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R Assignment

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Database Description

The database describes the context of a Library Management System. It illustrates the relationship between database users, administrators, librarians and the books in the library. This document includes both the high level diagram and schema diagram of the relational database.

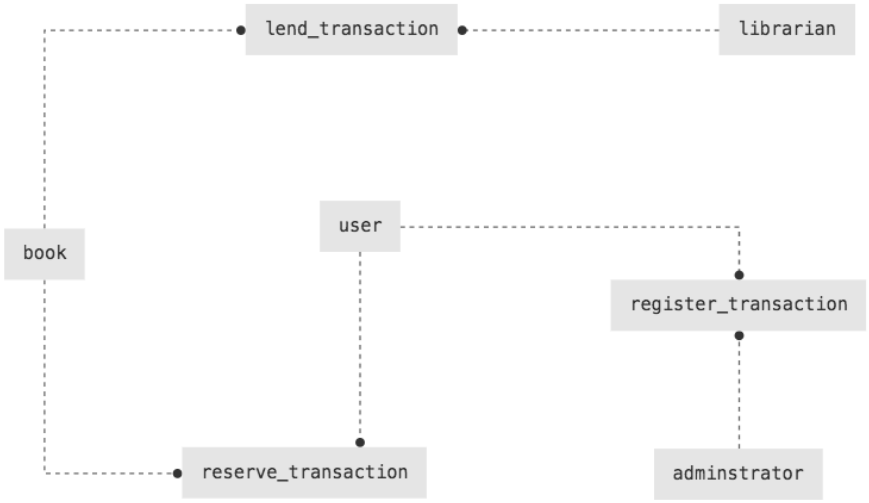

Figure 1 High level diagram of the database

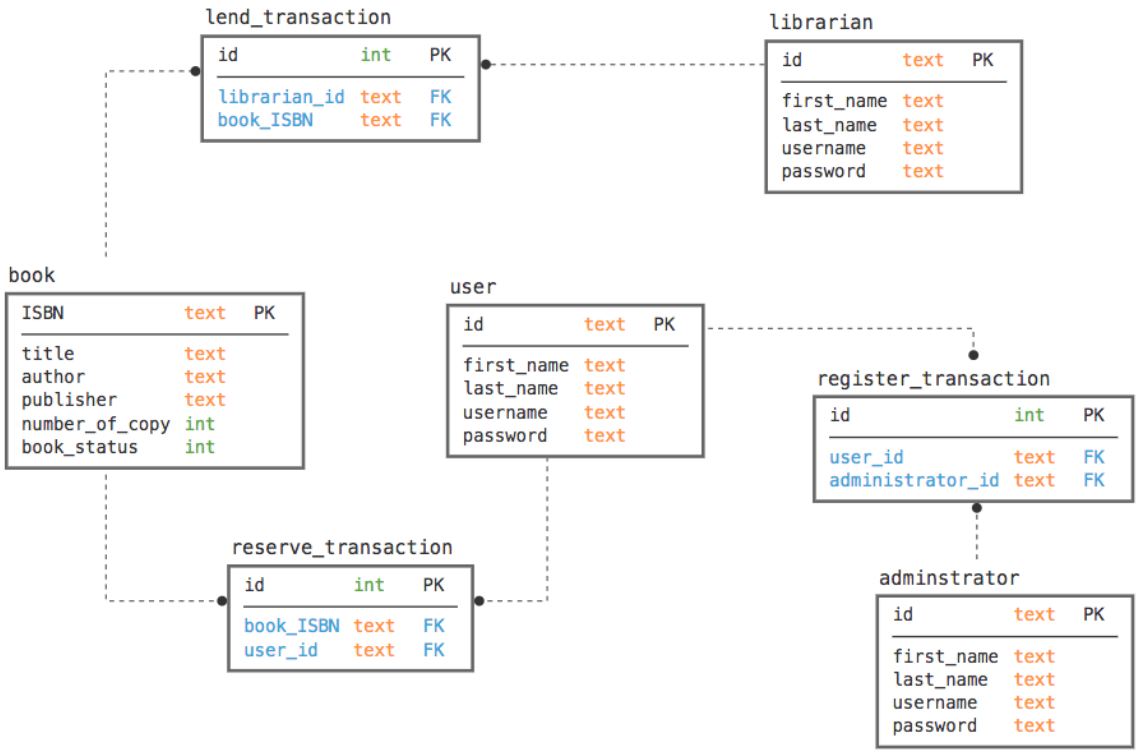

Figure 2 Schema diagram

Furthermore, to capitalize on the relationship between the entities, we've included ER diagram of the database.

