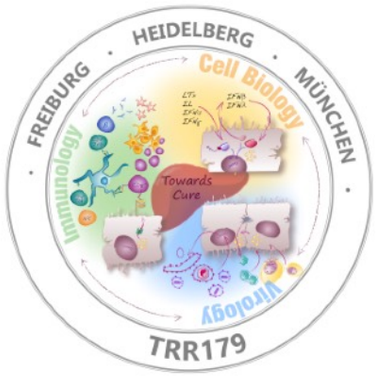


# Introduction to R for data analysis

## - Rmarkdown -

Carl Herrmann & Carlos Ramirez
IRTG Course - June 2021

# Reproducible analysis

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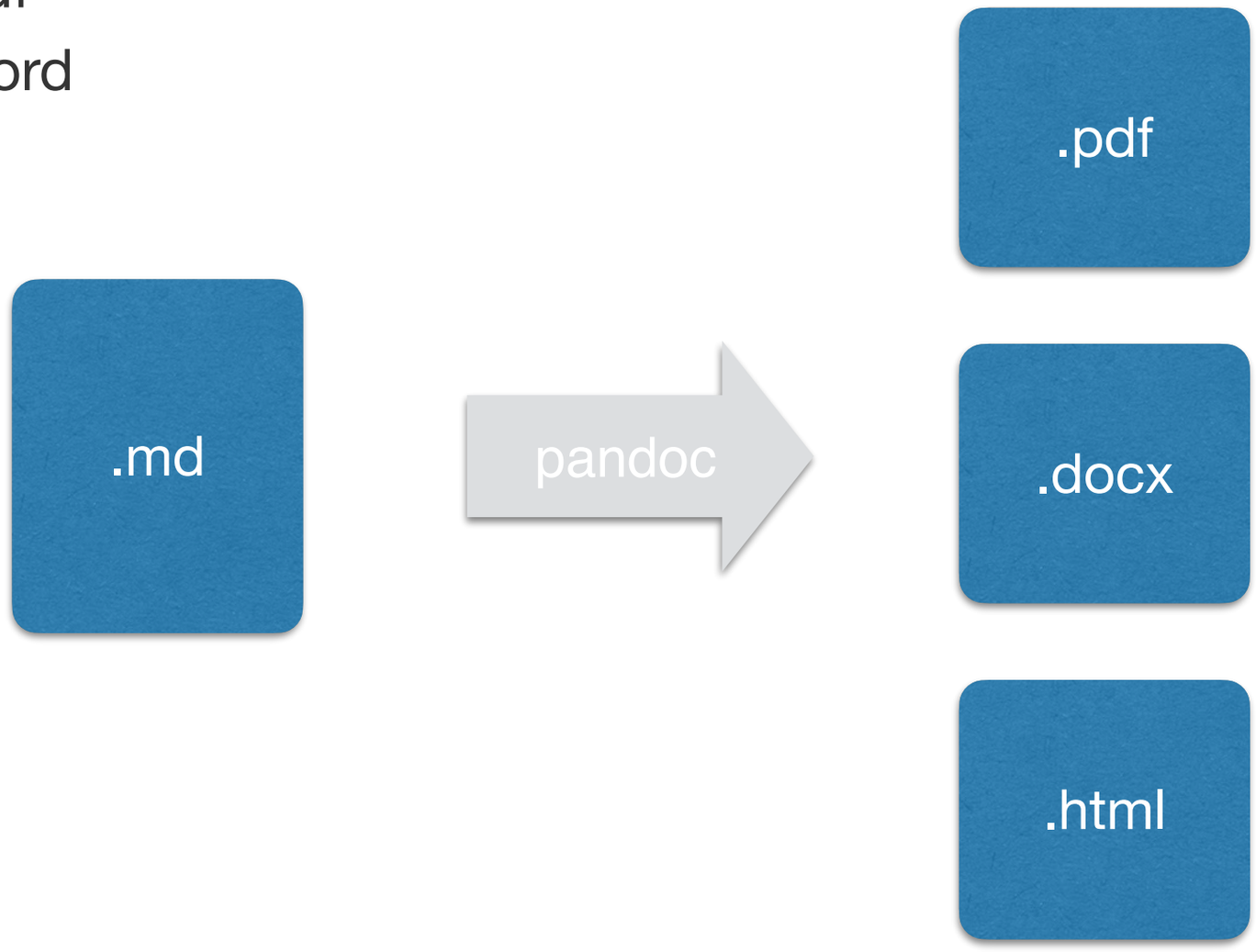
- Reproducibility of results is important for experimental work (lab book!) but also for computational analysis!
- Different systems have been developed to ensure reproducibility of analysis flows
- For R based analysis, the best option is to use **Rmarkdown** documents
  - high levels of reproducibility
  - easy update of results
  - easy sharing of results with colleagues (html / pdf document)

