Introduction to R

Installation ,Packages, Directory, Data Management and Analysis

Kamarul Imran Musa, Assoc Prof (Epidemiology and Statistics)

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What we will cover?

R and RStudio

RStudio Cloud

Installation for R and RStudio

Optional installation for Miktex or Texlive and MacTex

R scripts, R packages, R Taskview

Live-coding (partial)

RStudio Cloud

- Anyone can register
- Using RStudio on the cloud
- Perhaps one of the quickest way to learn R
- Do not need to install R on your machine
- Allows collaborration.
- Facilitate learning. Free for now
- Go here https://rstudio.cloud/

RStudio Cloud

Interface

RStudio Cloud

Sign up and Log in (Please Sign Up) 4 mins

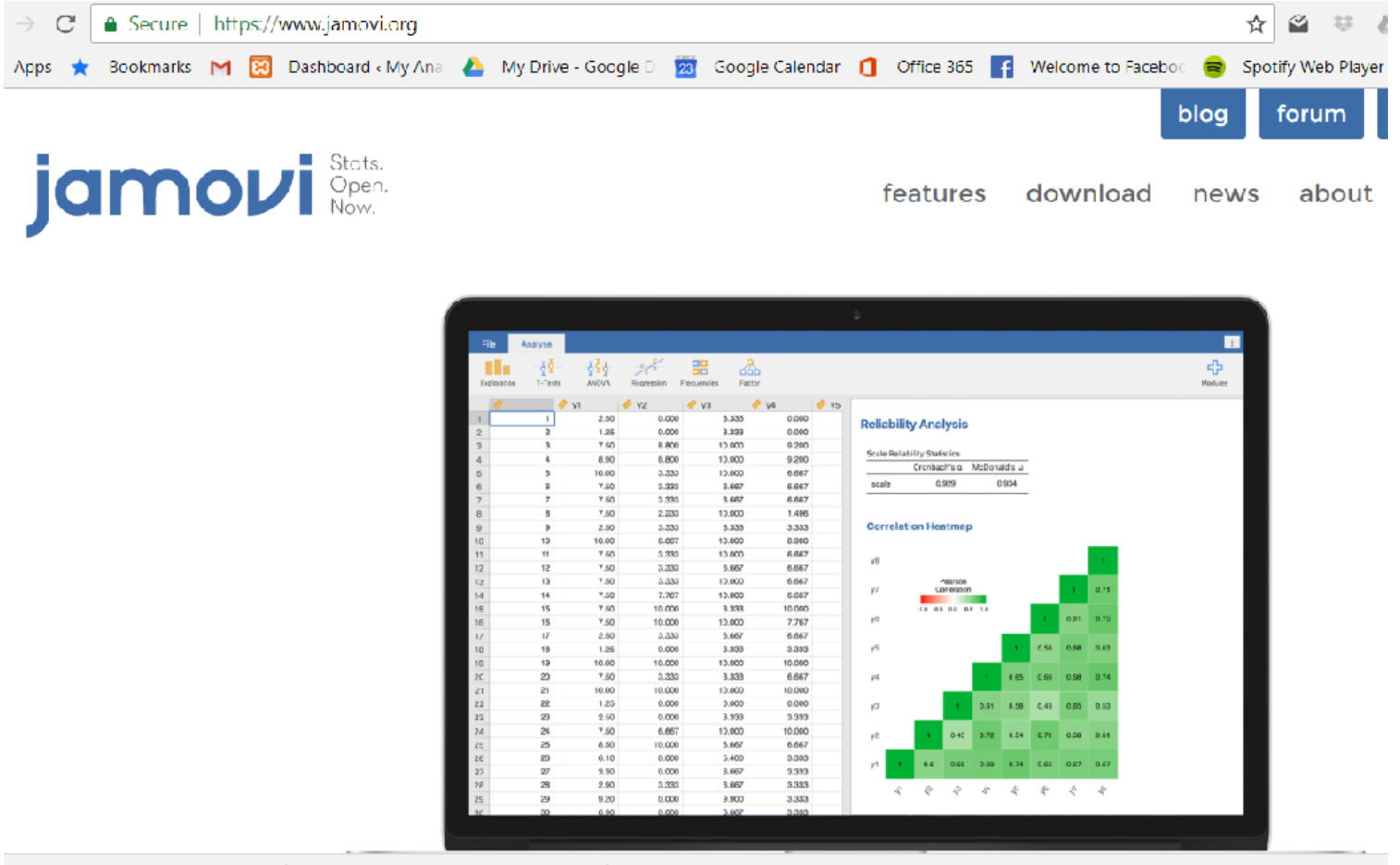
Point and click R GUI

A number of SPSS like GUI for R

- https://www.blueskystatistics.com/

Point and click R GUI

- https://www.jamovi.org/



RStudio Server

- You can install R and RStudio on the server
    - RStudio Server
- Doing analysis on the server
- Give a taste of working on BIG DATA
- Two versions of RStudio Server
    - RStudio Server
    - RStudio Server Professional
- For example:
    - https://healthdata.usm.my/rstudio/auth-sign-in

Installation

You have to have **Admin Right** to your machine

Installation

R

RStudio

MiKTeX, TeXLive and MacTex (optional)

Installation for R

We need to install two software (at least)

Install the **R** software from cran.

