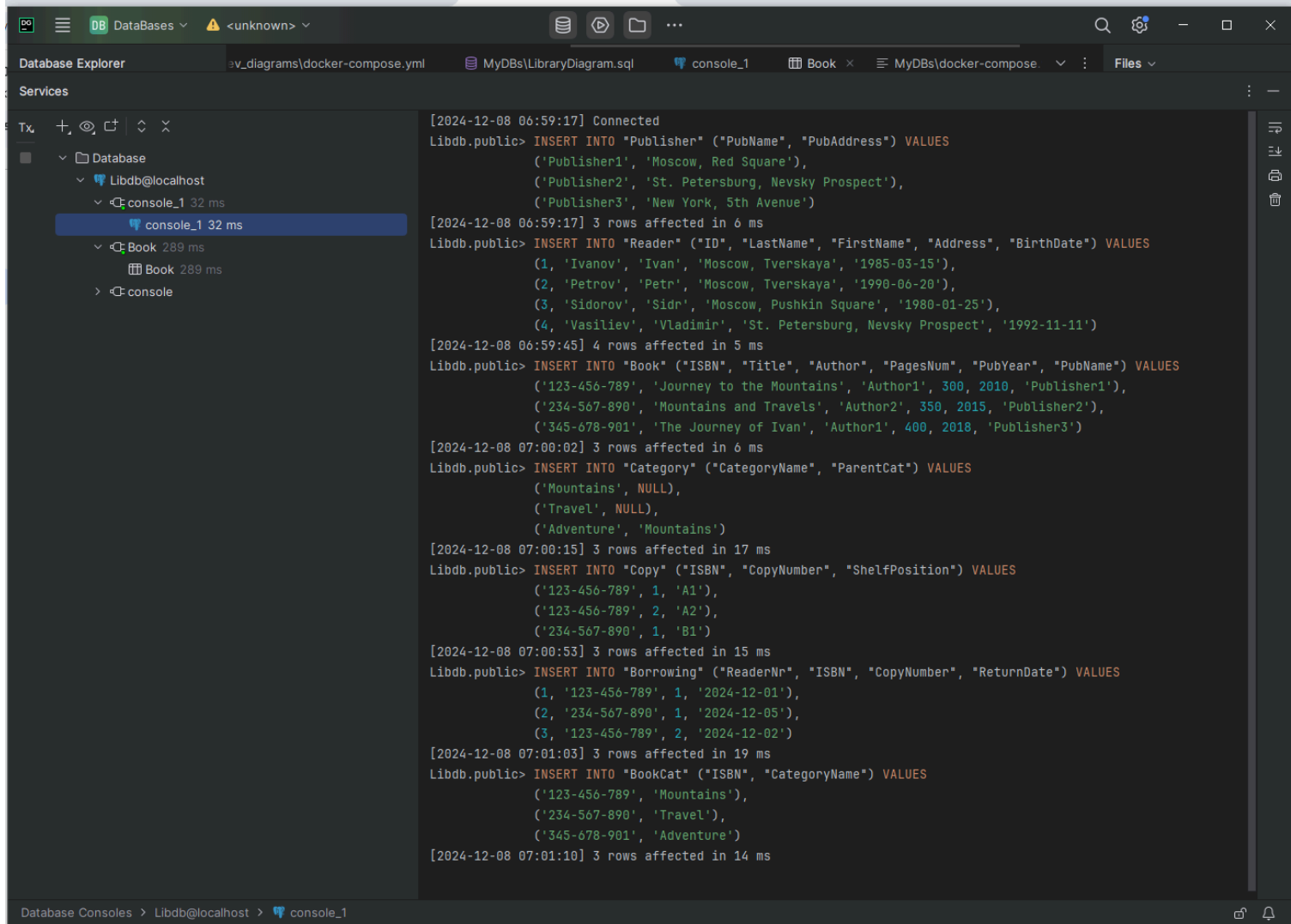


## Задание 5

### Лим В. БПИ225

#### Задача 1:

Сгенерировал и вставил данные в базу:

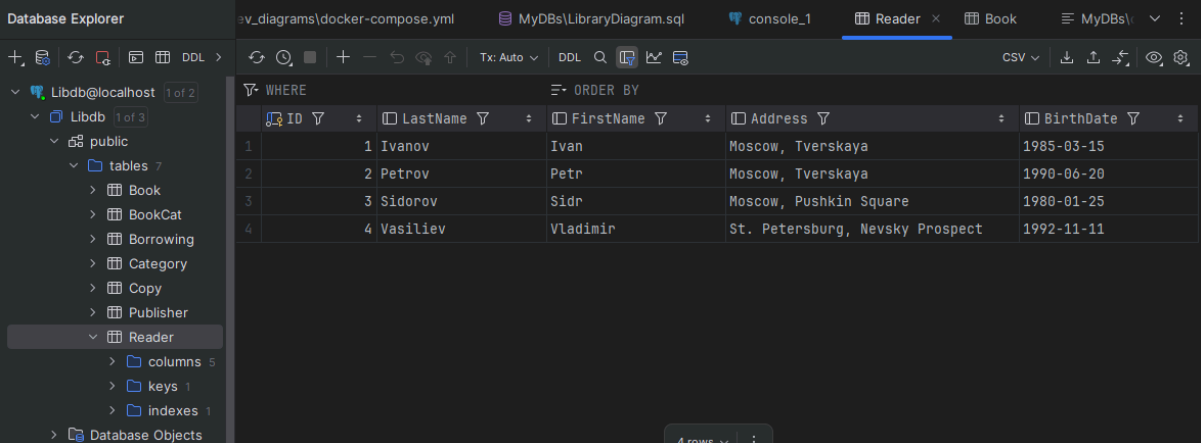


The screenshot shows a database console interface with a sidebar on the left and a main command area on the right. The sidebar displays a tree view of database services, including 'Libdb@localhost' and 'console\_1'. The main area shows a series of SQL commands and their execution results, including connection status, insert operations for 'Publisher', 'Reader', 'Book', 'Category', 'Copy', 'Borrowing', and 'BookCat' tables, and the number of rows affected for each operation.

```
[2024-12-08 06:59:17] Connected
Libdb.public> INSERT INTO "Publisher" ("PubName", "PubAddress") VALUES
    ('Publisher1', 'Moscow, Red Square'),
    ('Publisher2', 'St. Petersburg, Nevsky Prospect'),
    ('Publisher3', 'New York, 5th Avenue')
[2024-12-08 06:59:17] 3 rows affected in 6 ms
Libdb.public> INSERT INTO "Reader" ("ID", "LastName", "FirstName", "Address", "BirthDate") VALUES
    (1, 'Ivanov', 'Ivan', 'Moscow, Tverskaya', '1985-03-15'),
    (2, 'Petrov', 'Petr', 'Moscow, Tverskaya', '1990-06-20'),
    (3, 'Sidorov', 'Sidr', 'Moscow, Pushkin Square', '1980-01-25'),
    (4, 'Vasiliev', 'Vladimir', 'St. Petersburg, Nevsky Prospect', '1992-11-11')
[2024-12-08 06:59:45] 4 rows affected in 5 ms
Libdb.public> INSERT INTO "Book" ("ISBN", "Title", "Author", "PagesNum", "PubYear", "PubName") VALUES
    ('123-456-789', 'Journey to the Mountains', 'Author1', 300, 2010, 'Publisher1'),
    ('234-567-890', 'Mountains and Travels', 'Author2', 350, 2015, 'Publisher2'),
    ('345-678-901', 'The Journey of Ivan', 'Author1', 400, 2018, 'Publisher3')
[2024-12-08 07:00:02] 3 rows affected in 6 ms
Libdb.public> INSERT INTO "Category" ("CategoryName", "ParentCat") VALUES
    ('Mountains', NULL),
    ('Travel', NULL),
    ('Adventure', 'Mountains')
[2024-12-08 07:00:15] 3 rows affected in 17 ms
Libdb.public> INSERT INTO "Copy" ("ISBN", "CopyNumber", "ShelfPosition") VALUES
    ('123-456-789', 1, 'A1'),
    ('123-456-789', 2, 'A2'),
    ('234-567-890', 1, 'B1')
[2024-12-08 07:00:53] 3 rows affected in 15 ms
Libdb.public> INSERT INTO "Borrowing" ("ReaderNr", "ISBN", "CopyNumber", "ReturnDate") VALUES
    (1, '123-456-789', 1, '2024-12-01'),
    (2, '234-567-890', 1, '2024-12-05'),
    (3, '123-456-789', 2, '2024-12-02')
[2024-12-08 07:01:03] 3 rows affected in 19 ms
Libdb.public> INSERT INTO "BookCat" ("ISBN", "CategoryName") VALUES
    ('123-456-789', 'Mountains'),
    ('234-567-890', 'Travel'),
    ('345-678-901', 'Adventure')
[2024-12-08 07:01:10] 3 rows affected in 14 ms
```

а) Какие фамилии читателей в Москве?

