



**e-Rum2020**

VIRTUAL CONFERENCE

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*04\_Generalizability*

# A UNIFIED APPROACH FOR WRITING AUTOMATIC REPORTS

## Parameterization and Generalization of R-Markdown

# What is a generalizable Rmd?

Generalization definitions from Computer Science:

“

*Generalization* is the process of extracting shared characteristics from two or more classes, and combining them into a generalized superclass. Shared characteristics can be attributes, associations, or methods. [1](#)

**Generalization**

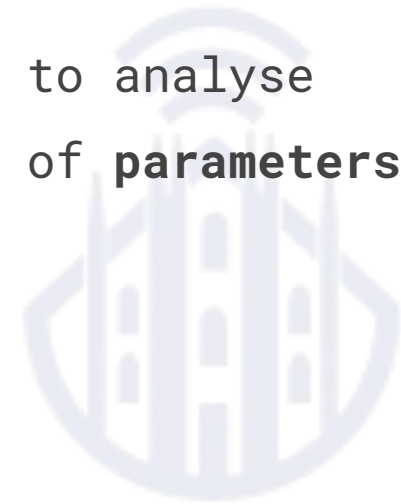
the identification, and possible organization, of common properties of abstractions. [2](#)

CODE ORIENTED SOFTWARE REUSE [3](#)

”

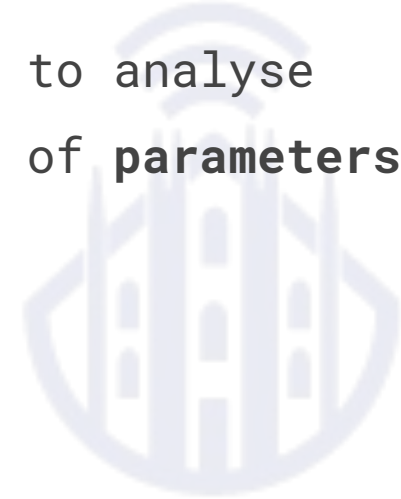
# What is a generalizable Rmd?

Generalization -> use the **same Rmd script** to analyse **different facets** of a study by making use of **parameters**, thus **never altering** the Rmd code.



# What is a generalizable Rmd?

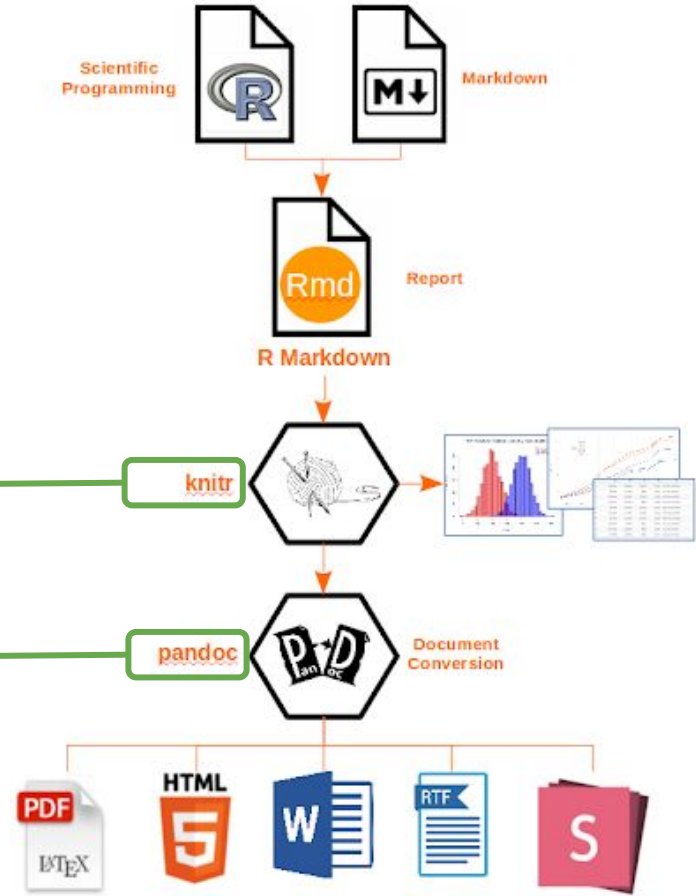
Generalization -> use the **same Rmd script** to analyse **different facets** of a study by making use of **parameters**, thus **never altering** the Rmd code.