- choose R version for your machine OS
- Windows OS https://cran.r-project.org/bin/windows/base/R-3.6.1-win.exe
- Mac OS https://cran.r-project.org/bin/macosx/R-3.6.1.pkg
- Linux: then choose your flavour

Installation for RStudio

- Install RStudio for your OS from here https://www.rstudio.com/products/rstudio/download/#download
- Choose the supported platforms
- size around 70-90 MB

Check R and RStudio on your machine

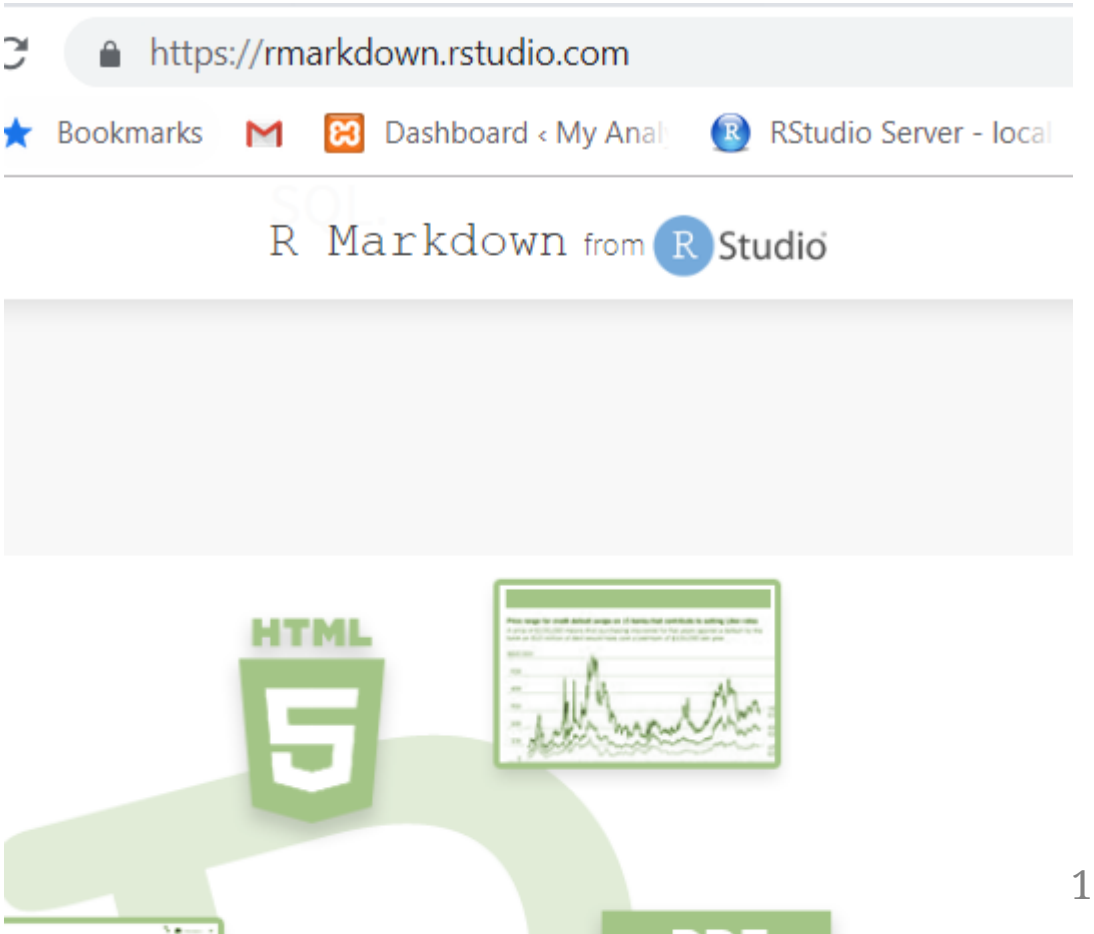
Do you have R? what version?

Do you have RStudio? what version?

Do you need to update?

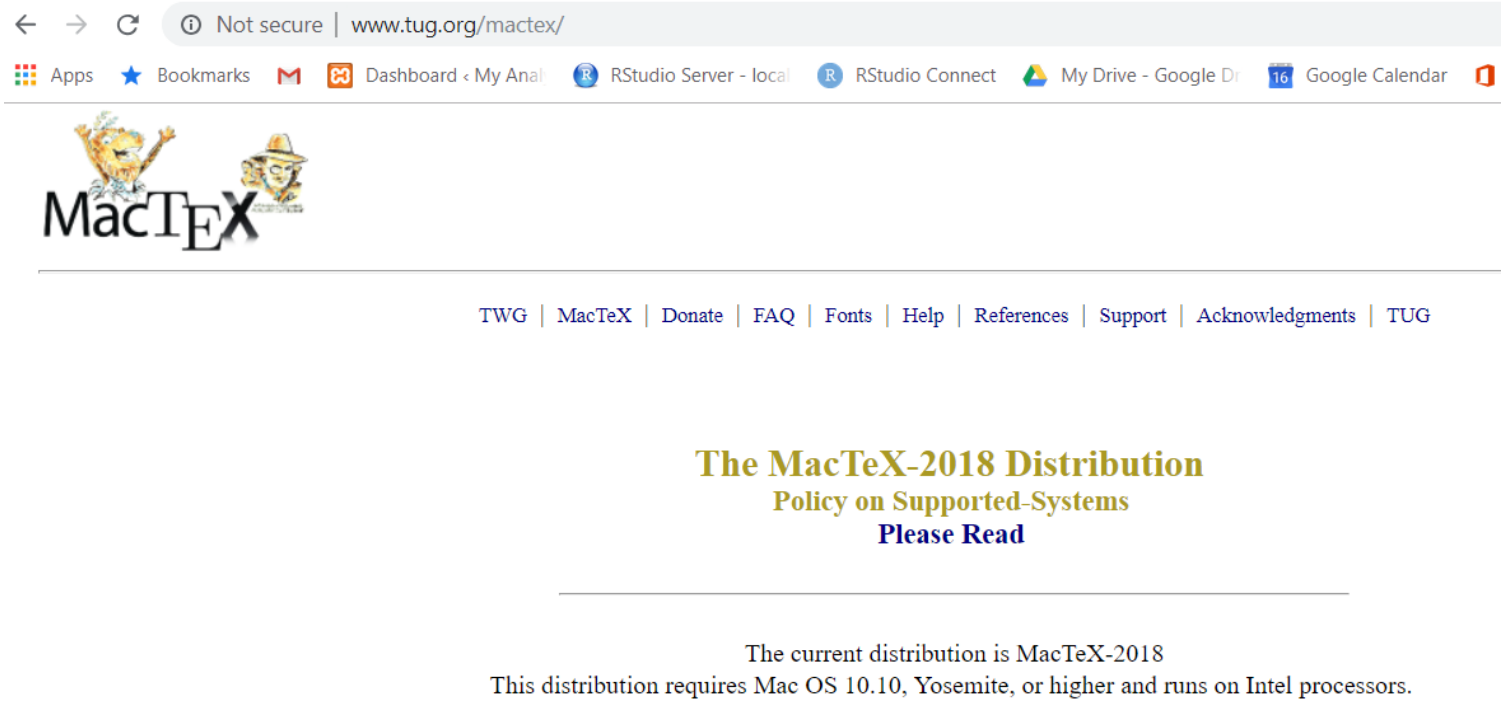
Installation of MiKTeX, TeXLive and MacTex

