, ,

2020-12-18

Contents

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Chapter 1

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1.1

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1.3

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. , `git`
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Chapter 2

2.1 : R

, , Python (?)
(: pandas (?), numpy (?), matplotlib (?)) R (?) (: dplyr
(?), data.table (?), ggplot2 (?)).
, c# , , c# e
, , . , , Julia (?)
Python R
c#. ,
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R . R
, , ,
. R
R Rstudio
, (Rmarkdown (?)), (bookdown (?)),
(shiny (?)), (blogdown (?)), . e bookdown,
( ) , ,
Rstudio. R
. , rOpenSci
(R) , . -
, CRAN (Comprehensive R Archive Network)
: CRAN Task View: Reproducible Research.

R.
R . ,
R
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R Rstudio (Rmarkdown)

Jypiter
(VScode). ,
( ) , Rstudio
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2.2

—
R. , R
(R (Rstudio)):

```
#
#
#

paketi <- c(
  "readr",
  "dplyr",
  "docopt",
  "assertthat",
  "devtools",
  "usethis",
  "prodigenr",
  "rmarkdown",
  "knitr"
)

install.packages(pkgs = paketi)
```

2.3 : git

, git (??),
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e undo/redo , ( ),
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git ( ). , git
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Table 2.1: .

		csv, MySQL
		R git
		dplyr, ggplot2
		docker ( )

. `git`
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2.4

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Chapter 3

3.1 (, ,)

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10 R ( ).

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. , , , Downloads :

```
trosoci <- read_csv("~/Downloads/trosoci-moja-firma.csv")

trosoci_sumirani <- trosoci %>%
  group_by(vraboten, tip_na_trosok) %>%
  summarise_at("cena", "sum") %>%
  arrange(vraboten, tip_na_trosok)

write_csv(trosoci_sumirani,
          path = "~/Download/trosoci-moja-firma-sumirani.csv")
```

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. Rstudio :

```
trosoci <- read_csv("~/Downloads/trosoci-moja-firma.csv")

trosoci_sumirani <- trosoci %>%
  group_by(vraboten, tip_na_trosok) %>%
  summarise_at("cena", "sum") %>%
```

```
  arrange(vraboten, tip_na_trosok)

write_csv(trosoci_sumirani,
          path = "~/Download/trosoci-moja-firma-sumirani.csv")
```

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?!?“ ?

1. ~/Downloads/trosoci-moja-firma.csv.
? ( )

2. ~/Downloads/trosoci-moja-firma.csv.
Linux Windows ,
Downloads (. C:\Downloads)
~/Downloads)? ( ) ( )

3. , , R:
readr (?) dplyr (?).
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? ( ) ( ).

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4. ~/Downloads/trosoci-moja-firma.csv
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5. , Downloads /
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6. , summarise_at
. , R dplyr,
summarise_at .
dplyr, summarise_at ,
dplyr, summarise_at
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3.2 -

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- . C:/Data,
  C:/Analizi.
- (: C:/Data/ 2020/ /).
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- (#) README ,
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- ( ) .
- (
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- (randomness)
  (set.seed R).
  .

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Chapter 4

4.1

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vraboten, tip_na_trosok cena. :

```
trosoci
```

```
## # A tibble: 30 x 3
##    vraboten    tip_na_trosok            cena
##    <chr>       <chr>                   <dbl>
##  1    .                               75
##  2     .                             81
##  3    .                               13
##  4      .                   40
##  5       .                        89
##  6     .                             48
##  7      .                   96
##  8     .                     23
##  9     .                             84
## 10    .                               29
## # ... with 20 more rows
```

, , :

```
trosoci %>%
  group_by(vraboten, tip_na_trosok) %>%
  summarise_at("cena", "sum") %>%
  arrange(vraboten, tip_na_trosok)
```

```
## # A tibble: 12 x 3
## # Groups:   vraboten [5]
```

```
##    vraboten    tip_na_trosok            cena
##    <chr>       <chr>                   <dbl>
##  1    .                          31
##  2    .                               177
##  3    .                                51
##  4       .                           324
##  5       .                          111
##  6       .                   196
##  7       .                           218
##  8       .                            54
##  9      .                      23
## 10      .                              48
## 11      .                             127
## 12      .                             116
```

4.2

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1. R
2.
3.

