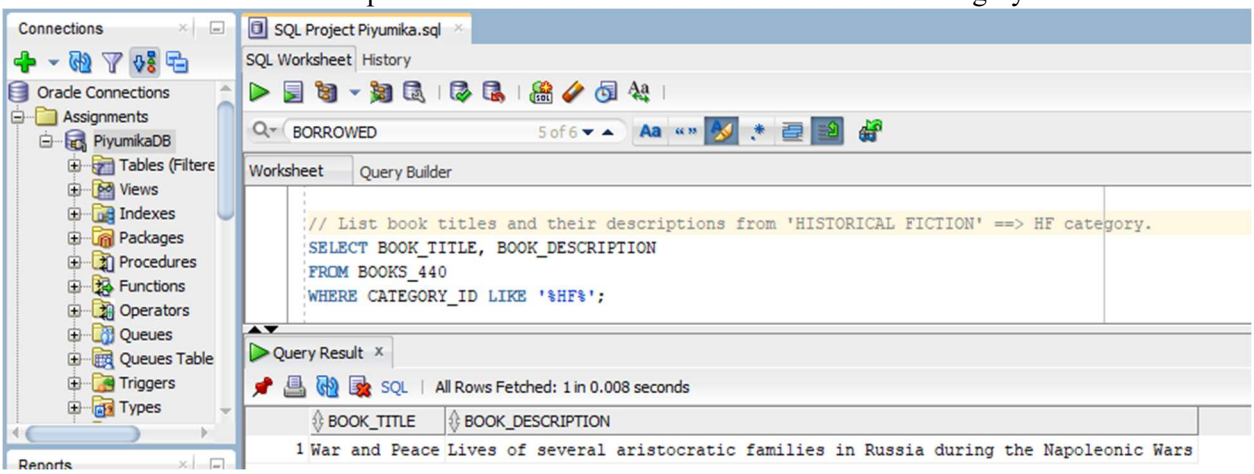
3. Find Book titles written by a Author Leo Tolstoy.



4. Find authors whose books are not currently in the library.

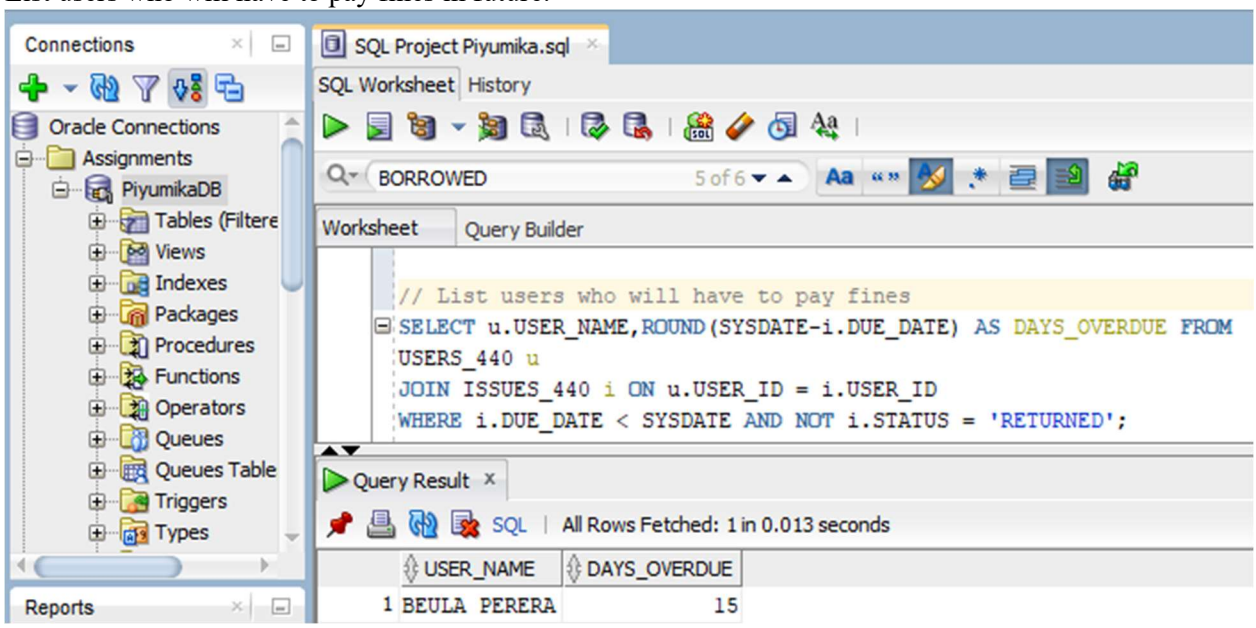


5. List book titles and their descriptions from 'HISTORICAL FICTION' ==> HF category.

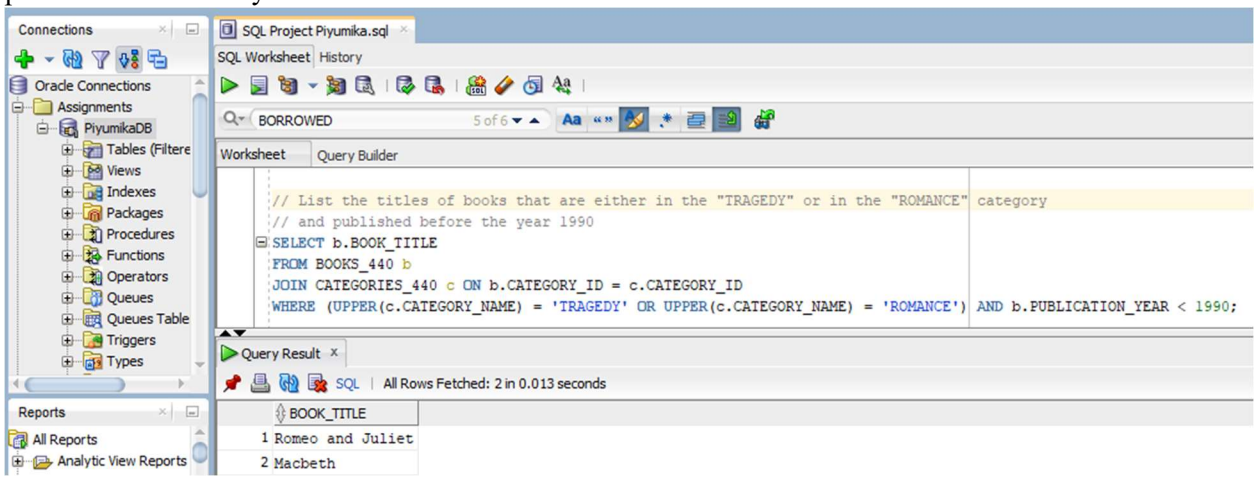


3.3 Category C

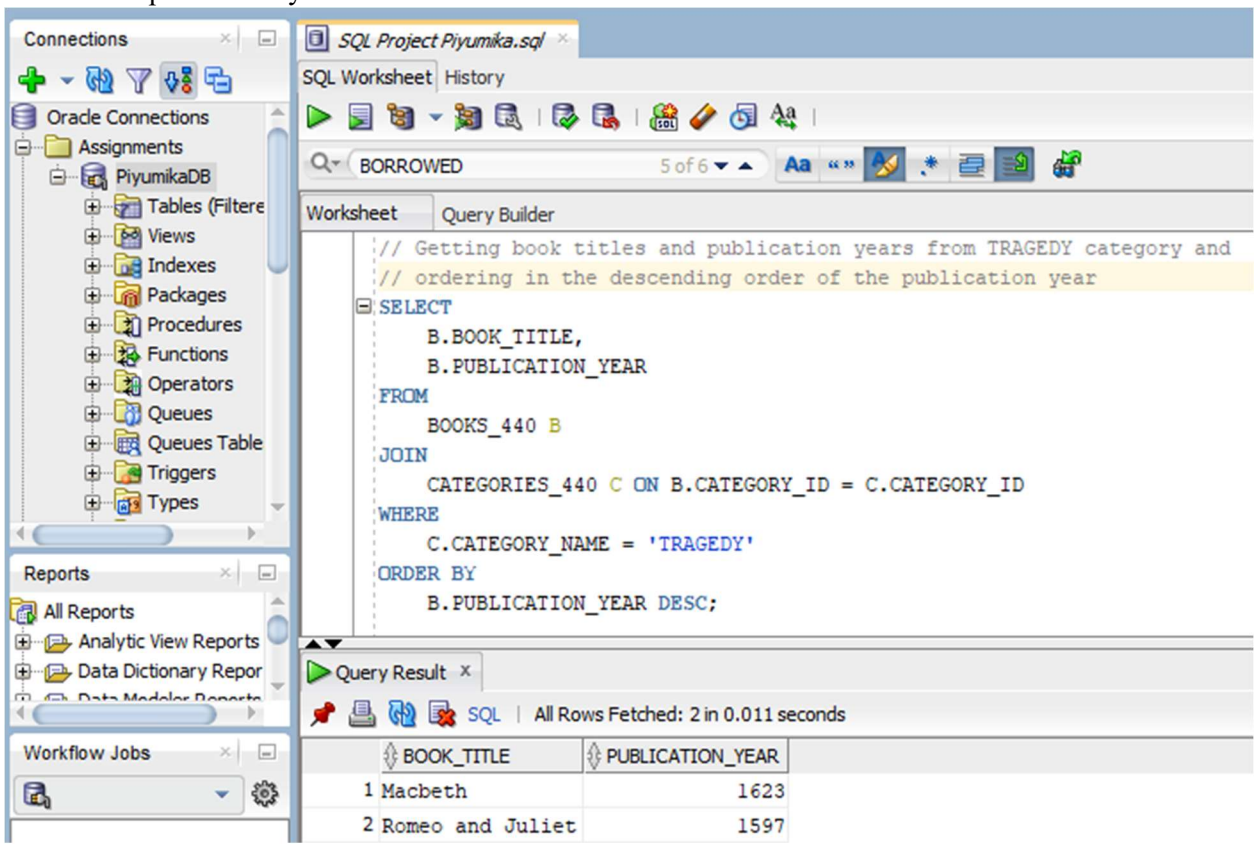
1. List users who will have to pay fines in future.



