

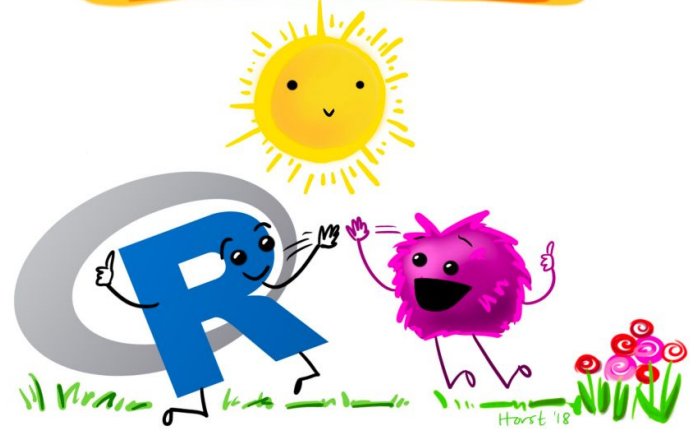
لغة الآر من الصفر إلى الإحتراف

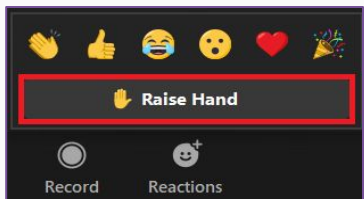
at first I was like...



Credit: Allison Horst

...but now it's like...





قواعد الدورة

● كتابة الاسم في Google Doc

○ الإجابة على Icebreaker question

● إطفاء الجوال

● يُفضل فتح الكاميرا

● لا تتردد في طرح أي سؤال خلال الجلسة

● Slack

مرحبا في كورس "لغة الأَر (R) من الصفر إلي الإحتراف"

المدرية: د بتول المزروق

الأسبوع: الأول

التاريخ: ٢٢ يونيو ٢٠٢٢

وصف الجلسة:

في هذه الجلسة سنتعرف على الخطة التعليمية مع بيان أهمية استخدام لغة آر (R) وإبراز دورها المميز في علم البيانات. لغة آر (R) هي لغة مفتوحة المصدر تُستخدم في التمثيل المرئي للبيانات وتعدديتها، بالإضافة إلى النمذجة. وقد احتلت أعلى المراتب في تصنيفات لغات البرمجة المستخدمة في علوم البيانات على مدار عدة سنوات، مما أدى إلى تزايد استخدامها.

تسجيل الأسماء

الاسم / المدينة / حسابات وسائل التواصل الاجتماعي لمن يرغب (twitter و GitHub وما إلى ذلك)

-
-
-
-
-
-
-



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خطة الدورة التدريبية

الأسبوع	نوع المحاضرة	اليوم	التاريخ	الساعة (بتوقيت السعودية)	المدة بالساعات
الرابع	محاضرة مباشرة	الخميس	28 يوليو 2022	من ١١:٣٠ إلى ٣:٣٠ مساءً	1
الخامس	محاضرة مباشرة	الثلاثاء	2 أغسطس 2022	من ١٣:٣٠ إلى ٥:٣٠ مساءً	2
	محاضرة مباشرة	الأربعاء	3 أغسطس 2022	من ٢:٣٠ إلى ٤:٣٠ مساءً	2
	ساعة مكتبية	الثلاثاء	2 أغسطس 2022	من ٢:٣٠ إلى ٣:٣٠ مساءً	1
السادس	محاضرة مباشرة	الثلاثاء	9 أغسطس 2022	من ٥:٣٠ إلى ٥:٣٠ مساءً	2
	محاضرة مباشرة	الأربعاء	10 أغسطس 2022	من ٢:٣٠ إلى ٤:٣٠ مساءً	2
	ساعة مكتبية	الأربعاء	10 أغسطس 2022	من ٥:٣٠ إلى ٥:٣٠ مساءً	1
السابع	عرض المشروعات النهائية	الأربعاء	17 أغسطس 2022	من ٢:٣٠ إلى ٤:٣٠ مساءً	2
	عرض المشروعات النهائية	الخميس	18 أغسطس 2022	من ١٢:٣٠ إلى ٢:٣٠ مساءً	2





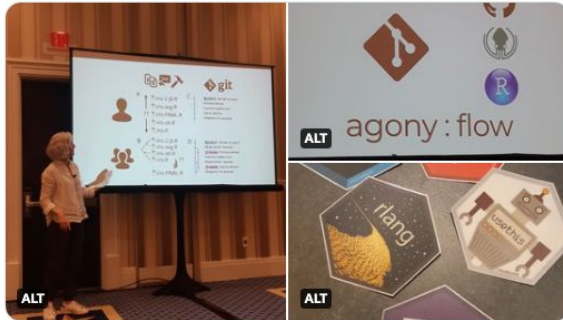
Catherine Kim, PhD
@fishiintheC



Afternoon recapping #git and #github with #RStudio with the legendary @JennyBryan.