, readr (?) dplyr (?) . :

```
#
library(dplyr)
library(readr)

#              ,          CRAN  :
# install.packages("dplyr")
# install.packages("readr")

trosoci <- read_csv("data/trosoci-moja-firma.csv")

trosoci_sumirani <- trosoci %>%
  group_by(vraboten, tip_na_trosok) %>%
  summarise_at("cena", "sum") %>%
  arrange(vraboten, tip_na_trosok)

write_csv(trosoci_sumirani,
          path = "data/trosoci-moja-firma-sumirani.csv")
```

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```
#
library(dplyr)
library(readr)

#              ,        :
# install.packages("dplyr")
# install.packages("readr")

#     :
#
#
pateka_do_input <- NULL # "data/trosoci-moja-firma.csv"
pateka_za_output <- NULL # "data/trosoci-moja-firma-sumirani.csv"

#      :
# pateka_do_input <- "~/Downloads/trosoci-moja-firma.csv"
# pateka_do_output <- "~/Downloads/trosoci-moja-firma-sumirani.csv"

#   :
# pateka_do_input <- "C:\rabota\podatoci\trosoci\trosoci-moja-firma.csv"
# pateka_do_output <- "C:\rabota\podatoci\trosoci\trosoci-moja-firma-sumirani.csv"

#
trosoci <- read_csv(pateka_do_input)

#
trosoci_sumirani <- trosoci %>%
  group_by(vraboten, tip_na_trosok) %>%
  summarise_at("cena", "sum") %>%
  arrange(vraboten, tip_na_trosok)

#
write_csv(trosoci_sumirani,
          path = pateka_za_output)
```

4.3

,
:

```
sumiraj_trosoci <- function(trosoci, destinacija) {

  #
  trosoci <- read_csv(trosoci)

  #
  trosoci_sumirani <- trosoci %>%
    group_by(vraboten, tip_na_trosok) %>%
    summarise_at("cena", "sum") %>%
    arrange(vraboten, tip_na_trosok)

  #
  write_csv(trosoci_sumirani,
            path = destinacija)
}
```

, (
moja-tabela.csv moja-tabela-medijani.csv) .
R (Python) :

```
#
#       `trosoci`

sumiraj_trosoci <- function(trosoci_tabela) {

  #
  trosoci <- read_csv(trosoci_tabela)

  #
  trosoci_sumirani <- trosoci %>%
    group_by(vraboten, tip_na_trosok) %>%
    summarise_at("cena", "sum") %>%
    arrange(vraboten, tip_na_trosok)

  #
  folder_name <- dirname(trosoci_tabela)
  base_name <- tools::file_path_sans_ext(basename(trosoci_tabela))
  new_name <- paste(base_name, "sumirani.csv", sep="-")
  destinacija <- file.path(folder_name, new_name)

  #
  write_csv(trosoci_sumirani, path = destinacija)
}
```

:

```
#     :
#                R                    `sumiraj_trosoci`

#
library(dplyr)
library(readr)

#              ,         :
# install.packages("dplyr")
# install.packages("readr")

#
#        `trosoci`

sumiraj_trosoci <- function(trosoci_tabela) {

  #
  trosoci <- read_csv(trosoci_tabela)

  #
  trosoci_sumirani <- trosoci %>%
    group_by(vraboten, tip_na_trosok) %>%
    summarise_at("cena", "sum") %>%
  arrange(vraboten, tip_na_trosok)

  #
  folder_name <- dirname(trosoci_tabela)
  base_name <- tools::file_path_sans_ext(basename(trosoci_tabela))
  new_name <- paste(base_name, "sumirani.csv", sep="-")
  destinacija <- file.path(folder_name, new_name)