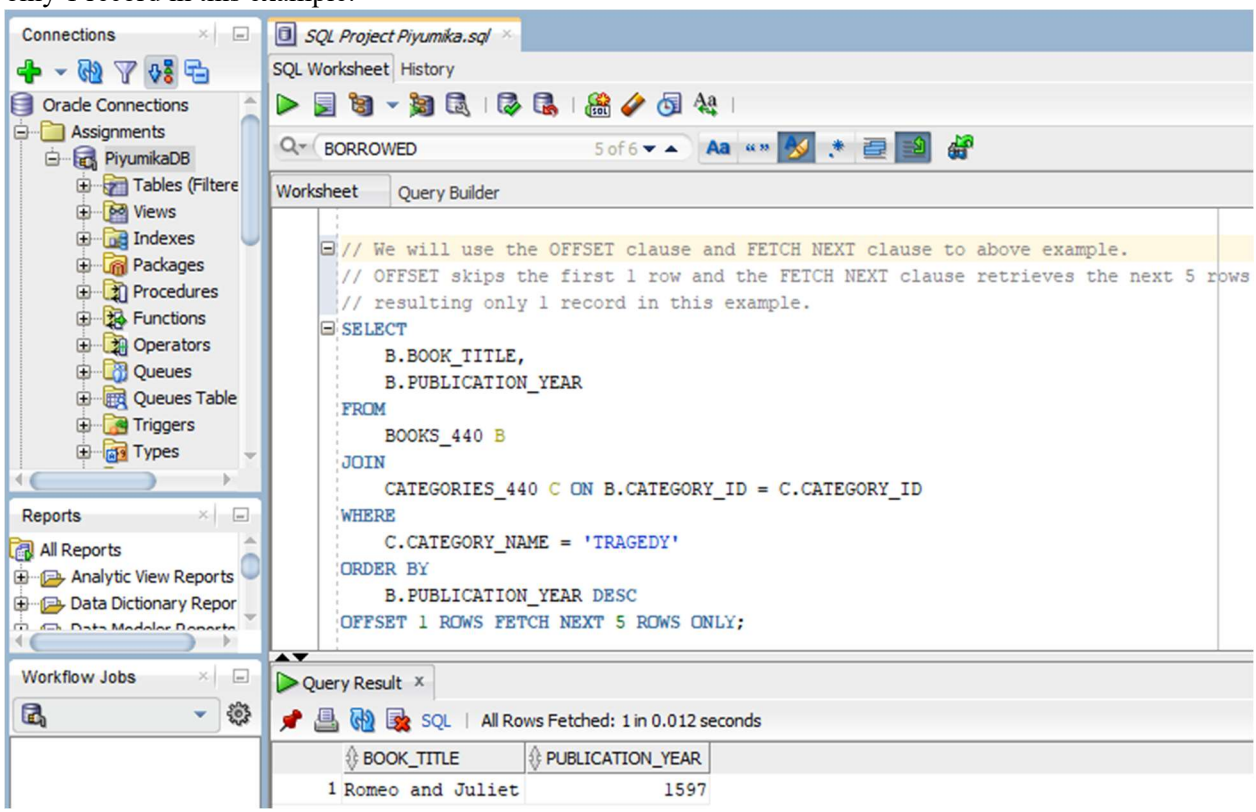
2. List the titles of books that are either in the "TRAGEDY" or in the "ROMANCE" category and published before the year 1990.



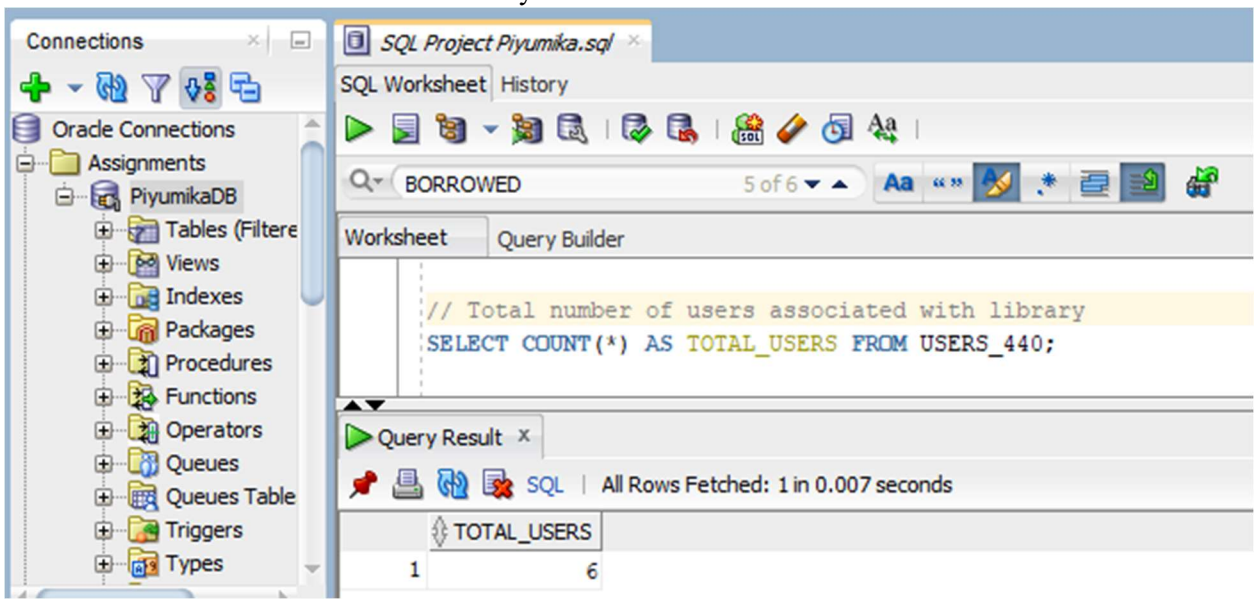
3. Getting book titles and publication years from TRAGEDY category and ordering in the descending order of the publication year.



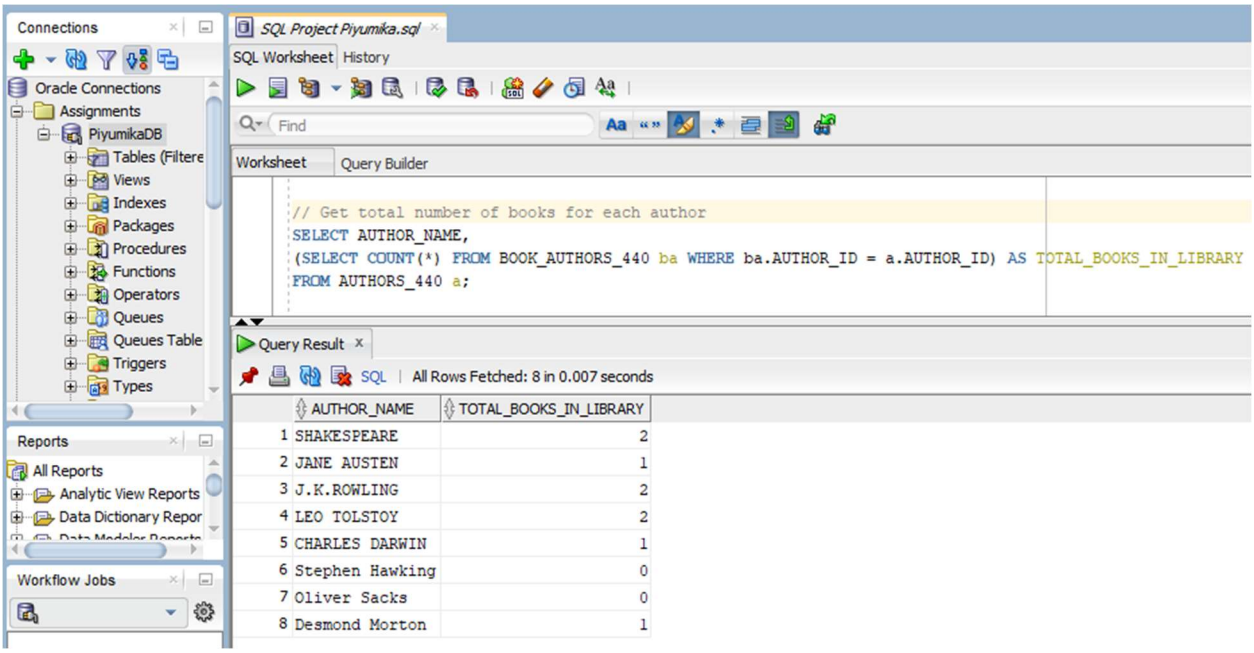
4. We will use the OFFSET clause and FETCH NEXT clause to above example.
   OFFSET skips the first 1 row and the FETCH NEXT clause retrieves the next 5 rows resulting only 1 record in this example.