# Markdown

- Markdown is a way to format plain text with a simple text editor
- Markdown documents can be converted with a **renderer** into
  - html
  - pdf
  - word



# Rendering markdown

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markdown

```
# My document

## this is a header

In the text we can *highlight* or put in **bold**.

## making lists

We can make **numbered lists**:

1. first item
2. second item

or unordered lists

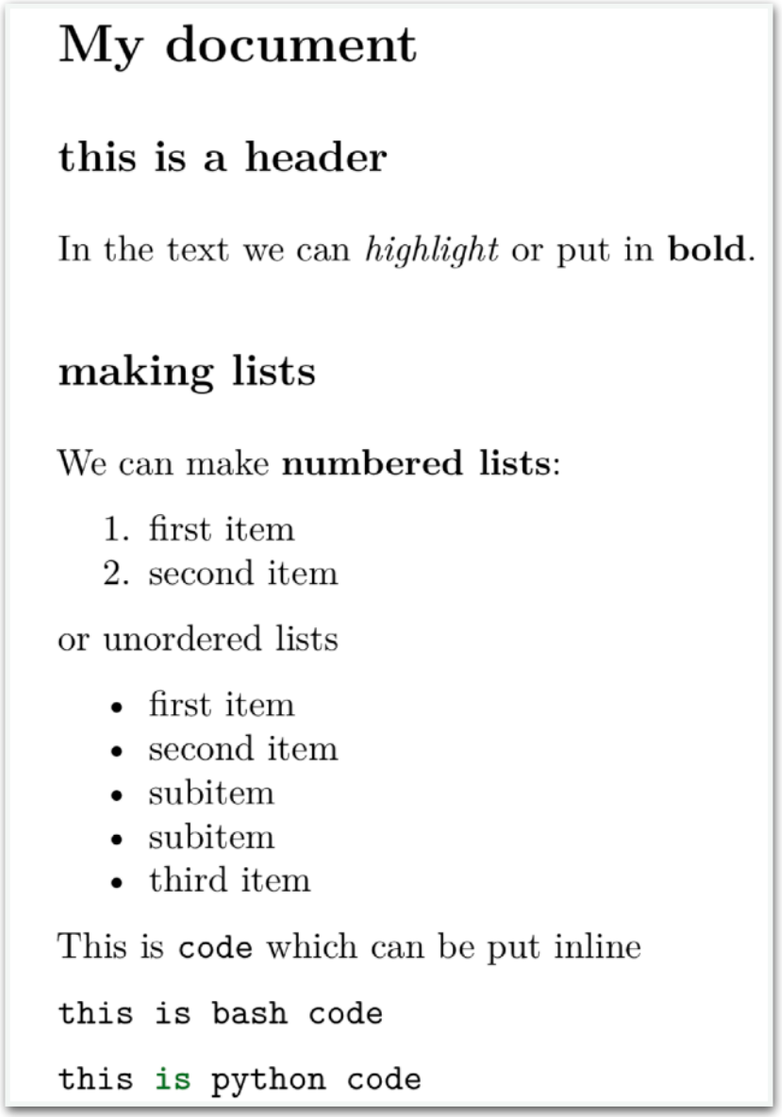
* first item
* second item
  + subitem
  + subitem
* third item

This is `code` which can be put inline