Nice to hear from the pros that experiencing agony is normal 😊

And hex stickers make an appearance!
#RStudioConf2022



Jenny Bryan standing in front of a slide on comparing workflows without and with using version control with git.

Slide from Jenny Bryan's git and github with R presentation about the agony of git with the program's github, gitkracken, and rstudio that promote flow.

Hexagon 'hex' stickers for the dev tools, testthat, rlang, usethis, and fs r packages.

5:13 AM · Jul 26, 2022 · Twitter for Android



Jess Butler
@JessButler284



Slides and code from this year's workshops at #RStudioConf2022

Causal Inference
Teaching Data Science
Getting Started with Quarto
Production-Quality Shiny Apps
Package Development Masterclass
Data Science for SysAdmins
Art from Code



github.com

rstudio::conf(2022)

Workshops at rstudio::conf 2022. rstudio::conf(2022) has 21 repositories available. Follow their code on GitHub.

10:09 AM · Jul 27, 2022 · Twitter Web App

92 Retweets 5 Quote Tweets 376 Likes



[Link](#)



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مراجعة



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كيفية قراءة البيانات في R

```
read_csv("path")
```

In relative to the working directory using `setwd()`

```
read_csv(here("folder", "file"))
```

```
read_csv(here("data", "data.csv"))
```



معنى هذا الرمز في لغة R

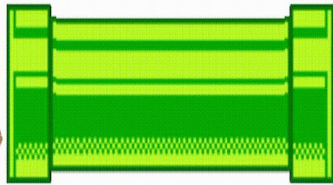
(و تُم) = %>%

dataset %>%

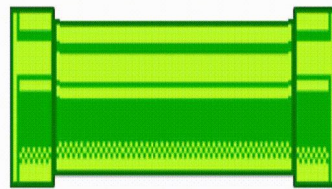
select(**column**)



Mario



%>%



%>%



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```
filter(data, row == "Mexico")
```

