R Workshop - MISA

Dr. J. Tichon

Feb 17, 2022

Getting Started in R

What is R?

R is a statistical programming language that excels at tasks that involve data management, statistical analysis, data visualization,and simulation.

What is R?

However, R is so much more than a programming language:

- Report writing
- Data management
- Creating dashboards
- Creating HTML pages
- Powerful data visualization tools
- Interactive web based demonstrations

Who Uses R?

- Statisticians
- Any discipline that touches data
- Front-end developers
- News sites
- E-commerce businesses
- Data analytics

Why Should You Learn R?

- Business of data management, cleaning, and organization is quicker and more powerful
- Creates reports that seamlessly integrate text, math, code, graphs
- Easy to share with people that require different formats: csv , html, PDF, Word
- Free, heavily supported, and found throughout every discipline and increasingly major businesses
- Creates accessible, and powerful dashboards for internal use and for websites

Talk Outline

- Company/Business Dashboards
- Data Visualization
- Educational Possibilities
- Getting Setup with R
- Personal Documents
- Working with Data

Company/Business Dashboards

- Shiny Gallery
- Career Pathfinder
- Freedom of Press

Data Visualization

- Tidy Tuesday Github
- #TidyTuesday
- BBC and ggplot

Educational Possibilities

- Permutation Lab
- Regression Tutorial with Learnr
- Slope Simulation

Getting Setup with R

Installing Software

1- Download R (https://cran.r-project.org/mirrors.html)

2- Download R Studio (https://www.rstudio.com/products/rstudio/download/)

3- Install tinytex by running the following two lines of code in console:

install.packages('tinytex')

tinytex::install_tinytex()

R Studio Cloud

There is a web based cloud version of R Studio at (http://rstudio.cloud)

Every account has 25 free hours a month, can purchase additional time for various price points.

Opening Up R Studio

- Take a look at the basics of R Studio
- YouTube tutorial of main parts of the program

Projects for Workflow

- For every new task you work on in R Studio, you can create a project rooted to a folder so that it always looks how you left it.

Personal Documents

.r files

- .r files function as plain text documents in which you can write code without having to worry about it running
- See anova.R

Slides

- Presentations can be made in Beamer
- These slides are simple but you can do anything you'd normally do plus more like...

Slides - Typset math

$$\int_0^4 \frac{e^{-x-2}}{4x}$$

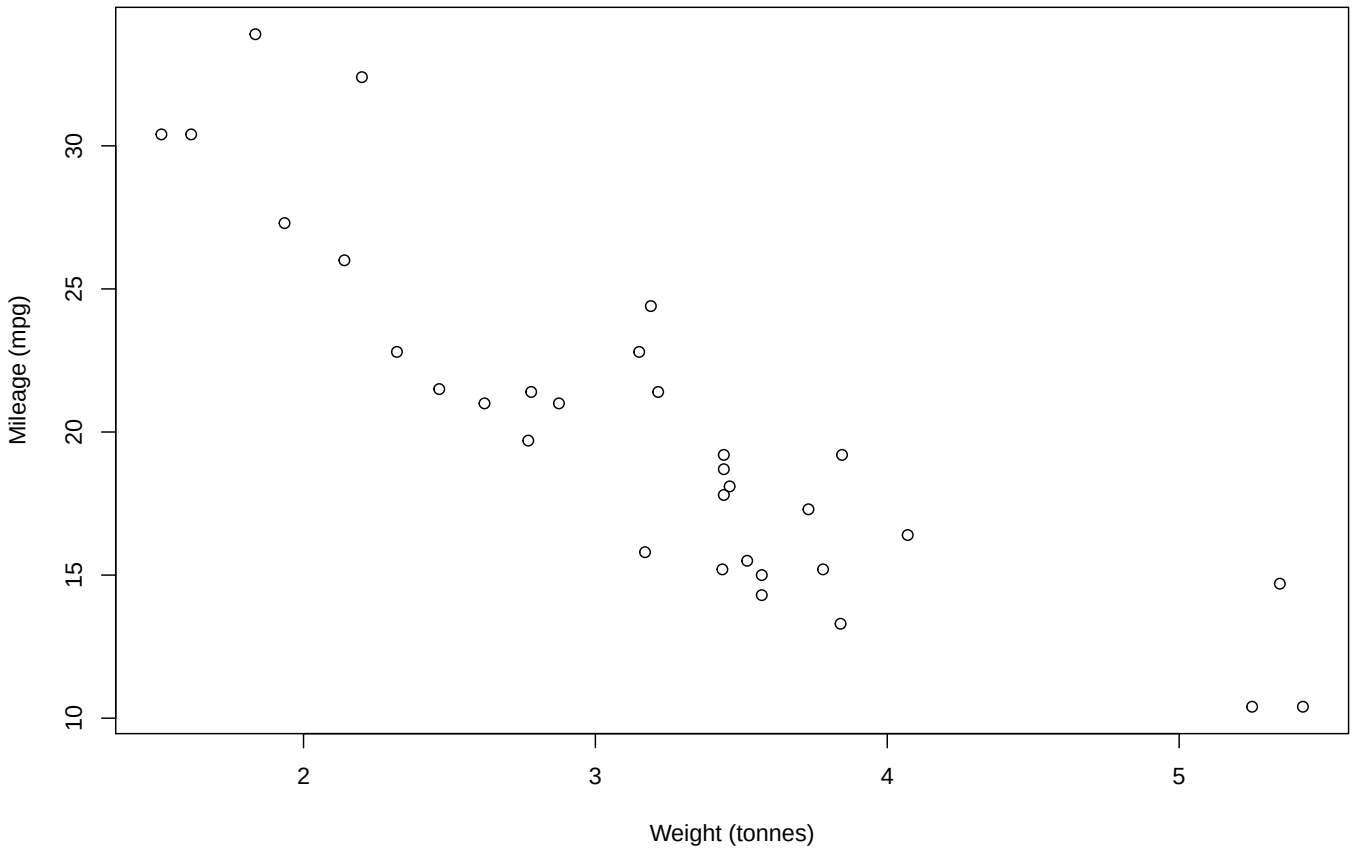
Slides - Include code

```
cars.lm <- lm(mpg~wt, data = mtcars)
cars.lm
```