  #
  write_csv(trosoci_sumirani, path = destinacija)
}
```

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4.4 Rscript R

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R, R
R .
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```
Rscript.exe sumiraj_trosoci.R trosoci_dekemvri_2020.csv
```

. Rscript,
( ),
( ):

```
# (data/sumiraj-trosoci-1.R)

#     :
#                R                    `sumiraj_trosoci`

#
library(dplyr)
library(readr)

#              ,        :
# install.packages("dplyr")
# install.packages("readr")

#
#       `trosoci`

sumiraj_trosoci <- function(trosoci_tabela) {

  #
  trosoci <- read_csv(trosoci_tabela)

  #
  trosoci_sumirani <- trosoci %>%
    group_by(vraboten, tip_na_trosok) %>%
    summarise_at("cena", "sum") %>%
  arrange(vraboten, tip_na_trosok)

  #
  folder_name <- dirname(trosoci_tabela)
  base_name <- tools::file_path_sans_ext(basename(trosoci_tabela))
  new_name <- paste(base_name, "sumirani.csv", sep="-")
  destinacija <- file.path(folder_name, new_name)

  #
  write_csv(trosoci_sumirani, path = destinacija)
}

#
dadeni_trosoci <- commandArgs(trailingOnly=TRUE)[[1]]
```

```
#
sumiraj_trosoci(trosoci = dadeni_trosoci)
```

,
data sumiraj-trosoci-1.R trosoci-moja-firma.csv.

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, .

, docopt docstring,

. docopt/docstring ,
Python Perl (?) .

, assertthat,
. , docopt assertthat
, commandArgs() stopifnot()
R. .

```
# (data/sumiraj-trosoci-2.R)

'                                .
    ta                        : `vraboten`, `tip_na_trosok`,   `cena`.

 Usage:
    sumiraj-trosoci-2.R <tabela_so_trosoci>
    sumiraj-trosoci-2.R --help
    sumiraj-trosoci-2.R --version

 Options:
    --help
    --version

' -> doc

#
library(docopt)
arguments <- docopt(doc, version = "          2.0\n")

#               csv
assertthat::assert_that(
  assertthat::has_extension(arguments$tabela_so_trosoci, ext = "csv"))

#
suppressPackageStartupMessages({
  library(dplyr)
  library(readr)
```

```
  library(assertthat)
})

#              ,        :
# install.packages("dplyr")
# install.packages("readr")
# install.packages(assertthat)

#
#       `trosoci_tabela`

sumiraj_trosoci <- function(trosoci_tabela) {

  #
  trosoci <- read_csv(trosoci_tabela)

  assertthat::assert_that(inherits(trosoci, "data.frame"), msg = "                    `d
  assertthat::assert_that(all(c("vraboten", "tip_na_trosok", "cena") %in% names(trosoci
                          msg = "                          : 'vraboten', 'tip_na_trosok'
  assertthat::assert_that(is.numeric(trosoci$cena), msg = "     `cena`               ."


  #
  trosoci_sumirani <- trosoci %>%
    group_by(vraboten, tip_na_trosok) %>%
    summarise_at("cena", "sum") %>%
    arrange(vraboten, tip_na_trosok)

  #
  folder_name <- dirname(trosoci_tabela)
  base_name <- tools::file_path_sans_ext(basename(trosoci_tabela))
  new_name <- paste(base_name, "sumirani.csv", sep="-")
  destinacija <- file.path(folder_name, new_name)

  #
  write_csv(trosoci_sumirani, path = destinacija)
}

#               (    )
dadeni_trosoci <- arguments$tabela_so_trosoci

#
sumiraj_trosoci(trosoci = dadeni_trosoci)
```

, .

