UNIVERSITÄT KOBLENZ · LANDAU

MOD 3
R MARKDOWN

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Landau, 25th October 2021

Purpose of Writing Markdown Scripts

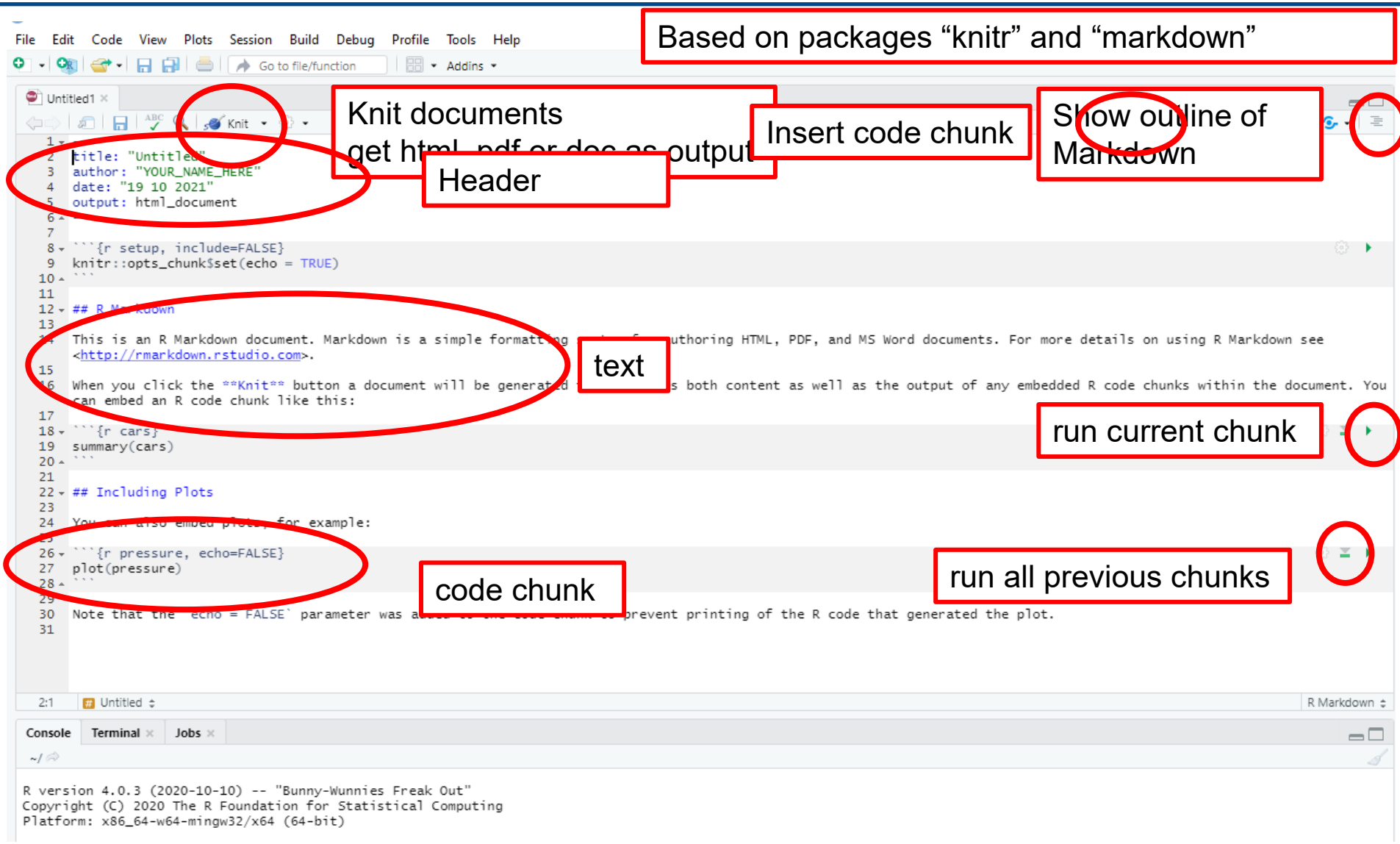
Normal R script

- Code and text are not separated
- Only one level of dividers possible
- Text with inline code not possible
- Script and results are separated

R Markdown

- Code (in chunks) and text are separated
- Entering of headlines, tables etc. is possible
- Text with in-line code (also Latex) possible
- (Beautiful) outcome where script and results are together
- Easier to recap and publish script + results!

