

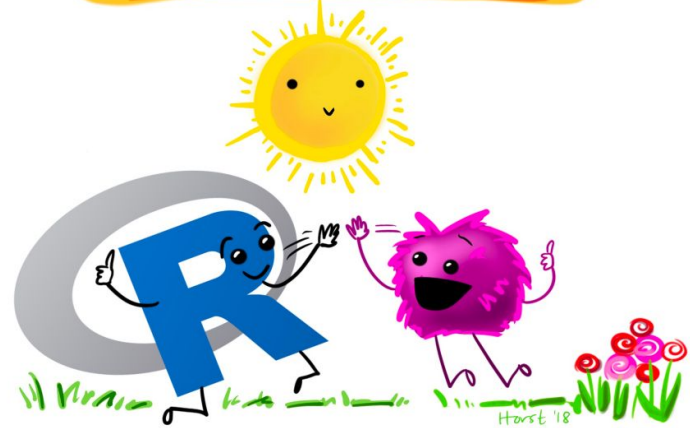
# لغة الآر من الصفر إلى الإحتراف

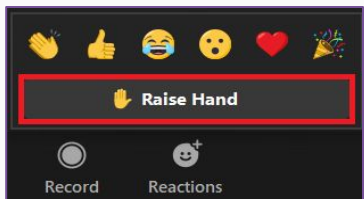
at first I was like...



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 المزوق

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)

- 
- 
- 
- 
- 
- 
- 



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



## خطة الدورة التدريبية

الأسبوع	نوع المحاضرة	اليوم	التاريخ	الساعة (بتوقيت السعودية)	المدة بالساعات
الرابع	محاضرة مباشرة	الخميس	28 يوليو 2022	من ١١:٣٠ إلى ١٣:٣٠ 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 ١٣:٣٠ 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 ٤:٣٠ 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

One-to-one Sessions this Thursday  
And optional Terminal Session



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



Saturday, August 13, 2022

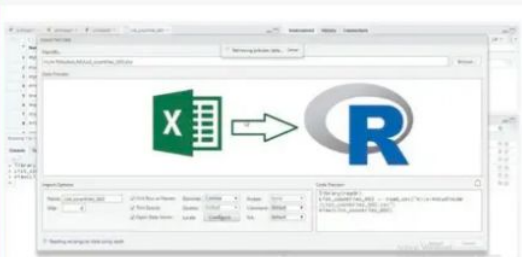
## From Excel to R



Hosted By  
Simisani N.



gaborone@rladies.org



### From Excel to R with Yanina Bellini Saibene

14:00pm SAST/CAT, 13th August

register at:  
[www.meetup.com/rladies-gaborone/events/286104389/](http://www.meetup.com/rladies-gaborone/events/286104389/)



R-Ladies Gaborone  
Public group

[Link](#)



Saturday, August 13, 2022 at 3:00 PM  
to Saturday, August 13, 2022 at 4:00  
PM AST

[Add to calendar](#)



Online event  
Link visible for attendees

Sponsors

[See all](#)



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)



Wednesday, September 28, 2022

## R-Ladies NYC Lightning Talks - RSVP and Call for Speakers



Hosted By  
Emily H. and Ayanthi G.

### Details

We are excited to host an online version of one of our most popular events - R-Ladies NYC Lightning Talks!

Fill out this brief form by Thursday, September 1st to submit your application to be a speaker!

<https://docs.google.com/forms/d/1vXC-iKiQCycnwd4sjqYm9BgIOITHEvsPPdZBrVIEjg/edit>

Lightning talks are five minute talks. You can talk about anything R, Tech, and/or Data Science related. Looking for ideas? How about talking about a cool package you found, how you use R in your company, a favorite learning resource, your journey into Data Science, or a side project you've been working on?

We would especially love to hear from people who've never presented at a meetup or conference before and/or those who still don't feel confident speaking publicly. A lightning talk can be a great way to start out speaking, as it's quick, low-prep, and fun!

Interested in proposing a talk but want to brainstorm ideas, get feedback, or some encouragement? We're here to help! You can join the #lightningtalks channel in our slack channel or email [nyc@rladies.org](mailto:nyc@rladies.org). We would be happy to set up a time to talk with you!



