

Introduction to R for Data Management and Analysis

Marcel Ramos

Thursday, June 20, 2019

Announcements

- Last in-person class
- Next online classes
 - Data Analysis workflow
 - Reporting and reproducibility
- Review session on Tuesday?

Notes on Tuesday's lecture

- Questions on the material
- Breakdown bigger problems into small manageable steps

Working in R

How to actually learn any new programming concept



Essential

Changing Stuff and
Seeing What Happens

Notes on Tuesday's lecture (cont.)

Pseudocode

- for loop structure

```
for (variable in vector) {  
  # < enter code here >  
}
```

- function structure

```
functionname <- function(argument1 = "default1",  
                           argument2 = "default2") {  
  myresult <- anotherfunction(argument1, argument2)  
  return(myresult)  
}
```

More on functions

argument
names

```
functionName <- function(argument1, argument2, ...) {
```

```
## body of function ##
```

```
## do something with argument1 and argument2
```

```
return(value)
```

```
}
```

function
keyword; does
not change

Good for sending
additional arguments
to functions inside the
body

Curly braces will start and
end the function (>1 line);
they indicate *expressions*

```
function( arglist ) expr  
return(value)
```

❖ The body of the function will include the operations to

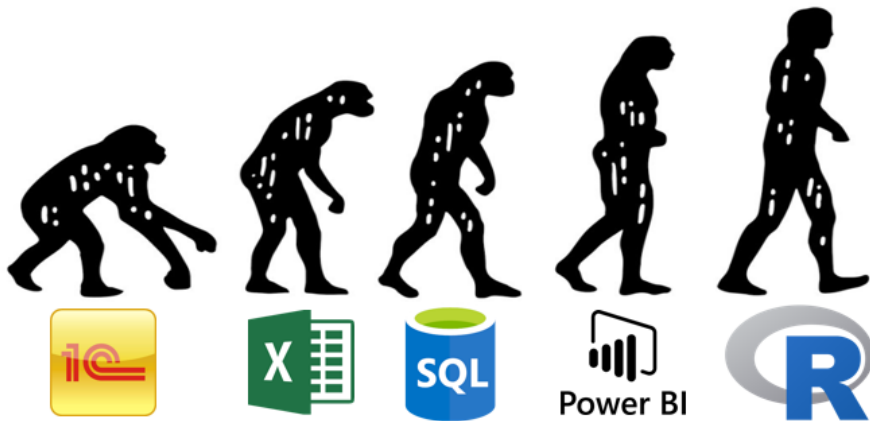
Notes on Tuesday's lecture (cont..)

- Functions are powerful tools
- Minimize errors
- Create a set of operations to achieve a goal
- Easy to write
 - Predictable input
 - Predictable output
- Loops are useful but are not easily extensible

Why don't we use Excel?



Ranking Statistical Software



Mini Review Session

- Zero-level R Tutorial

Common Errors and Troubleshooting

- R Basics Chapter

- R is particularly good at statistics
- Packages with new methods get published faster
- Extensibility is an MAJOR advantage compared to other software

The basics

- Frequency tables
- Calculating odds ratios
- `relevel`

Frequencies

- gmodels package
- CrossTable function
- table function

Statistical Tests

- `chisq.test` function
 - categorical 2x2
- `fisher.test` function
 - categorical with correction
- `t.test` function
 - categorical (2 levels) & continuous

Useful functions to apply on model objects

- Functions that work on `lm` class objects
 - `summary`
 - `fitted`
 - `resid`
 - `predict`

Tidy model results with broom

- Use the broom package to clean up results from model functions
 - tidy - model coefficients
 - augment - fitted/residual values and more
 - glance - model level statistics

Linear Regression

- `lm` function
- UCLA example

Logistic Regression and Odds Ratios

- glm function
- Odds Ratio calculation
- UCLA example