- , . ,
:

```
$ Rscript sumiraj-trosoci-2.R
Error:                                  .
    ta                        : `vraboten`, `tip_na_trosok`,   `cena`.

 Usage:
    sumiraj-trosoci-2.R <tabela_so_trosoci>

Execution halted
```

:

```
$ Rscript sumiraj-trosoci-2.R trosoci-moja-firma.csv
[1] TRUE
Parsed with column specification:
cols(
  vraboten = col_character(),
  tip_na_trosok = col_character(),
  cena = col_double()
)
```

, :

```
Rscript sumiraj-trosoci-2.R trosoci-moja-firma.xls
Error: File 'trosoci-moja-firma.xls' does not have extension csv
Execution halted
```

cena eur:

```
Rscript sumiraj-trosoci-2.R trosoci-moja-firma-eur.csv
[1] TRUE
Parsed with column specification:
cols(
  vraboten = col_character(),
  tip_na_trosok = col_character(),
  eur = col_double()
)
Error:                          : 'vraboten', 'tip_na_trosok', 'cena'.
Execution halted
```

4.5

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R 10 ~/Downloads Linux

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Chapter 5

/ (R + markdown)

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p- ,),
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, , , R rmarkdown
(?). rmarkdown
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5.1 markdown

Markdown, *markup* HTML LaTeX
. markdown,
a . R
Rstudio Rmarkdown R for Data Science
( ) R ,
rmarkdown („ “ ‘literate programming’).

, . , :

_ _ **markdown** .
[ ](https://kbroman.org/knitr_knutshell/pages/Rmarkdown.html)
[ ](https://rmarkdown.rstudio.com/authoring_quick_tour.html)
`Rmarkdown`.

, ja : ` 3.14 * 2`.
K (chunk) .
** `R` `r`**. (- , ``
)

, : $P = r^2 * \pi$

:

markdown .
Rmarkdown.

, ja : 6.28. K
(chunk) . R r. (
- ,
.)

, : $P = r^2 * \pi$

HTML, PDF, MS Word
, , , .

5.2 , , knitr

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( ) . rmarkdown
. ```{r}
```. R knitr (???)
R #.
, knitr .

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, :

rmarkdown knitr.
HTML, LaTex, MS Word,
markup rmarkdown. ,
, , , , ,
HTML LaTeX.

## 5.3

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. ? j
, Rmd
. , yaml :

---
```

````
---
title: "Проба"
author: "Душко долгоушко"
date: "12/14/2020"
output: html_document
---

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

## R Markdown

Ова е R Markdown документ

Кога ќе го кликнете копчето **Knit** во `Rstudio`,
или извршите `rmarkdown::render()` во `R` конзола
ќе се генерира документ што ја вклучува содржината
и резултатит од интегрираниот R код. На пример:

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

## Вклучување графици

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

Параметарот `echo = FALSE` го додадовме за да го _скриеме_
прикажеме `R` кодот што го прави графикот
````

Figure 5.1: Rmd , ,

Проба

Душко долгоушко

12/14/2020

R Markdown

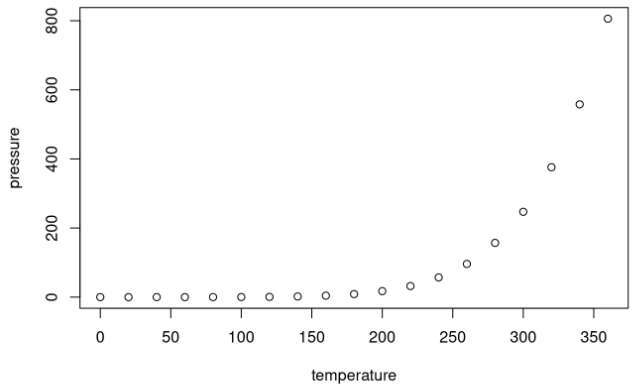
Ова е R Markdown документ

Кога ќе го кликнете копчето **Knit** во `Rstudio`, или извршите `rmarkdown::render()` во `R` конзола ќе се генерира документ што ја вклучува содржината и резултатит од интегрираниот R код. На пример:

```
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
```

Вклучување графици



Параметарот `echo = FALSE` го додадовме за да го *скриеме* прикажеме `R` кодот што го прави графикот