R-Ladies New York  
Public group



Wednesday, September 28, 2022 at  
2:00 AM to Wednesday, September 28,  
2022 at 4:00 AM AST  
[Add to calendar](#)



Online event  
Link visible for attendees

Report this event

A cool package you found, how you use R in your company, a favorite learning resource, your journey into Data Science, or a side project you've been working on



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)





**R-Ladies**

61 countries • 218 groups • 88262 members



Upcoming events   Groups Near Me



**R-Ladies**

Members

**88,262**

Groups

**218**

Countries

**61**

[Link](#)



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



BY



**R-Ladies welcomes members of all R proficiency levels,  
whether you're a new or aspiring R user, or an experienced  
R programmer interested in mentoring,  
networking & expert upskilling.**

Part of **R-Ladies – 218 groups**

## **R-Ladies Saudi Arabia (Dammam)**

- Dammam, Saudi Arabia
- 415 members · Public group
- Organized by R-Ladies Global and 4 others

[Edit group info](#)

Share:

- [About](#)
- [Events](#)
- [Members](#)
- [Photos](#)
- [Discussions](#)
- [More](#)

[Create event](#)

[Manage group](#)

[Join R-Ladies Dammam](#)

[Follow R-Ladies Dammam](#)

[Follow OSCSA](#)



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk





[HOME](#) [SCHEDULE](#) [SPEAKERS](#) [ACCESSIBILITY](#) [TASK FORCE](#) [NEWS & BLOG](#)

# CarpentryCon 2022

Expanding Data Frontiers  
August 1-12, 2022

[REGISTER TO ATTEND](#)

Website: <https://carpentries.org/>

CarpentriesCon 2022: <https://2022.carpentrycon.org/>



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk





One-to-one Sessions this Thursday  
And optional Terminal Session



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)



# What we will learn this week?



- Going deeper with R Markdown
- Publishing R Markdown
- Creating a blog with R Markdown
- SQL and R
- Joining datasets
- Saving plots and data
- Encapsulating computational environment with `renv`
- Reshaping data with `pivot\_longer` and `pivot\_wider`
- Creating custom functions and loops
- `reprex` and filing issues in GH
- Datetimes and factors
- Modelling
- The difference between lists/dataframes/tibble



# مراجعة



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)





@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# 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

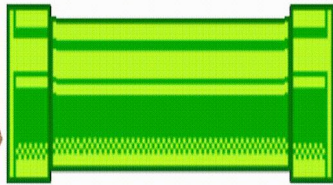
( و تُم ) = %>%

dataset %>%

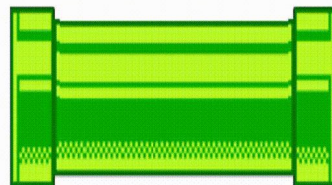
select(**column**)



Mario



%>%



%>%



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)





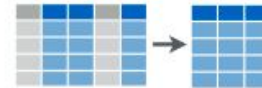
- `filter()` : pick observations by their values

### 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



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# Data transformation with dplyr : CHEAT SHEET

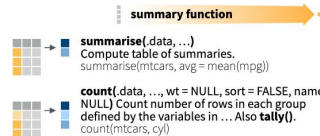


dplyr functions work with pipes and expect tidy data. In tidy data:



## 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).



## 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.



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.



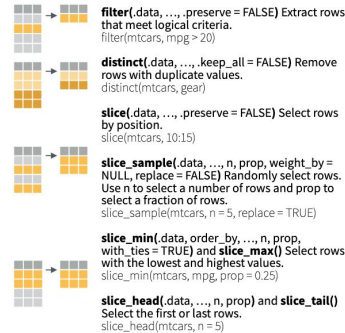
**ungroup(x, ...)** Returns ungrouped copy of table. `ungroup(g_mtcars)`



## Manipulate Cases

### EXTRACT CASES

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

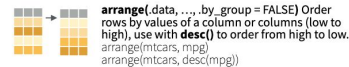


### Logical and boolean operators to use with filter()

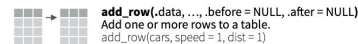
`==` `<` `<=` `is.na()` `%in%` `|` `xor()`  
`!=` `>` `>=` `is.na()` `!` `&`

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

### ARRANGE CASES



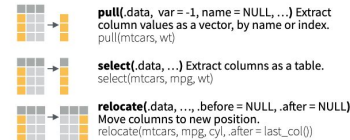
### ADD CASES



## Manipulate Variables

### EXTRACT VARIABLES

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



### Use these helpers with select() and across()

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

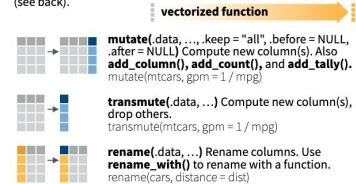
**contains(match)** **num\_range(prefix, range)** ; e.g. `mpg:cyl`  
**ends\_with(match)** **all\_of(x)/any\_of(x, ..., vars)** ; e.g. `gear`  
**starts\_with(match)** **matches(match)** **everything()**

