



Addis Ababa University

Addis Ababa Institute of Technology

Center of Information Technology and Scientific Computing

Department of Information Technology

R Assignment

Prepared by:	Abel Mandefro	ATR/9193/07
	Biruk Adera	ATR/8909/07
	Nathan Tsegaye	ATR/5726/07
	Yabetse Genene	ATR/9745/07

Submitted to: Alazar Alemayehu

Table of Contents

Database Description	3
Used Packages	4
Steps and Answers	4

Table of Figures

Figure 1 High level diagram of the database	3
Figure 2 Schema diagram	3
Figure 3 ER Diagram	4
Figure 4 creating a connection to the database	5
Figure 5 Creating the administrator table	5
Figure 6 Create register relation table	6
Figure 7 Insert into admin table	6
Figure 8 Execute the command to read administrator table	7
Figure 9 administrator table with 4 columns	7
Figure 10 Adding last name column to administrator	7
Figure 11 Administrator table after adding a new column	8
Figure 12 Updating the administrator table to remove NA value	8
Figure 13 Administrator table after update	8
Figure 14 Inserting additional data	9
Figure 15 Deleting a row from the administrator table	9
Figure 16 Summary of the table	10
Figure 17 First and last values in the table	10

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.

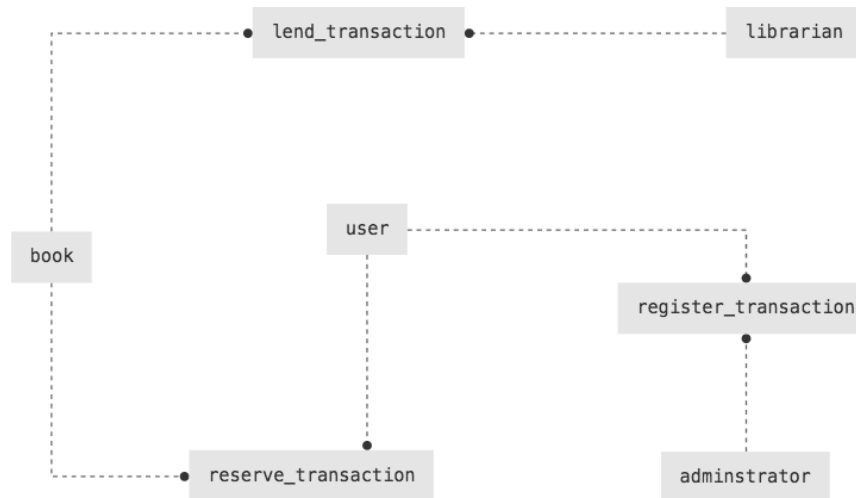


Figure 1 High level diagram of the database

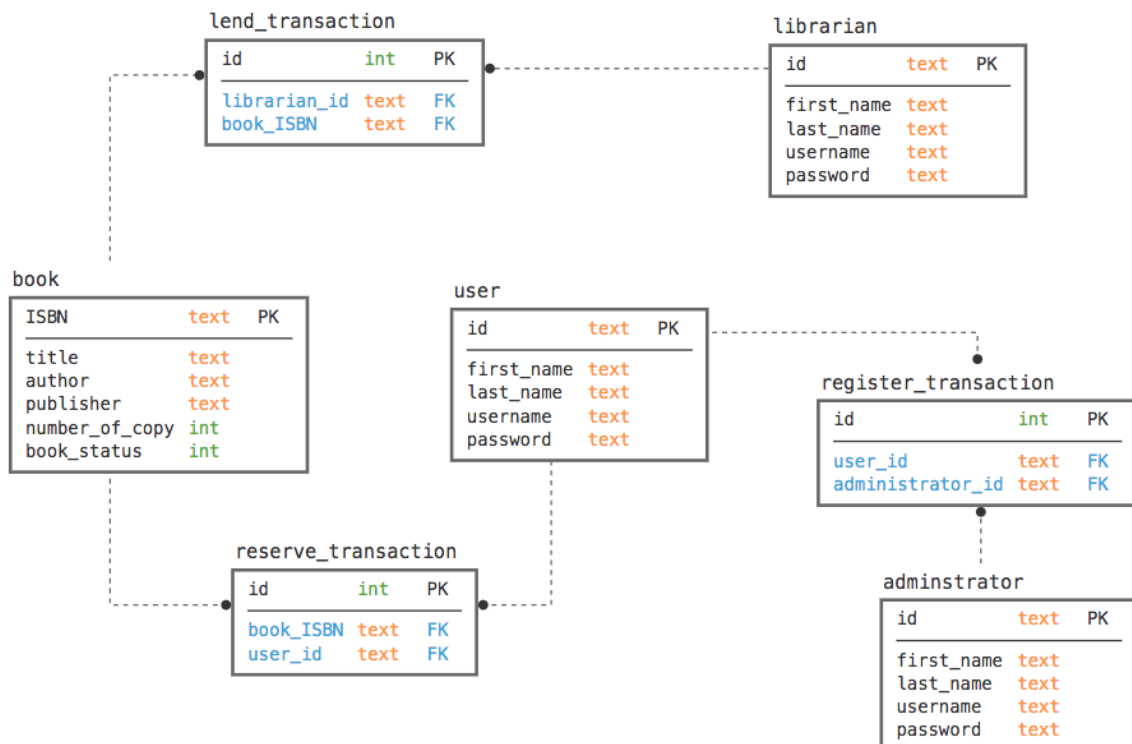


Figure 2 Schema diagram

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

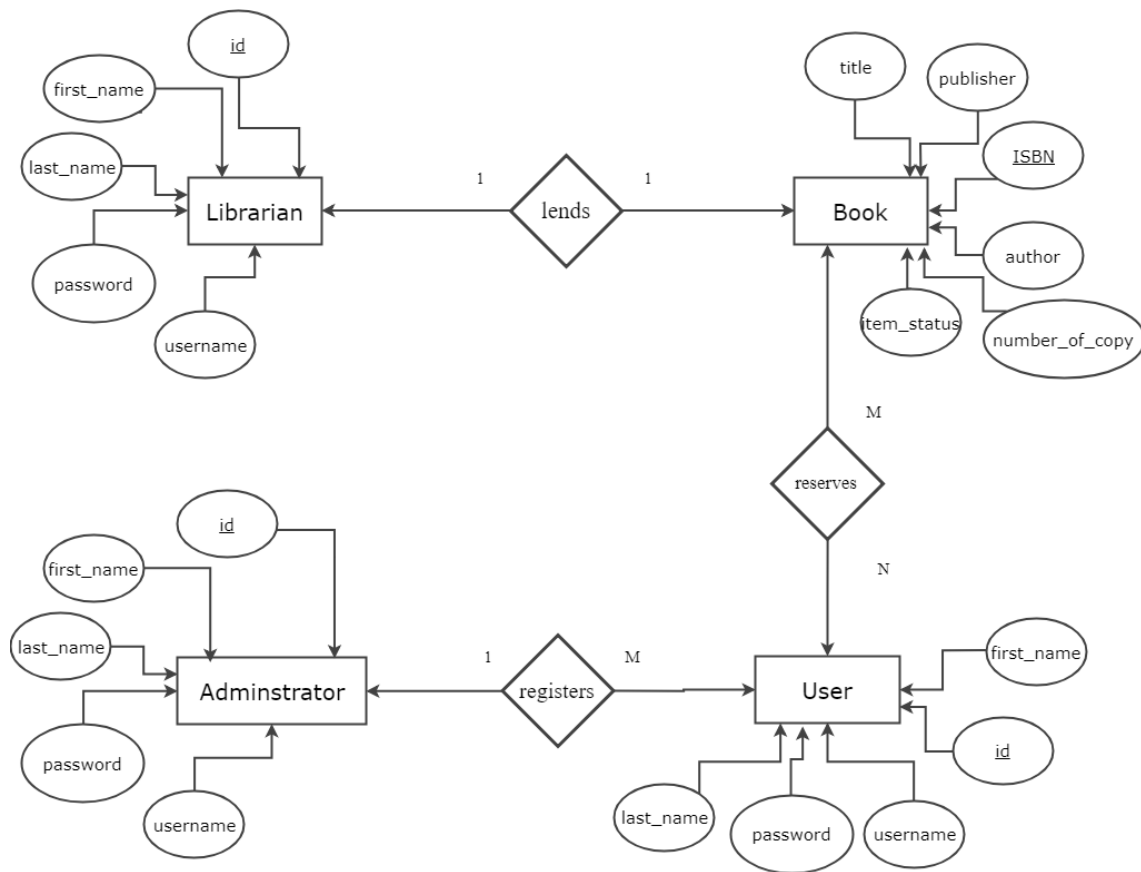


Figure 3 ER Diagram

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.