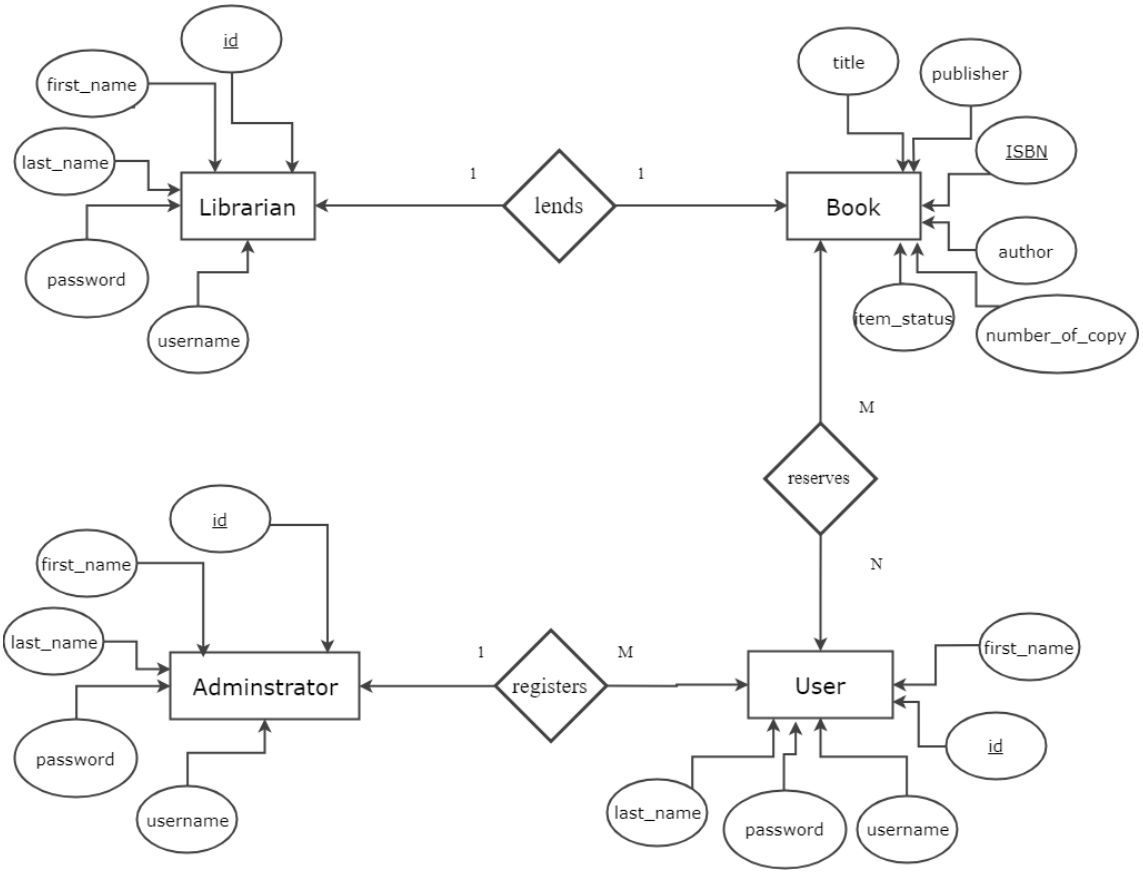

Figure 3 ER Diagram

Used Packages

The **DBI** package defines a common interface between the R and database management systems (DBMS). DBI interface defines a small set of classes that enable us to connect to a DBMS, create and execute SQL statements in the DBMS, extract result and so on. DBI provides drivers and an API that facilitates the communication with specific DBMS like SQLite.

We used **RSQLite** which is a DBI-compatible interface and can use primarily functions defined in the DBI package. RSQLite package was used to connect and manipulate library management SQLite database.

Steps and Answers

- Loading the necessary libraries and creating a connection to the library management SQLite database using DBI's dbConnect method. The dbListTables command lists the existing tables in the database which have been created using the SQL query included in the Git repo.