OVERVIEW


Based on packages “knitr” and “markdown”
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
Untitled1
Knit
Knit documents
get html, pdf or doc as output
Header
Insert code chunk
Show outline of Markdown
title: "Untitled"
author: "YOUR_NAME_HERE"
date: "19 10 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
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
s 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:
text
run current chunk
```{r cars}
summary(cars)
```
Including Plots
You
for example:
```{r pressure, echo=FALSE}
plot(pressure)
```
code chunk
run all previous chunks
Note that the `echo = FALSE` parameter was
prevent printing of the R code that generated the plot.
2:1
Untitled
R Markdown
Console
Terminal
Jobs
~/
R version 4.0.3 (2020-10-10) -- "Bunny-Wunnies Freak Out"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

HEADER

```
---
title: "Title_name"
author: "VCS"
date: "3_11_2020"
editor_options:
  chunk_output_type: console
output:
  html_document:
    number_sections: yes
    toc: yes
    toc_depth: '3'
    toc_float: true
  pdf_document:
    toc: yes
    toc_depth: '3'
---
```

Title of Markdown

Author of Markdown

Date Markdown was created

Position where results of code chunks are presented, if “console” as usual when writing an R script

Are headlines numbered?

Will the contents be displayed

Depth of contents in

Will the content be visible on the side of the html?

Inline / Text Options

- Have different levels of headlines

```
# Headline A
## Headline B
```

1 Headline A
1.1 Headline B

- Enter text in italics or bold
  - For italics use one * or _
  - For bold use two * or _

```
*italics* or _italics_
**bold** or __bold__
```

italics or *italics*
bold or **bold**

- Use superscripts or subscripts
  - For superscripts framed by ^
  - For subscripts framed by ~

```
H^+^
H~2~O
```

H^+
H_2O

Inline / Text Options

- Enter links
  - enter links in < >
  - setting word in [] and the link in ()

```
https://www.uni-koblenz-landau.de
```

https://www.uni-koblenz-landau.de

```
[Uni](https://www.uni-koblenz-
landau.de)
```

Uni

- Enter (un)ordered lists

```
* unordered list  (or + / -)
1. ordered list
```

- unordered list

1. ordered list

- Enter tables

```
First column | Second column
-|-
First row | First row
Second row | Second row
```

First column	Second column
First row	First row
Second row	Second row

IN-LINE R CODE

- When writing code in `r ` sections you can enter R code outside of chunks, here some examples:
  - Entering date

    `` `r format(Sys.time(), "%d.%m.%Y")` `` 25.10.2021

  - Enter calculations

    `` 2 + 2 = `r 2+2` `` 2 + 2 = 4

  - Refer to your dataframe

    `` `r nrow(mtcars)` `` 32
    `` `r ncol(mtcars)` `` 11

In-Line Latex Code + Equations

- You can enter in-line Latex code by setting it in $ $, here some examples:
  - Entering special characters

```
$\alpha$
$\beta$
```

α
β

  - Enter in-line equations

```
$y = x^2$
```

$y=x^2$

- You can also enter full equations in separate lines, set these in $$ $$

```
$$ k_{OW} = log \left( \frac{c_{1-octanol}}{c_{water}} \right)   $$
```

$$k_{OW} = log \left(\frac{c_{1-octanol}}{c_{water}} \right)$$

Code Chunks

- Use “Strg + Alt + I” to enter code chunks

```
```{r}
```
```

- The code inside chunks is a usual R-script

Code Chunk Options

- Give chunks names ```` ```{r name} ````
- Display code in output ```` ```{r name, echo = TRUE} ````
- Display messages in output ```` ```{r name, message = TRUE} ````
- Display warnings in output ```` ```{r name, warning = TRUE} ````
- Run code chunk ```` ```{r name, eval = TRUE} ````
- Different result options ```` ```{r name, results = X} ````
  - X = hold → all text results below code chunk
  - X = hide → don't display text results
  - X = markup (default) → display text results directly