```bash
this is bash code
```

```python
this is python code
```
```

pdf



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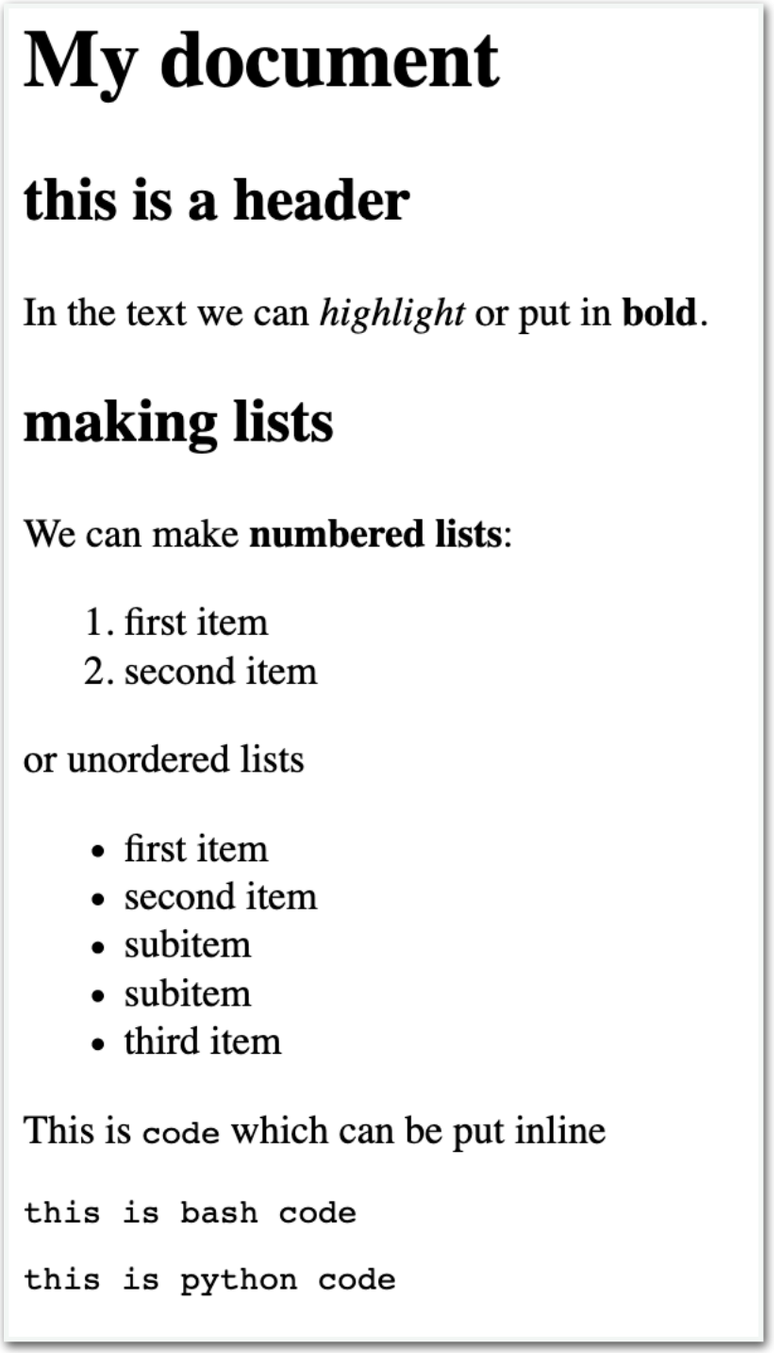
- subitem
- subitem
- third item

This is `code` which can be put inline

```
this is bash code
```

```
this is python code
```

html



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This is `code` which can be put inline

```
this is bash code
```

```
this is python code
```

# Rmarkdown

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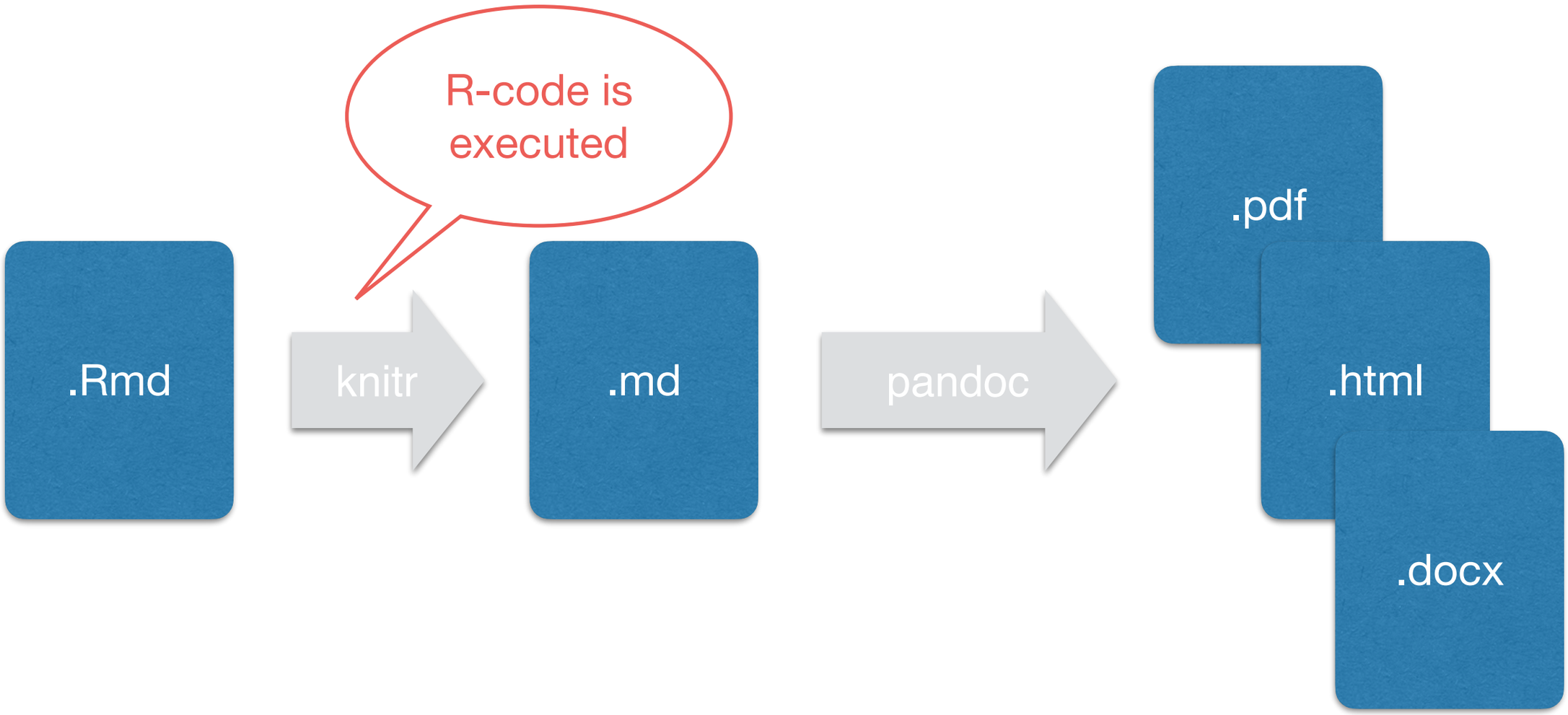
- With Rmarkdown, R-code parts can be included into the  markdown document
- the R-code will be executed, the result integrated into markdown