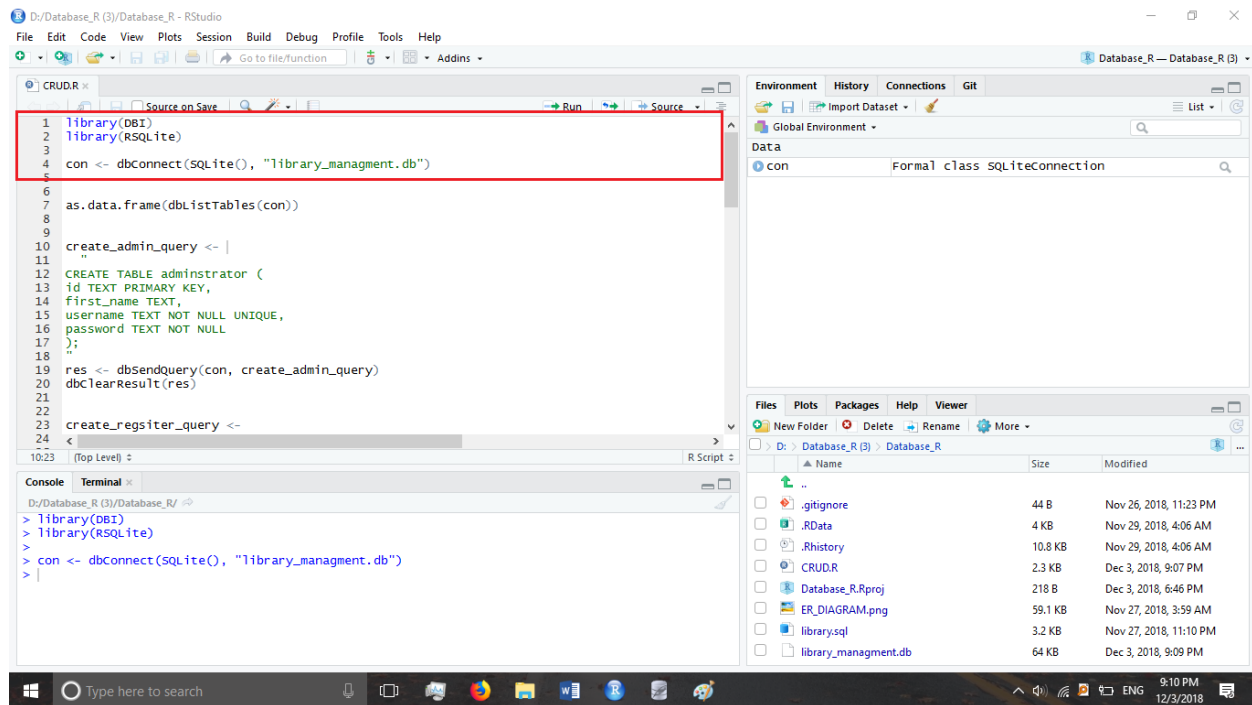


Figure 4 creating a connection to the database

- 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.