Figure 5.2: HTML Rmd

```
title:
output: html_document
params:
  grad: Tetovo
---
```

params R ,
:

```
params$grad
```

:

```
library(dplyr)
filtriraj_gradovi <- function(podatoci, potreben_grad) {
  podatoci %>% dplyr::filter(grad == potreben_grad)
}
```

,
:

```
#
filtriraj_gradovi(podatoci = moi_podatoci, potreben_grad = params$grad)
#
```

, R :

```
rmarkdown::render(input = "mojizvestaj.Rmd", params = list("Tetovo"))
```

, for
HTML, PDF MS Word :

```
gradovi <- c("Tetovo", "Gostivar", "Debar", "Berovo", "Dojran") # ...
for ( i in gradovi) {
  message("              : ", i)
  rmarkdown::render(input = "pateka/do/mojizvestaj.Rmd", params = list(i))
}
```

?
. , izvestaj.Rmd
, :

```
izvestaj.Rmd
tetovo-izvestaj.Rmd
debar-izvestaj.Rmd
skopje-izvestaj.Rmd
skopje-izvestaj-juni.Rmd
skopje-izvestaj-juni-specijalen-so-logo.Rmd
kichevo-izvestaj-avgust-2019.Rmd
kicevo-izvestaj-avgust.Rmd
```

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, kopje-izvestaj-juni-specijalen-so-logo.Rmd
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5.4

rmarkdown knitr
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- (:)
- Rmd Shiny (?)
- HTML prettydoc
- bookdown ( )
- rmarkdown rmarkdown::render_site
- flexdashboard

5.5

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Jypiter Python ( ), ,
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Rmd -
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Chapter 6

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Rmd (??). ,
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6.1 1:

6.1.1

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(?) README . README
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tabela_1 tabela_2.

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```
strategija_1/
  grafik_1
      code_grafik_1.R
      data_grafik_1.csv
  grafik_2
      code_grafik_2.R
      data_grafik_2.csv
  README
  tabela_1
      code_tabela_1.R
      data_tabela_1.csv
  tabela_2
      code_tabela_2.R
      data_tabela_2.csv
  tabela_3
       code_tabela_3.R
       data_tabela_3.csv
```

1 2 1 2, ,
:

```
strategija_1/
  grafik_1
      code_grafik_1.R
      code_tabela_1.R
      data_grafik_1.csv
  grafik_2
      code_grafik_2.R
      code_tabela_2.R
      data_grafik_2.csv
  README
  tabela_3
       code_tabela_3.R
       data_tabela_3.csv
```

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6.1.2

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6.1.3

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```
strategija_1/
   README
   zaednicki-kod.R
   grafik_1
       code_grafik_1.R
```

```
      code_tabela_1.R
      data_grafik_1.csv
   grafik_2
      code_grafik_2.R
      code_tabela_2.R
      data_grafik_2.csv
   tabela_3
       code_tabela_3.R
       data_tabela_3.csv
```

, , .
, , ,
. , code_tabela_3.R
sumiraj-po-grupi() zaednicki-kod.R
grafik_2, .
,
.

6.2 2: R

6.2.1

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, ,
. ,

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:

```
strategija_2/
   izvestai
   podatoci
   README
   skripti
```

R („ „
library(mojpaket)), :

(skripti R),
(podatoci data data-raw), README
, .

? , ,
:

1. R (global environment, .GlobalEnv),

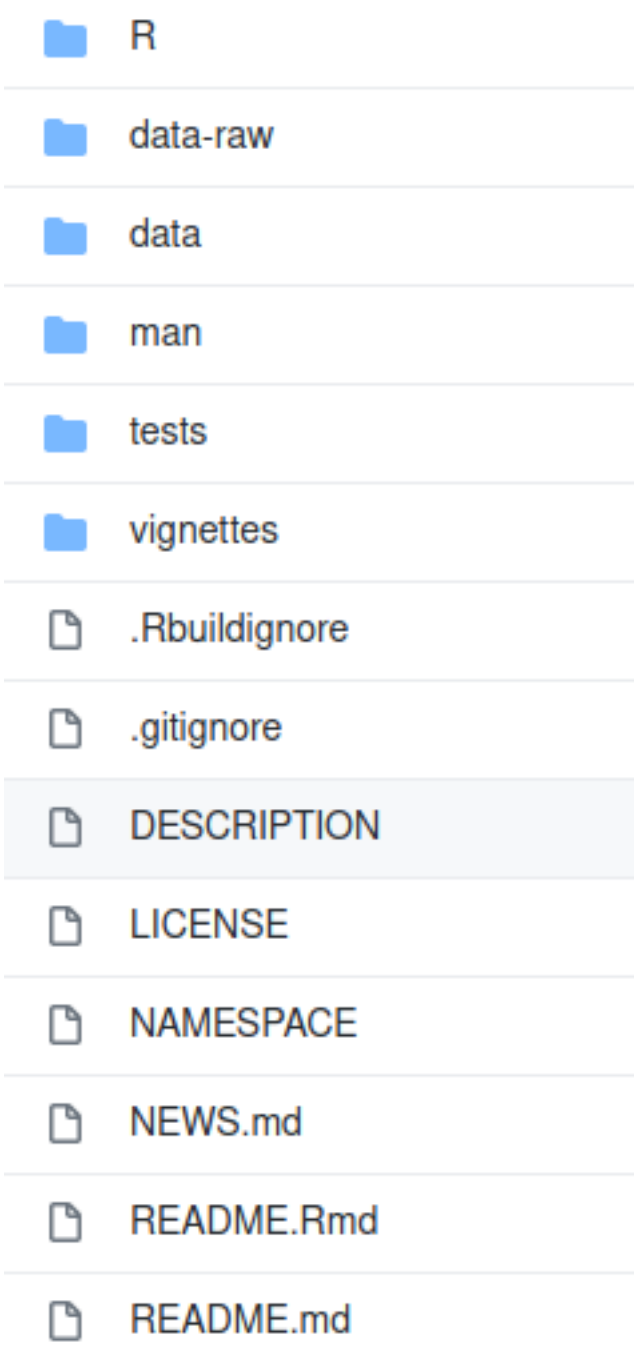
R
data-raw
data
man
tests
vignettes
.Rbuildignore
.gitignore
DESCRIPTION
LICENSE
NAMESPACE
NEWS.md
README.Rmd
README.md

Figure 6.1: R ( )

2. podatoci

3. (, , HTML/PDF) izvestai

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, .

6.2.2

, , ,
. .

, . ,
R ,
(devtools (?) usethis (?)), :

```
library(devtools)
library(usethis)
devtoos::create(path = "mojpaket")

podatoci1 <- read.csv("~/Desktop/moi-podatoci.csv")
usethis::use_data("podatoci1")
```

:

```
mojpaket/
   DESCRIPTION
   NAMESPACE
   data
   R
```

, , , , -
.
, R ((?)).

:
/ /
. : prodigenr, makeProject, ProjectTemplate,
fertile, goodpractice, (,
,). , , prodigenr (?)
R ( )
R .

```
library(prodigenr)
setup_project("data/mojproekt2")
```

, :

```
mojproekt2/
   data
      README.md
```

```
DESCRIPTION
doc
    README.md
mojproekt2.Rproj
R
    fetch_data.R
    README.md
    setup.R
README.md
TODO.md
```

, `setup.R` /
. `fetch_data.R`
`data/` .
, `DESCRIPTION` (- `R`). ,
(`library(help="prodigenr")`)
.

6.2.3

`R` . `R`
,
, , (unit
tests) .

6.2.4

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6.3

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. ,

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Chapter 7

git GitHub

R .

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(Figure3.2-final-for-print.R),

, -

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:

```
sumiraj_trocosi.R
sumiraj_trosoci_po_vraboten.R
sumiraj_trosoci_po_vraboten-2.R
sumiraj_trosoci_final.R
sumiraj_trosoci_juni2020-novo.R
sumiraj_trosoci_juni2020-novo-update.R
...
```

,

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git Github , ,

.