# Behind the knit

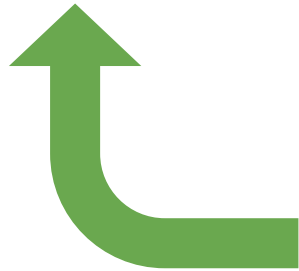
Converts chunks of code

Converts document



# Behind the knit

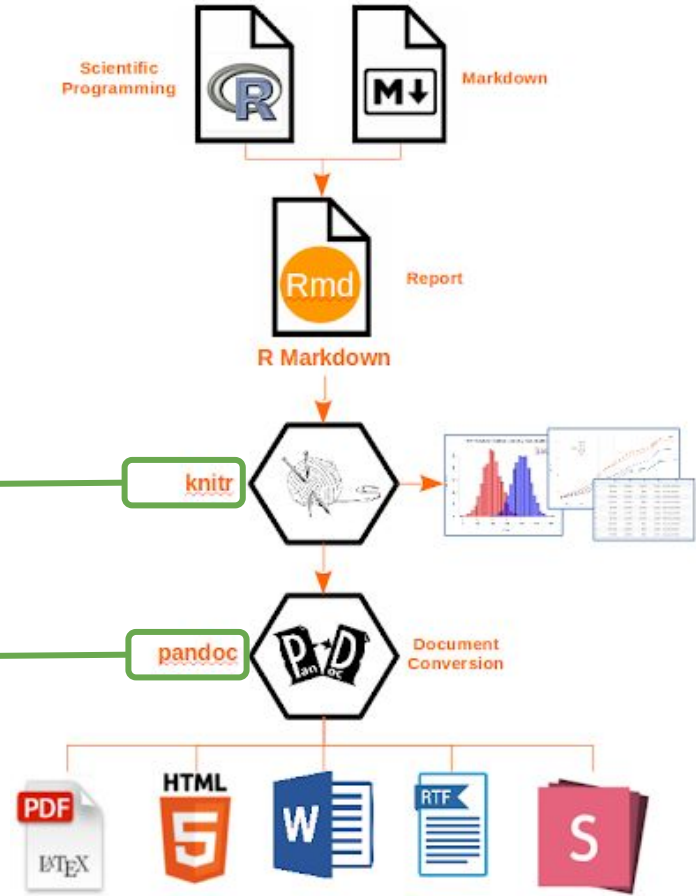
The `rmarkdown::render()` function



Converts chunks of code

Converts document

[rmarkdown.rstudio.com](https://rmarkdown.rstudio.com)



# Render function

Input Rmd/md file  
Format (html, pdf)  
Output name  
Output directory

...

YAML parameters

```
render(  
  input,  
  output_format = NULL,  
  output_file = NULL,  
  output_dir = NULL,  
  output_options = NULL,  
  output_yaml = NULL,  
  intermediates_dir = NULL,  
  knit_root_dir = NULL,  
  runtime = c("auto", "static", "shiny", "shiny_prerendered"),  
  clean = TRUE,  
  params = NULL,  
  knit_meta = NULL,  
  envir = parent.frame(),  
  run_pandoc = TRUE,  
  quiet = FALSE,  
  encoding = "UTF-8"  
)
```

[rmarkdown.rstudio.com](https://rmarkdown.rstudio.com)

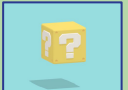
## Your turn: Exercise 9

 E09\_renderRmarkdown.R

The render function  
run the Rmd  
contained in the  
folder named  
"markdown"

```
1 rmarkdown::render(  
2   input="/cloud/project/markdown/GP_report_render_function_s.Rmd",  
3   output_format = "html_document",  
4   output_dir = "/cloud/project/solutions",  
5   params = list(  
6     month = "07",  
7     year = 2019,  
8     gp = "A81005"  
9   ),  
10  run_pandoc = TRUE,  
11  output_file = paste0("/cloud/project/output/GP_report_render_function_s.html")  
12 )
```

- Change output parameters from the render function
- Change output folder



Time: 5 min



!!GREAT!!



