

cind110_Assignment_02

Ben Kacikanis

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

Use RStudio for this assignment. Edit the file `A2_W20_Q.Rmd` and insert your R code where wherever you see the string “#INSERT YOUR QUERY HERE”

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document.

This assignment makes use of schema and data that were adapted from: R. Elmasri, S.B. Navathe (2016). Fundamentals of Database Systems, 7th Edition, Addison-Wesley

Setting the working directory and establishing a connection to MYSQL Server

```
install.packages('RMySQL', dependencies = TRUE, repos = "http://cran.us.r-project.org")
```

```
## Installing package into '/home/datastudent/R/x86_64-pc-linux-gnu-library/3.4'
## (as 'lib' is unspecified)
```

```
## Warning in install.packages("RMySQL", dependencies = TRUE, repos = "http://
## cran.us.r-project.org"): installation of package 'RMySQL' had non-zero exit
## status
```

```
library(RMySQL)
```

```
## Loading required package: DBI
```

```
sqlQuery <- function (query) {

  # creating DB connection object with RMySQL package
  # Please consider updating the username and password
  DB <- dbConnect(MySQL(), user='root', password='data', dbname='LibraryDB',
    host='127.0.0.1')

  # send Query to btain result set
  rs <- dbSendQuery(DB, query)

  # get elements from result sets and convert to dataframe
  result <- fetch(rs, -1)

  # close db connection
  dbDisconnect(DB)
```

```
# return the dataframe
```

```
return(result)
```

```
}
```

Example 1

Retrieve the `Name` and `Address` of all borrowers.

```
sqlQuery("SELECT Name, Address
          FROM BORROWER;")
```

```
## Warning: Closing open result sets
```

Name	Address
<chr>	<chr>
Carmen J Clyburn	2604 Victoria Park Ave, ON
Ali Ahmadi	3853 Broadmoor Blvd, Mississauga, ON
Sythoun Sun	3783 Front Street, Toronto, Ontario
Stainbrook Green	1065 Glover Road, Hannon, ON
Jess Huynh	3094 Brew Creek Road, Whistler, BC
Harry V. Stainbrook	1065 Glover Road, Hannon, ON
Ethel V. Stainbrook	1074 Glover Road, Hannon, ON

7 rows

Q1

For every publisher located in `United States`, list the Publisher `Name` and the published book(s) `Title (s)`.

```
sqlQuery("SELECT PUBLISHER.Name, BOOK.Title
          From PUBLISHER,BOOK WHERE PUBLISHER.Address LIKE '%United States%'

          ;")
```

```
## Warning: Closing open result sets
```

Name
<chr>
HarperCollins
John Wiley & Sons
Scribner
Vintage Books
HarperCollins

John Wiley & Sons
Scribner
Vintage Books
HarperCollins
John Wiley & Sons

1-10 of 40 rows | 1-1 of 2 columns

Previous1234Next

Q2

Display all combinations of `BOOK` `Book_id` and `BOOK_COPIES` `No_of_copies` in the database.

```
sqlQuery("SELECT DISTINCT BOOK.Book_id,BOOK_COPIES.No_of_copies
        From BOOK
        CROSS JOIN BOOK_COPIES

        ")
```

Warning: Closing open result sets

Book_id	No_of_copies
<int>	<int>
9	1
10	1
3	1
2	1
5	1
4	1
7	1
8	1
6	1
1	1

1-10 of 80 rows

Previous123456...8Next

#INSERT YOUR QUERY HERE

Q3

Retrieve all book `Title` (s) in alphabetical order.

```
sqlQuery( "SELECT Title
          FROM BOOK
```

ORDER BY Title

;"")

Warning: Closing open result sets

Title

<chr>

Behind the Beautiful Forevers: Life, Death, and Hope in a Mumbai Undercity

Energy Myths and Realities: Bringing Science to the Energy Policy Debate

I Contain Multitudes: The Microbes Within Us and a Grander View of Life

Life 3.0: Being Human in the Age of Artificial Intelligence

Prepared: What Kids Need for a Fulfilled Life

Should We Eat Meat?: Evolution and Consequences of Modern Carnivory

Sustainable Energy - Without the Hot Air

The Emperor of All Maladies: A Biography of Cancer

The Gene: An Intimate History

The Most Powerful Idea in the World: A Story of Steam, Industry, and Invention

1-10 of 10 rows

#INSERT YOUR QUERY HERE

Q4

Retrieve all unique countries of all publishers

```
sqlQuery(" SELECT DISTINCT SUBSTRING_INDEX(Address,',',-1) as Country
          FROM PUBLISHER
          ;")
```