KNITTING PDF

- Generate PDF → Latex needs to be installed

```
install.packages('tinytex')
tinytex::install_tinytex()
```

- Problem: If there is long text in the code chunks, it might not wrap correctly

  Solution:

````
```{r,echo=FALSE,message=FALSE,warning=FALSE}
# Set so that long lines in R will be wrapped:
knitr::opts_chunk$set(tidy.opts=list(width.cutoff=80), tidy=TRUE)
```
````

Interactive Documents / Websites

- Can be done using the package “shiny”
  → shiny apps
  Examples: https://shiny.rstudio.com/gallery/
  http://standartox.uni-landau.de/
- Possibility to create reactive tables or plots
- Way too many options to have a look here
- Useful links
  - https://shiny.rstudio.com/tutorial/
  - https://mastering-shiny.org
  - https://shiny.rstudio.com/images/shiny-cheatsheet.pdf

At Home Tasks

- See tasks uploaded in OLAT
- One part: Create this function + corresponding text in R Markdown:

$$sumTU = log10\left(\sum_{i=1}^{n} \frac{c_i}{EC_{50_i}}\right)$$

where c_i is the concentration of the pesticide *i* and EC_{50i} is the concentration of pesticide *i* at which 50 % of the test organisms (*Daphnia magna*) were affected.

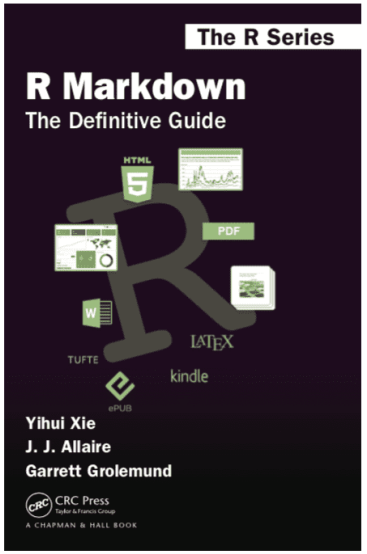
- Upload your Markdown at GitHub

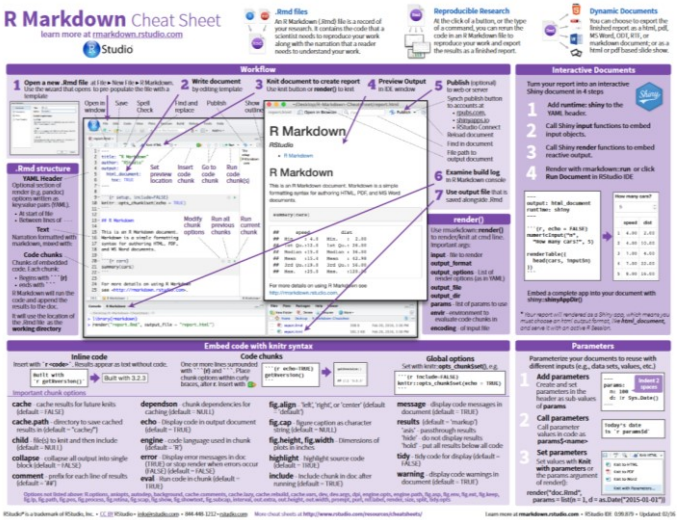
➔ Write R codes of following course days as R Markdowns

➔ Remember:
Your Project has to be submitted as R Markdown

Some useful Links

- https://bookdown.org/yihui/rmarkdown/
- https://rmarkdown.rstudio.com/
- https://raw.githubusercontent.com/rstudio/cheatsheets/master/rmarkdown-2.0.pdf





And many, many more ☺

THANKS FOR YOUR ATTENTION!

DO YOU HAVE QUESTIONS?

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