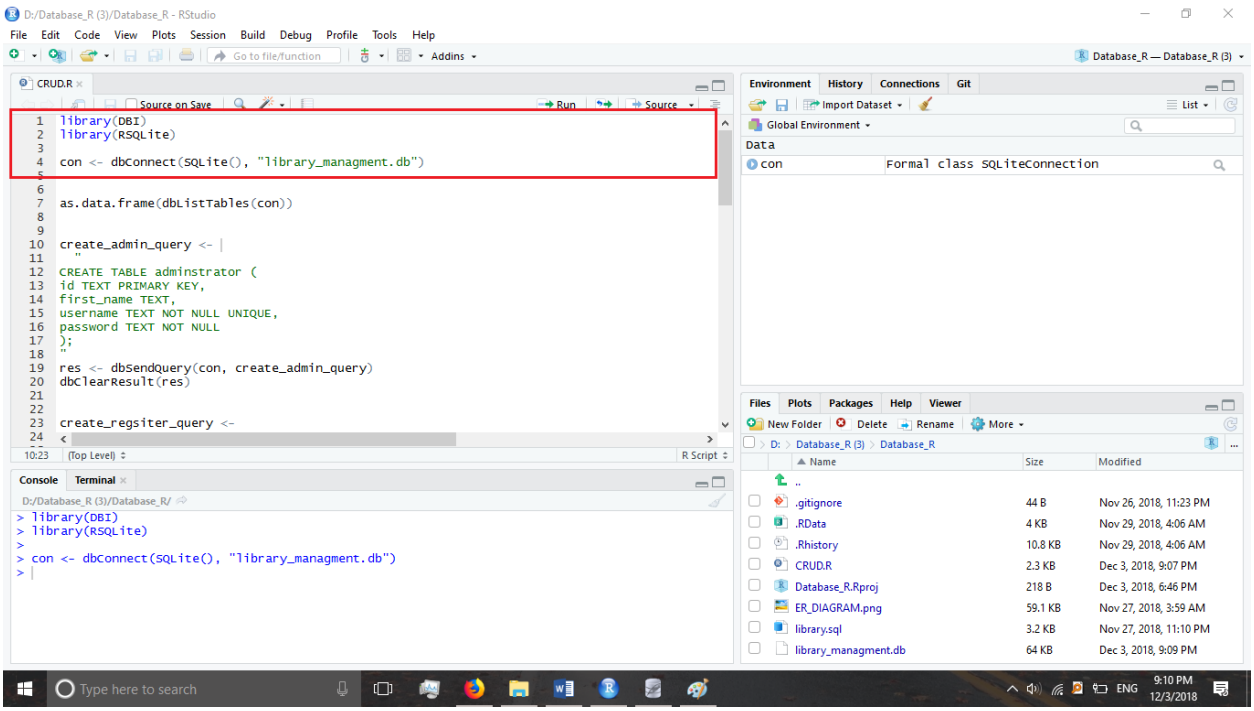

Figure 4 creating a connection to the database

- Create **administrator** database using create admin string query and dbSendQuery method. The dbClearResult command is used to clear a result set with pending rows before executing the next SQL query.

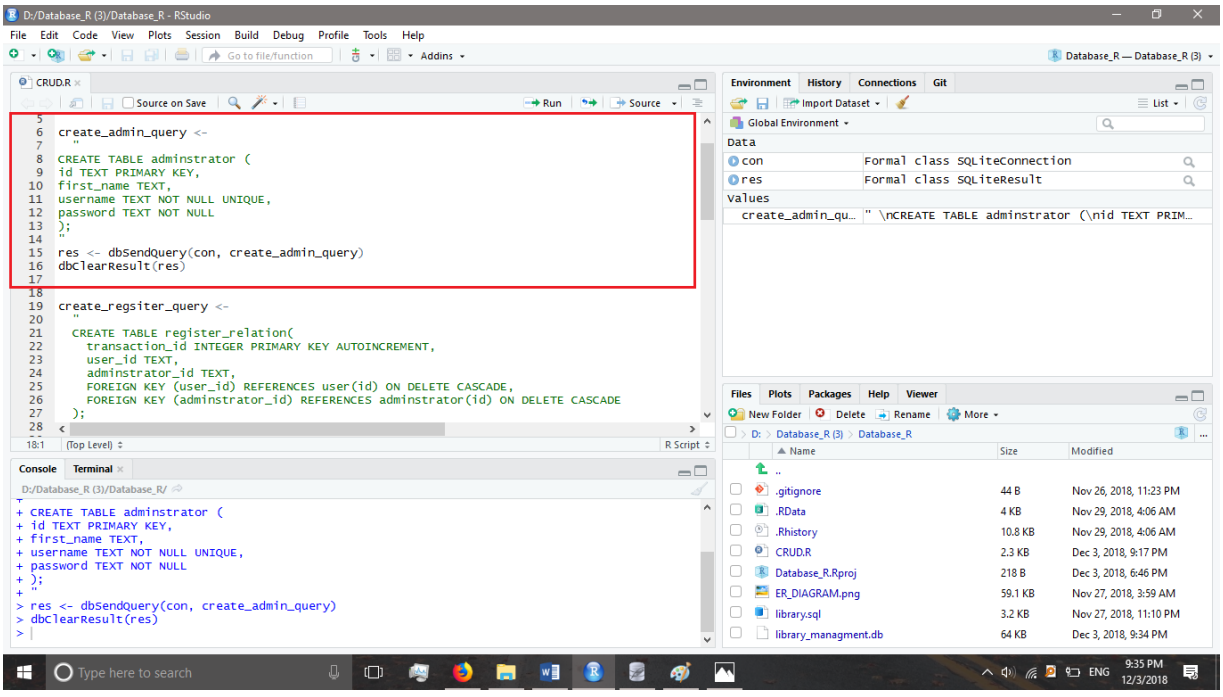

Figure 5 Creating the administrator table

The same way a register relation table which has a foreign key relationship with the administrator table is created.