5. Total number of users associated with library.

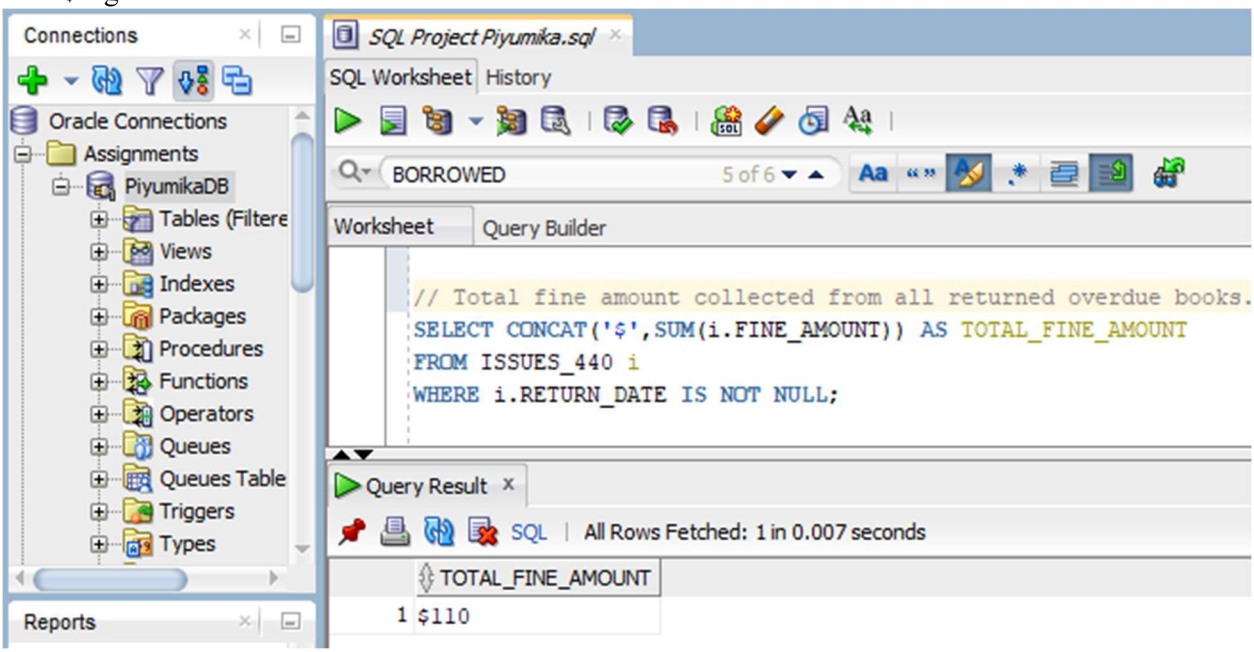


6. Get total number of books for each author.

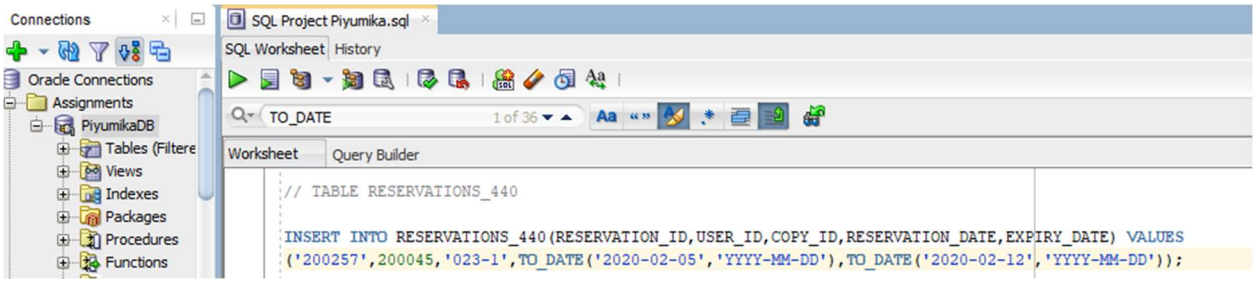


3.4 Category D

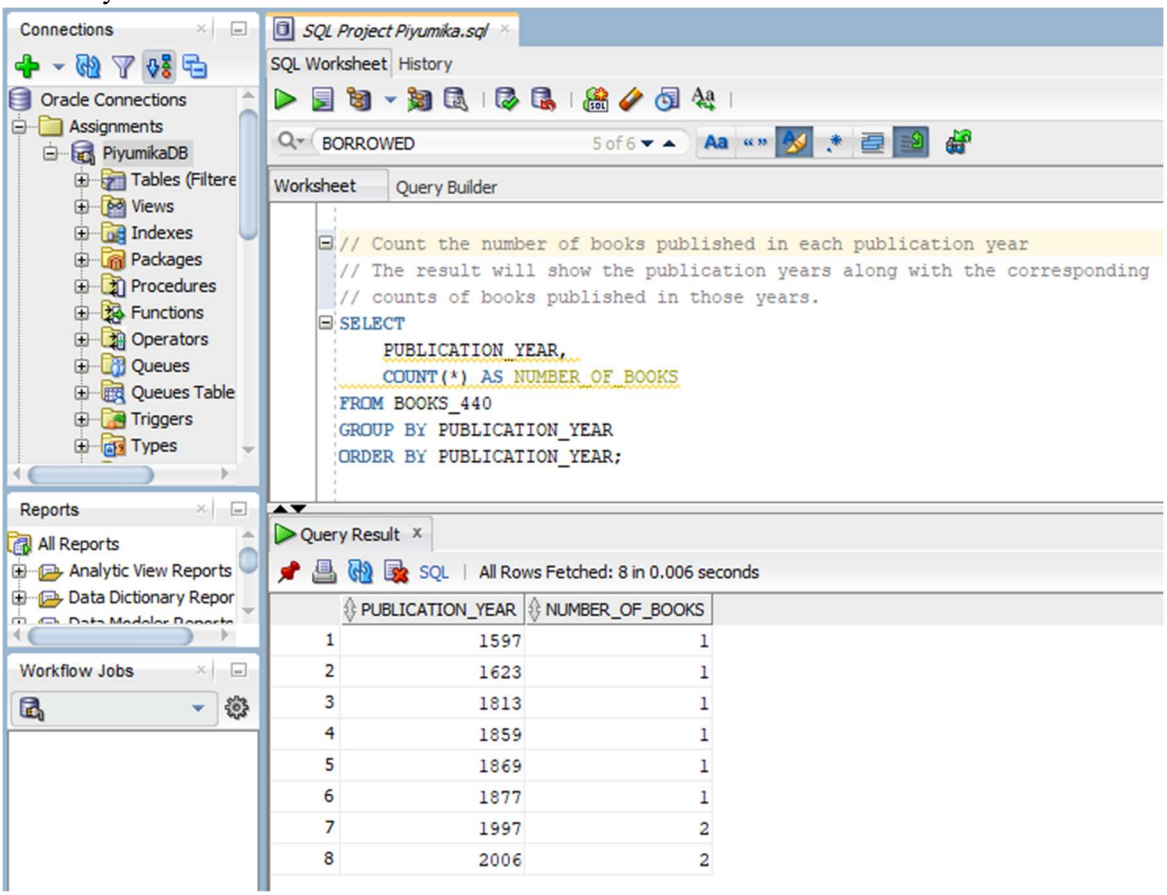
1. Total fine amount collected from all returned overdue books and display the value concatenated with $ sign.



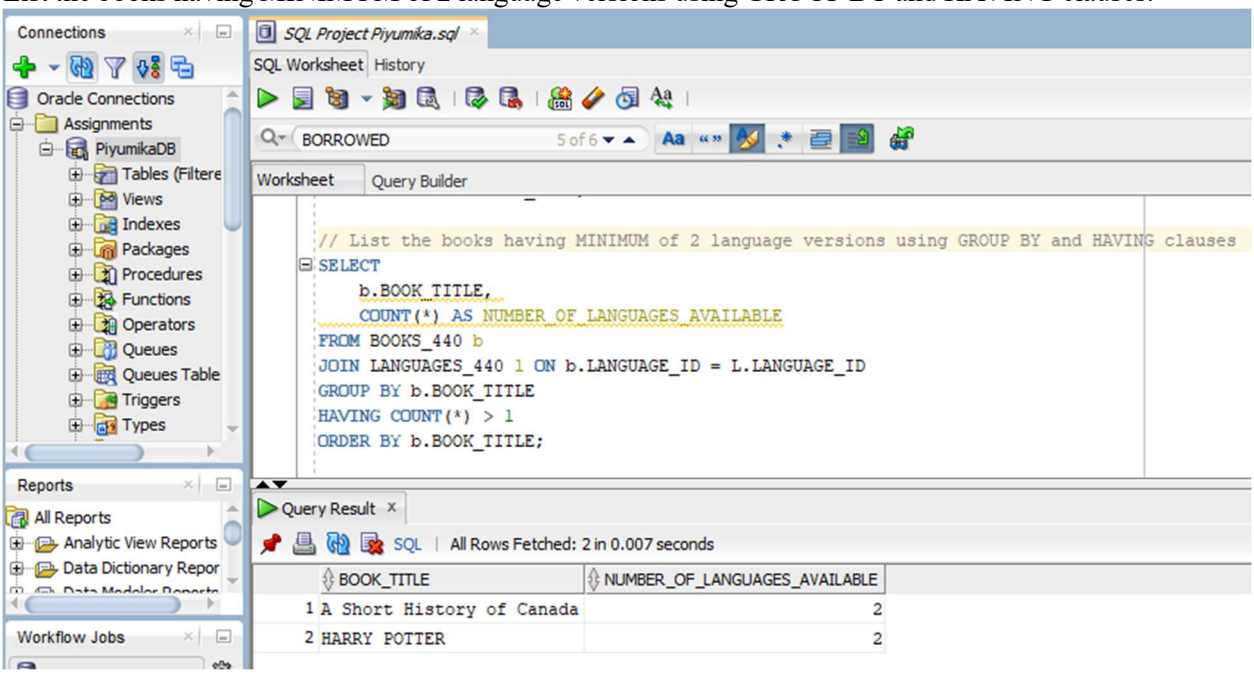
2. TO_DATE function is used to covert a string representation of a date into an actual date data type. When I am using INSERT INTO for entering data into tables I am using it many times in this project. An example scenario is shown below.



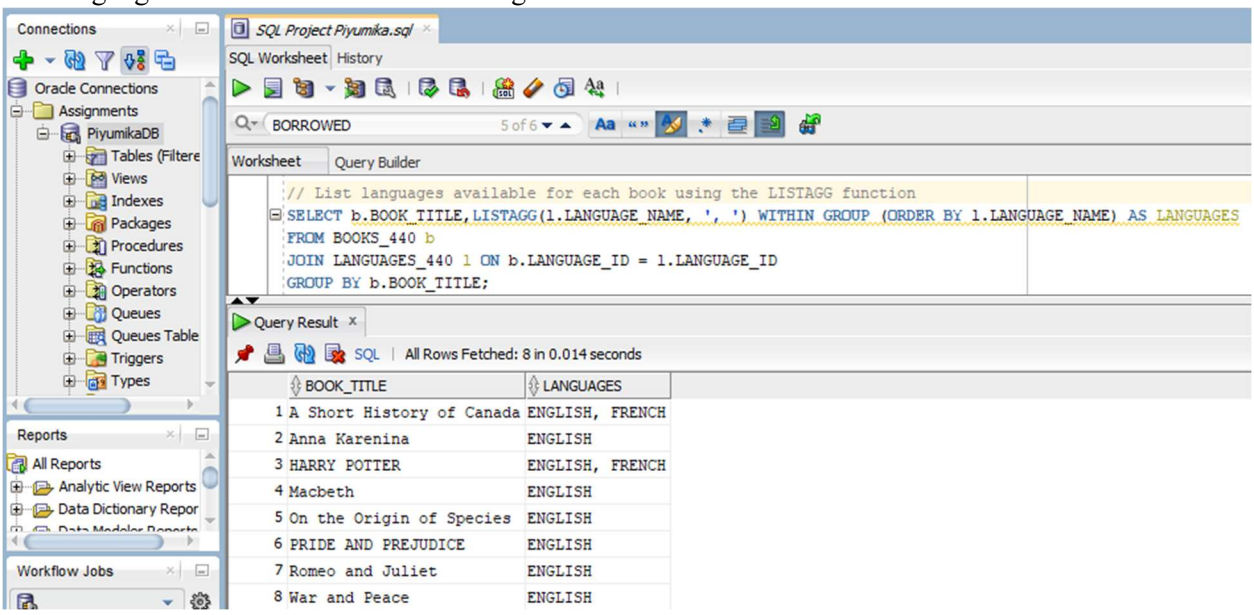
3. Count the number of books published in each publication year.
   The result will show the publication years along with the corresponding counts of books published in those years.