# Rmarkdown format

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Knit | Insert | Run

```
---
title: "Demo"
author: "Carl Herrmann"
date: "6/14/2021"
output: html_document
---

```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
```

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, an
MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well
as the output of any embedded R code chunks within the document. You can embed an R code chunk lik
this:

```{r cars}
summary(cars)
```

## Including Plots

You can also embed plots, for example:

```{r pressure, echo=FALSE}
plot(pressure)
```

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R
code that generated the plot.
```

# Demo

Carl Herrmann

6/14/2021

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

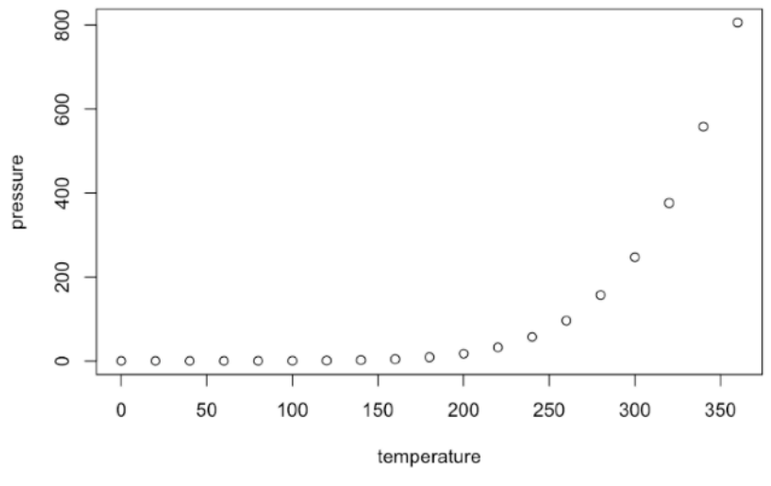
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

## Including Plots

You can also embed plots, for example:




Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

# Rmarkdown format

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````
---
title: "Project 01"
author: "Carl Herrmann"
date: "4/17/2019"
output:
  html_document:
    keep_md: yes
  pdf_document: default
---
# A Rmarkdown tutorial

This is a brief tutorial on how to use Rmarkdown to create dynamic documents

```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
knitr::opts_knit$set(root.dir='/Users/carlherrmann/Teaching/SS2019/DataAnalysis_4FS')
```

## Load the dataset

```{r read_data}
allDepMapData = readRDS('Data/depmap/DepMap19Q1_allData.RDS')
```

Now plot the distribution of the cell lines according to the tissue type

```{r plot_data}
freq = sort(table(allDepMapData$annotation$Primary.Disease))
par(las=2,mar=c(3,8,3,3));barplot(freq,horiz=TRUE, col='lightgrey')
```
````

header: set options

R code chunks

text in markdown

# Rmarkdown chunk options

- Display options can be set for each chunk individually, or for all chunks at the beginning of the document

````
```{r setup, include=FALSE}
knitr::opts_chunk$set(echo = TRUE)
knitr::opts_chunk$set(cache = TRUE)
```
````

valid for all chunks

- echo=TRUE : R-code is displayed in final document
- cache = TRUE : results of all chunks are cached

````
```{r plot_data,fig.height=12,fig.width=12}
freq = sort(table(allDepMapData$annotation$Primary.Disease))
par(las=2,mar=c(3,8,3,3));barplot(freq,horiz=FALSE, col='lightgrey')
```
````

valid for **this** chunks

- set height and width of output figure

# Reference


- https://rmarkdown.rstudio.com/
- https://www.rstudio.com/wp-content/uploads/2016/03/rmarkdown-cheatsheet-2.0.pdf