Warning: Closing open result sets

Country

<chr>

United States

United Kingdom

2 rows

#INSERT YOUR QUERY HERE

Q5

Retrieve the `Title` , `Due date` , and borrower `Name` for all books that have been checked out from `Branch_id = 3025`, with the latest `Date_out` first. Display books with the same `Date_out` in order by the borrower `Name` , and those with the same `Date_out` and borrower `Name` in order by the book `Title` .

```
sqlQuery("SELECT BOOK.Title, BOOK_LOANS.Due_date, BORROWER.Name
FROM BOOK
INNER JOIN BOOK_LOANS ON BOOK.Book_id=BOOK_LOANS.Book_id
INNER JOIN BORROWER ON BOOK_LOANS.Card_no=BORROWER.Card_no
WHERE BOOK_LOANS.Branch_id=3025
ORDER BY BOOK_LOANS.Date_Out, BORROWER.Name,BOOK.Title
;")
```

Warning: Closing open result sets

Title
<chr>
Sustainable Energy - Without the Hot Air
I Contain Multitudes: The Microbes Within Us and a Grander View of Life
Life 3.0: Being Human in the Age of Artificial Intelligence
Sustainable Energy - Without the Hot Air

4 rows | 1-1 of 3 columns

#INSERT YOUR QUERY HERE

Q6

Retrieve the names and card numbers of borrowers who have checked out books from branch `3025` or `3568` sorted by borrower's `Card_no` in ascending order.

```
#INSERT YOUR QUERY HERE
sqlQuery(" SELECT DISTINCT Name,BORROWER.Card_no
FROM BORROWER
INNER JOIN BOOK_LOANS ON BORROWER.Card_no= BOOK_LOANS.Card_no
WHERE BOOK_LOANS.Branch_id = 3568 or Branch_id=3025
ORDER BY BORROWER.Card_no Asc
;")
```

Warning: Closing open result sets

Name	Card_no
<chr>	<int>
Carmen J Clyburn	166
Sythoun Sun	703
Harry V. Stainbrook	976

3 rows

Q7

Find the books (Book titles and Publisher Names) not published by HarperCollins , sorted by publisher's name in descending order.

```
#INSERT YOUR QUERY HERE
sqlQuery("SELECT Title, Publisher_name
          FROM BOOK
          INNER JOIN PUBLISHER ON BOOK.Publisher_name= PUBLISHER.Name
          WHERE PUBLISHER.Name != 'HarperCollins'
          ORDER BY PUBLISHER.Name Desc
          ;")
```

Warning: Closing open result sets

Title
<chr>
Life 3.0: Being Human in the Age of Artificial Intelligence
The Emperor of All Maladies: A Biography of Cancer
The Gene: An Intimate History
The Most Powerful Idea in the World: A Story of Steam, Industry, and Invention
Should We Eat Meat?: Evolution and Consequences of Modern Carnivory
5 rows 1-1 of 2 columns

Q8

For each branch (branch ID), find the number of books checked out after 2020-01-26.

```
sqlQuery(" SELECT COUNT(BOOK_LOANS.Date_out),BOOK_LOANS.Branch_id
          From BOOK_LOANS
          Where BOOK_LOANS.Date_out > 2020-01-26
          GROUP BY Branch_id
          ;")
```

Warning: Closing open result sets

COUNT(BOOK_LOANS.Date_out)	Branch_id
<dbl>	<int>
4	3025
2	3568
1	4156
1	5489
4 rows	

#INSERT YOUR QUERY HERE

Q9

Find the borrower name(s) who have borrowed the largest number of books.