### MANIPULATE MULTIPLE VARIABLES AT ONCE



### 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).



RStudio® is a trademark of RStudio, PBC • CC BY SA RStudio • info@rstudio.com • 844-448-1212 • rstudio.com • Learn more at [dplyr.tidyverse.org](https://dplyr.tidyverse.org) • dplyr 1.0.7 • Updated: 2021-07



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# ggplot2: Build a data MASTERPIECE



Credit: Allison Horst

HORST '18



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk





# 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



@OpenSciSaudi, @batool664



www.osc-ksa.com

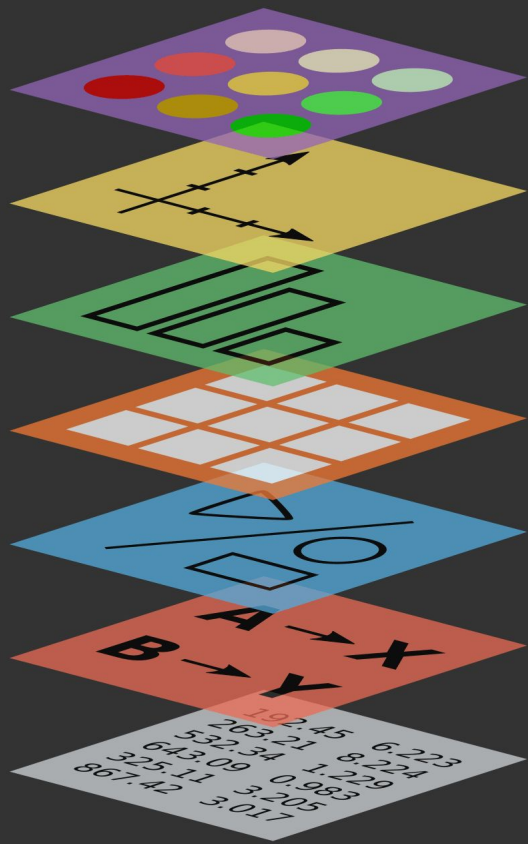


batool@liverpool.ac.uk





**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



@OpenSciSaudi, @batool664

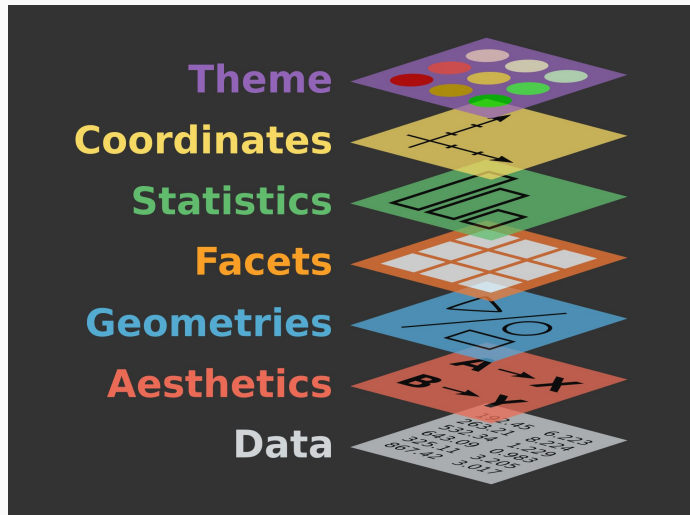


www.osc-ksa.com



batool@liverpool.ac.uk





```
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")
```