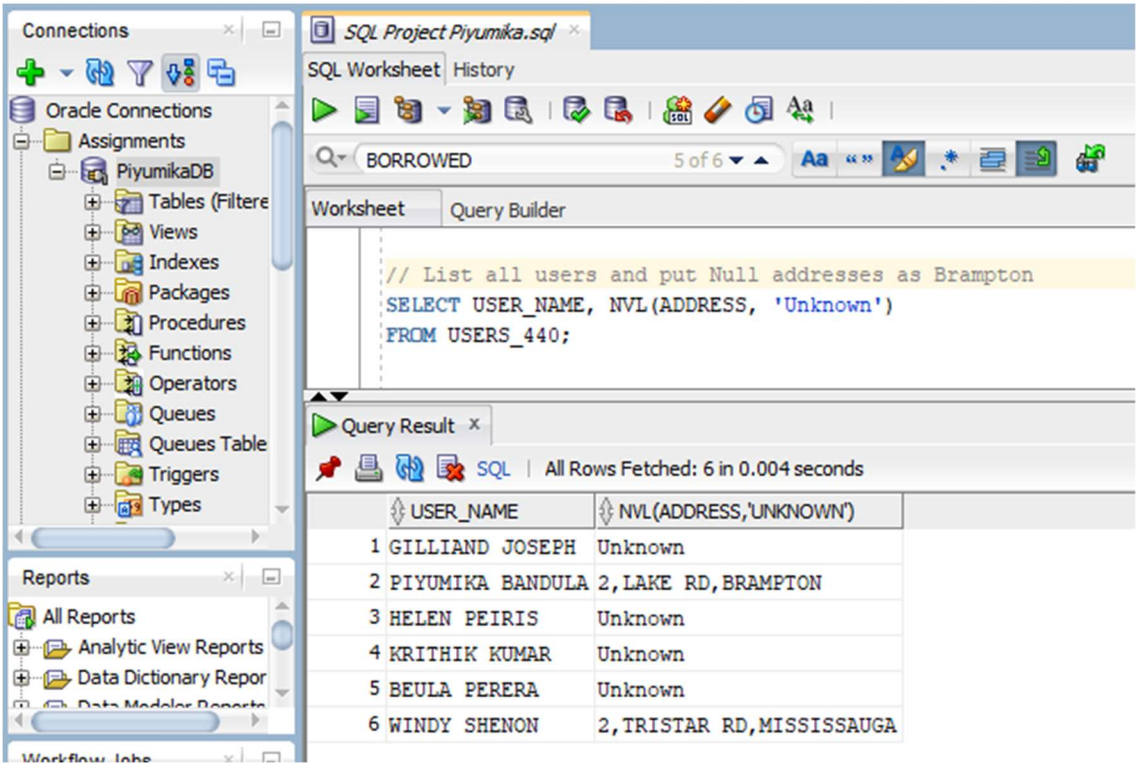
4. List the books having MINIMUM of 2 language versions using GROUP BY and HAVING clauses.



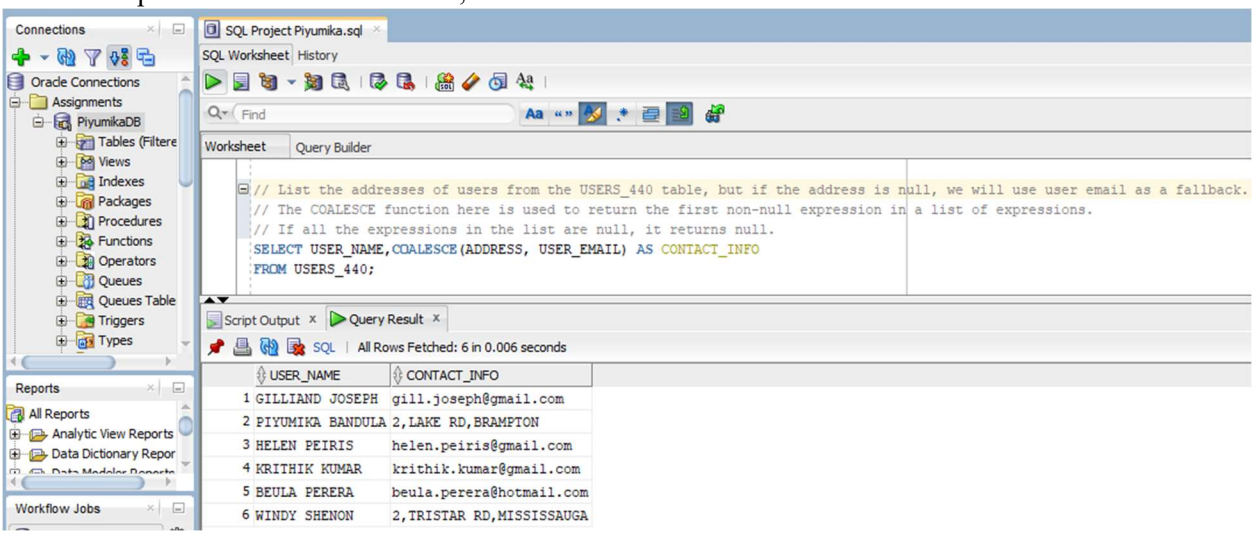
5. List languages available for each book using the LISTAGG function.



6. List all users and put Null addresses as Brampton. NVL function is used in Oracle SQL to replace a null value with another value.

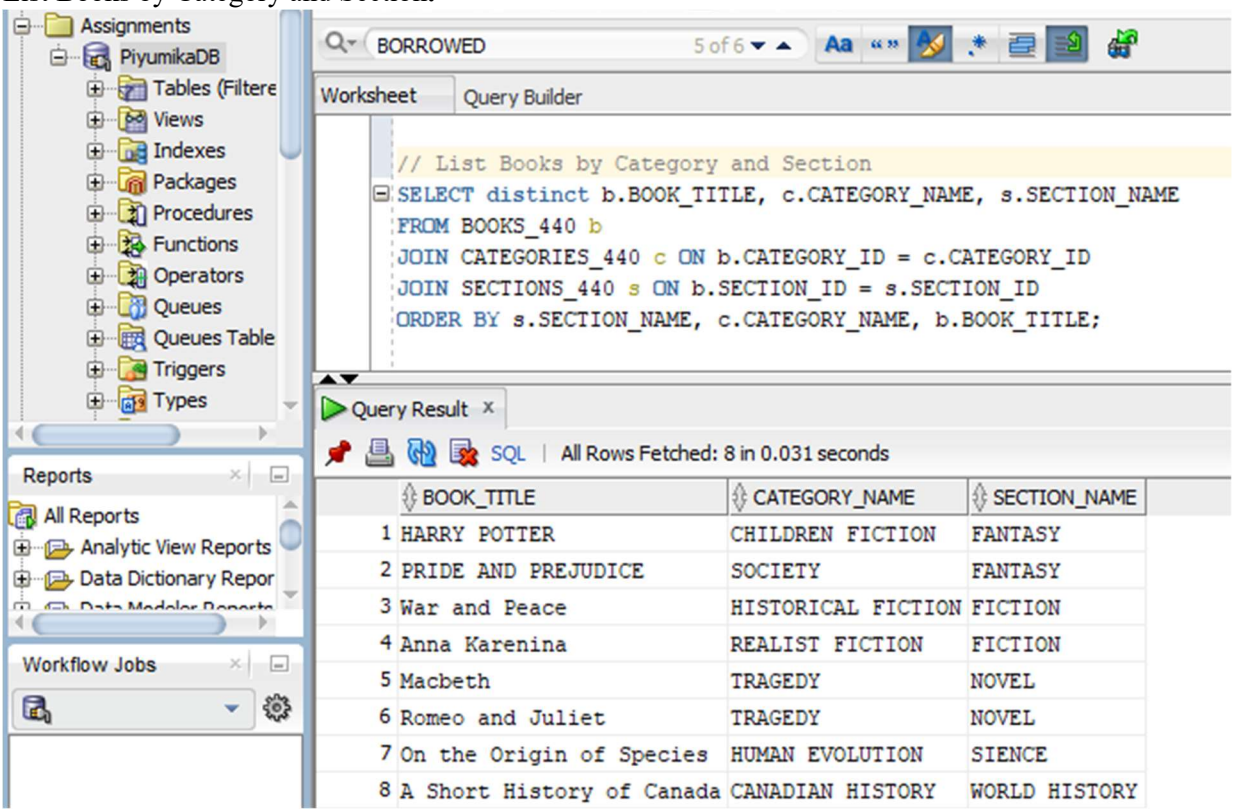


7. List the addresses of users from the USERS_440 table, but if the address is null, we will use user email as a fallback.
The COALESCE function here is used to return the first non-null expression in a list of expressions. If all the expressions in the list are null, it returns null.