#INSERT YOUR QUERY HERE

```
sqlQuery("
    SELECT BORROWER.NAME
    FROM BOOK_LOANS
    INNER JOIN BORROWER ON BOOK_LOANS.Card_no= BORROWER.Card_no
    GROUP BY BORROWER.Name
    HAVING COUNT(BOOK_LOANS.Card_no)>= ALL (SELECT COUNT(BOOK_LOANS.Card_no)
                                           FROM BOOK_LOANS
                                           INNER JOIN BORROWER ON BOOK_LOANS.Card
_no= BORROWER.Card_no
                                           GROUP BY BORROWER.Name )

;")
```

Warning: Closing open result sets

NAME

<chr>

Harry V. Stainbrook

1 row

Q10

For each branch and book, calculate then display the number of days between the Due_date and Date_out along with the BORROWER Name and Book Title

```
sqlQuery(" SELECT  BORROWER.Name, BOOK.Title, BOOK_LOANS.Branch_id,ABS(BOOK_LOANS.Due_date-BOOK_LO
ANS.Date_out) AS Difference
    FROM BOOK_LOANS
    INNER JOIN LIBRARY_BRANCH ON BOOK_LOANS.Branch_id= LIBRARY_BRANCH.Branch_id
    INNER JOIN BOOK ON BOOK_LOANS.Book_id = BOOK.Book_id
    INNER JOIN BORROWER ON BOOK_LOANS.Card_no=BORROWER.Card_no
    ORDER BY Branch_id,Title

;")
```

Warning: Closing open result sets

Name

<chr>

Carmen J Clyburn

Carmen J Clyburn
Harry V. Stainbrook
Sythoun Sun
Harry V. Stainbrook
Harry V. Stainbrook
Sythoun Sun
Jess Huynh
8 rows 1-1 of 4 columns

Q11

Retrieve the `Title` and `Due_date` of any book checked out from Branch ID=3025 that is due inclusively between 2019-12-20 and 2020-02-20

```
sqlQuery(" SELECT BOOK.Title,BOOK_LOANS.Due_date
          FROM BOOK_LOANS
          INNER JOIN BOOK
          ON BOOK_LOANS.Book_id=BOOK.Book_id

          WHERE BOOK_LOANS.Branch_id=3025 and
          Due_date BETWEEN '2019-12-20' AND '2020-02-20'

          ;")
```

Warning: Closing open result sets

Title
<chr>
Life 3.0: Being Human in the Age of Artificial Intelligence
Sustainable Energy - Without the Hot Air
2 rows 1-1 of 2 columns

#INSERT YOUR QUERY HERE

Q12

Retrieve the `Name`, `Address` and `Card_no` of each borrower whose last name is `Stainbrook` and who borrowed a book from a Branch named either `Bayview` or `Albion`

```
#INSERT YOUR QUERY HERE
sqlQuery("SELECT BORROWER.Name, BORROWER.Address ,BORROWER.Card_no
          FROM BORROWER
          INNER JOIN BOOK_LOANS ON BORROWER.Card_no=BOOK_LOANS.Card_no
          INNER JOIN LIBRARY_BRANCH ON BOOK_LOANS.Branch_id=LIBRARY_BRANCH.Branch_id
          WHERE LIBRARY_BRANCH.Branch_name= 'Bayview' or 'Albion' AND
          BORROWER.Name like '%Stainbrook%'")
```



```
;")
```

```
## Warning: Closing open result sets
```

Name<chr>	Address<chr>	Card_no<int>
Harry V. Stainbrook	1065 Glover Road, Hannon, ON	976
Harry V. Stainbrook	1065 Glover Road, Hannon, ON	976

2 rows

Q13

Retrieve the `Title` of each book that has at least 5 copies and exists in either `Bayview` or `Black Creek` library.

```
#INSERT YOUR QUERY HERE
sqlQuery(" SELECT BOOK.Title
          FROM BOOK
          INNER JOIN BOOK_COPIES ON BOOK.Book_id=BOOK_COPIES.Book_id
          INNER JOIN LIBRARY_BRANCH ON BOOK_COPIES.Branch_id=LIBRARY_BRANCH.Branch_id
          WHERE BOOK_COPIES.No_of_copies >=5
          AND LIBRARY_BRANCH.Branch_name = 'Bayview' or 'Black Creek'

;")
```

```
## Warning: Closing open result sets
```

Title<chr>
The Most Powerful Idea in the World: A Story of Steam, Industry, and Invention
Prepared: What Kids Need for a Fulfilled Life

2 rows

Q14

Retrieve the names of all publishers who published more than one book

```
#INSERT YOUR QUERY HERE
sqlQuery("

          SELECT Publisher_name
          FROM BOOK
          GROUP BY Publisher_name
          HAVING COUNT(Publisher_name)>1
```

```
;"")
```

```
## Warning: Closing open result sets
```