- necessary to convert the outputs to pdf
- will use this for RMarkdown



MiKTeX, for Window OS

MacTeX, for Mac OS



Progress?

R

- R OK?

RStudio

- RStudio OK?

MikTeX or MacTex (optional)

- MiKTeX, TeXLive and MacTeX ready?

Hands-On (2 options): Start your RStudio

Login to RStudio Cloud

OR

Start RStudio on your machine

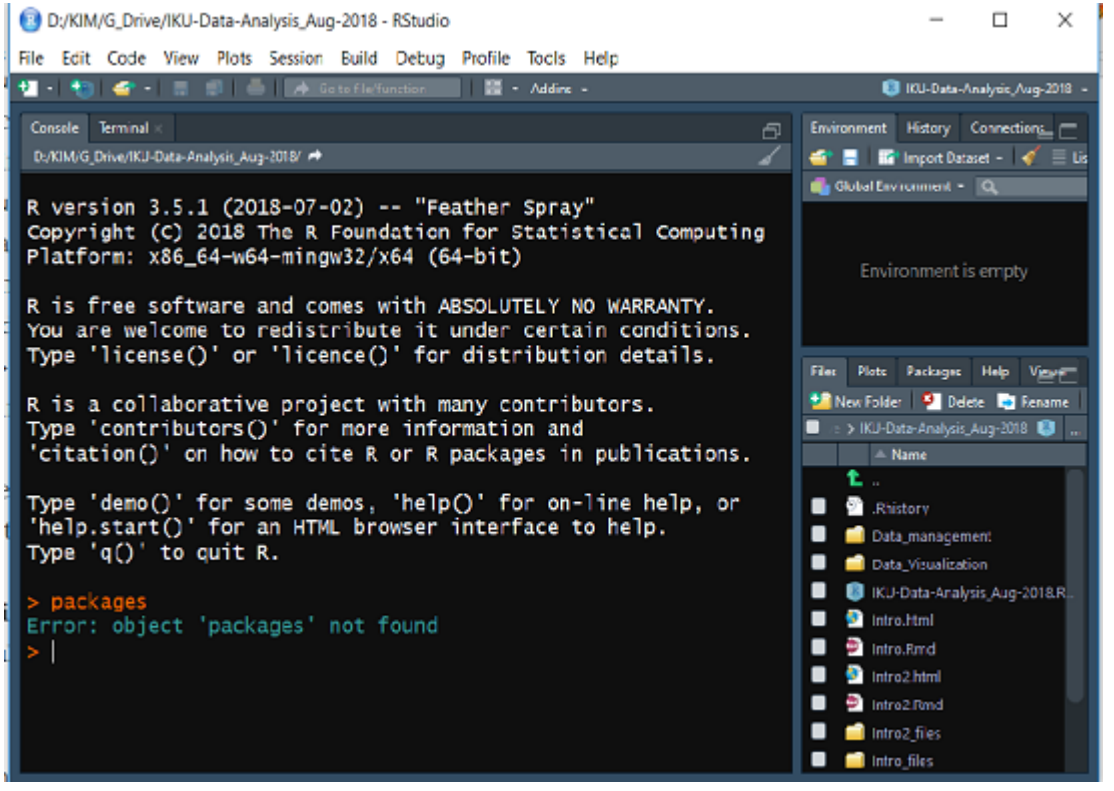
Login to RStudio Cloud

https://rstudio.cloud

- username
- password

Start R on your machine

- Find Rstudio in your machine

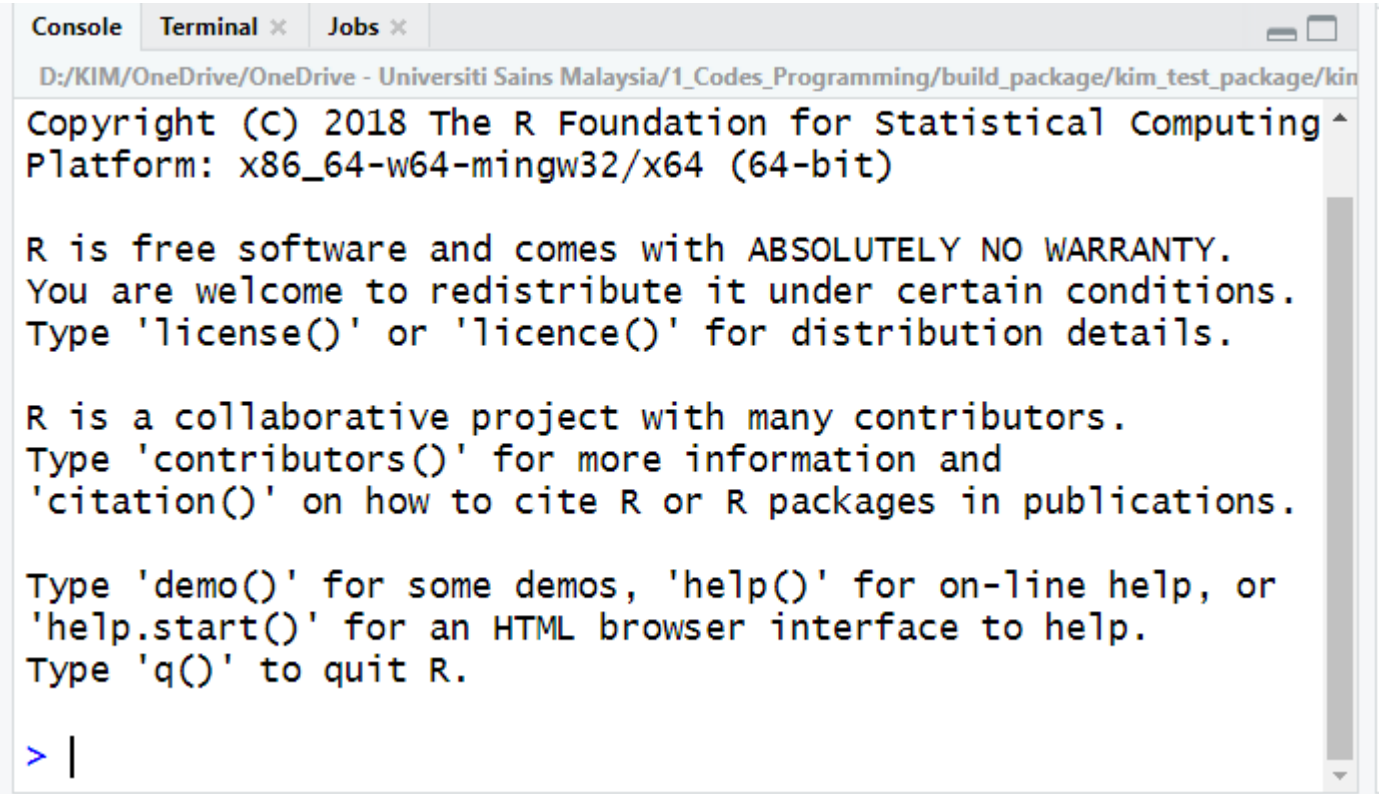


What you see on RStudio

- There will be 3 panes if you start Rstudio for the first time
- 4 panes if you have used RStudio before