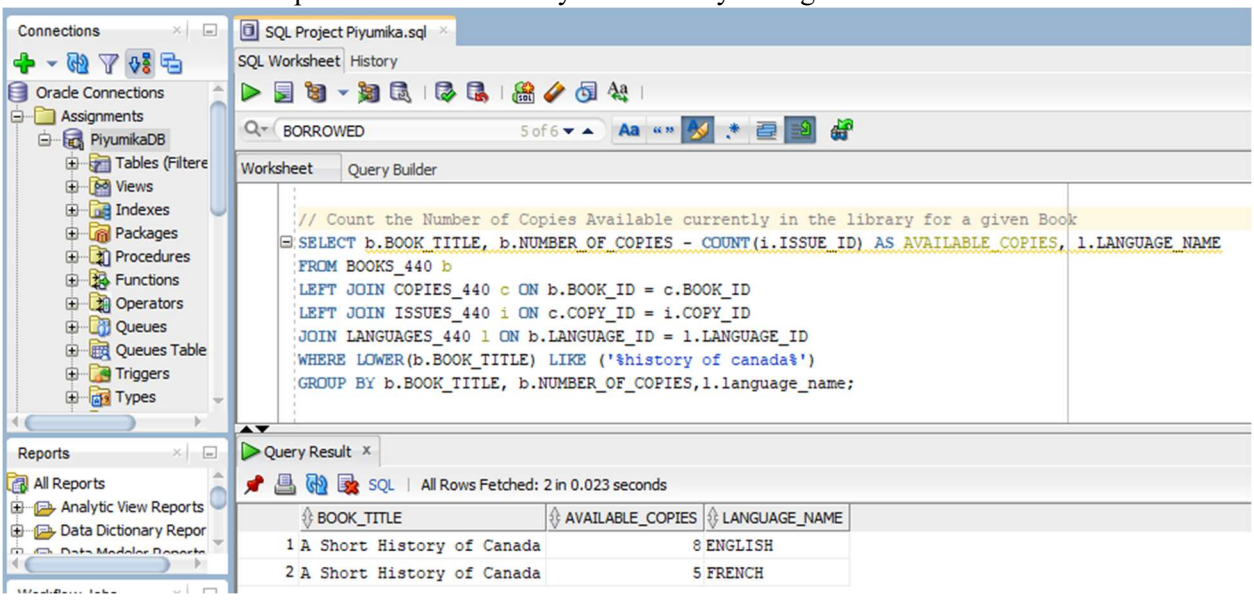


3.5 Category E

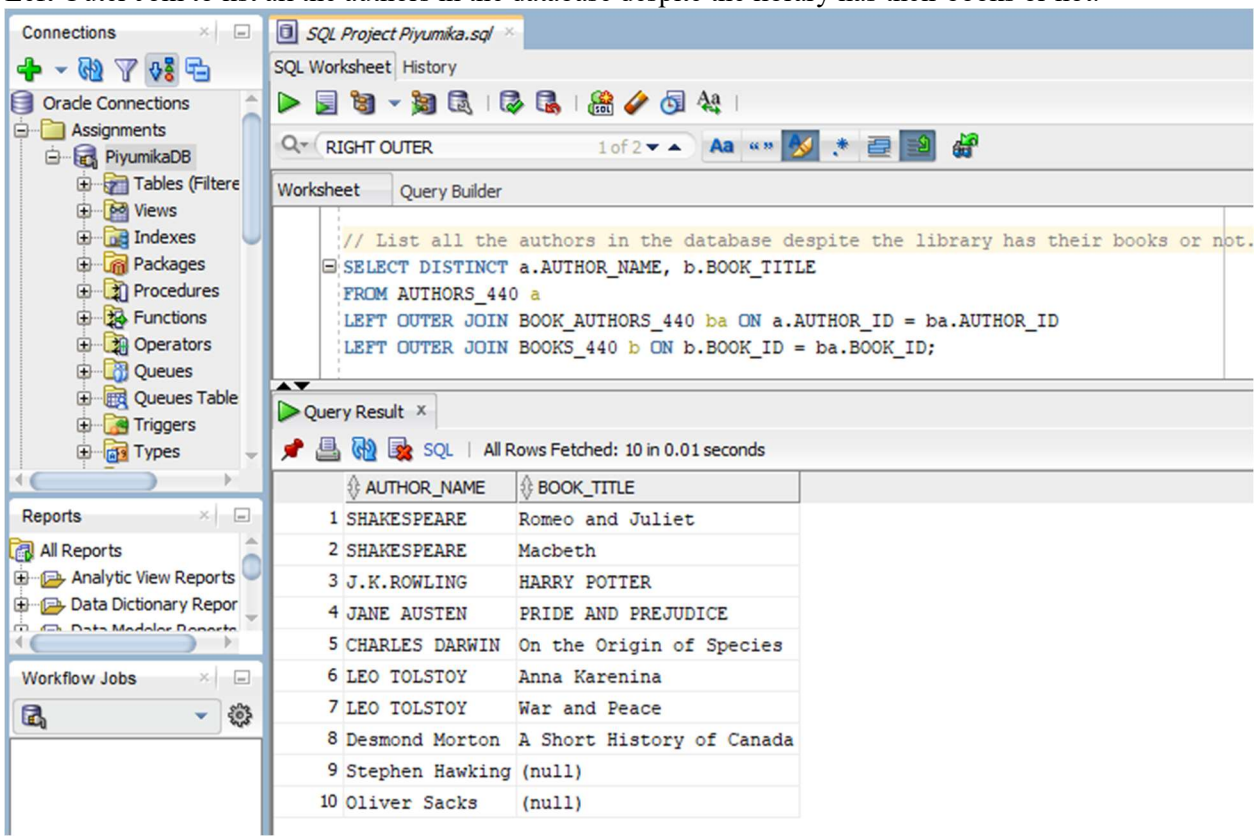
1. List Books by Category and Section.



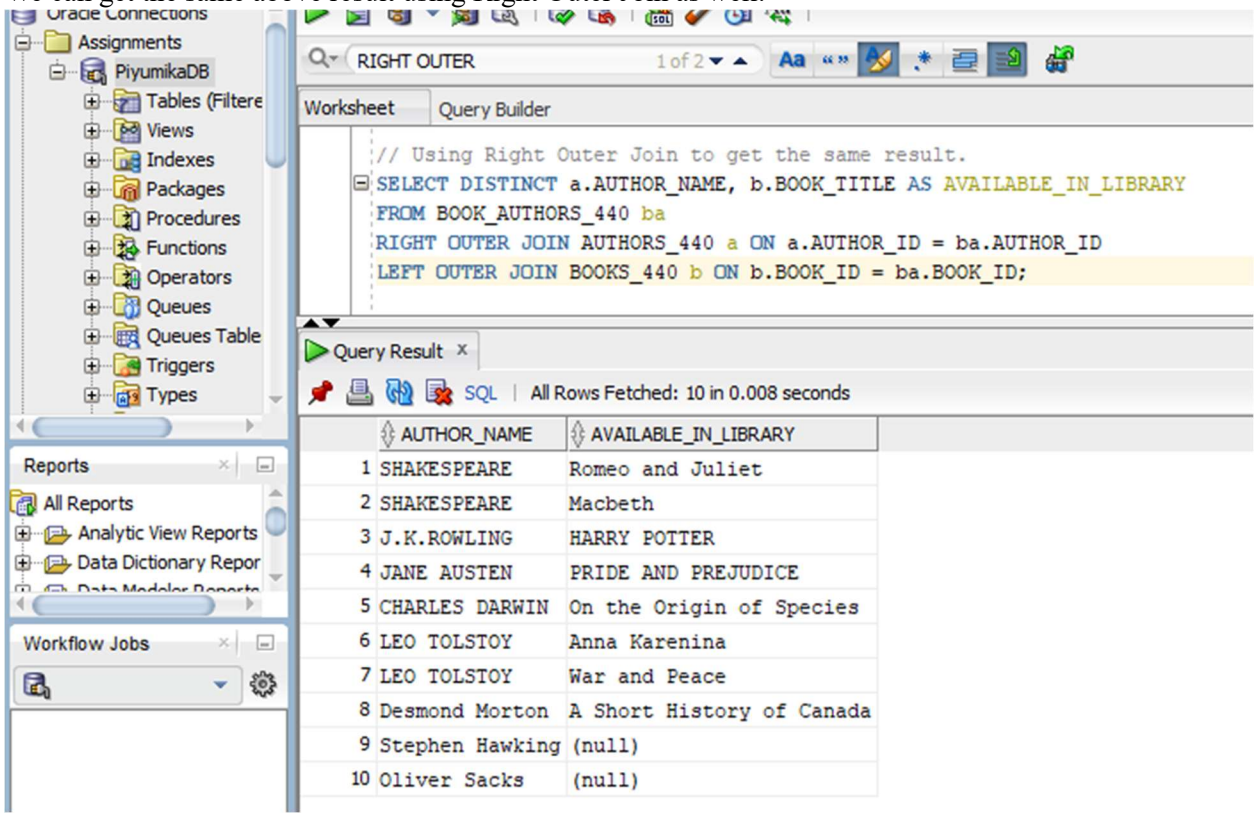
2. Count the Number of Copies Available currently in the library for a given Book.



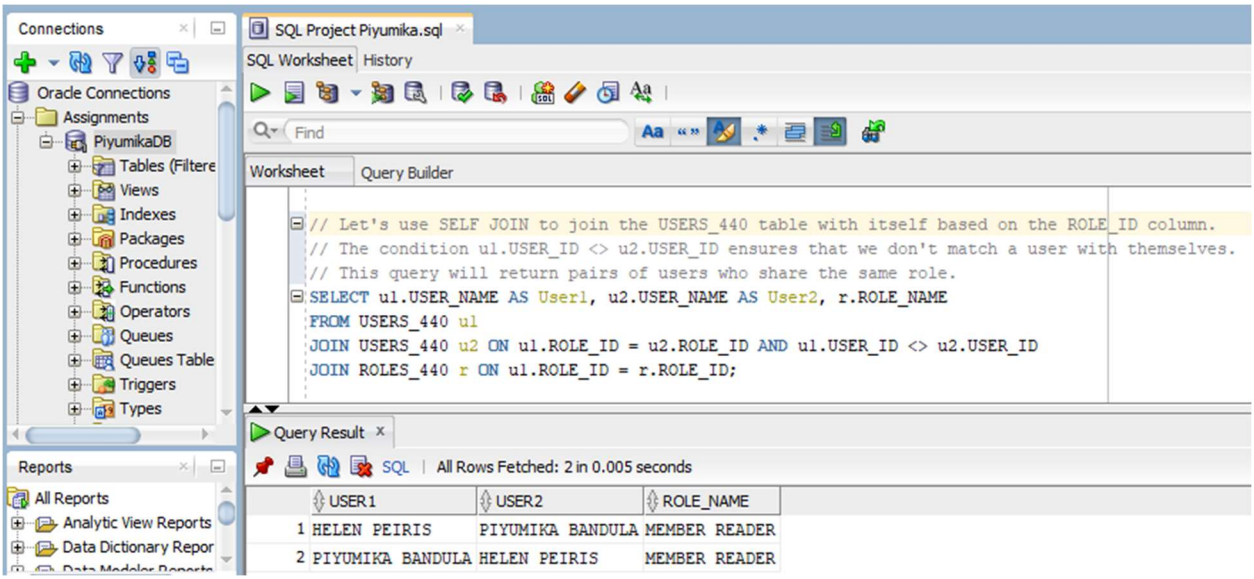
3. Left Outer Join to list all the authors in the database despite the library has their books or not.



4. We can get the same above result using Right Outer Join as well.

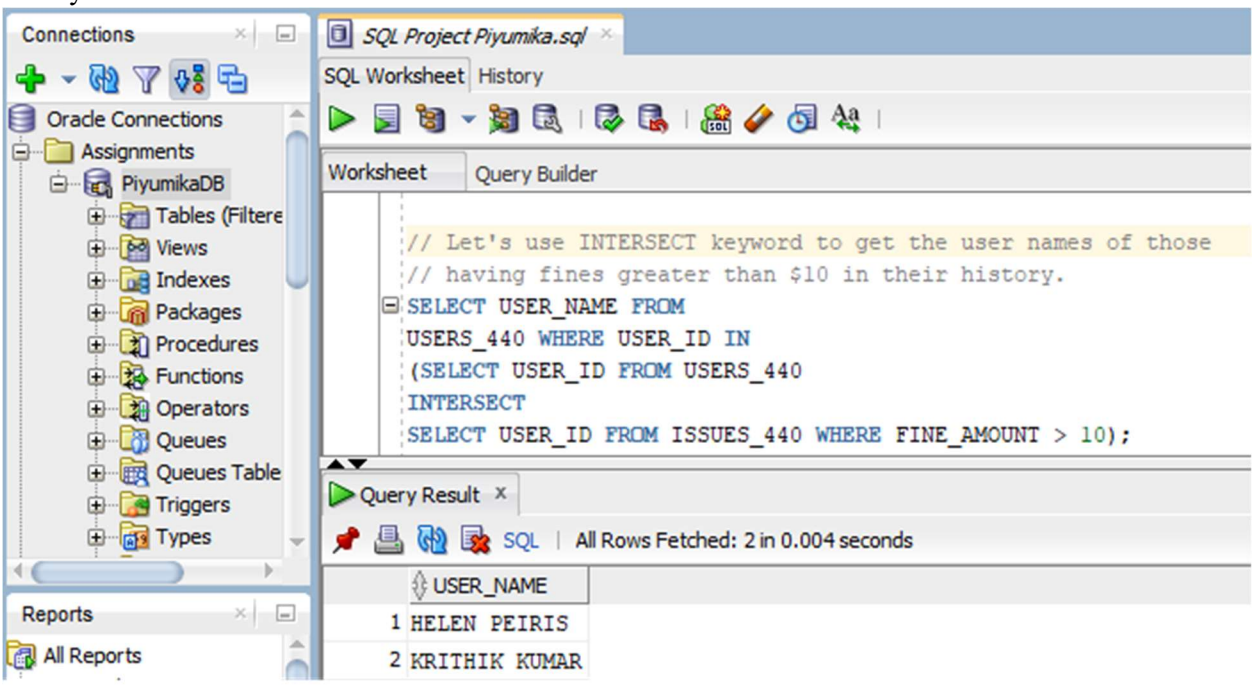


5. Let's use SELF JOIN to join the USERS_440 table with itself based on the ROLE_ID column. The condition u1.USER_ID <> u2.USER_ID ensures that we don't match a user with themselves. This query will return pairs of users who share the same role.