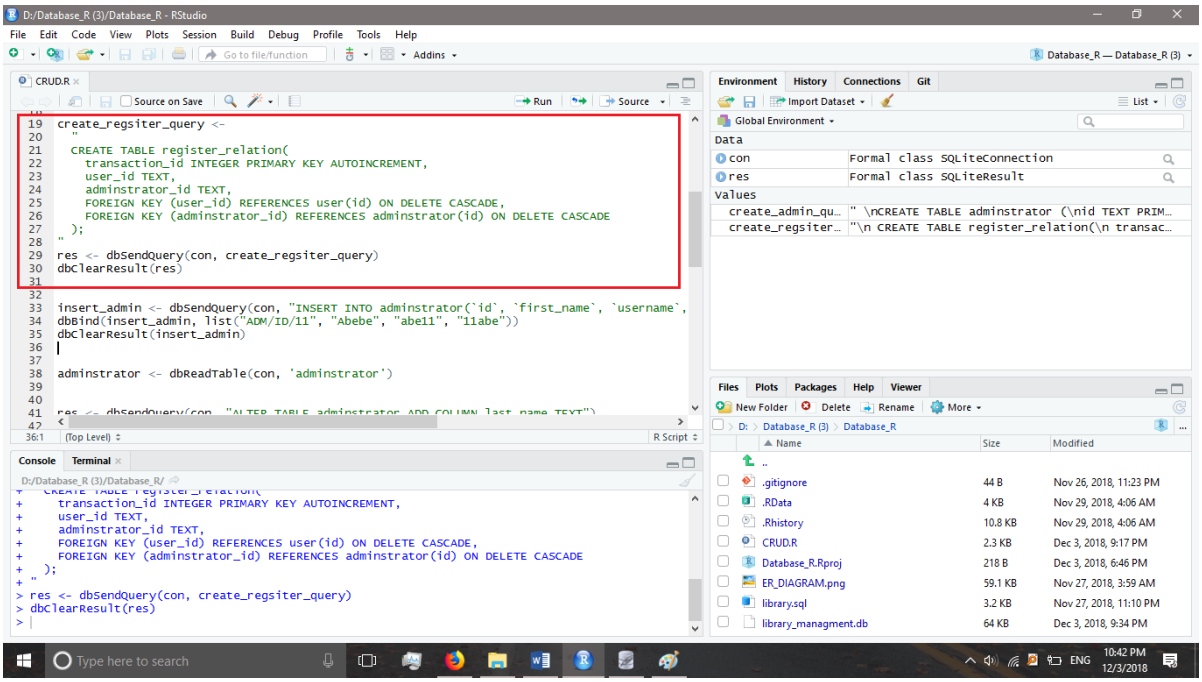

Figure 6 Create register relation table

- Insert data into the administrator table. The dbSendQuery function can be called with queries that contain placeholders for values. The dbBind function binds these placeholders to actual values, and is intended to be called on the result of dbSendQuery.