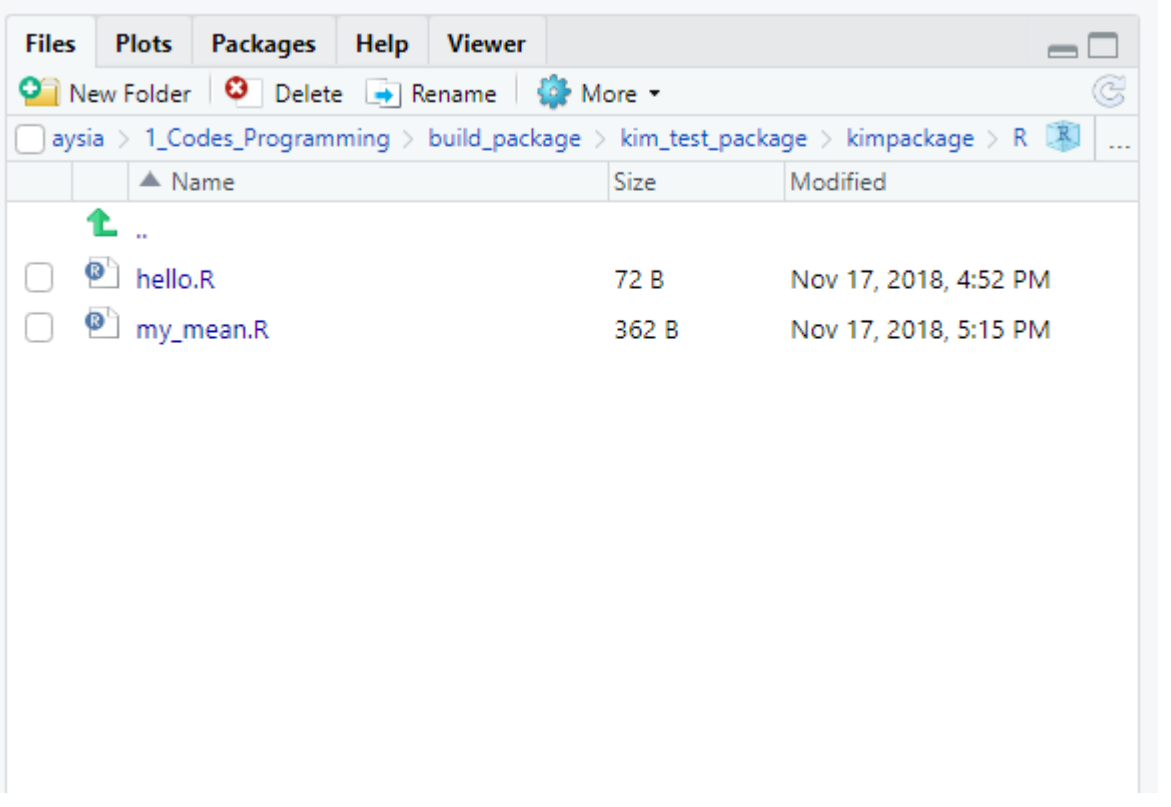
Console tab

- this is where we will see most of the results

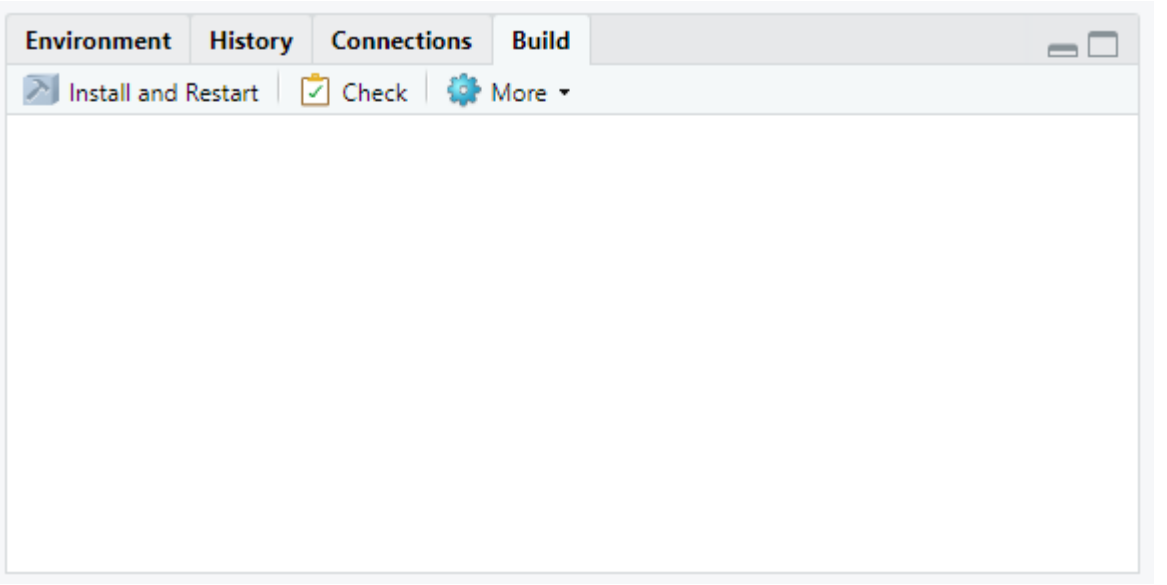


Files, Plots, Packages, Help and Viewer Pane

- List of objects
- R files, datasets, tables, list etc

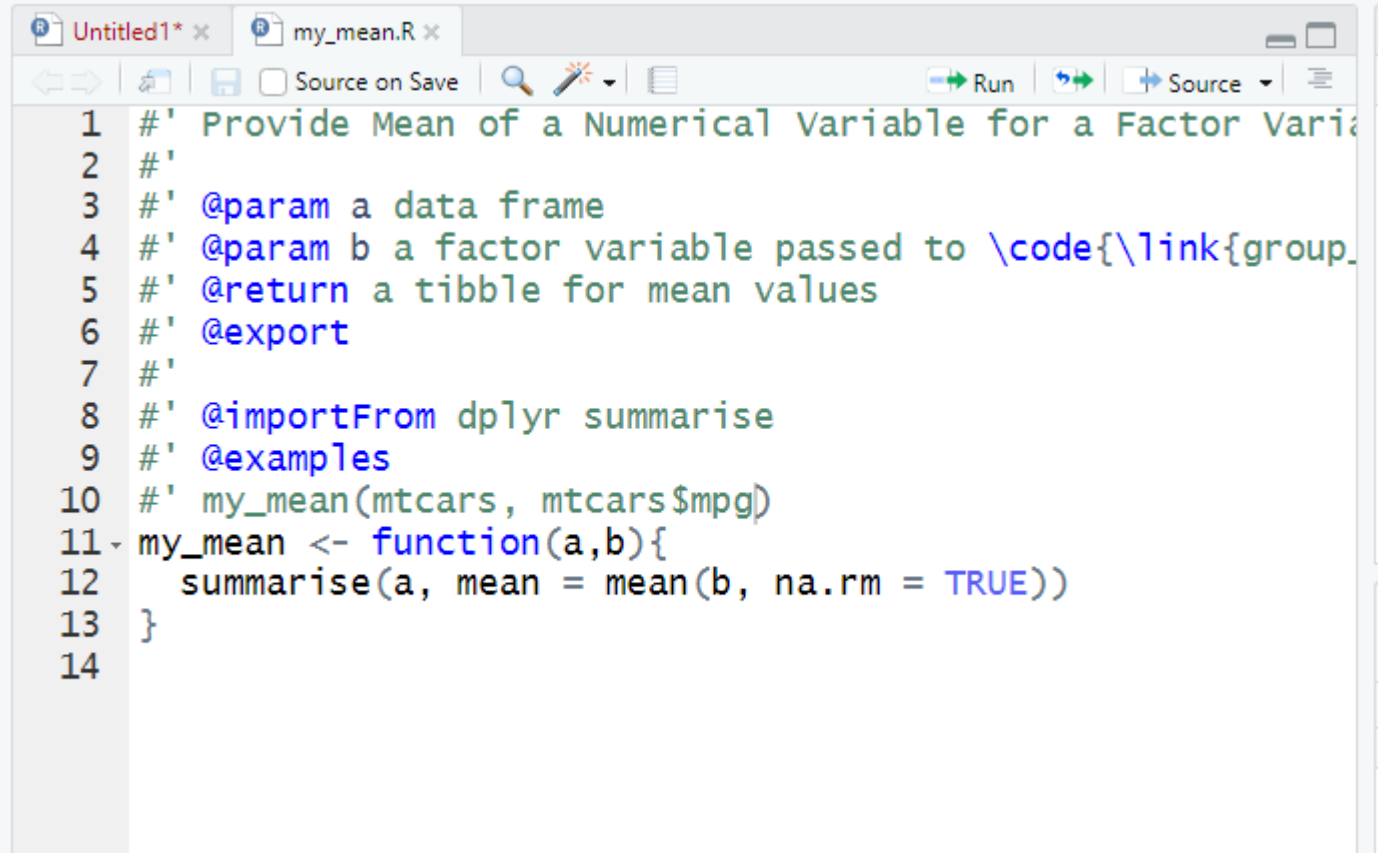


Environment, History, Connection and Build Pane



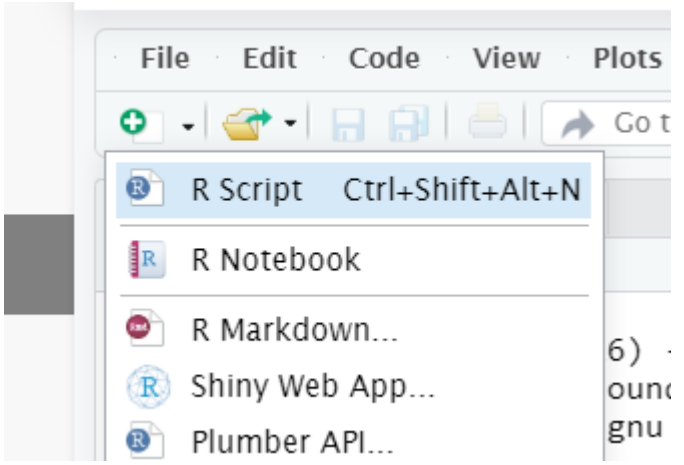
Source Pane

- this is where we will create files and write our codes



Open a new R script

- File -> R Script
- In Window OS, CTRL-SHIFT-N



Our first R script

First script

- In Line 1, type `2 + 3`
- click CTRL-ENTER or CMD-ENTER
- see the outputs in the Console Pane

```
2 + 3
```

```
## [1] 5
```

Saving R script

For future use

- File ->
- Save As ->
- Choose folder ->
- Name the file

Check version of R

```
version[6:7]
```

```
##          _
## major 3
## minor 6.1
```

The current version for R is 3, 6.1

If you lower version, then you want to upgrade. To upgrade

- for Windows, you can use **installr** package
- for Mac OS, you can use some functions

More info here https://www.linkedin.com/pulse/3-methods-update-r-rstudio-windows-mac-woratana-ngarmtrakulchol/

function, argument and parameters

```
f <- function(<arguments>) {
## Do something interesting
}
```

For example, for the function `lm()` to estimate parameters for linear regression model

```
args(lm)
```

```
## function (formula, data, subset, weights, na.action, method = "qr",
##     model = TRUE, x = FALSE, y = FALSE, qr = TRUE, singular.ok = TRUE,
##     contrasts = NULL, offset, ...)
## NULL
```

For example:

```
lm(weight ~ Time, data = ChickWeight)
```

```
##
## Call:
## lm(formula = weight ~ Time, data = ChickWeight)
##
## Coefficients:
## (Intercept)         Time
##      27.467        8.803
```

Ref:

- https://www.stat.auckland.ac.nz/~ihaka/downloads/Waikato-WRUG.pdf
- https://www.stat.berkeley.edu/~statcur/Workshop2/Presentations/functions.pdf