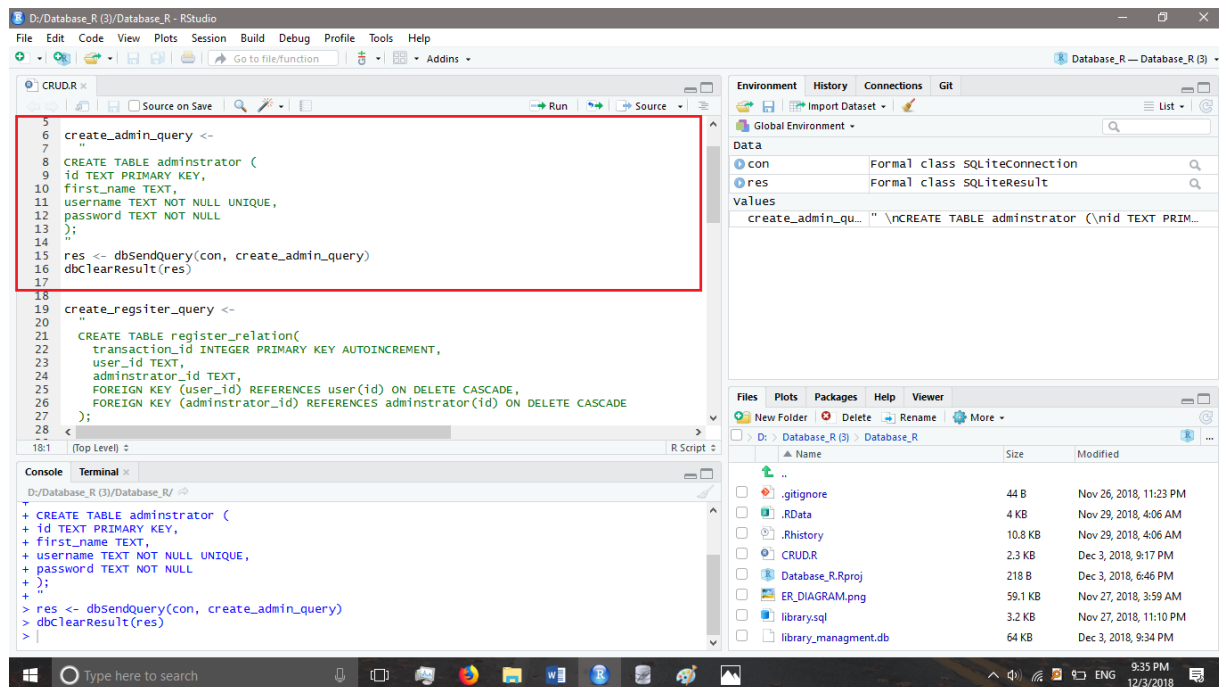


Figure 5 Creating the administrator table

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

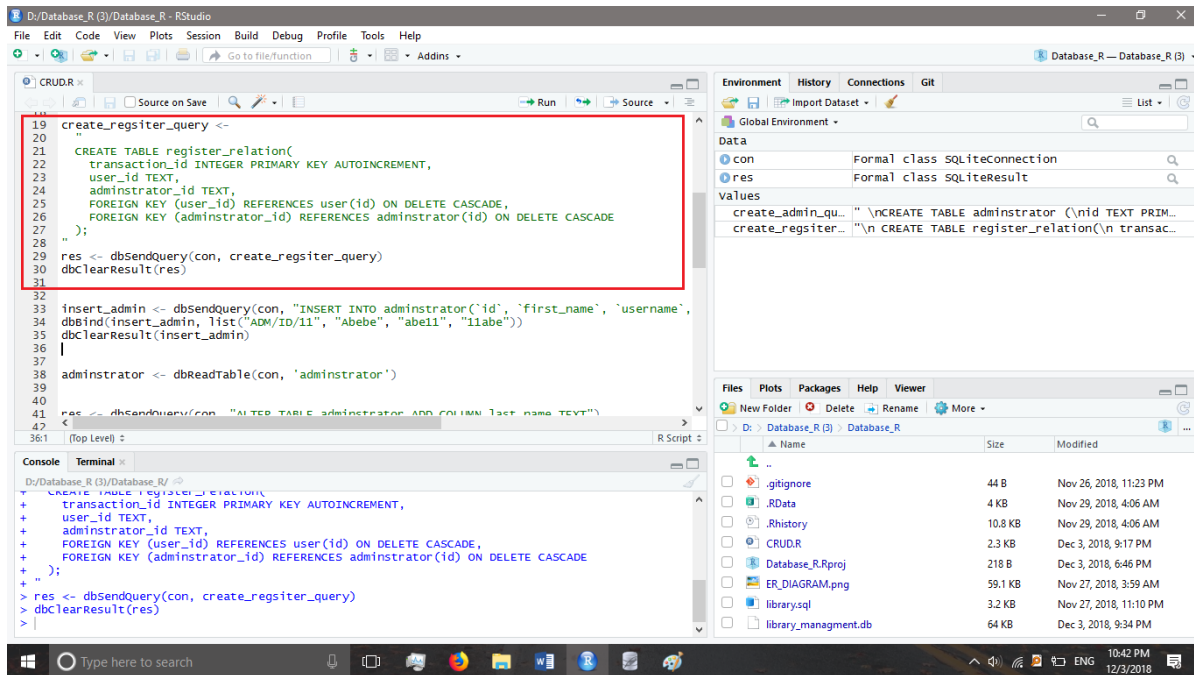


Figure 6 Create register relation table

- 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.

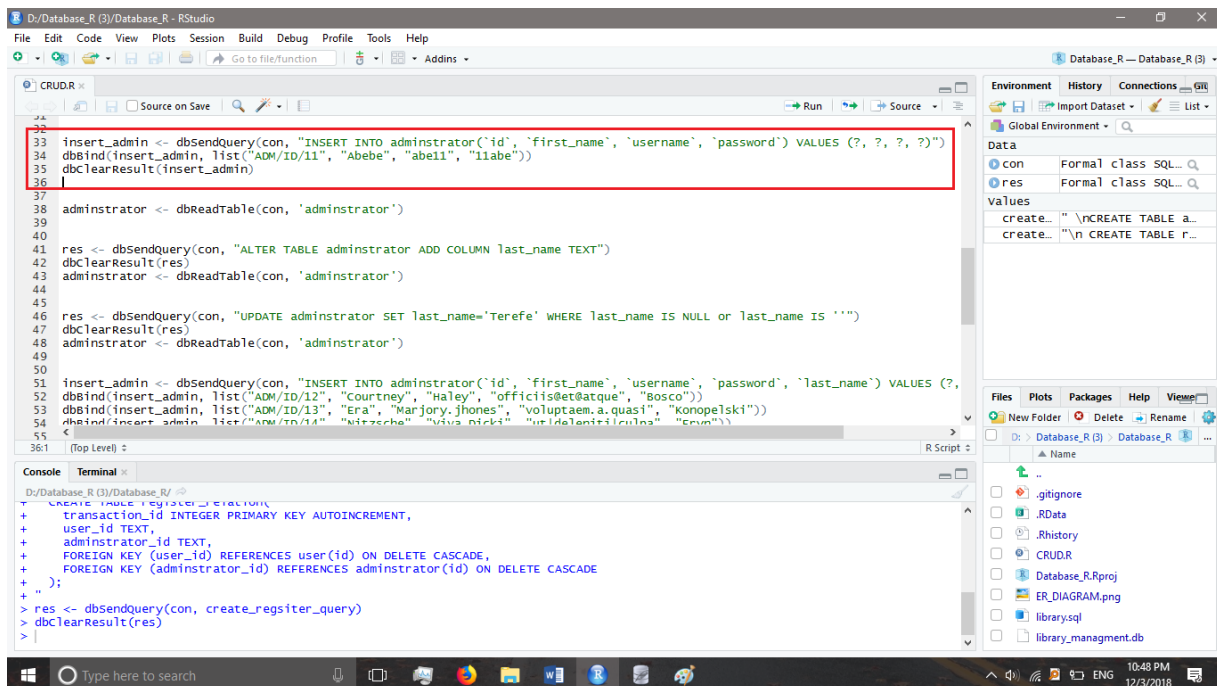


Figure 7 Insert into admin table

- Read the newly populated database as a data frame

```

28 res <- dbSendQuery(con, create_regster_query)
29 dbClearResult(res)
30
31
32
33 insert_admin <- dbSendQuery(con, "INSERT INTO administrator('id', 'first_name', 'usern
34 dbbind(insert_admin, list("ADM/ID/11", "Abebe", "abe11", "11abe"))
35 dbClearResult(insert_admin)
36
37
38 administrator <- dbReadTable(con, 'administrator')
39
40