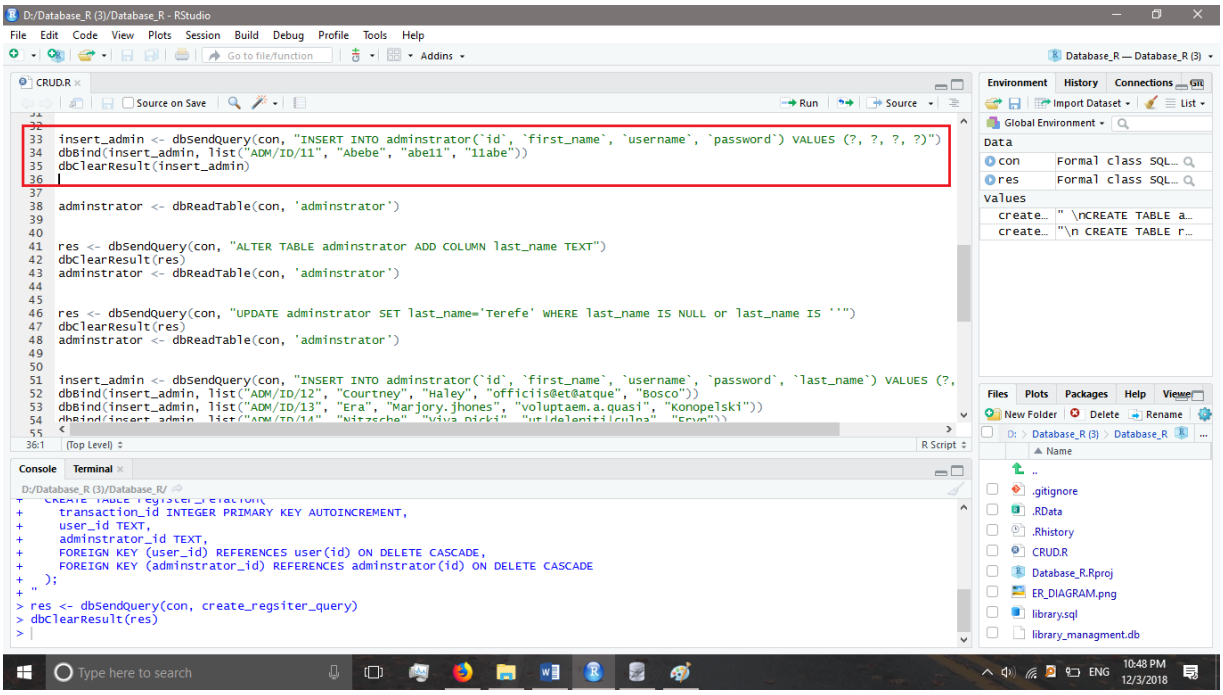

Figure 7 Insert into admin table

- Read the newly populated database as a data frame

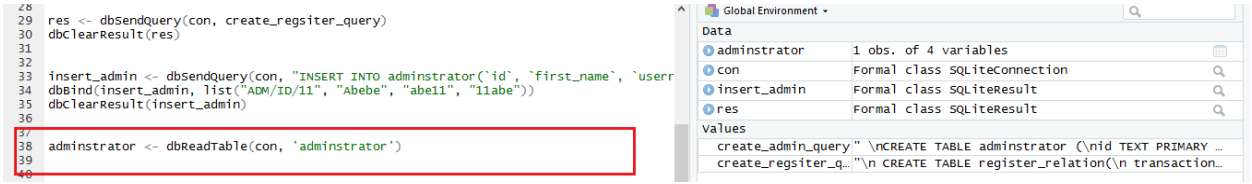

Figure 8 Execute the command to read administrator table

And the data frame is shown below

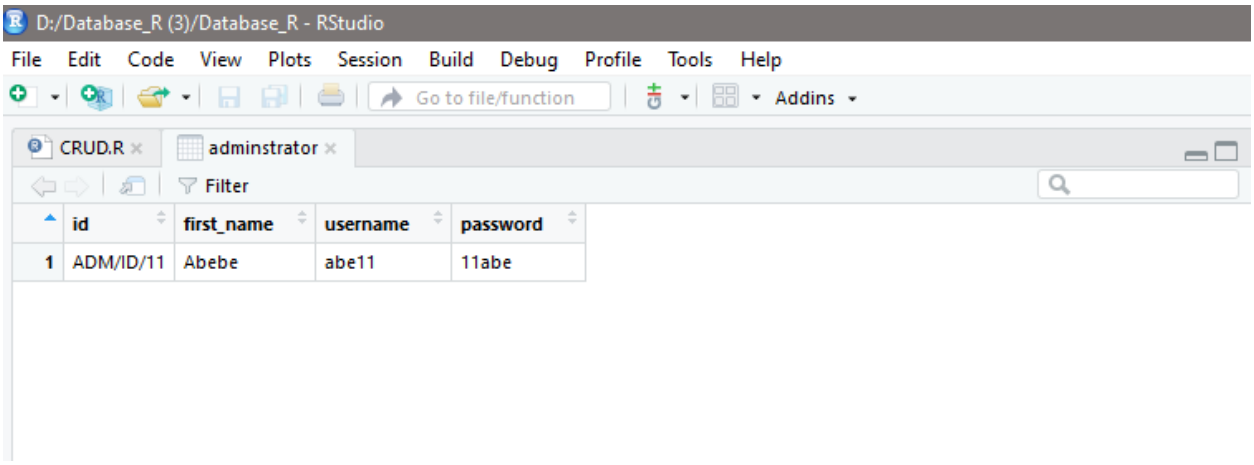

Figure 9 administrator table with 4 columns

- Add a last name column to administrator table.