```
filter(data, row == "Mexico")
```

```
Data %>%
```

```
filter(row == "Mexico")
```





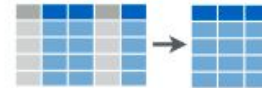
- `filter()` : pick observations by their values

Subset Observations (Rows)



- `select()` : pick variables by their names

Subset Variables (Columns)





- `mutate()` : create new variables with functions of existing variables

Make New Variables



- `summarise()` : collapse many values down to a single summary

Summarise Data





sepal.length	sepal.width	variety
5.1	3.5	Setosa
4.9	3	Setosa
4.7	3.2	Setosa
4.6	3.1	Setosa
5	3.6	Setosa
7	3.2	Versicolor
6.4	3.2	Versicolor
6.9	3.1	Versicolor
5.5	2.3	Versicolor
6.5	2.8	Versicolor
6.3	3.3	Virginica
5.8	2.7	Virginica
7.1	3	Virginica
6.3	2.9	Virginica
6.5	3	Virginica
7.6	3	Virginica
4.9	2.5	Virginica

SUM

SUM

SUM

variety	sepal.length	sepal.width
Setosa	24.3	16.4
Versicolor	32.3	14.6
Virginica	44.5	20.4



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Data transformation with dplyr : : CHEAT SHEET



dplyr functions work with pipes and expect tidy data. In tidy data:



Each variable is in its own column



Each observation, or case, is in its own row



x %>% f(y) becomes f(x, y)

Summarise Cases

Apply **summary functions** to columns to create a new table of summary statistics. Summary functions take vectors as input and return one value (see back).

summary function



summarise(data, ...)
Compute table of summaries.
summarise(mtcars, avg = mean(mpg))



count(data, ..., wt = NULL, sort = FALSE, name = NULL) Count number of rows in each group defined by the variables in ... Also **tally()**.
count(mtcars, cyl)

Group Cases

Use **group_by(data, ..., add = FALSE, drop = TRUE)** to create a "grouped" copy of a table grouped by columns in ... dplyr functions will manipulate each "group" separately and combine the results.



mtcars %>%
group_by(cyl) %>%
summarise(avg = mean(mpg))

Use **rowwise(data, ...)** to group data into individual rows. dplyr functions will compute results for each row. Also apply functions to list-columns. See tidy cheat sheet for list-column workflow.



starwars %>%
rowwise() %>%
mutate(film_count = length(films))

ungroup(x, ...) Returns ungrouped copy of table.
ungroup(mtcars)



Manipulate Cases

EXTRACT CASES

Row functions return a subset of rows as a new table.



filter(data, ..., preserve = FALSE) Extract rows that meet logical criteria.
filter(mtcars, mpg > 20)



distinct(data, ..., keep_all = FALSE) Remove rows with duplicate values.
distinct(mtcars, gear)



slice(data, ..., preserve = FALSE) Select rows by position.
slice(mtcars, 10:15)



slice_sample(data, ..., n, prop, weight, by = NULL, replace = FALSE) Randomly select rows. Use `n` to select a number of rows and `prop` to select a fraction of rows.
slice_sample(mtcars, n = 5, replace = TRUE)



slice_min(data, order_by, ..., n, prop, with_ties = TRUE) and **slice_max()** Select rows with the lowest and highest values.
slice_min(mtcars, mpg, prop = 0.25)



slice_head(data, ..., n, prop) and **slice_tail()** Select the first or last rows.
slice_head(mtcars, n = 5)

Logical and boolean operators to use with filter()

`==` `<` `<=` `is.na()` `%in%` `|` `xor()`
`!=` `>` `>=` `is.na()` `!` `&`

See ?base::Logic and ?Comparison for help.

ARRANGE CASES



arrange(data, ..., by_group = FALSE) Order rows by values of a column or columns (low to high), use with **desc()** to order from high to low.
arrange(mtcars, mpg)
arrange(mtcars, desc(mpg))

ADD CASES



add_row(data, ..., before = NULL, after = NULL)
Add one or more rows to a table.
add_row(cars, speed = 1, dist = 1)

Manipulate Variables

EXTRACT VARIABLES

Column functions return a set of columns as a new vector or table.



pull(data, var = -1, name = NULL, ...) Extract column values as a vector, by name or index.
pull(mtcars, wt)



select(data, ...) Extract columns as a table.
select(mtcars, mpg, wt)



relocate(data, ..., before = NULL, after = NULL)
Move columns to new position.
relocate(mtcars, mpg, cyl, after = last_col())