Таблица Reader:

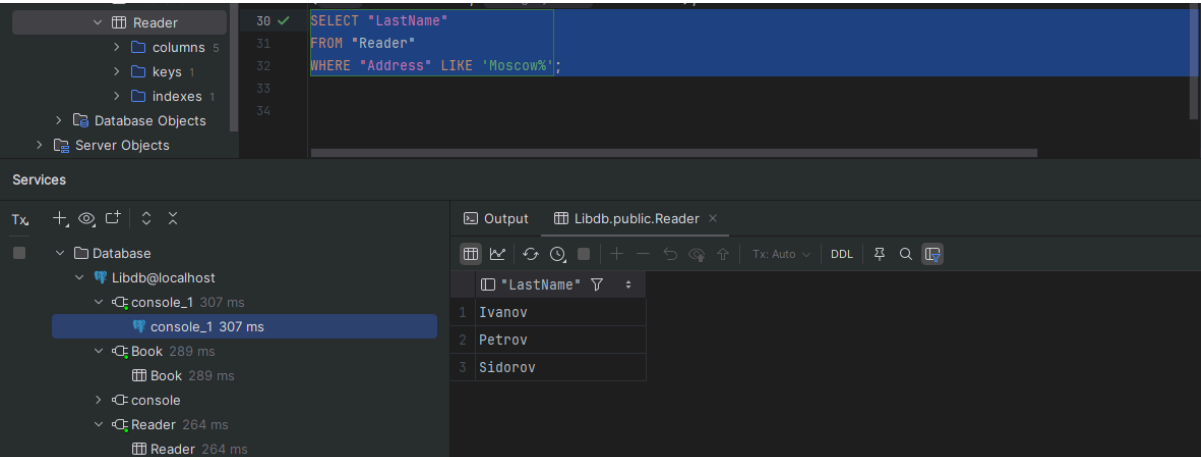


ID	LastName	FirstName	Address	BirthDate
1	Ivanov	Ivan	Moscow, Tverskaya	1985-03-15
2	Petrov	Petr	Moscow, Tverskaya	1990-06-20
3	Sidorov	Sidr	Moscow, Pushkin Square	1980-01-25
4	Vasiliev	Vladimir	St. Petersburg, Nevsky Prospect	1992-11-11

Запрос:

```
SELECT "LastName" FROM "Reader" WHERE "Address" LIKE 'Moscow%';
```

Результат:



```
SELECT *LastName*
FROM *Reader*
WHERE *Address* LIKE *Moscow%*;
```

*LastName*
Ivanov
Petrov
Sidorov

Все правильно✓

б) Какие книги (author, title) брал Иван Иванов?

Иван Иванов имеет id 1:

ID	LastName	FirstName	Address	BirthDate
1	Ivanov	Ivan	Moscow, Tverskaya	1985-03-15

Таблица Borrowing:

ReaderNr	ISBN	CopyNumber	ReturnDate
1	123-456-789	1	2024-12-01
2	234-567-890	1	2024-12-05
3	123-456-789	2	2024-12-02

Таблица Book чтобы удостовериться потом через ISBN книги:

ISBN	Title	Author	PagesNum	PubYear	PubName
123-456-789	Journey to the Mountains	Author1	300	2010	Publisher1

Запрос:

```
SELECT "Author", "Title" FROM "Book" JOIN "Borrowing" ON "Book"."ISBN" =  
"Borrowing"."ISBN" JOIN "Reader" ON "Borrowing"."ReaderNr" = "Reader"."ID"  
WHERE "Reader"."LastName" = 'Ivanov' AND "Reader"."FirstName" = 'Ivan';
```

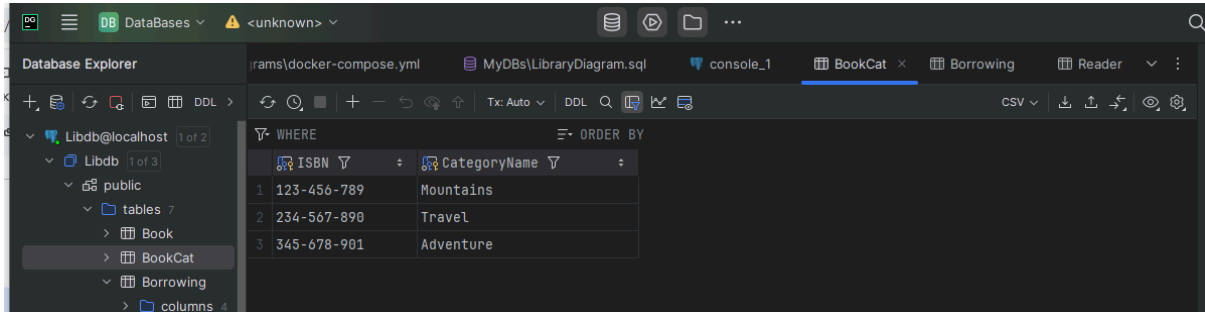
Результат:

Author	Title
Author1	Journey to the Mountains

Все правильно ✓

в) Какие книги (ISBN) из категории "Горы" не относятся к категории "Путешествия"?