7.1 git

, git , track changes MS Word, . git ,

git. ,
git ( ),
git
.

( )
. , 99%
(backup-izvestaj)
„ “ . - ,
. , mojizvestaj.Rmd
, , .
git . „
“, (
)
.

```
______1_________            (       )
      \_________          (   )
```

1 = (branch)

:
, . ,
(git).
, git :

```
______1_________            (       ) ______2________
      \________          (   )_________________/
```

1 = (branch)
1 = (merge)

git :

```
#
git init
#
git add + git commit # (N   )
#
git checkout -b rabotna-verzija # (1 =       )
#
# (                    )
git add + git commit # (N   )
#
git checkout main ()
#
git merge rabotna-verzija # (2 =     )
```

```
#
git add + git commit (N    )
```

( )
git add (git) git commit (
). (commit), git
( ). , ( )
, .
:

```
git add + git commit # id: 1a...
git add + git commit # id: 34...
git add + git commit # id: tt... (                )
git add + git commit # id: 01...
git add + git commit # id: ad...
git checkout 34...   #
```

, , ,
, .

.

(,).

7.2 GitHub

Git Bitbucket,
Github Gitlab.
,
. git (,
local), GitHub (, remote). , ,
, .
, , ,
(pull request).

Github HMTL
. , , Rmarkdown,
HTML (??).

Github, **gh-pages**, .
. gh-pages
HTML docs.

, Rmd, HTML
docs, Github
. , :

-
-

- HTML docs
- git
- (git push) (GitHub)
- gh-pages

.

- . , , - - , git .

7.2.1

git rstudio git https://git-scm.com/download/win. github.com.

7.2.2

Github, .
, , Readme .

, Settngs gh-pages docs

Rstudio File -> New Project -> Version Control, Git : URL-
.

Rstudio Github
. , Files Rstudio Readme- .

, , , ,
Rmarkdown, . HTML Rmarkdown, , docs HTML index.html.

Git Rstudio .
Staged , Commit . Mojot prv proekt na github. Commit Push.

, github.com/korisnicko_ime/ime_na_repozitora korisnicko_ime.github.io/ime_na_repozitorium/.

Voila, .

7.3

gh-pages, Rmd
.