Publisher_name

<chr>

Scribner

1 row

Q15

Retrieve the `Title` of each book that has 4, 6, 8 or 10 copies

```
#INSERT YOUR QUERY HERE
```

```
sqlQuery("SELECT DISTINCT Title
          FROM BOOK
          INNER JOIN BOOK_COPIES ON BOOK.Book_id=BOOK_COPIES.Book_id
          WHERE BOOK_COPIES.No_of_copies= 4 or 6 or 8 or 10
```

```
;"")
```

```
## Warning: Closing open result sets
```

Title

<chr>

Life 3.0: Being Human in the Age of Artificial Intelligence

Should We Eat Meat?: Evolution and Consequences of Modern Carnivory

I Contain Multitudes: The Microbes Within Us and a Grandeur View of Life

Behind the Beautiful Forevers: Life, Death, and Hope in a Mumbai Undercity

The Most Powerful Idea in the World: A Story of Steam, Industry, and Invention

Sustainable Energy - Without the Hot Air

The Emperor of All Maladies: A Biography of Cancer

The Gene: An Intimate History

Energy Myths and Realities: Bringing Science to the Energy Policy Debate

Prepared: What Kids Need for a Fulfilled Life

1-10 of 10 rows

Q16

Find the average of the copies of all books in each branch.

#INSERT YOUR QUERY HERE

```
sqlQuery(" SELECT Branch_id,AVG(No_of_copies)
          FROM BOOK_COPIES
          GROUP BY Branch_id
          ;")
```

```
## Warning in .local(conn, statement, ...): Decimal MySQL column 1 imported as
## numeric
```

```
## Warning: Closing open result sets
```

Branch_id	AVG(No_of_copies)
<int>	<dbl>
3025	2.0000
3568	4.2500
4156	4.0000
5489	5.3333

4 rows

Q17

For each publisher inc. which has published more than one book, retrieve the `Address` and the `Phone` number of its head quarter that is located in the `United States`.

#INSERT YOUR QUERY HERE

```
sqlQuery(" SELECT Name, Address,Phone
          FROM PUBLISHER
          INNER JOIN BOOK ON PUBLISHER.Name=BOOK.Publisher_name
          WHERE PUBLISHER.Address LIKE '%United States%'
          GROUP BY Name
          HAVING COUNT(Publisher_name)>1
          ;")
```

```
## Warning: Closing open result sets
```

Name	Address	Phone
<chr>	<chr>	<chr>
Scribner	New York, New York, United States	333-333-3333

1 row

Q18

Retrieve the names of all books which exist in a library that has the book with the highest number of copies among all books.

#INSERT YOUR QUERY HERE

```
sqlQuery("

    SELECT Title
    FROM BOOK
    INNER JOIN BOOK_COPIES ON BOOK.Book_id=BOOK_COPIES.Book_id
    WHERE BOOK_COPIES.Branch_id=
    (SELECT Branch_id
    FROM BOOK_COPIES
    WHERE No_of_copies =(
    SELECT MAX(No_of_copies)
    FROM BOOK_COPIES))
    AND BOOK_COPIES.No_of_copies>0

;")
```

Warning: Closing open result sets

Title
<chr>
Sustainable Energy - Without the Hot Air
The Emperor of All Maladies: A Biography of Cancer
2 rows

Q19

Retrieve book titles and publisher names. Return book details even if the book record is not present for the publisher. Hint: Use LEFT JOIN

```
#INSERT YOUR QUERY HERE

sqlQuery("SELECT Book_id,Title, PUBLISHER.Name
          FROM BOOK
          LEFT JOIN PUBLISHER ON BOOK.Publisher_name = PUBLISHER.Name

;")
```

Warning: Closing open result sets

Book_id
<int>
1
2
3
4

	5
	6
	7
	8
	9
	10
1-10 of 10 rows 1-1 of 3 columns	

Q20

Retrieve duplicate records based on `Branch_id` and `Card_no` from `BOOK_LOANS` relation.

```
#INSERT YOUR QUERY HERE
sqlQuery(" SELECT Card_no,Branch_id
          FROM BOOK_LOANS
          GROUP BY Card_no , Branch_id
          HAVING  COUNT(Card_no)>1
          ;")
```

Warning: Closing open result sets

Card_no	Branch_id
<int>	<int>
166	3025
976	3568
2 rows	