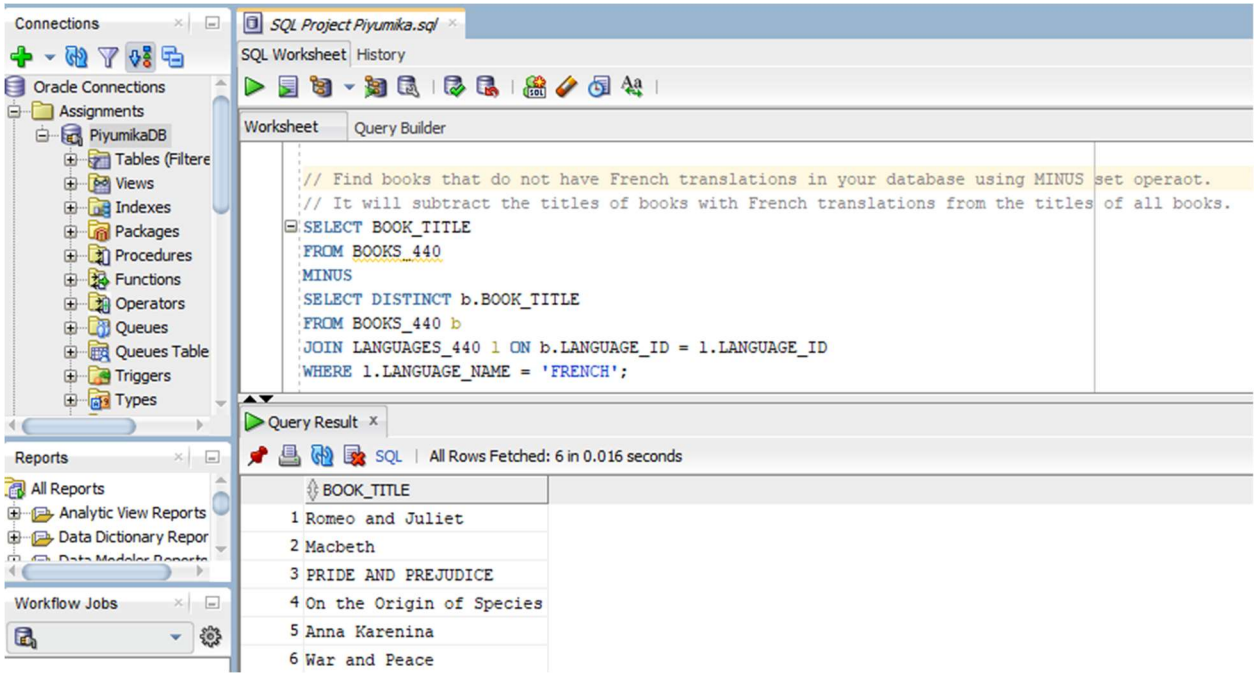


3.6 Category F

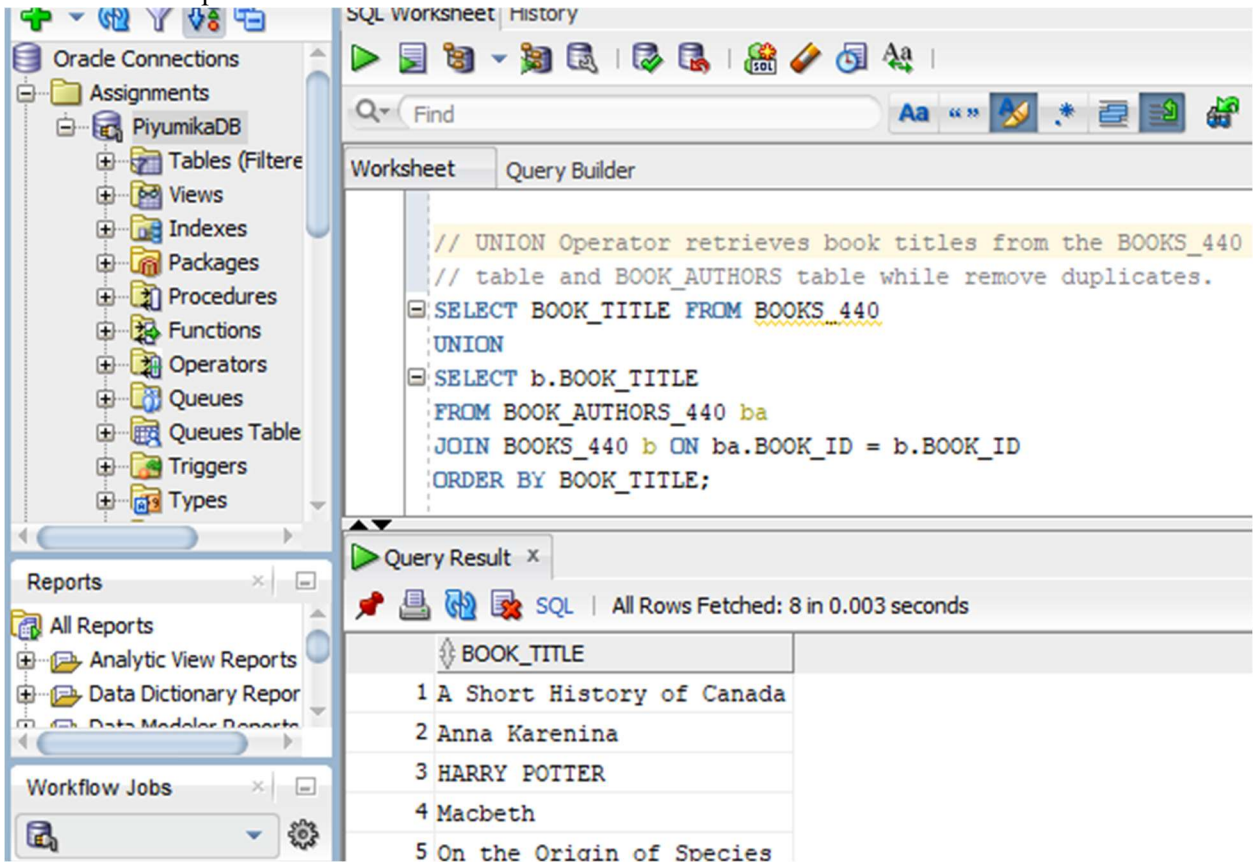
1. Let's use INTERSECT set operator to get the names of those having fines greater than $10 in their history.



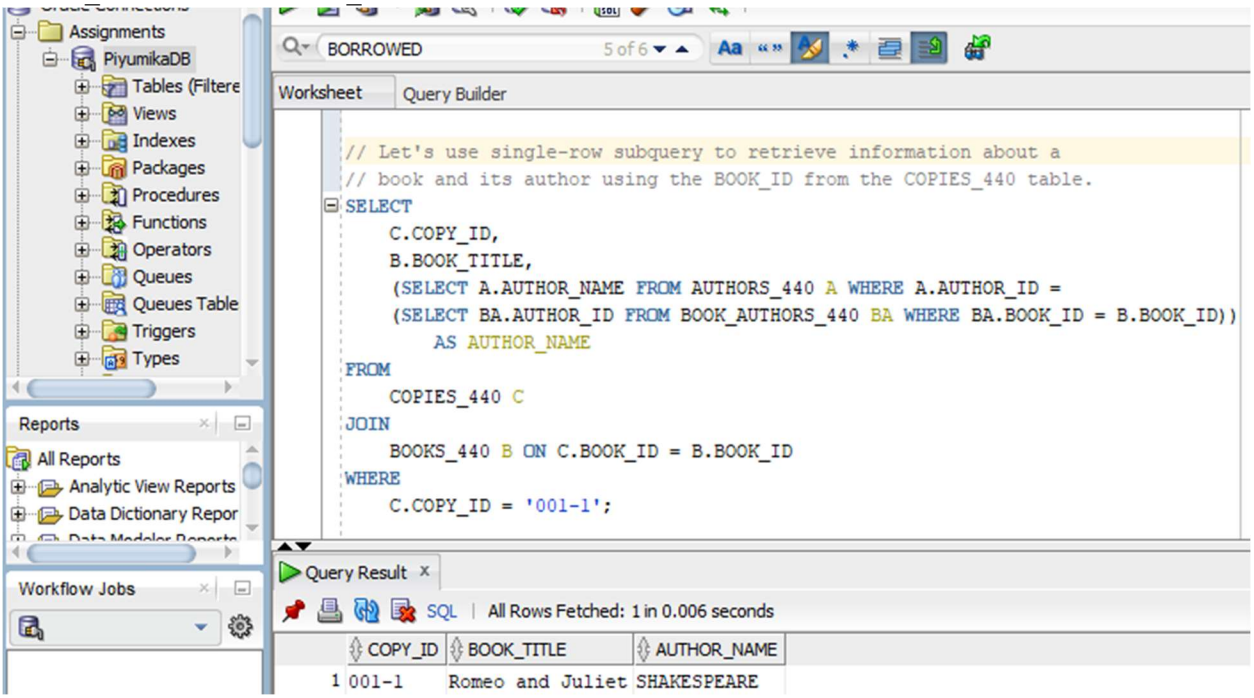
2. Find books that do not have French translations in your database using MINUS set operator.
   It will subtract the titles of books with French translations from the titles of all books.