```

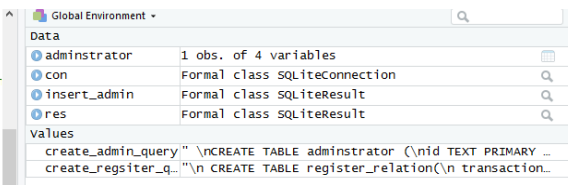
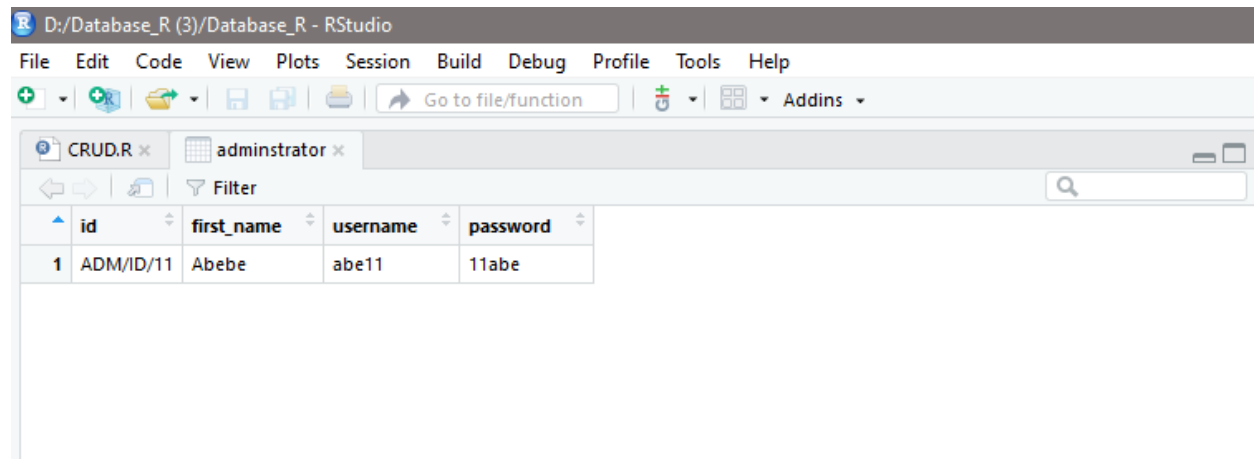


Figure 8 Execute the command to read administrator table

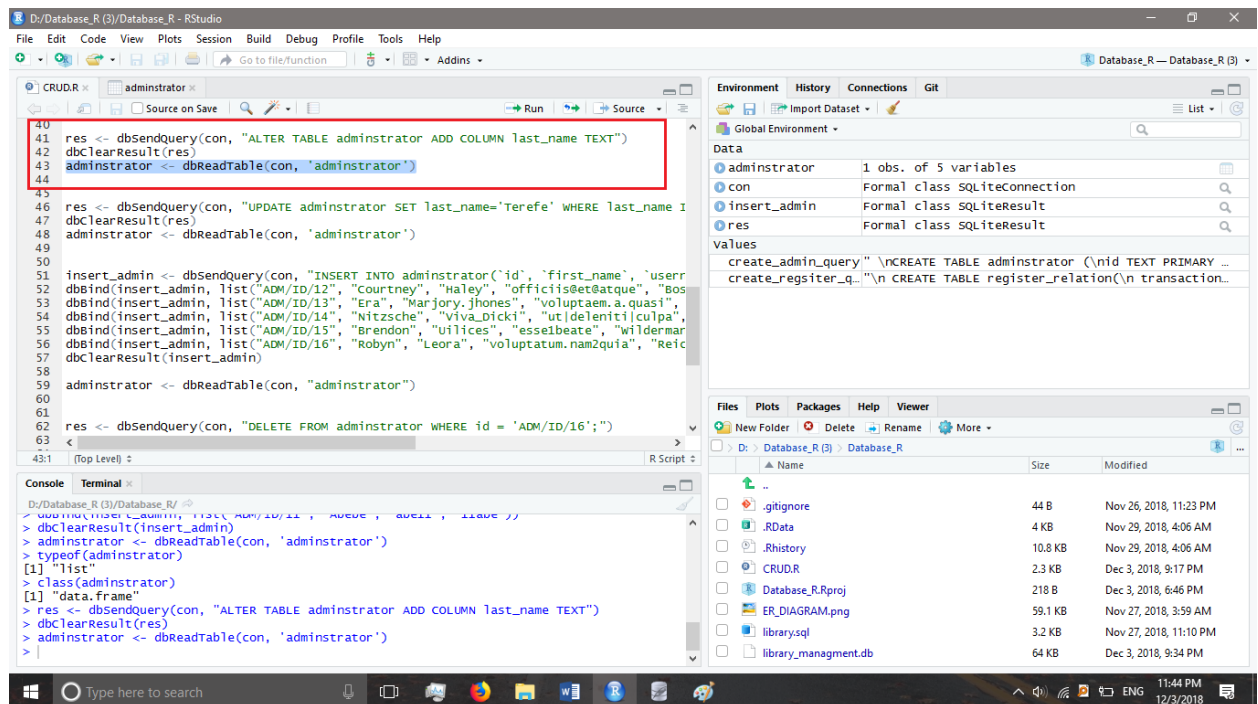
And the data frame is shown below



id	first_name	username	password
1	ADM/ID/11	Abebe	abe11

Figure 9 administrator table with 4 columns

- Add a last name column to administrator table.