В таблице BookCat у нас только одна книга в категории "Mountains" и она не относится к категории "Travel"



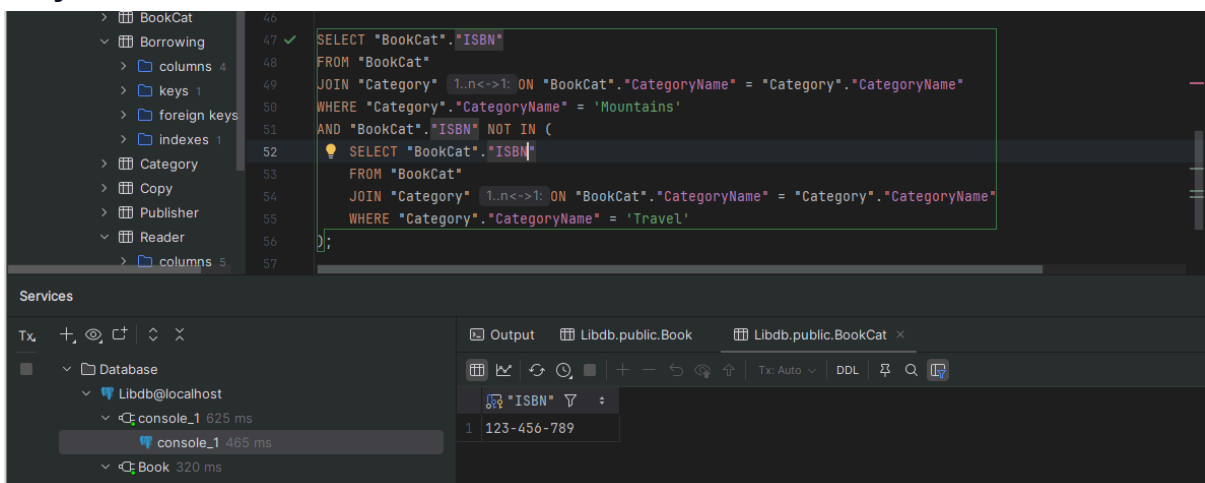
The screenshot shows a database client interface with a tree view on the left and a table view on the right. The tree view shows a database named 'Libdb' with a public schema containing a table 'BookCat'. The table view shows the following data:

ISBN	CategoryName
123-456-789	Mountains
234-567-890	Travel
345-678-901	Adventure

**Запрос:**

```
SELECT "BookCat"."ISBN"  
FROM "BookCat"  
JOIN "Category" ON "BookCat"."CategoryName" = "Category"."CategoryName"  
WHERE "Category"."CategoryName" = 'Mountains'  
AND "BookCat"."ISBN" NOT IN (  
    SELECT "BookCat"."ISBN"  
    FROM "BookCat"  
    JOIN "Category" ON "BookCat"."CategoryName" = "Category"."CategoryName"  
    WHERE "Category"."CategoryName" = 'Travel'  
);
```

**Результат:**



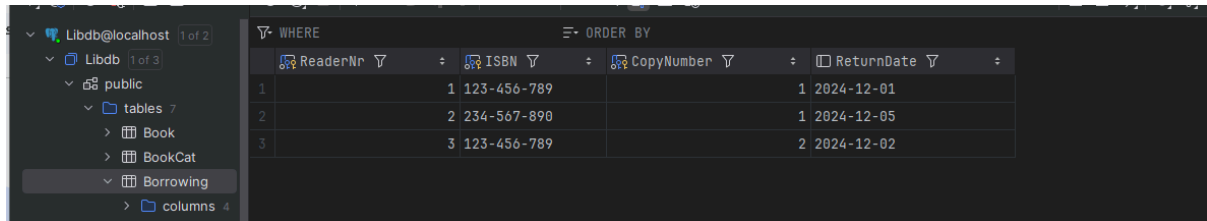
The screenshot shows a database client interface with a tree view on the left, a SQL editor in the center, and a results pane on the right. The SQL editor contains the same query as above. The results pane shows the output of the query:

ISBN
123-456-789

Все правильно ✓

г) Какие читатели (LastName, FirstName) вернули копию книги?

Из таблицы Borrowing видно, что все свои книги вернули:



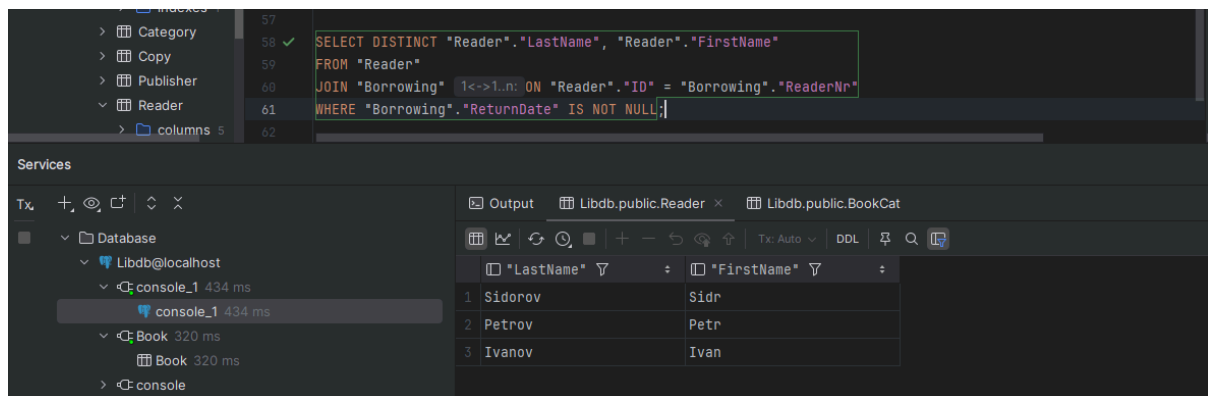
The screenshot shows a database client interface with a tree view on the left containing 'Libdb@localhost', 'Libdb', 'public', 'tables', 'Book', 'BookCat', and 'Borrowing'. The main area displays the 'Borrowing' table with columns: ReaderNr, ISBN, CopyNumber, and ReturnDate. The table contains three rows of data.

ReaderNr	ISBN	CopyNumber	ReturnDate
1	123-456-789	1	2024-12-01
2	234-567-890	1	2024-12-05
3	123-456-789	2	2024-12-02

Запрос:

```
SELECT DISTINCT "Reader"."LastName", "Reader"."FirstName" FROM "Reader"  
JOIN "Borrowing" ON "Reader"."ID" = "Borrowing"."ReaderNr" WHERE  
"Borrowing"."ReturnDate" IS NOT NULL;
```

Результат:



The screenshot shows a database client interface with a tree view on the left containing 'Category', 'Copy', 'Publisher', 'Reader', and 'columns'. The main area displays the SQL query: `SELECT DISTINCT "Reader"."LastName", "Reader"."FirstName" FROM "Reader" JOIN "Borrowing" ON "Reader"."ID" = "Borrowing"."ReaderNr" WHERE "Borrowing"."ReturnDate" IS NOT NULL;`. Below the query, the 'Services' section shows the 'Output' tab with the results of the query, displaying the last names and first names of the readers who have returned books.

"LastName"	"FirstName"
Sidorov	Sidr
Petrov	Petr
Ivanov	Ivan

Все правильно ✓

д) Какие читатели (LastName, FirstName) брали хотя бы одну книгу (не копию), которую брал также Иван Иванов (не включайте Ивана Иванова в результат)?

Из таблицы Borrowing и Reader мы видим, что Петр Петров взял ту же книгу, что и Иван Иванов:

The screenshot shows a database management tool interface. On the left, a tree view shows the database structure: Libdb@localhost, Libdb, public, tables, Book, BookCat, Borrowing, columns, and keys. The main window displays a query result for the Borrowing table. The query is: `SELECT ID, LastName, FirstName, Address, BirthDate FROM Borrowing`. The result shows four rows of data.

ID	LastName	FirstName	Address	BirthDate
1	Ivanov	Ivan	Moscow, Tverskaya	1985-03-15
2	Petrov	Petr	Moscow, Tverskaya	1990-06-20
3	Sidorov	Sidr	Moscow, Pushkin Square	1980-01-25
4	Vasiliev	Vladimir	St. Petersburg, Nevsky Prospect	1992-11-11

The screenshot also shows a query result for the Reader table. The query is: `SELECT ReaderNr, ISBN, CopyNumber, ReturnDate FROM Reader`. The result shows three rows of data.

ReaderNr	ISBN	CopyNumber	ReturnDate
1	123-456-789	1	2024-12-01
2	234-567-890	1	2024-12-05
3	123-456-789	2	2024-12-02

**Запрос:**

```
SELECT DISTINCT "Reader"."LastName", "Reader"."FirstName" FROM "Reader"
JOIN "Borrowing" ON "Reader"."ID" = "Borrowing"."ReaderNr" WHERE
"Borrowing"."ISBN" IN ( SELECT "Borrowing"."ISBN" FROM "Borrowing" JOIN
"Reader" ON "Borrowing"."ReaderNr" = "Reader"."ID" WHERE "Reader"."LastName"
= 'Ivanov' AND "Reader"."FirstName" = 'Ivan' ) AND NOT ("Reader"."LastName" =
'Ivanov' AND "Reader"."FirstName" = 'Ivan');
```