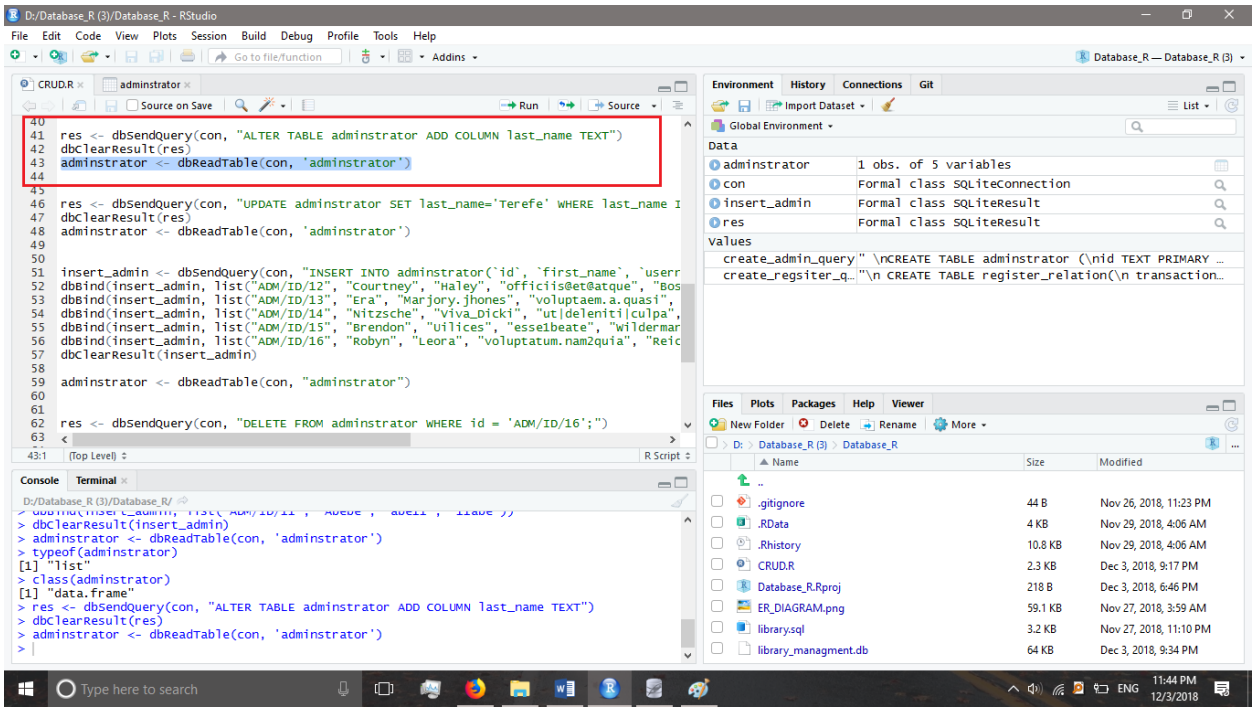

Figure 10 Adding last name column to administrator

- Administrator table after adding a column to it

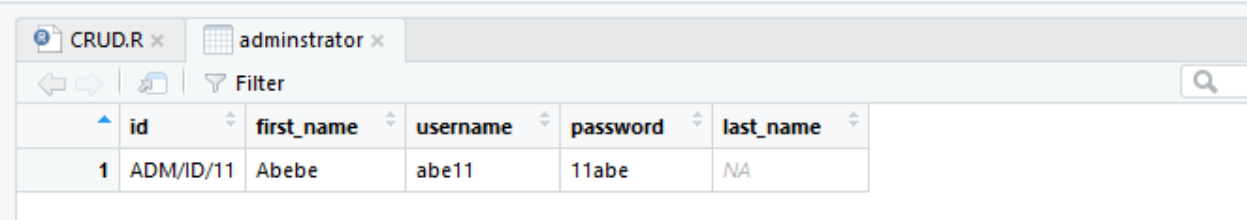

Figure 11 Administrator table after adding a new column

- Update administrator table to remove the N/A value in the new column entry

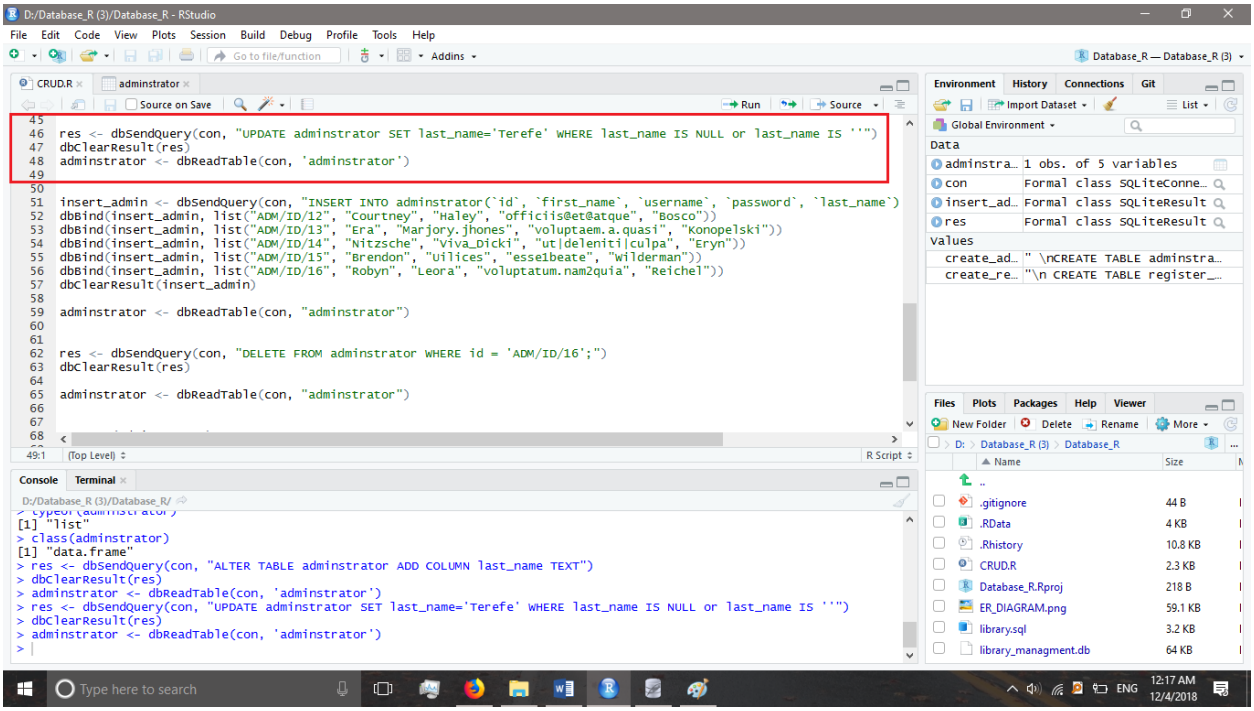

Figure 12 Updating the administrator table to remove NA value

- The table after update

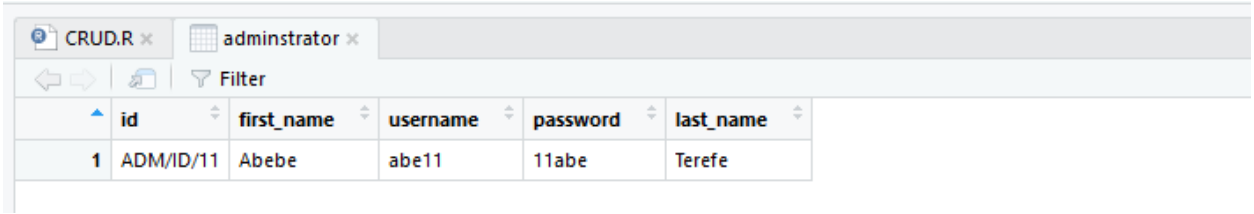

Figure 13 Administrator table after update

- Adding more data to the administrator table

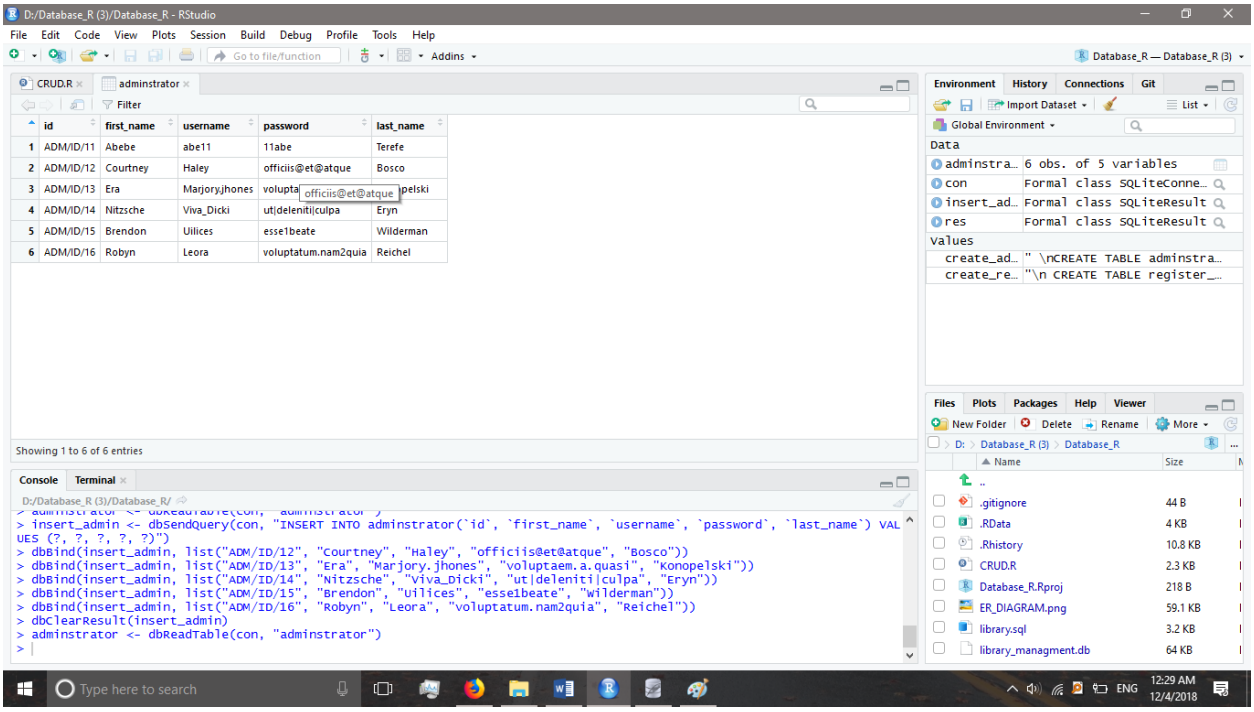

Figure 14 Inserting additional data