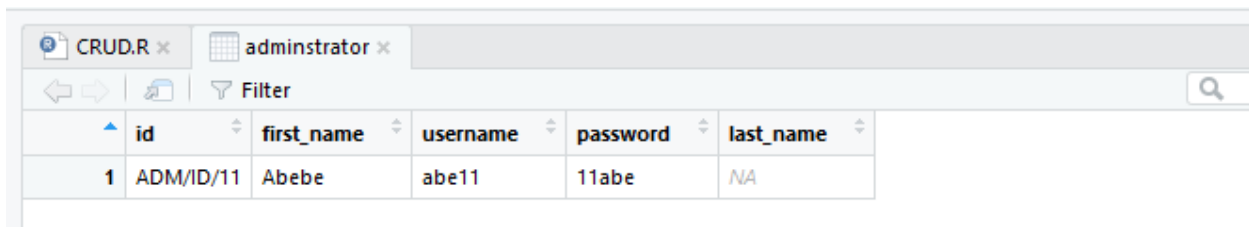
```

40
41 res <- dbSendQuery(con, "ALTER TABLE administrator ADD COLUMN last_name TEXT")
42 dbClearResult(res)
43 administrator <- dbReadTable(con, 'administrator')
44
45
46 res <- dbSendQuery(con, "UPDATE administrator SET last_name='Terefe' WHERE last_name I
47 dbClearResult(res)
48 administrator <- dbReadTable(con, 'administrator')
49
50
51 insert_admin <- dbSendQuery(con, "INSERT INTO administrator('id', 'first_name', 'usern
52 dbbind(insert_admin, list("ADM/ID/12", "Courtney", "Haley", "officiis@et@atque", "Bos
53 dbbind(insert_admin, list("ADM/ID/13", "Era", "Marjory.jhones", "voluptaem.a.quasi",
54 dbbind(insert_admin, list("ADM/ID/14", "Nitzsche", "Vilva.Dicki", "ut[delentit]culpa",
55 dbbind(insert_admin, list("ADM/ID/15", "Brendon", "Uilices", "esseibeate", "wilderma
56 dbbind(insert_admin, list("ADM/ID/16", "Robyn", "Leora", "voluptatum.nam2quia", "Reic
57 dbClearResult(insert_admin)
58
59 administrator <- dbReadTable(con, "administrator")
60
61
62 res <- dbSendQuery(con, "DELETE FROM administrator WHERE id = 'ADM/ID/16';")
63
64

```

Figure 10 Adding last name column to administrator

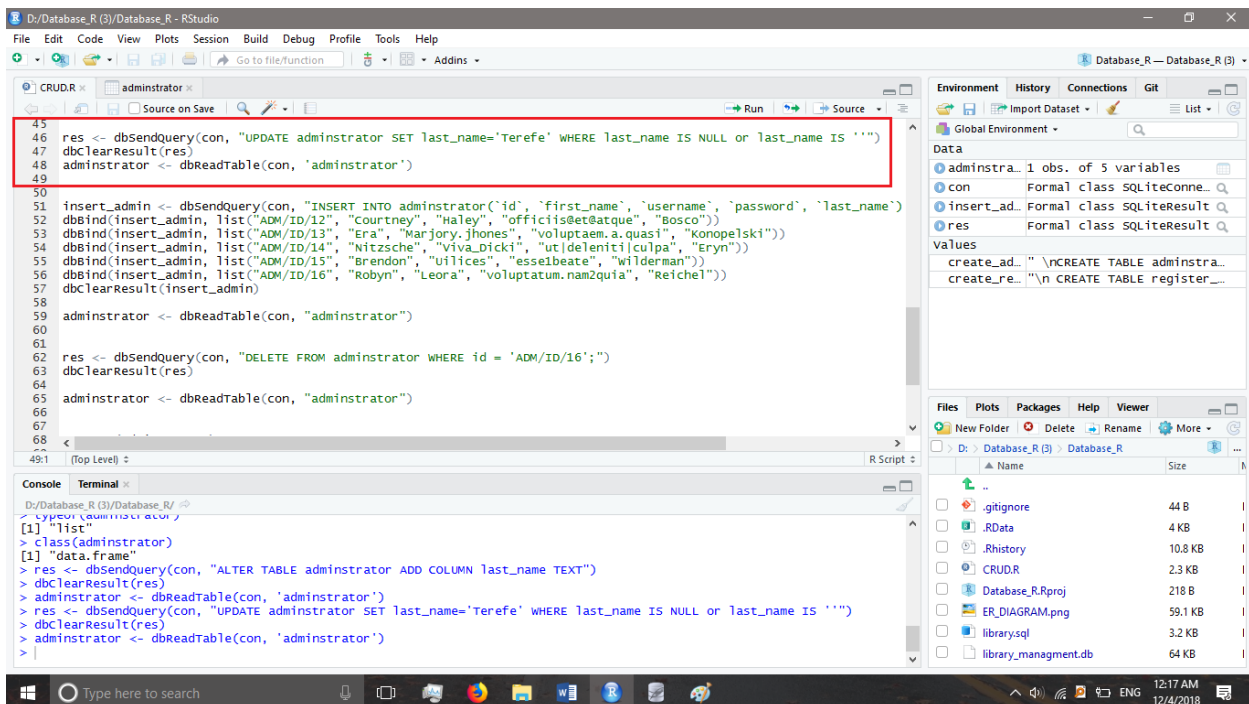
- Administrator table after adding a column to it