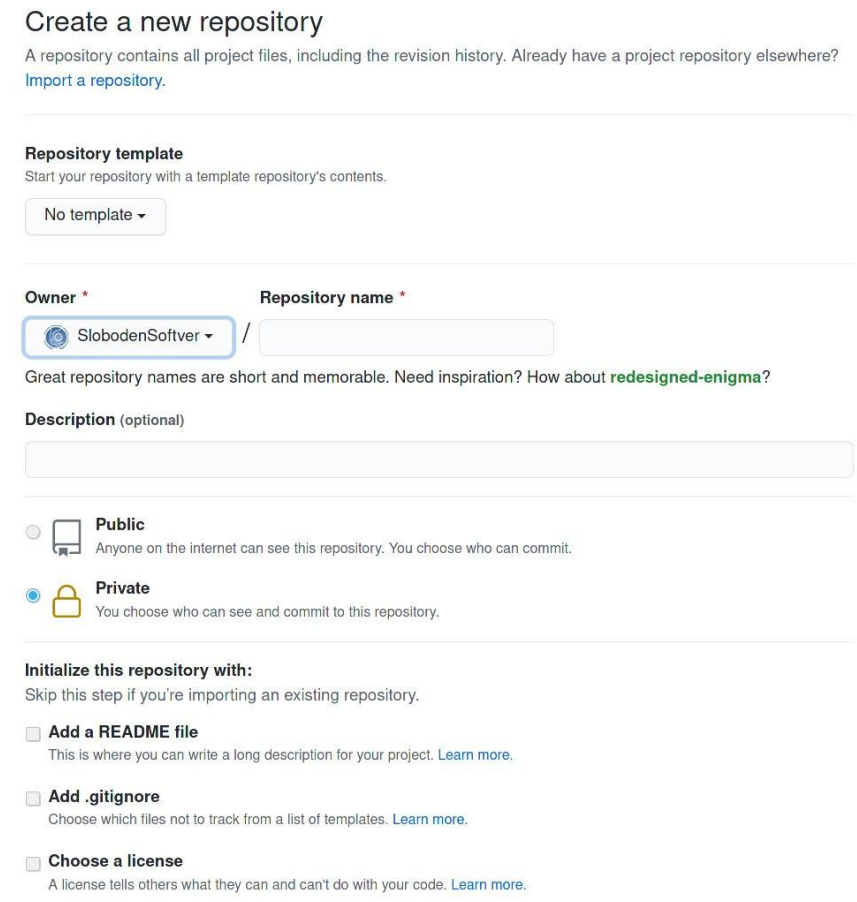

Figure 7.1: `GitHub`

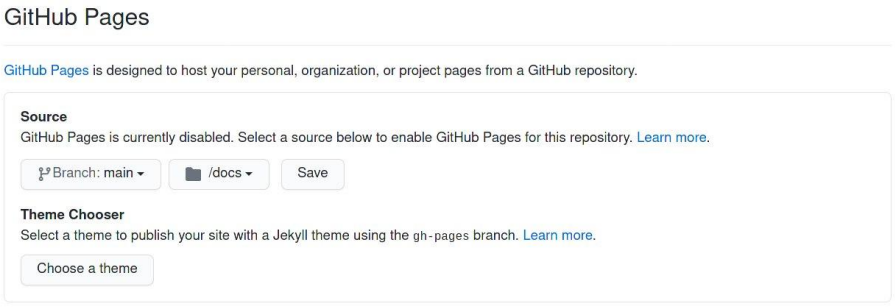

Figure 7.2: `gh-pages` `GitHub`

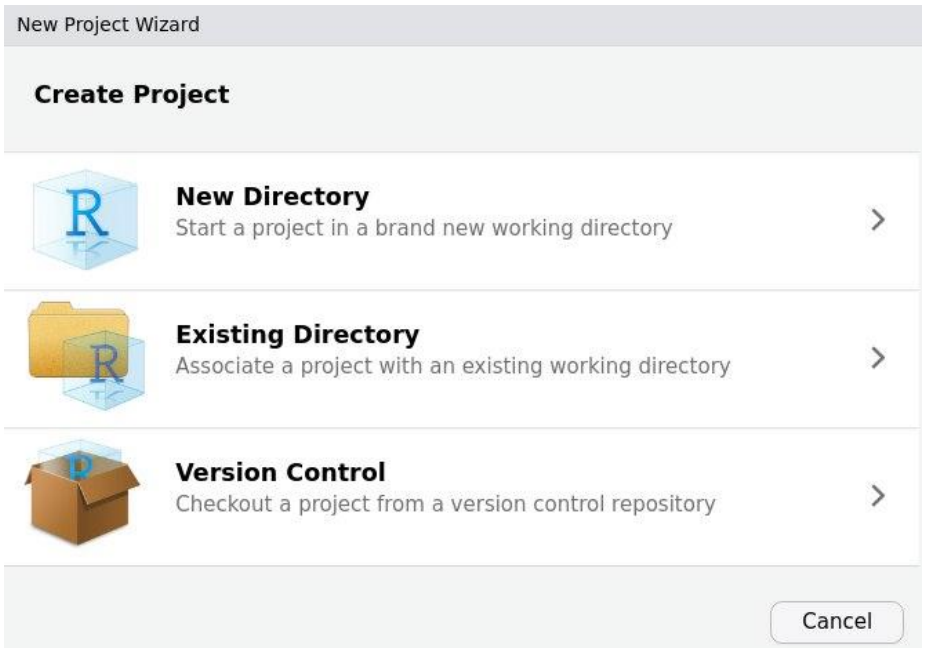

Figure 7.3: R Github

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git, ,
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