## WORK WITH DATABASES DIRECTLY FROM R

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## TOOLS FOR TODAY

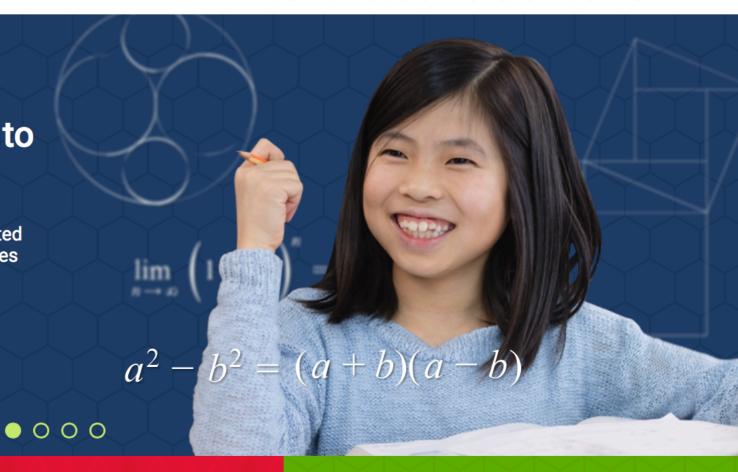
- Database software: SQLite
- R packages: DBI, RSQLite, stringr
- Database: Chinook (SQLite version)
   https://github.com/lerocha/chinook database/blob/master/ChinookDatabase/
   DataSources/Chinook\_Sqlite.sqlite



## Training Today's Brightest Minds to Solve Tomorrow's Problems

Art of Problem Solving creates educational materials for motivated students in grades 2–12. Our books, classes, and online resources help students become creative, successful problem solvers.

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#### AoPS Online

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- ► Challenging problems presented in a way that encourages students to keep trying, teaching perseverance
- Online learning system for more practice, along with games, puzzles, and progress reporting for parents and teachers
- Suitable as a complete curriculum or as an in-depth supplement

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- ► Educational enrichment math and language arts courses taught by accomplished, passionate instructors
- ► Small class sizes, ensuring that students receive individual attention from teachers
- ► An outstanding peer group where students find friends, teammates, and positive role models
- ► Problem-solving education that helps students excel in school and on tests while also encouraging them to pursue a deep, focused understanding of the content

## GENERAL REQUIREMENTS

- Database accepts connections from you: username/password set by admin
- Database accepts connections from your IP: privileges set by admin
- R packages: DBI and one of RMySQL, RPostgres,
   RSQLite, etc. to match your database

## REMOTE CONNECTIONS

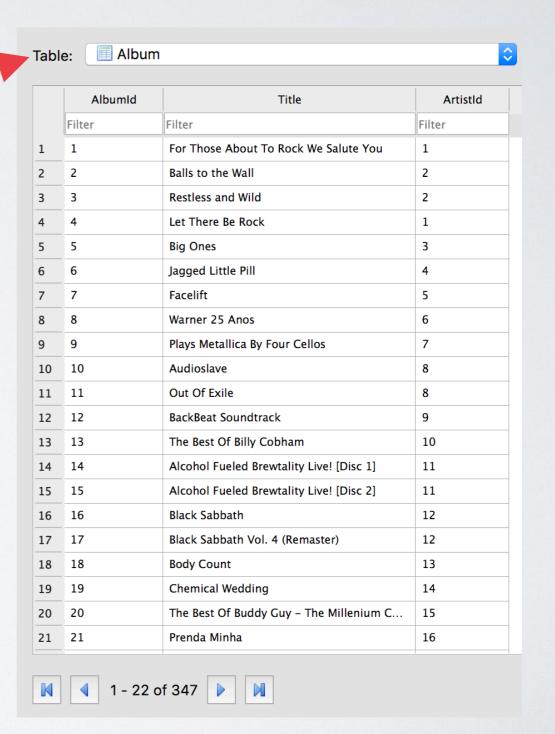


This means that I can connect to this MySQL database from anywhere.

Someone with admin access to the database needs to set this up.

## CHINOOK DATABASE

#### Name Tables (11) **Album Artist** Customer **Employee** Genre Invoice InvoiceLine MediaType Playlist PlaylistTrack Track



# SELECT \* FROM Album WHERE ArtistId = 118

|   | AlbumId | Title                   | ArtistId |
|---|---------|-------------------------|----------|
| 1 | 178     | Live On Two Legs [Live] | 118      |
| 2 | 179     | Pearl Jam               | 118      |
| 3 | 180     | Riot Act                | 118      |
| 4 | 181     | Ten                     | 118      |
| 5 | 182     | Vs.                     | 118      |

## SELECT Title FROM Album WHERE ArtistId = 118

|   | Title                   |  |  |  |  |  |
|---|-------------------------|--|--|--|--|--|
| 1 | Live On Two Legs [Live] |  |  |  |  |  |
| 2 | Pearl Jam               |  |  |  |  |  |
| 3 | Riot Act                |  |  |  |  |  |
| 4 | Ten                     |  |  |  |  |  |
| 5 | Vs.                     |  |  |  |  |  |
|   |                         |  |  |  |  |  |

SELECT \*
FROM Album
INNER JOIN Artist
USING (ArtistId)
WHERE ArtistId = 118

|   | AlbumId | Title                   | ArtistId | Name      |
|---|---------|-------------------------|----------|-----------|
| 1 | 178     | Live On Two Legs [Live] | 118      | Pearl Jam |
| 2 | 179     | Pearl Jam               | 118      | Pearl Jam |
| 3 | 180     | Riot Act                | 118      | Pearl Jam |
| 4 | 181     | Ten                     | 118      | Pearl Jam |
| 5 | 182     | Vs.                     | 118      | Pearl Jam |

```
library(DBI)
library(RSQLite)
con <- dbConnect(RSQLite::SQLite(),</pre>
"~/Downloads/Chinook_Sqlite.sqlite")
on.exit(dbDisconnect(con))
sql <- "SELECT * FROM Album"
albums <- dbGetQuery(con, sql)
albums [albums $ArtistId == 118, ]
```

#### OTHER CONNECTIONS

```
library(DBI)
library(RMySQL)
library(RPostgres)
conMySQL <- dbConnect(RMySQL::MySQL(),</pre>
user="jane_doe",
password="CorrectHorseBatteryStaple",
dbname="killerapp", host="example.com")
conPostgres <- dbConnect(RPostgres::Postgres(),</pre>
user="jane_doe",
password="CorrectHorseBatteryStaple",
dbname="killerapp", host="example.com")
```

- More efficient than exporting CSVs from the database and then reading them into R. R script will always have access to fresh data.
- Access multiple databases from one R script, even if the databases are on different servers and use different technologies.
- Avoid running slow queries on a production server by doing simple queries on the server and then processing and combining the data in R.
- Complicated SQL queries can be replaced with a sequence of smaller, easier to understand (and debug!) steps in R.

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