	id	first_name	username	password	last_name
1	ADM/ID/11	Abebe	abe11	11abe	NA

Figure 11 Administrator table after adding a new column

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



```

45 res <- dbSendQuery(con, "UPDATE adminstrator SET last_name='Terefe' WHERE last_name IS NULL or last_name IS ''")
46 dbClearResult(res)
47
48 adminstrator <- dbReadTable(con, 'adminstrator')
49
50
51 insert_admin <- dbSendQuery(con, "INSERT INTO adminstrator('id', 'first_name', 'username', 'password', 'last_name')
52 dbBind(insert_admin, list("ADM/ID/12", "Courtney", "Haley", "officials@et@atque", "Bosco"))
53 dbBind(insert_admin, list("ADM/ID/13", "Era", "Marjory.jhones", "voluptatem.a.quasi", "Konopelski"))
54 dbBind(insert_admin, list("ADM/ID/14", "Nitzsche", "Viva.Dicki", "ut|deleniti|culpa", "Eryn"))
55 dbBind(insert_admin, list("ADM/ID/15", "Brendon", "Uilices", "esseibeate", "Wilderman"))
56 dbBind(insert_admin, list("ADM/ID/16", "Robyn", "Leora", "voluptatum.nam2quia", "Reichel"))
57 dbClearResult(insert_admin)
58
59 adminstrator <- dbReadTable(con, "adminstrator")
60
61
62 res <- dbSendQuery(con, "DELETE FROM adminstrator WHERE id = 'ADM/ID/16';")
63 dbClearResult(res)
64
65 adminstrator <- dbReadTable(con, "adminstrator")
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99

```

Console output:

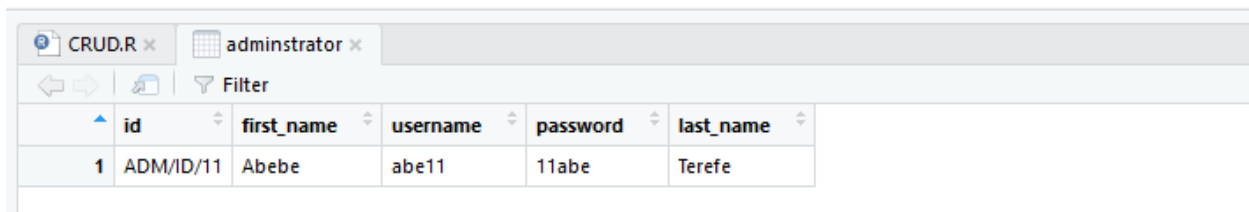
```

> typeOf(adminstrator)
[1] "list"
> class(adminstrator)
[1] "data.frame"
> res <- dbSendQuery(con, "ALTER TABLE adminstrator ADD COLUMN last_name TEXT")
> dbClearResult(res)
> adminstrator <- dbReadTable(con, 'adminstrator')
> res <- dbSendQuery(con, "UPDATE adminstrator SET last_name='Terefe' WHERE last_name IS NULL or last_name IS ''")
> dbClearResult(res)
> adminstrator <- dbReadTable(con, 'adminstrator')
>