LET'S MOVE  
ANOTHER STEP



# Parameterized render function

DEFINE ALL PARAMETERS OUTSIDE THE RENDER FUNCTION

```
12 rmarkdown::render(  
13   input=inputFile,  
14   output_format = "html_document",  
15   output_dir = outputDir,  
16   params = list(  
17     year = yyyy,  
18     month = mm,  
19     gp = selected_gp  
20   ),  
21   run_pandoc = TRUE,  
22   output_file = nameFile  
23 )
```

# Parameterized render function

```
3 inputFile = "/cloud/project/markdown/GP_report_render_function.Rmd"
4 outputDir = "/cloud/project/output"
5 yyyy = 2019
6 mm = "07"
7 selected_gp = "A81005"
8 nameFile = "GP_report_render_function_E11.html"
```

The diagram illustrates the mapping of variables from the first code block to the `rmarkdown::render` function call in the second code block. Green arrows point from the variable names in the first block to their corresponding arguments in the second block: `inputFile` to `input`, `outputDir` to `output_dir`, `yyyy` to `year`, `mm` to `month`, `selected_gp` to `gp`, and `nameFile` to `output_file`. The `params` list in the second block contains the year, month, and group parameters.

```
12 rmarkdown::render(
13   input = inputFile,
14   output_format = "html document",
15   output_dir = outputDir,
16   params = list(
17     year = yyyy,
18     month = mm,
19     gp = selected_gp
20   ),
21   run_pandoc = TRUE,
22   output_file = nameFile
23 )
```

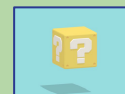
## Your turn: Exercise 10

 E10\_renderRmarkdown\_parameterized.R

No need to alter the  
render function to  
change output!

```
3 inputFile = "/cloud/project/markdown/GP_report_render_function.Rmd"
4 outputDir = "/cloud/project/output"
5 yyyy = 2019
6 mm = "07"
7 selected_gp = "A81005"
8 nameFile = "GP_report_render_function_E11.html"
```

- Change any parameter



Time: 5 min


!!SUPER!!

MOVE TO THE  
FINAL LEVEL




# Generalized render function

Embed the render function in a function



```
12 rmarkdown::render(  
13   input=inputFile,  
14   output_format = "html_document",  
15   output_dir = outputDir,  
16   params = list(  
17     year = yyyy,  
18     month = mm,  
19     gp = selected_gp  
20   ),  
21   run_pandoc = TRUE,  
22   output_file = nameFile  
23 )
```



# Generalized render function

```
2
3 ▸ renderReport = function(inputFile, outputDir, yyyy, mm, selected_gp, nameFile){
4
5   rmarkdown::render(
6     input=inputFile,
7     output_format = "html_document",
8     output_dir = outputDir,
9     params = list(
10       year = yyyy,
11       month = mm,
12       gp = selected_gp
13     ),
14     run_pandoc = TRUE,
15     output_file = paste0(outputDir,"/",nameFile)
16   )
17 }
18
```

# Generalized render function

```
2
3 ▸ renderReport = function(inputFile, outputDir, yyyy, mm, selected_gp, nameFile){
4
5   rmarkdown::render(
6     input=inputFile,
7     output_format = "html_document",
8     output_dir = outputDir,
9     params = list(
10       year = yyyy,
11       month = mm,
12       gp = selected_gp
13     ),
14     run_pandoc = TRUE,
15     output_file = paste0(outputDir,"/",nameFile)
16   )
17 }
18
```

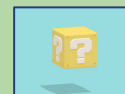


## Your turn: Exercise 11

 E11\_renderFunction.R

```
19  
20 # Run the function with chosen parameters  
21  
22 renderReport(inputFile = "/cloud/project/markdown/GP_report_render_function.Rmd",  
23              outputDir = "/cloud/project/output",  
24              yyyy = 2019,  
25              mm = "07",  
26              selected_gp = "A81005",  
27              nameFile = "GP_report_render_function_E12.html")
```

- Run the function once and then run it “one shot” with different arguments



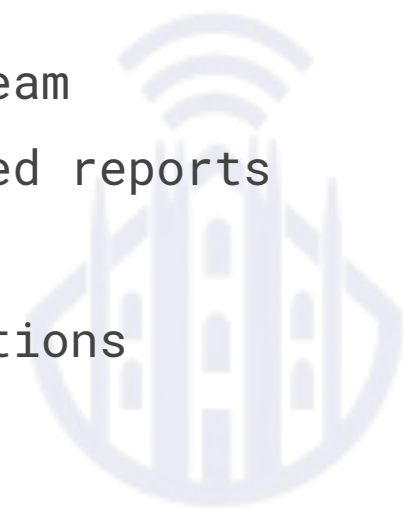
Time: 5 min

## Ok but... why????

Create parameterized and generalized Rmd skelton reports in any project that can be run for different facets of your analysis without rewriting and/or manually selecting parameters.

# Applications

- Share (reproducible) reports across team
- Create (reproducible) customer-centered reports
- Schedule report generation
- Embed parameterized report in applications
- ...



# Questions



# Next up: Prescriptions Project

Source: [giphy.com](https://www.giphy.com)