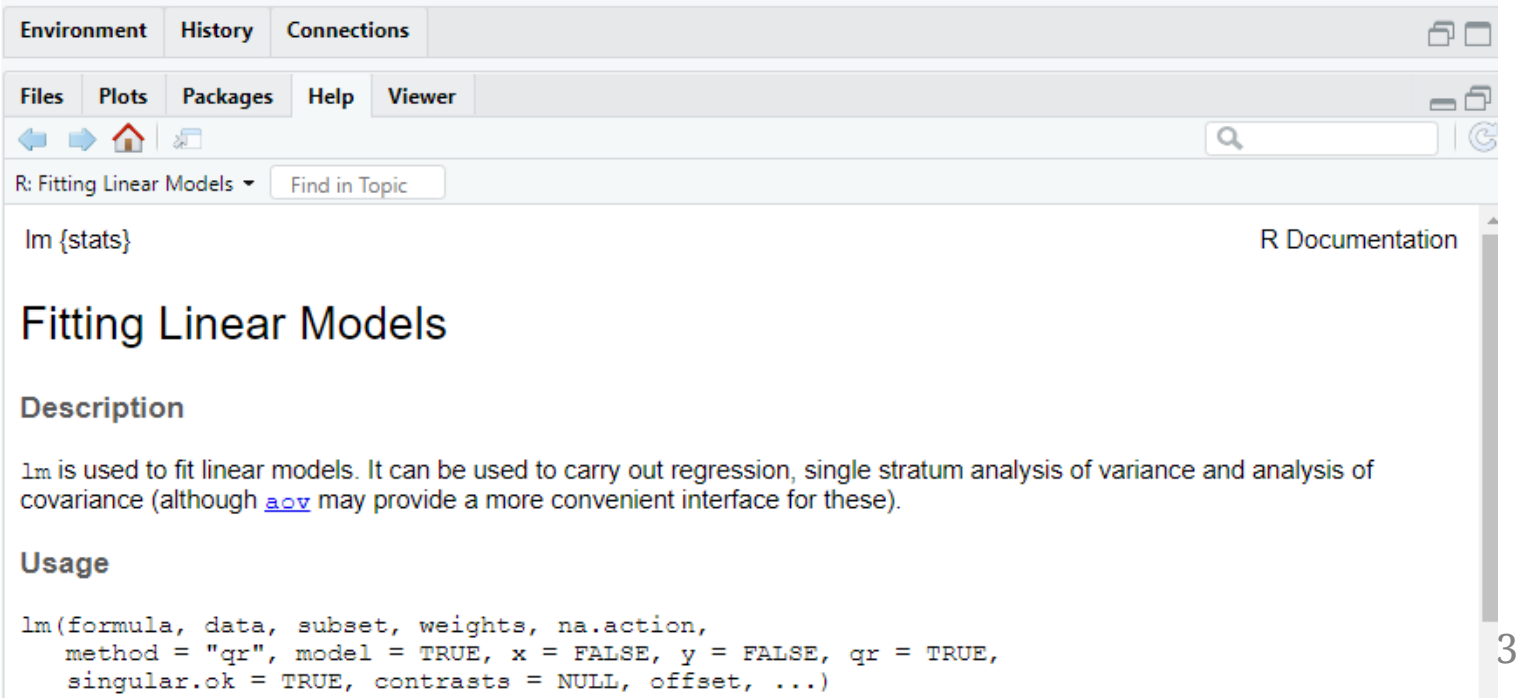
Need more help?

Then type the ? before the function

```
?lm
```

```
## starting httpd help server ... done
```

See what will be displayed in Help Pane



Packages

Packages on CRAN

https://cran.r-project.org/

- Currently, the CRAN package repository features 12784 available packages
- Cran Task Views

Check if the package you need is available in your R library

Type this inside your console

```
library(ggplot2)
```

- You should not receive any error message.
- If you have not installed the package, you will receive and error message. And it tells you that the package is not available in your R.
- the package is stored in the R folder in your My Document or HOME directory

```
.libPaths()
```

```
## [1] "C:/Users/drkim/OneDrive/Documents/R/win-library/3.6"
## [2] "C:/Program Files/R/R-3.6.1/library"
```

Install an R package

- To install an R package, you can type below (without the # tag)

```
# install.packages(foreign, dependencies = TRUE)
```

- You need to have internet access
- You can install from a zip file (from your machine or USB), from github and other repo

Directory

Directory

This is important. Not knowing your working directory will make you lost

- You must know where your folder is located
- The folder can contain many sub folders
- The folder should contain dataset (if you want to analyze your data)
- It will later store the objects created during R session

```
getwd()
```

```
## [1] "C:/Users/drkim/OneDrive - Universiti Sains Malaysia/3_Statistics/Mona
```

- You have to know to write file path. It is written differently for Window OS and other OS

Starting your R job

There are 2 ways to start your job

- create a new project (recommended)
- setting your working directory using `setwd()` (not recommended)