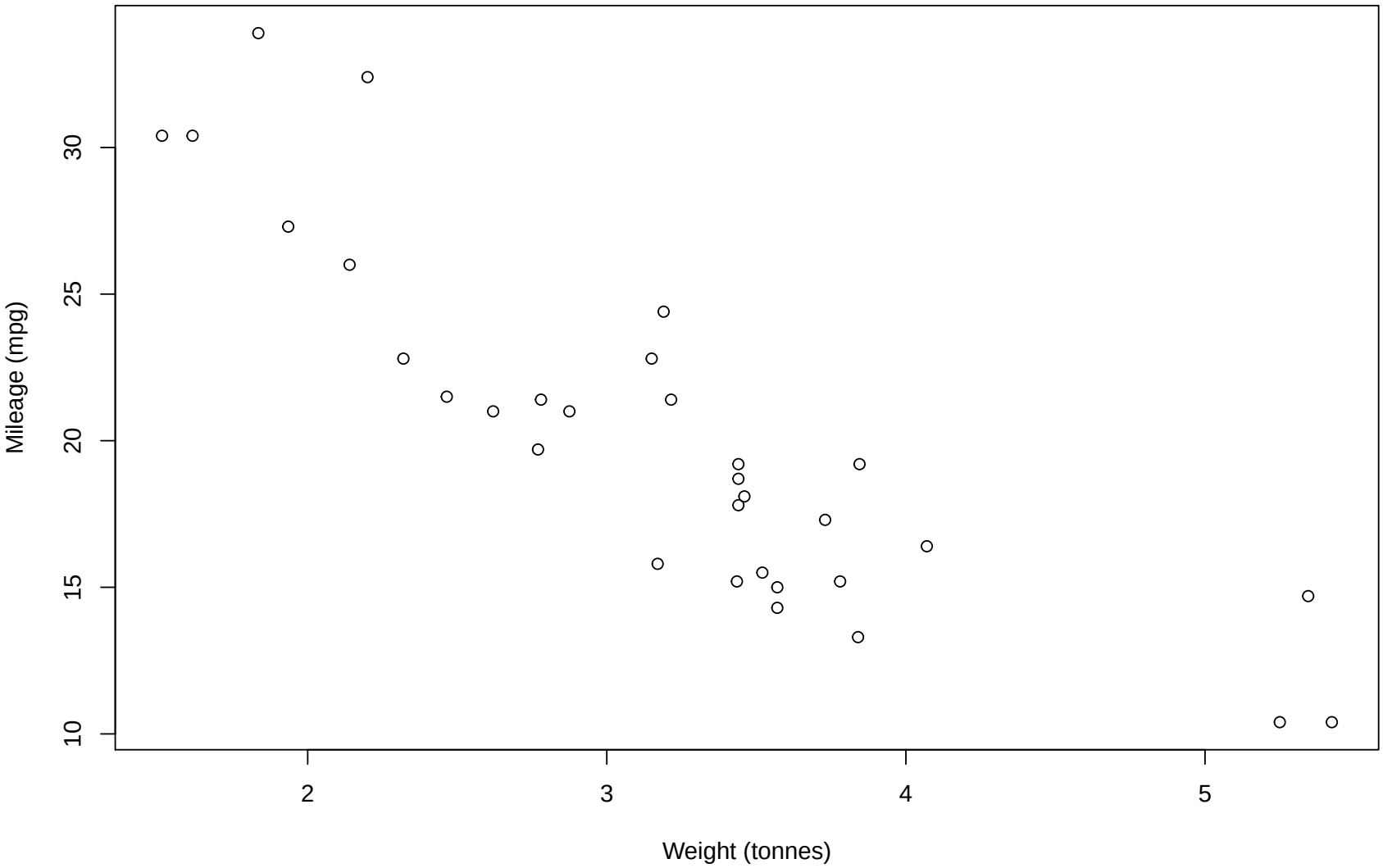
```
##
## Call:
## lm(formula = mpg ~ wt, data = mtcars)
##
## Coefficients:
## (Intercept)           wt
##      37.285       -5.344
```

Include Plots with Code

```
plot(mpg~wt, data = mtcars,
     xlab = "Weight (tonnes)", ylab = "Mileage (mpg)")
```



Include Plots Without Code



Create HTML, PDF, or Word Document

- R Markdown (.rmd) files combine math typeseting (LaTeX), r coding, and Markdown formatting to create PDF, HTML, or Word documents.
- See sports-project_J-Tichon.rmd

Working with Data

Writing Data Directly with Vectors

```
x <- c(4, 7, 8, 9)
mean(x)
```

```
## [1] 7
```

Writing Multiple Vectors to a Dataframe

```
name <- c("Jean", "Jorts")
colour <- c("Tortie", "Orange")
weight <- c(8, 12)
dislikes <- c("Union Busting", "Being Buttered")
catInfo <- data.frame(name, colour, weight, dislikes)
```

Writing Multiple Vectors to a Dataframe

```
catInfo
```

```
##    name colour weight       dislikes
## 1  Jean Tortie      8  Union Busting
## 2 Jorts Orange     12 Being Buttered
```

Importing and Cleaning Data from a .csv File

- See census-code-clean.R

Good Resources for Starting

- R For Data Science
- R For the Rest of Us