- Deleting the last row from the administrator table

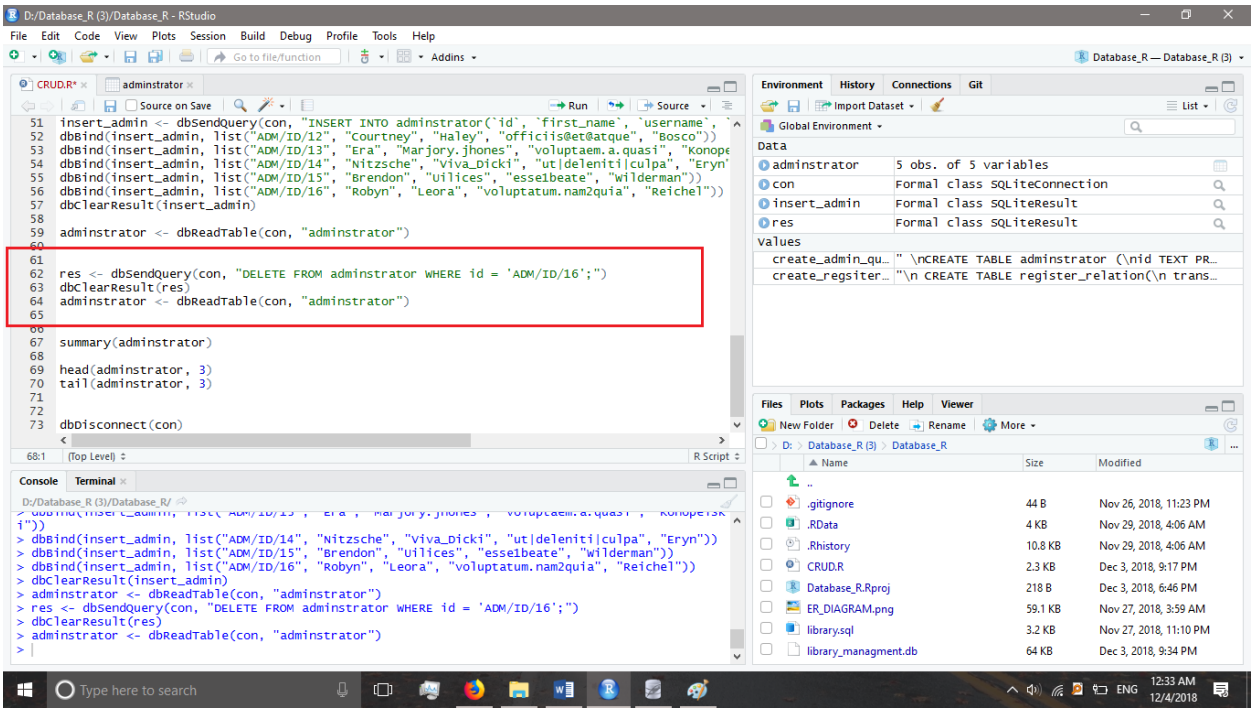

Figure 15 Deleting a row from the administrator table

- Summary of the table

```
> summary(adminstrator)
      id            first_name          username           password
 Length:5           Length:5           Length:5           Length:5
 Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character
  last_name
 Length:5
 Class :character
 Mode  :character
> |
```

Figure 16 Summary of the table

- First and last 3 values in the administrator table

```
D:/Database_R (3)/Database_R/
> head(adminstrator, 3)
         id first_name       username          password  last_name
1 ADM/ID/11      Abebe          abe11             11abe     Terefe
2 ADM/ID/12   Courtney          Haley officiis@et@atque      Bosco
3 ADM/ID/13        Era Marjory.jhones voluptaem.a.quasi Konopelski
> tail(adminstrator, 3)
         id first_name       username          password  last_name
3 ADM/ID/13        Era Marjory.jhones voluptaem.a.quasi Konopelski
4 ADM/ID/14   Nitzsche     Viva_Dicki ut|deleniti|culpa       Eryn
5 ADM/ID/15    Brendon        Uilices        esse1beate  Wilderman
> |
```

Figure 17 First and last values in the table

- The last step is disconnecting from the database using the dbDisconnect command