Use these helpers with select() and across()

e.g. select(mtcars, mpg:cyl)

contains(match) **num_range(prefix, range)** `!`, e.g. mpg:cyl
ends_with(match) **all_of(x)/any_of(x, ..., vars)** `-`, e.g. gear
starts_with(match) **matches(match)** **everything()**

MANIPULATE MULTIPLE VARIABLES AT ONCE



across(cols, funs, ..., names = NULL) Summarise or mutate multiple columns in the same way.
summarise(mtcars, across(everything(), mean))



c_across(cols) Compute across columns in row-wise data.
transmute(rowwise(UKgas), total = sum(c_across(1:2)))

MAKE NEW VARIABLES

Apply **vectorized functions** to columns. Vectorized functions take vectors as input and return vectors of the same length as output (see back).

vectorized function



mutate(data, ..., keep = "all", before = NULL, after = NULL) Compute new column(s). Also **add_column()**, **add_count()**, and **add_tally()**.
mutate(mtcars, gpm = 1 / mpg)



transmute(data, ...) Compute new column(s), drop others.
transmute(mtcars, gpm = 1 / mpg)



rename(data, ...) Rename columns. Use **rename_with()** to rename with a function.
rename(cars, distance = dist)

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ggplot2:

Build a data MASTERPIECE



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أمثلة من TidyTuesday



TidyTuesday هو مشروع بيانات أسبوعي يستهدف مُجتمع R الدولي وهو مدعوم من R4DS Online Learning و R for Data Science و Community ، ويركز على فهم كيفية تلخيص البيانات وترتيبها باستخدام ggplot2 و tidyr و dplyr وغيرها من الأدوات في نظام لغة الآر.



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أمثلة من TidyTuesday



← Thread



Tom Mock at #RStudioConf
@thomas_mock

The @R4DScommunity welcomes you to week 28 of #TidyTuesday! We're exploring coffee!

bit.ly/tidyreadme
bit.ly/2BGDQQ8

#r4ds #tidyverse #rstats #dataviz

No alt
TidyTuesday
A weekly data project in R from the R4DS online learning community
variables observations values

No alt
Grading Month
Number of Gradings
Grading Day of Week
Median Total Score
Number of Gradings

7:19 PM · Jul 6, 2020 · Twitter Web App



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أمثلة من TidyTuesday



Nicola Rennie @nrennie35

A topical one for this week's #TidyTuesday (as I currently bake in 32°C heat), looking at the change in the percentage of California's population affected by droughts in the last 20 years.

Code: github.com/nrennie/tidytu...

#DataVisualization #DataViz #DataScience #RStats

California Droughts

In just 20 years, the percentage of California's population experiencing extreme or exceptional drought (level D3 or D4) in the second week of July has risen from 0.56% to 78.47%.

2001 2021

D4 Exceptional drought D4

D3 Extreme drought D3

D2 Severe drought D2

D1 Moderate drought D1

D0 Abnormally dry D0

None No drought None

ALT

N: Rennie | Date: U.S. Drought Monitor

A sigmoid plot showing the change in percentage of California's population who experience each level of drought between 2001 and 2021. Caption reads: In just 20 years, the percentage of California's population experiencing extreme or exceptional drought (level D3 or D4) in the second week of July has risen from 0.56% to 78.47%.

8:10 PM · Jul 20, 2021 · Twitter Web App

13 Retweets 2 Quote Tweets 61 Likes

Dr. Rosie Griffiths @Rosie_Griffiths

Finally got around to doing my first #TidyTuesday

#RStats #dataviz #ggplot #Datavisualization

No all Post-Pandemic Air Travel Levels in the Busiest European Countries

Pandemic Lockdown

Top ranked European countries by total number of flights during March 2020

01 07 14 21 28

March 2020

Return to Normal

Percentage change in total flights for the top 12 busiest European countries in 2020-2022 compared to their pre-pandemic levels

2020 2021 2022

% Change compared to 2019 of total flights taken

Month

Norway
Greece
Portugal
Spain
Turkey
Poland
France
Switzerland
Germany

2:47 PM · Jul 20, 2022 · Twitter Web App



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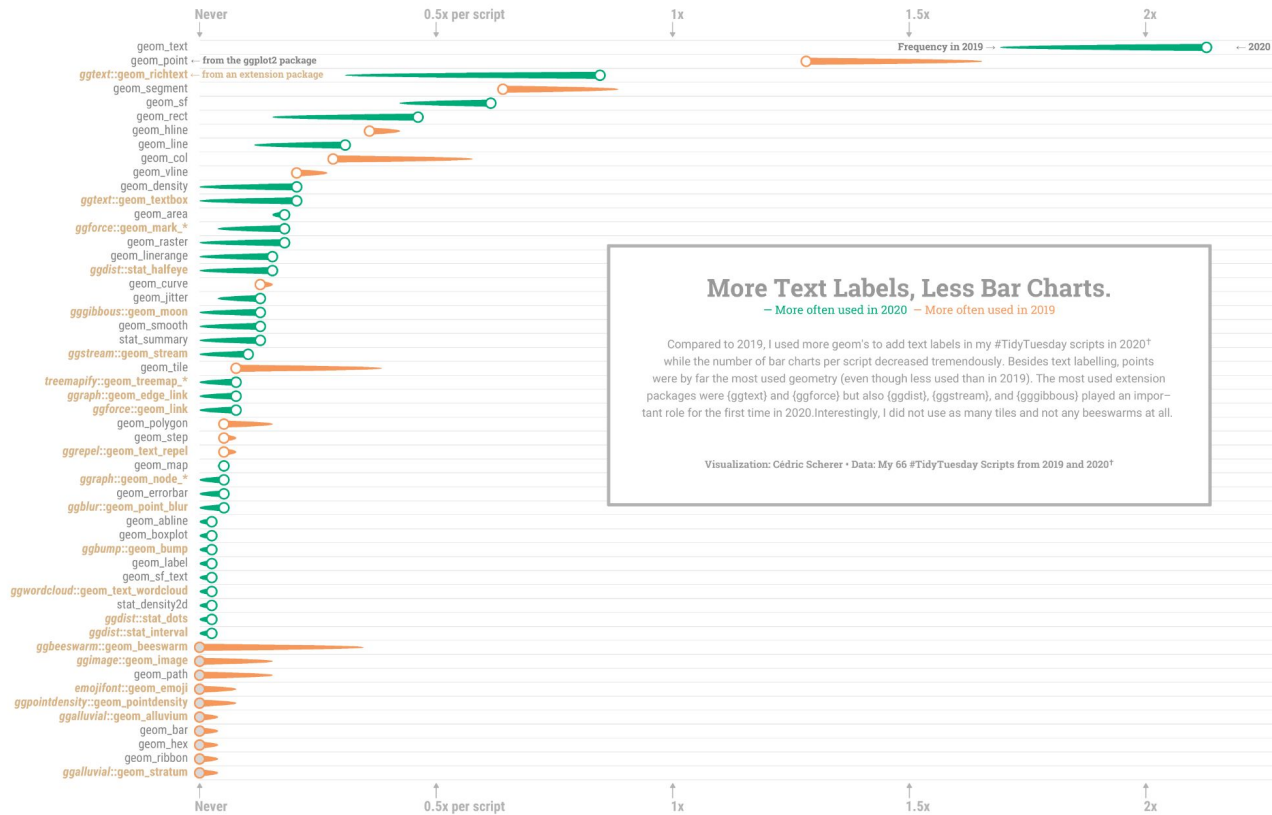