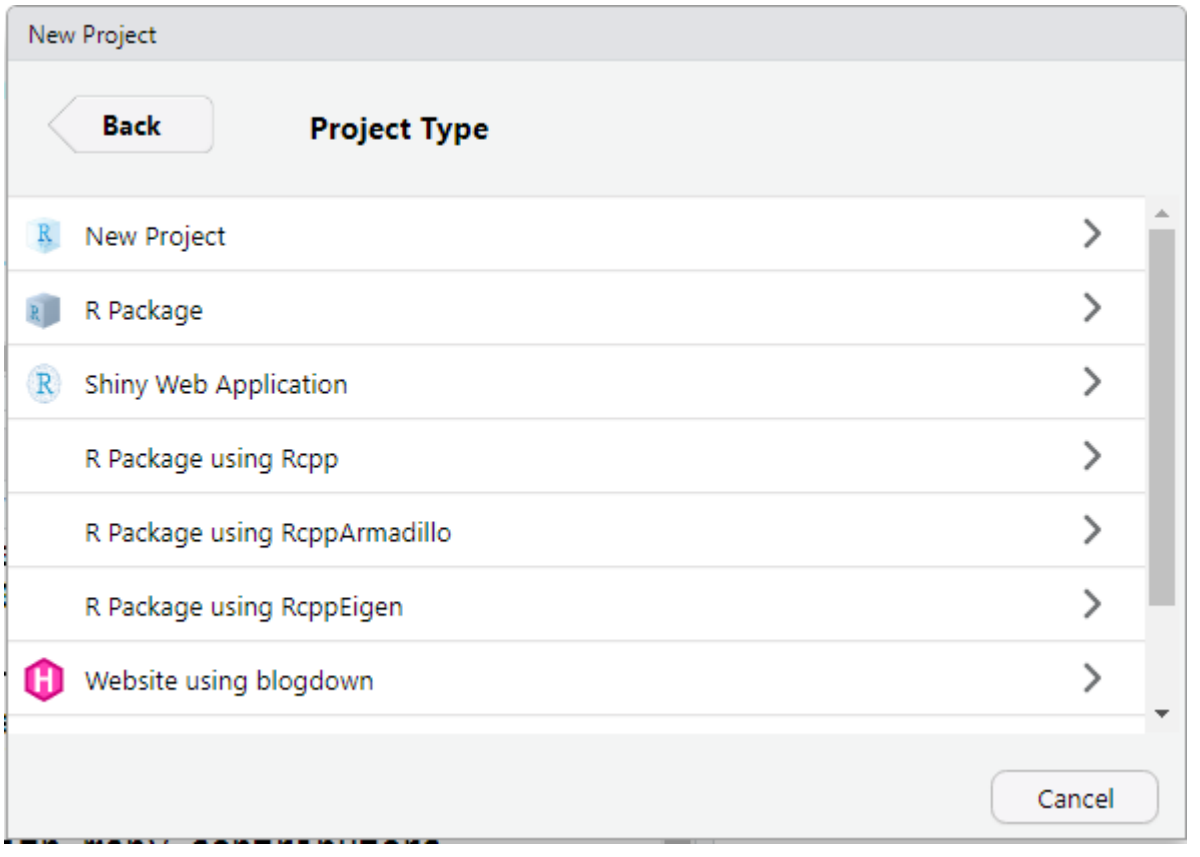
Create new project

- Always create a new project (This is the recommended way)
- Go to `File -> New Project`

Directory

Project type

Click New Project



Where is my data?

- in (usually) data frame form
- See the environment pane
- Your data is now in memory (RAM)
- How much your RAM for your machine?
- The data will be gone once you close RStudio
- But it will not change your original data (so be happy!)

Need help

If you need help you can

- Type a question mark infront of a function

```
?plot
```

- register and join RStudio Community here https://community.rstudio.com/
- Ask questions on Stack Overflow https://stackoverflow.com/
- Search for mailing list and subscribe to it
- Books on R https://bookdown.org/

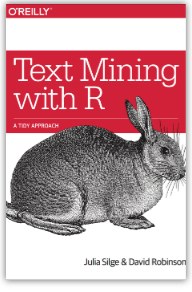
Bookdown

https://bookdown.org/

Text Mining with R

by Julia Silge and David Robinson

2018-07-26 Star 509



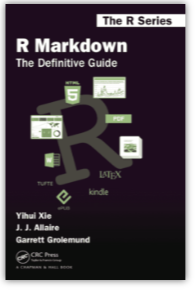
A guide to text analysis within the tidy data framework, using the tidytext package and other tidy tools […] This is the website for Text Mining with R! Visit the GitHub repository for this site, find the book at O'Reilly, or buy it on Amazon. This work by Julia Silge and David Robinson is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 United States … *Read more →*

1

R Markdown: The Definitive Guide

by Yihui Xie, J. J. Allaire, Garrett Grolemund

2018-07-24 Star 210



The first official book authored by the core R Markdown developers that provides a comprehensive and accurate reference to the R Markdown ecosystem. With R Markdown, you can easily create reproducible data analysis reports, presentations, dashboards, interactive applications, books, dissertations, websites, and journal articles, while enjoying the simplicity of Markdown and the great power of R and other languages. *Read more →*

2

Data Science at the Command Line

by Jeroen Janssens

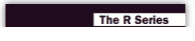
2018-07-24 Star 1,809

This is the website for Data Science at the

blogdown: Creating Websites with R Mark…

by Yihui Xie, Amber Thomas, Alison Presmanes Hill

2018-06-05 Star 758

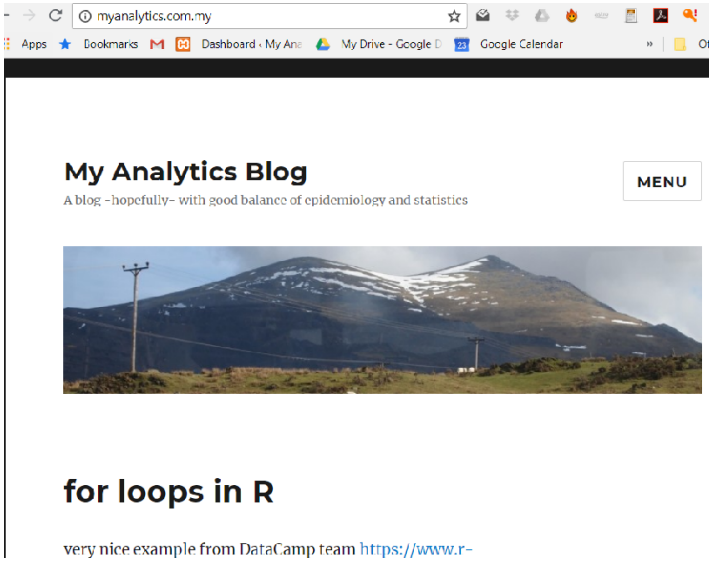


A guide to creating websites with R Markdown

Questions and contacts

Twitter : @kamarul_imran

Email : drkamarul@usm.my



Enjoy!

Slides created via the R package **xaringan**.