## Результат:

The screenshot shows a database management interface with a sidebar on the left displaying a database structure. The main area contains two SQL queries. The first query is a simple JOIN, and the second is a more complex query using a subquery to filter results. Below the queries, a 'Services' panel shows a table with two columns: 'LastName' and 'FirstName'. The table contains one row with the values 'Sidorov' and 'Sidr'.

```
57  
58 ✓ SELECT DISTINCT "Reader"."LastName", "Reader"."FirstName"  
59 FROM "Reader"  
60 JOIN "Borrowing" 1<->1..n: ON "Reader"."ID" = "Borrowing"."ReaderNr"  
61 WHERE "Borrowing"."ReturnDate" IS NOT NULL;  
62  
63 ✓ SELECT DISTINCT "Reader"."LastName", "Reader"."FirstName"  
64 FROM "Reader"  
65 JOIN "Borrowing" 1<->1..n: ON "Reader"."ID" = "Borrowing"."ReaderNr"  
66 WHERE "Borrowing"."ISBN" IN (  
67     SELECT "Borrowing"."ISBN"  
68     FROM "Borrowing"  
69     JOIN "Reader" 1..n<->1: ON "Borrowing"."ReaderNr" = "Reader"."ID"  
70     WHERE "Reader"."LastName" = 'Ivanov' AND "Reader"."FirstName" = 'Ivan'  
71 )  
72 AND NOT ("Reader"."LastName" = 'Ivanov' AND "Reader"."FirstName" = 'Ivan');  
73  
74
```

Services

Tx: +, -, <, >, ↺, ↻, ⌂, Tx: Auto, DDL, 🔍, 📄

Database

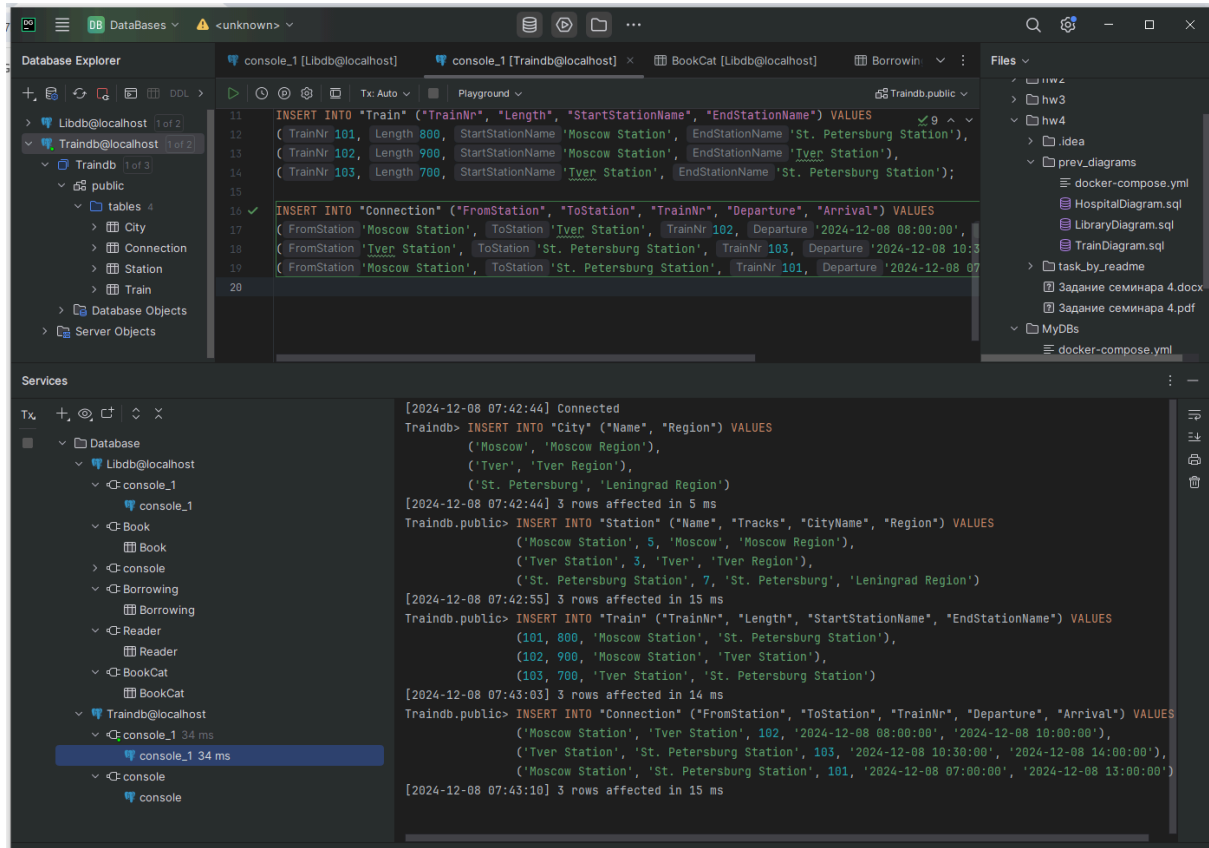
- Libdb@localhost
  - console\_1 1 s 15 ms
  - console\_1 655 ms