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More Text Labels, Less Bar Charts.

— More often used in 2020 — More often used in 2019

Compared to 2019, I used more geom's to add text labels in my #TidyTuesday scripts in 2020[†] while the number of bar charts per script decreased tremendously. Besides text labelling, points were far the most used geometry (even though less used than in 2019). The most used extension packages were (ggtext) and (ggforce) but also (ggdist), (ggstream), and (gggibbous) played an important role for the first time in 2020. Interestingly, I did not use as many tiles and not any beeswarms at all.

Visualization: Cédric Scherer • Data: My 66 #TidyTuesday Scripts from 2019 and 2020[†]

[†] I extracted all functions starting with *geom* or *stat* from my Rmd files containing the code for all my #TidyTuesday contributions (thanks Georgios for the idea and script). For the contributions from 2019 (n = 26) and 2020 (n = 40) I calculated the frequency of usage per year for each geom/stat as times used divided by the number of contributions. Note that some geom's which usually appear together (e.g. *treemapify::geom_treemap* functions) or behave very similarly (e.g. *ggforce::geommark* functions) were grouped together.



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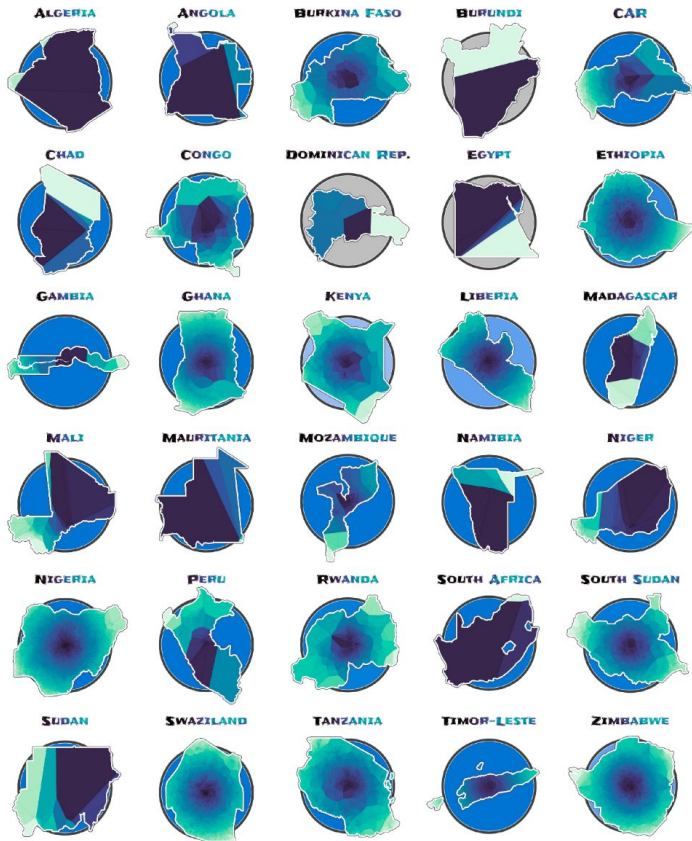
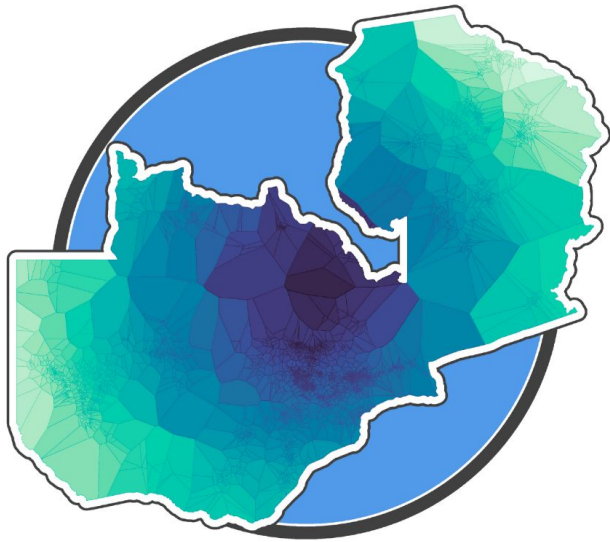
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ZAMBIA



The voronoi map shows water points monitored over time by governments and development partners. The data is collected by the Water Point Data Exchange (WPDE) which aims to unlock the potential of water point data to improve decision-making and increase rural water access. Voronoi maps are based on the minimal distance needed to reach a landmark—here reported water points—by using tessellation techniques that partition a plane into regions closest to these points. The darker the color of the region, the closer it is to the country's middle point. The coloring of the circle indicates the proportion of improved versus unimproved water sources: the more intense the blue, the more improved water points, grey means no information).

Visualization: Cédric Scherer • Data: Water Point Data Exchange (WPDE), May 2021



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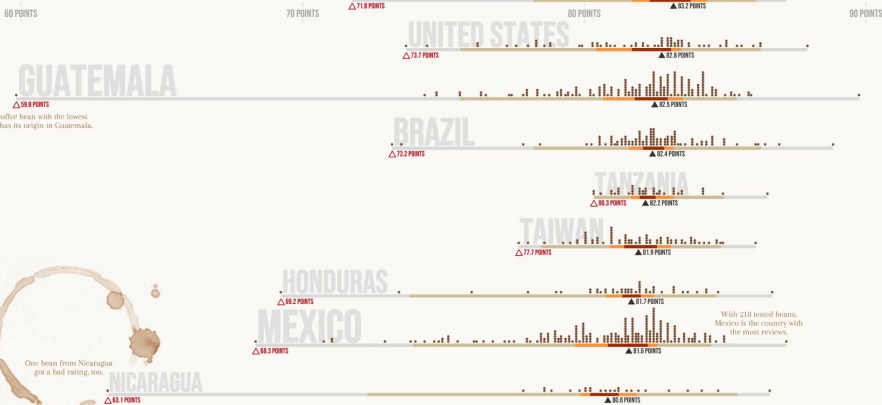
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Not my cup of coffee...

Each dot depicts one coffee bean rated by Coffee Quality Institute's trained reviewers. In addition, the multiple interval stripes show where 25%, 50%, 95%, and 100% of the beans fall along the rating gradient from 0 to 100 points. The rated coffee beans range from 59.8 points (Guatemala) to 89.9 (Ethiopia). Only countries of origin with 25 or more tested beans are shown. The red empty triangle marks the minimum rating, the black filled triangle indicates each country's median score.

Visualization by Cédric Scherer
Coffee icon: © Inepmark

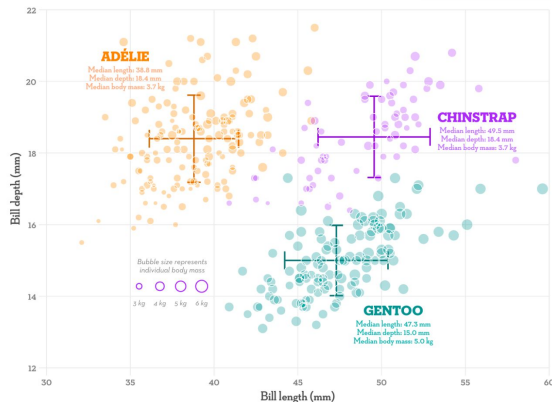


BILL DIMENSIONS OF BRUSH-TAILED PENGUINS

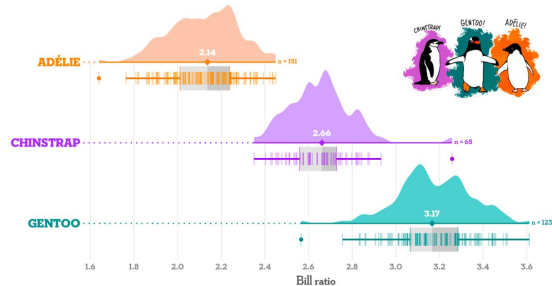
Pygoscelis adeliae (Adélie penguin) • *P. antarctica* (Chinstrap penguin) • *P. papua* (Gentoo penguin)



A. Scatterplot of bill length versus bill depth (error bars show median +/- sd)



B. Distribution of the bill ratio, estimated as bill length divided by bill depth



Note: In the original data, bill dimensions are recorded as "culmen length" and "culmen depth". The culmen is the dorsal (upper) ridge of a bird's bill.
Visualization Credits: Scherer • Data: Gorman, Williams & Fraser (2014) DOI:10.1371/journal.pone.0090081 • Illustration: Alison Hart



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BY



كيف أرسم البيانات في لغة R باستخدام ggplot2 ؟

1. تعيين البيانات (data)

2. ربط المتغيرات بالصفات الجمالية أو الإحداثيات aes()

3. تحديد نوع geom

What are the building blocks in ggplot2?

1. A mapping of variables in data to
2. aes() aesthetic attributes of
3. geom_etric objects.