```

Figure 12 Updating the administrator table to remove NA value

- The table after update



	id	first_name	username	password	last_name
1	ADM/ID/11	Abebe	abe11	11abe	Terefe

Figure 13 Administrator table after update

- Adding more data to the administrator table

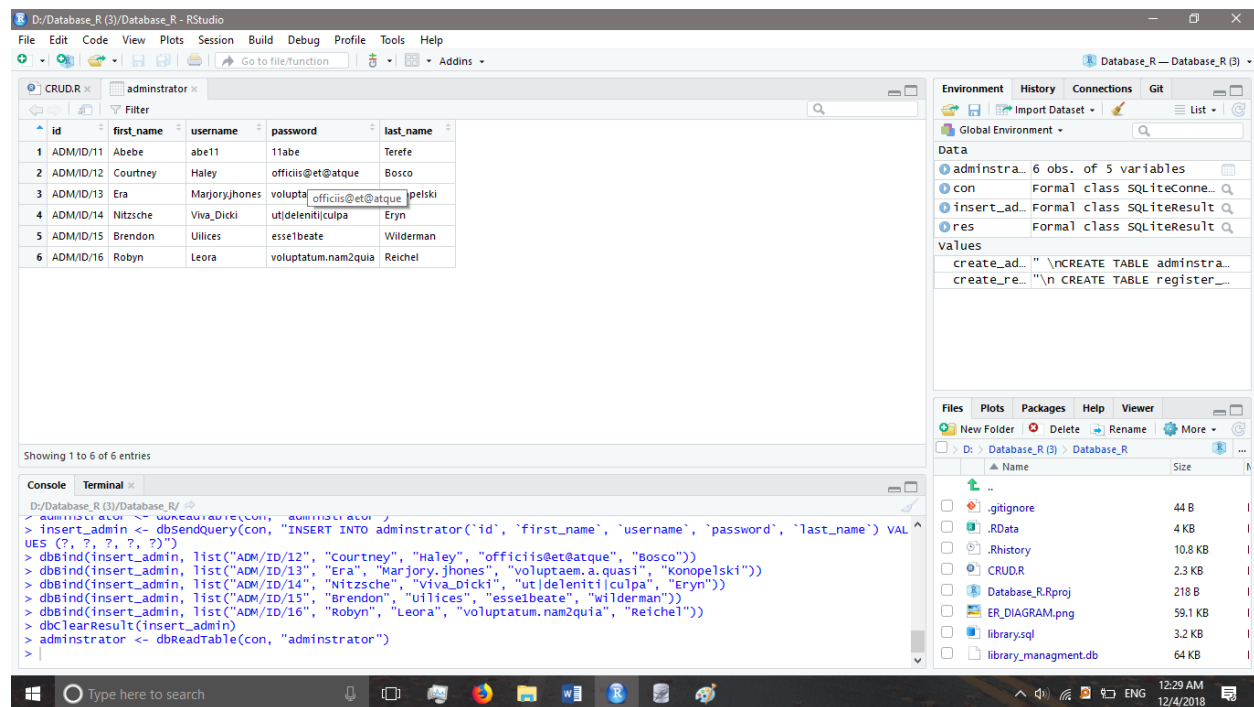


Figure 14 Inserting additional data

- Deleting the last row from the administrator table

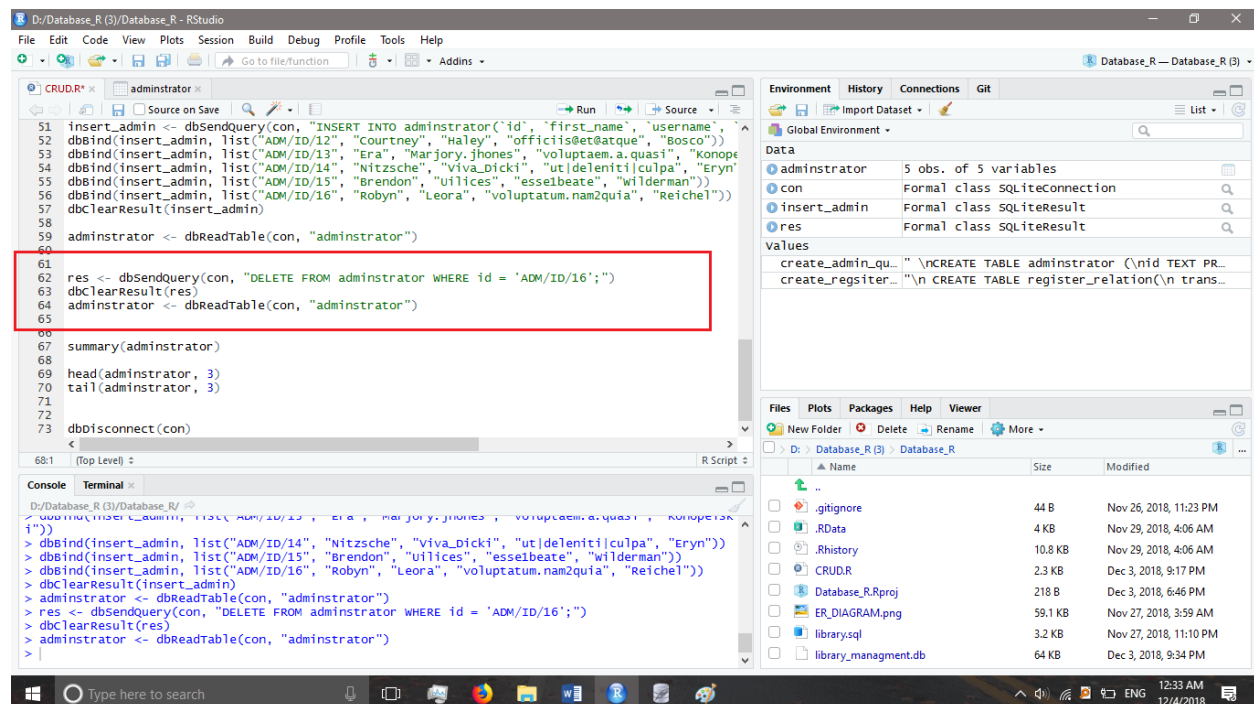


Figure 15 Deleting a row from the administrator table

- Summary of the table

```
> summary(administrator)
      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(administrator, 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(administrator, 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      esseibeate      wilderman
> |
```

Figure 17 First and last values in the table

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