	"LastName" ▼	"FirstName" ▼
1	Sidorov	Sidr

Все правильно ✓

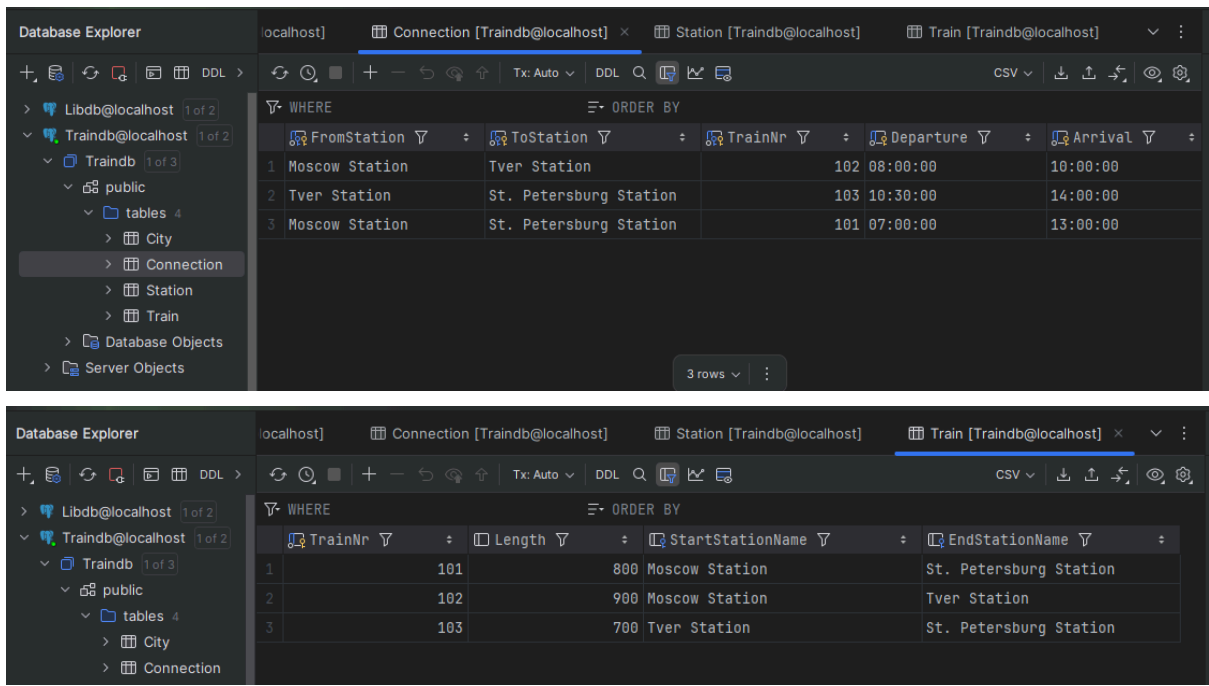
## Задача 2:

### Заполняю таблицу данными:



а) Найдите все прямые рейсы из Москвы в Тверь:

По таблице Train и Connection видно, что прямой только 102 в 8:00:

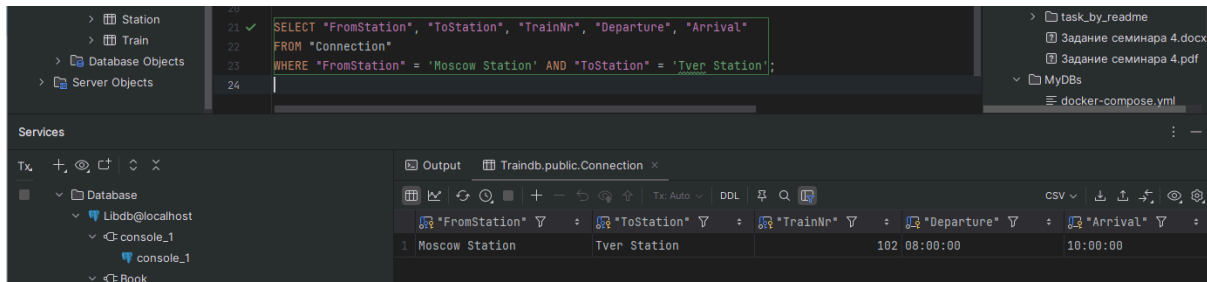




### Запрос:

```
SELECT "FromStation", "ToStation", "TrainNr", "Departure", "Arrival"  
FROM "Connection"  
WHERE "FromStation" = 'Moscow Station' AND "ToStation" = 'Tver Station';
```