```
ggplot(data = mydata,  
aes(x =column1,  
y=column2) +  
geom_point())
```

مثال



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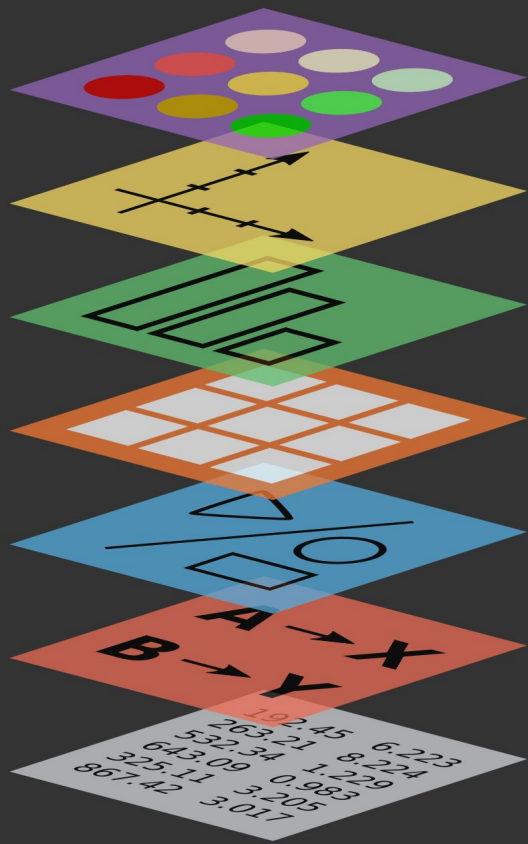


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Theme
Coordinates
Statistics
Facets
Geometries
Aesthetics
Data



192.45	6.223
263.21	8.224
532.34	1.229
643.09	0.983
325.11	3.205
867.42	3.017



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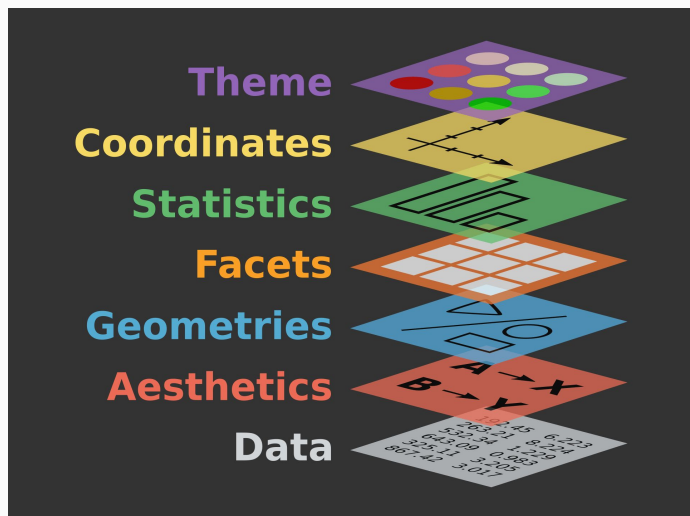


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```
ggplot(data, aes(x=col1, y = col2)) +  
  geom_point(alpha = 0.5) +  
  geom_smooth() +  
  facet_wrap(~ col) +  
  coord_flip() +  
  theme_bw() +  
  theme(legend.position = "none")
```