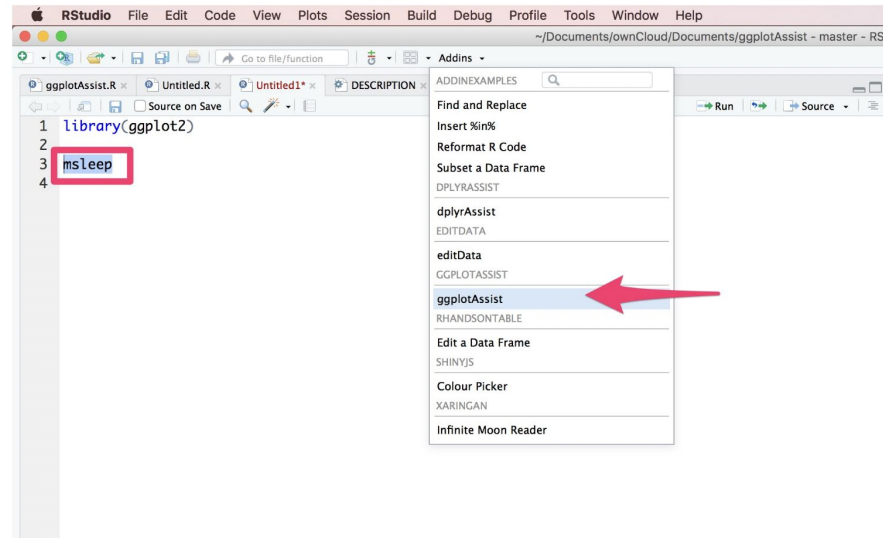
# ggplotAssist package



## 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](#)



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk







plotly



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)



## حفظ التمثيل البياني في الجهاز

---

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



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)



```
df ← data.frame(
  service_id = c(1:5),
  service_name = c("Netflix", "Disney+", "HBOMAX", "Hulu", "Peacock"),
  service_price = c(18, 10, 15, 7, 12),
  stringsAsFactors = FALSE
)

df

write.csv(df, "shows.csv", row.names = FALSE)

cat("The data frame is exported", "\n")
```



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)





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

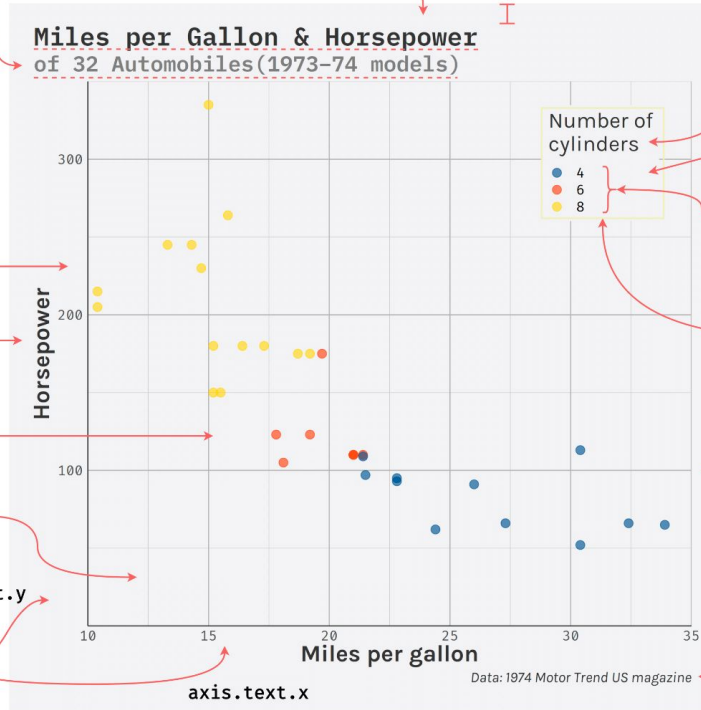
```
panel.grid.major = element_line()
```

```
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()
```

isabella-b

text = element\_text() ← modifications will be applied to all text elements

Full list of elements at [ggplot2.tidyverse.org/reference/theme](https://ggplot2.tidyverse.org/reference/theme)



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



## 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*



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# 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



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# 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*



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# 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



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk






```
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 ---
```



Publish

**Publish To**

 **RPubs**  
RPubs is a free service from RStudio for sharing documents on the web. >

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

Cancel



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk





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

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

Publish your website?



@OpenSciSaudi, @batool664



[www.osc-ksa.com](http://www.osc-ksa.com)



[batool@liverpool.ac.uk](mailto:batool@liverpool.ac.uk)



**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:** [Empty] with  Use system date
- Title:** Untitled
- Subtitle:** [Empty]
- Output:** html, with a 'Set html options' button
- Export to:** R Markdown (dropdown)
- Path:** Untitled.Rmd
- R Markdown Template:** Browse... Template (optional)

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



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# دمج البيانات من أكثر من مصدر



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



## الواجب

- كتابة مقالة في موضوع تعلمته في لغة الآر
  - كتابة بالعربي أو الأنجلش
  - أمثلة هي باكيچ جديدة أو عن رحلتك في التعلم أو عن الجيت هوب أو ...
- مشاهدة
- <https://www.youtube.com/watch?v=AADnslLpzI4>



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk



# 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؟



@OpenSciSaudi, @batool664



www.osc-ksa.com



batool@liverpool.ac.uk