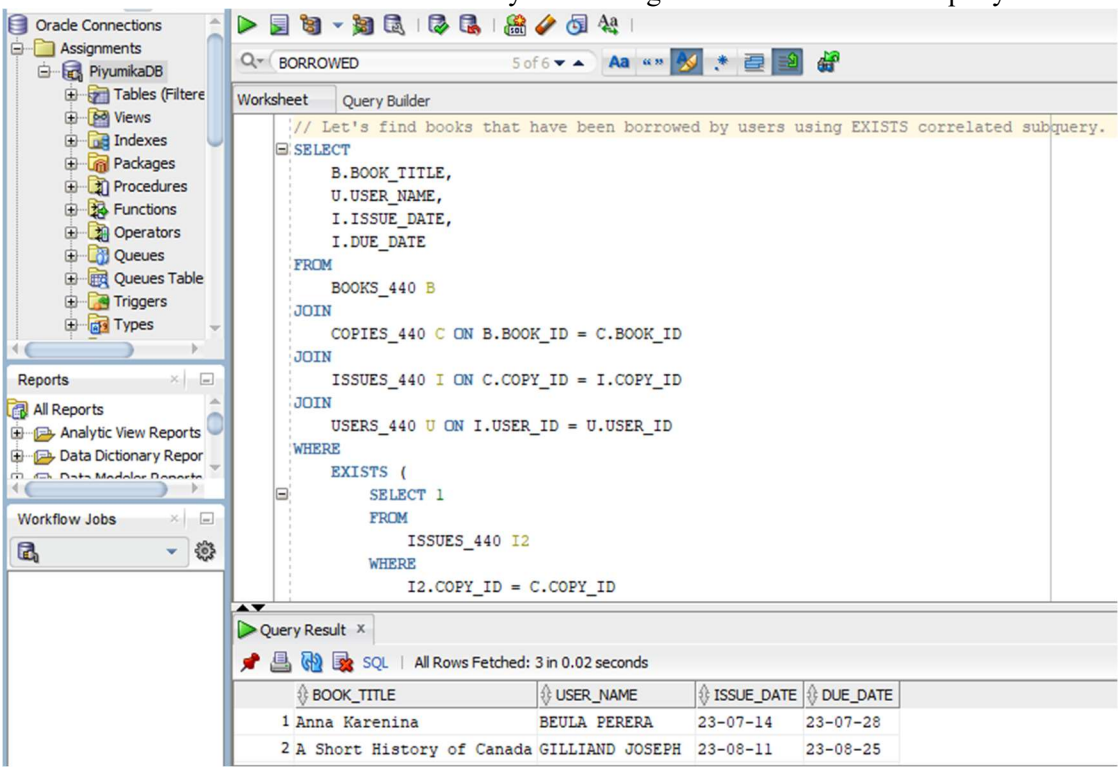
3. U NION Operator retrieves book titles from the BOOKS_440 table and BOOK_AUTHORS table
   while remove duplicates.



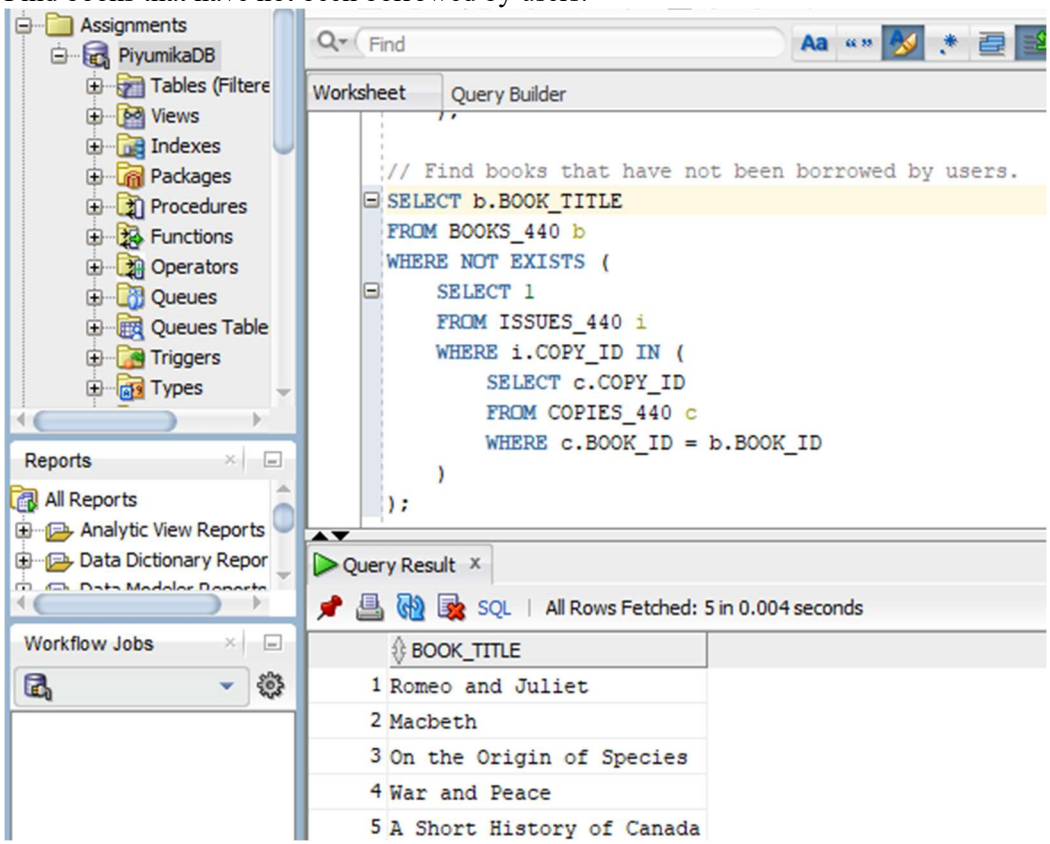
4. Let's use single-row subquery to retrieve information about a book and its author using the BOOK_ID from the COPIES_440 table.



5. Let's find books that have been borrowed by users using EXISTS correlated subquery.



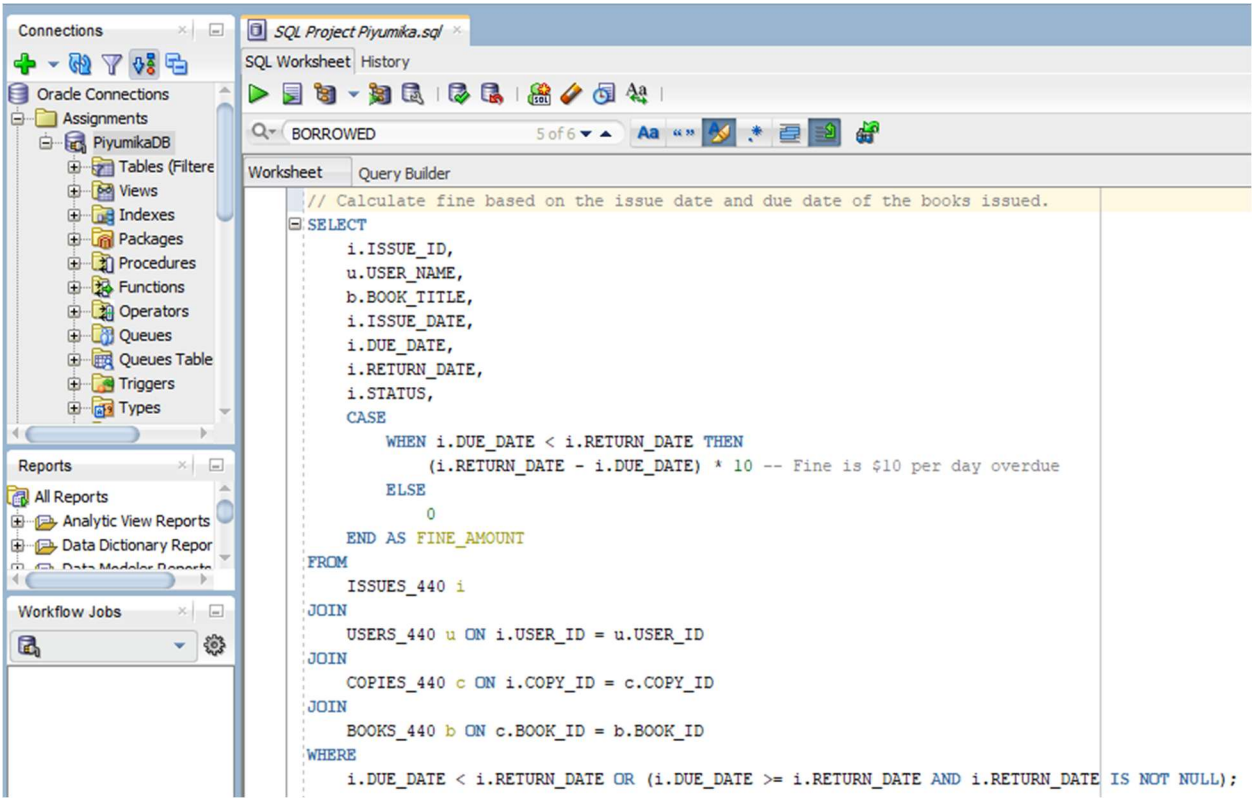
6. Find books that have not been borrowed by users.



3.7 Advance Category

Correlated subqueries refer to values from the outer query in the subquery.