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1- Read data from this link

<https://raw.githubusercontent.com/ScienceParkStudyGroup/r-lesson-based-on-ohi-data-training/gh-pages/data/se.csv>

2- plot the data using `geom_jitter` with the following conditions:

1. `x = park_name`
2. `y = visitors`
3. `color = park_name`
4. `alpha = 0.5`
5. `theme_bw`
6. Change the coordinator using `coord_flip()`



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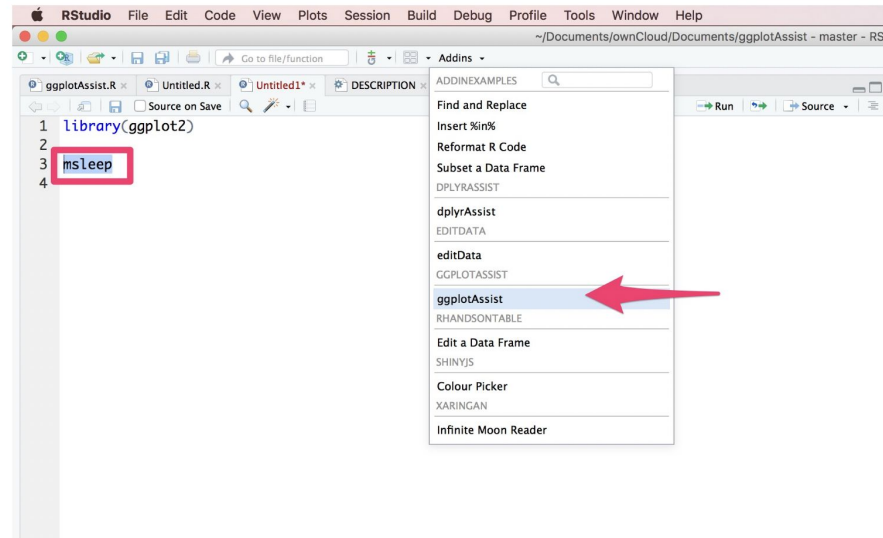
ggplotAssist package



Usage: As an RStudio Add-in

This addin can be used to interactively generate a `ggplot` using `ggplot2` package. The intended way to use this is as follows:

1. Highlight a symbol naming a `data.frame` or a `tibble` in your R session, e.g. `msleep` (1). Execute this addin(`arrow`), to interactively manipulate it.



[Link to docs in GH](#)



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plotly



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حفظ التمثيل البياني في الجهاز

```
ggsave("name_of_file.png", my_plot, width = 15, height = 10)
```



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ggplot2 theme elements reference

Set minimal as the baseline theme:
`theme_minimal() +
theme(theme.element = element_type())`

Use `element_blank()` to **remove an element**

Axis titles, text, ticks, and lines can be specified per axis using theme inheritance by putting `.x/.y` at the end of the theme element.

```
plot.title.position = "plot" } "plot" means that they will be aligned to the entire plot (instead of the panel)
plot.caption.position = "plot"
plot.title = element_text()
plot.subtitle = element_text()
```

```
plot.margin = margin(25, 25, 25, 25)
```

```
axis.line.y = element_line()
```

```
axis.title.y = element_text()
```