### Результат:



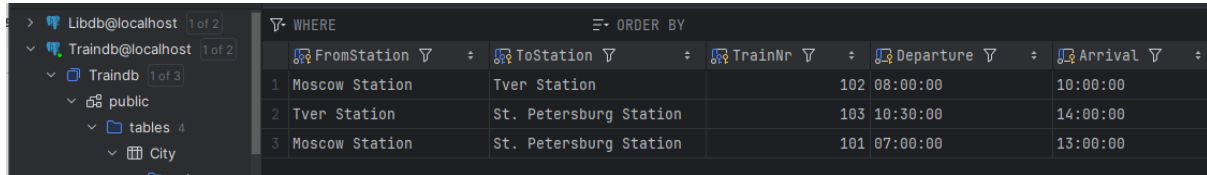
The screenshot shows a database IDE interface. The top pane displays a SQL query: `SELECT "FromStation", "ToStation", "TrainNr", "Departure", "Arrival" FROM "Connection" WHERE "FromStation" = 'Moscow Station' AND "ToStation" = 'Tver Station';`. The bottom pane shows the results of the query in a table format. The table has five columns: "FromStation", "ToStation", "TrainNr", "Departure", and "Arrival". The first row of data shows "Moscow Station" as the origin, "Tver Station" as the destination, train number 102, and departure/arrival times of 08:00:00 and 10:00:00 respectively.

"FromStation"	"ToStation"	"TrainNr"	"Departure"	"Arrival"
Moscow Station	Tver Station	102	08:00:00	10:00:00

Все правильно ✓

б) Найдите все многосегментные маршруты, имеющие точно однодневный трансфер из Москвы в Санкт-Петербург.

У нас из составных есть только маршрут Москва-Тверь -> Тверь-Питер:

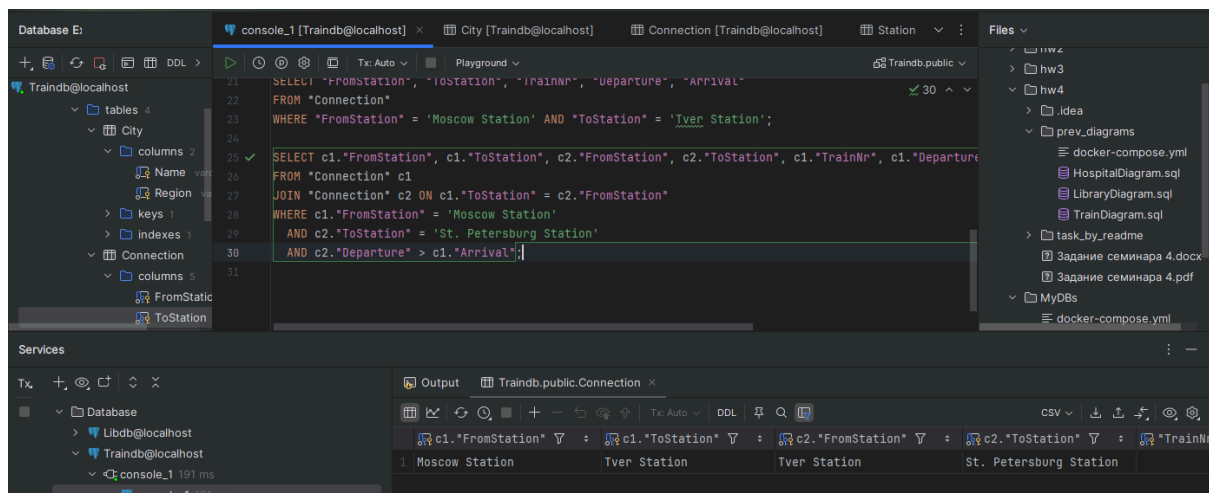


	FromStation	ToStation	TrainNr	Departure	Arrival
1	Moscow Station	Tver Station	102	08:00:00	10:00:00
2	Tver Station	St. Petersburg Station	103	10:30:00	14:00:00
3	Moscow Station	St. Petersburg Station	101	07:00:00	13:00:00

Запрос:

```
SELECT c1."FromStation", c1."ToStation", c2."FromStation", c2."ToStation",  
c1."TrainNr", c1."Departure", c2."Arrival"  
FROM "Connection" c1  
JOIN "Connection" c2 ON c1."ToStation" = c2."FromStation"  
WHERE c1."FromStation" = 'Moscow Station'  
AND c2."ToStation" = 'St. Petersburg Station'  
AND c2."Departure" > c1."Arrival";
```

Результат:



The screenshot shows a database IDE with a query editor and a results pane. The query is the same as the one above. The results pane shows the output of the query, which is a multi-segment route from Moscow to St. Petersburg via Tver.

c1."FromStation"	c1."ToStation"	c2."FromStation"	c2."ToStation"	c1."TrainNr"
Moscow Station	Tver Station	Tver Station	St. Petersburg Station	

Все правильно✓