1. Calculate fine based on the issue date and due date of the books issued.



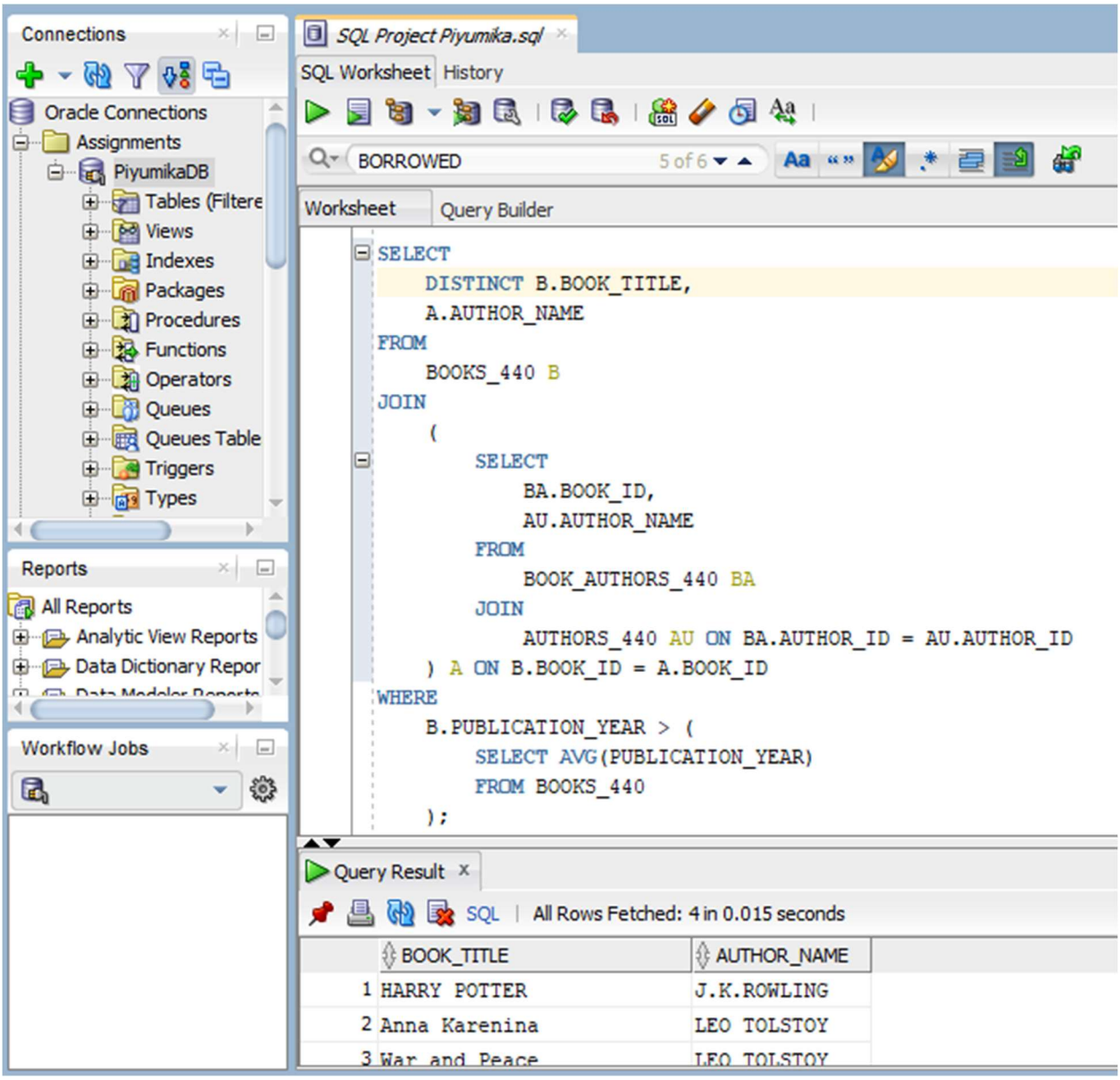
2. This query will provide a list of book titles and their corresponding author names for books published after the average publication year of all books in the BOOKS_440 table.

The main query retrieves book titles and author names from the BOOKS_440 and the nested subquery result (aliased as A).

The nested subquery retrieves book IDs and author names from the BOOK_AUTHORS_440 and AUTHORS_440 tables, respectively, using a JOIN to combine them.

The main query then joins the result of the nested subquery (A) with the BOOKS_440 table based on the BOOK_ID column.

The outer query's WHERE clause filters the results to include only books published after the average publication year of all books in the BOOKS_440 table.


Connections
Oracle Connections
Assignments
PiyumikaDB
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Procedures
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Queues Table
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Types
Reports
All Reports
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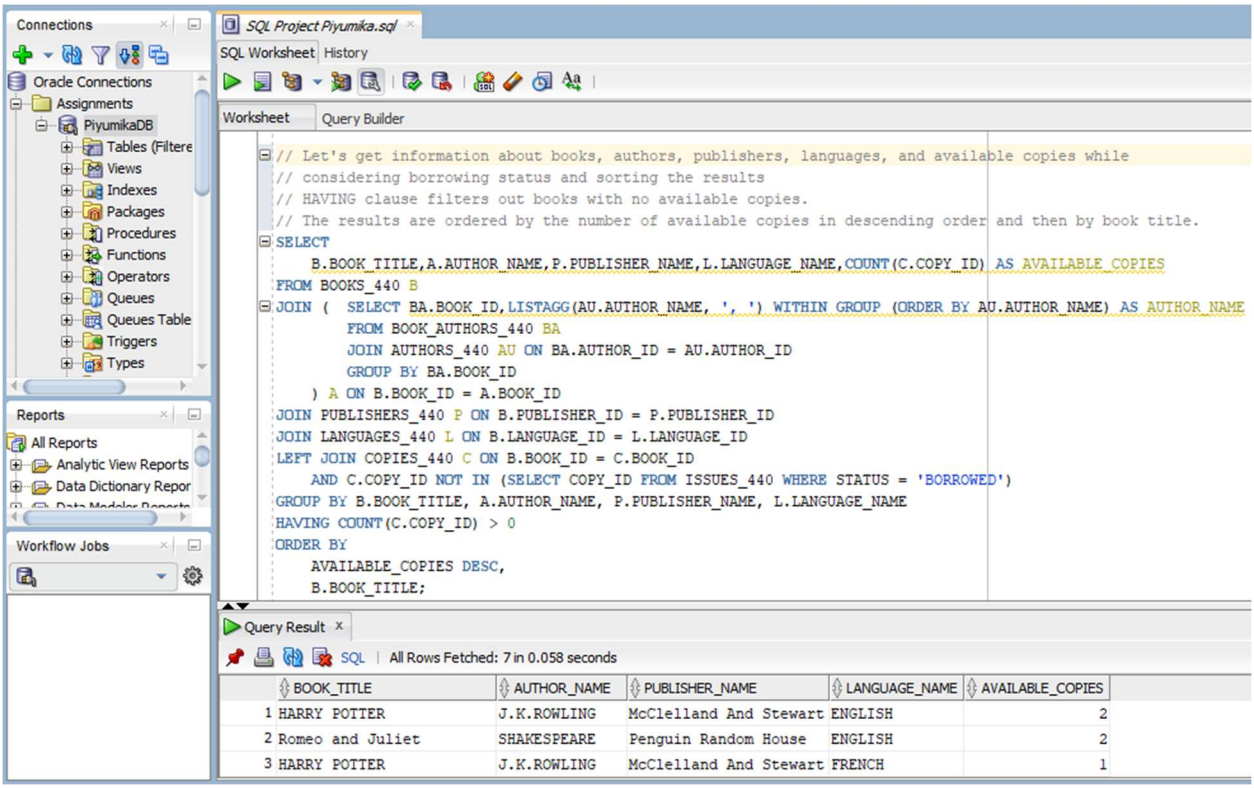
SQL Project Piyumika.sql
SQL Worksheet
History
BORROWED
5 of 6
Worksheet
Query Builder
SELECT
DISTINCT B.BOOK_TITLE,
A.AUTHOR_NAME
FROM
BOOKS_440 B
JOIN
(
SELECT
BA.BOOK_ID,
AU.AUTHOR_NAME
FROM
BOOK_AUTHORS_440 BA
JOIN
AUTHORS_440 AU ON BA.AUTHOR_ID = AU.AUTHOR_ID
) A ON B.BOOK_ID = A.BOOK_ID
WHERE
B.PUBLICATION_YEAR > (
SELECT AVG(PUBLICATION_YEAR)
FROM BOOKS_440
);
Query Result
SQL
All Rows Fetched: 4 in 0.015 seconds
BOOK_TITLE
AUTHOR_NAME
1 HARRY POTTER
J.K.ROWLING
2 Anna Karenina
LEO TOLSTOY
3 War and Peace
LEO TOLSTOY

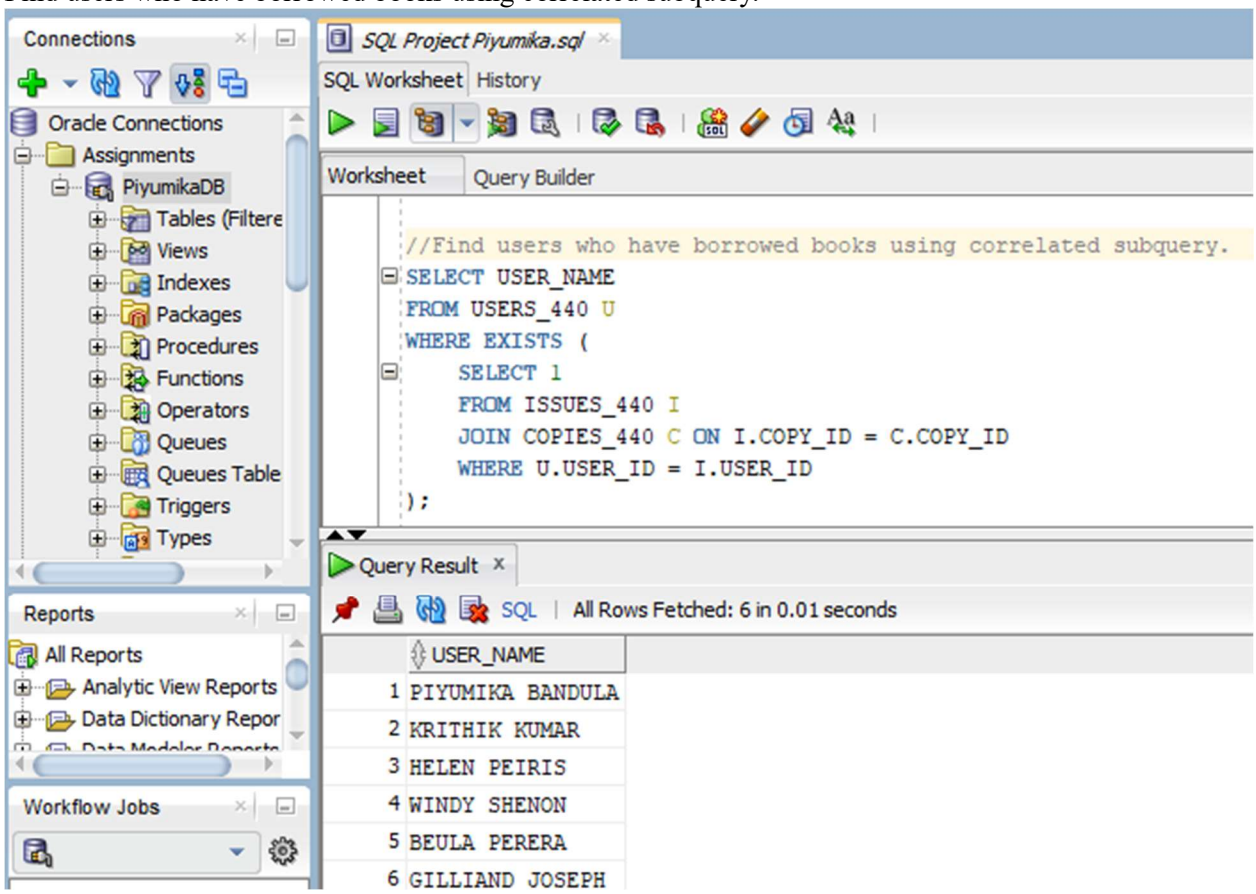
3. Let's get information about books, authors, publishers, languages, and available copies while considering borrowing status and sorting the results.

HAVING clause filters out books with no available copies.

The results are ordered by the number of available copies in descending order and then by book title.



4. Find users who have borrowed books using correlated subquery.



5. List authors whom the library has more books than the average number of books per author in the library.