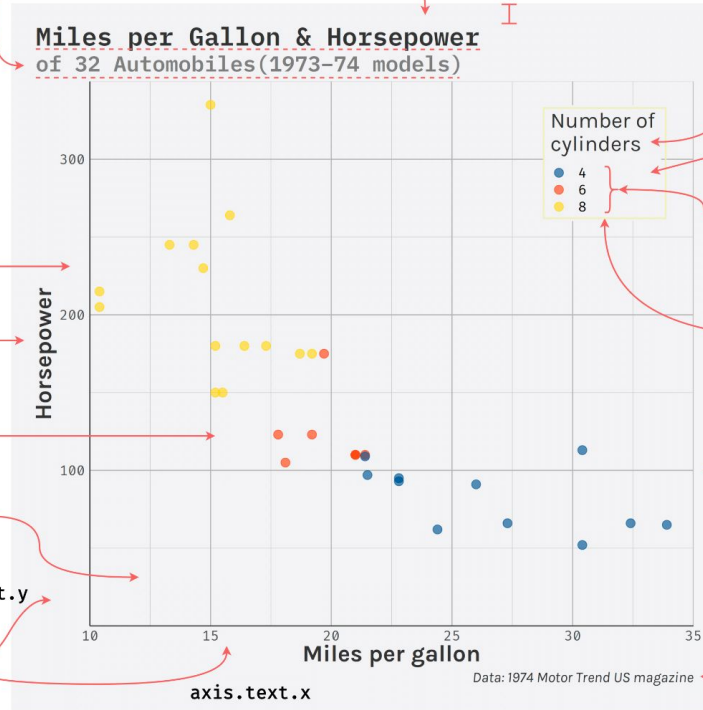
```
panel.grid.major = element_line()
```

```
panel.grid.minor = element_line()
```

```
axis.text.y
```

```
axis.text = element_text()
```

```
axis.text.x
```



```
legend.title = element_text()
```

```
legend.background = element_rect()
```

```
legend.text = element_text()
```

```
legend.position = c(.85,.85) / "none" / "left" / "right" / "bottom" / "top"
```

```
plot.background = element_rect()
```

```
plot.caption = element_text()
```

`text = element_text()` ← modifications will be applied to all text elements

Full list of elements at ggplot2.tidyverse.org/reference/theme

[isabella-b](#)



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YAML Header in R Markdown File

```
1 ---  
2 title: "Example"  
3 author: "Zachary M. Smith"  
4 date: "November 16, 2018"  
5 output: html_document  
6 ---
```



Rendered YAML Header

Example

Zachary M. Smith

November 16, 2018



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YAML Header in R Markdown File

```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "November 16, 2018"
5 output:
6   html_document:
7     toc: true
8     number_sections: true
9 ---
```



Rendered YAML Header

Example

Zachary M. Smith

November 16, 2018

- 1 R Markdown
- 2 Including Plots

Ref



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YAML Header in R Markdown File

```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "November 16, 2018"
5 output:
6   html_document:
7     toc: true
8     number_sections: true
9     toc_float: true
10 ---
```



Rendered YAML Header

1 R Markdown

2 Including Plots

Example

Zachary M. Smith

November 16, 2018



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YAML Header in R Markdown File

```
1 ---  
2 title: "Example"  
3 author: "Zachary M. Smith"  
4 date: "November 16, 2018"  
5 output:  
6   html_document:  
7     toc: true  
8     number_sections: true  
9     toc_float: true  
10    theme: cerulean  
11 ---
```



Rendered YAML Header

1 R Markdown

2 Including Plots

Example

Zachary M. Smith

November 16, 2018

1 R Markdown

2 Including Plots



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```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "`r Sys.Date()`"
5 output:
6   word_document: default
7   html_document: default
8 ---
```

```
1 ---
2 title: "Example"
3 author: "Zachary M. Smith"
4 date: "`r Sys.Date()`"
5 output:
6   word_document:
7     reference_docx: word_template.docx
8 ---
```



ymlthis is an R package intended to make it easier for you to generate YAML headers

```
ymlthis:::launch_yaml_addin().
```

The screenshot shows a 'Set up YAML' dialog box with the following fields and options:

- Author:** Zachary M. Smith
- Date:** Use system date (checked)
- Title:** Untitled
- Subtitle:**
- Output:** html (with 'Set html options' button)
- Export to:** R Markdown (dropdown menu)
- Path:** Untitled.Rmd
- R Markdown Template:** Browse... (with 'Template (optional)' button)

At the bottom, there are tabs for 'YAML', 'R Markdown Options', 'LaTeX Options', 'Citations', and 'Parameterized Reports', and a 'Done' button.



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 **RPubs**
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RStudio Connect is a server product from RStudio for secure sharing of applications, reports, plots, and APIs. >

Cancel



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Install **prettydoc** package and change the **YAML** header to:

```
output:  
  prettydoc::html_pretty:  
    theme: cayman  
    highlight: github  
    math: katex
```

Publish your website?



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الواجب

● حمل حزمة tidytuesdayR

● راجع بيانات الأسبوع ٢٨ هنا

○ <https://twitter.com/tidyTuesday>

○ غرد plot جديد وسيط مبني على هذه البيانات

○ مراجعه

■ <https://www.youtube.com/watch?v=-1x8Kpyndss>



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Feedback



- ما هو **أفضل** شيء تعلمته اليوم؟
- ما هو **أصعب** مفهوم تعرضت له في هذه الجلسة؟
- ما هو الشيء الذي تحب ان **يتحسن** في الجلسات القادمة؟

