R - -

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Contents

3

1 R **3**
1.1 R . . . 3
1.2 R . . . 3
1.3 . . . 3

2 R **3**
2.1 . . . 3
2.2 . . . 3
2.3 . . . 4

3 **4**
3.1 CRAN . . . 4
3.2 GitHub . . . 5

4 fs **5**
4.1 . . . 5
4.2 shell base , fs . . . 5
4.3 . . . 6
4.4 fs . . . 6
4.5 fs . . . 7

5 stringr **7**
5.1 . . . 7
5.2 stringr base . . . 8
5.3 . . . 8
5.4 stringr . . . 8
5.5 stringr . . . 8

6 **8**

7 ggplot2 **12**
7.1 R . . . 12
7.2 ggplot2 . . . 13
7.3 ggplot2 . . . 13
7.4 ggplot2 . . . 13
7.5 facet . . . 13
7.6 ggsave . . . 13
7.7 (windows) . . . 13
7.8 theme . . . 13

7.9 shiny . . . 13
7.10 . . . 13

8 magrritr **14**
8.1 tidyverse magrittr . . . 14
8.2 %>% . . . 14

9 rvest **17**
9.1 . . . 17
9.2 rvest RSelenium . . . 17
9.3 rvest . . . 17
9.4 . . . 18
9.5 HTML . . . 18
9.6 DOM . . . 18

10 Rselenium **18**
10.1 . . . 18
10.2 . . . 18
10.3 . . . 18
10.4 . . . 18
10.5 . . . 19

11 reticulate **19**
11.1 Python . . . 19
11.2 Python ( ) . . . 19
11.3 . . . 19
11.4 . . . 19
11.5 Pytho R . . . 19

12 shell **20**
12.1 . . . 20
12.2 Python . . . 20

13 DBI **20**
13.1 . . . 20
13.2 DBI . . . 20
13.3 . . . 21
13.4 . . . 21

14 xlsx **22**
14.1 . . . 22
14.2 ( ) . . . 25

15 qpdf PDF **25**
15.1 . . . 25

16 pdf docx **25**
16.1 RDCOMClient . . . 25
16.2 pdf2docx . . . 26

17 Microsoft365R **26**
17.1 Outlook . . . 27

Python Python Python R ( ) R
R

matutosi@gmail.com

1 R

R

1.1 R

<- (%>% |> (R-4.1))

= R = <- R =

1 tidyverse

::
FORTRAN Perl Ruby C C++ VBA Java Python JavaScript R R JavaScrip-
t Python

1.2 R

R Python reticulate Python R rpy2 1
R CRAN 1 R ( )

1.3

R ? R

2 R

R

2.1

OS Windows Download R-4.x.x for Windows (x)
https://cran.r-project.org/bin/windows/base/

2.2

... ?

-
-

- OK
- Message translation R

```
# https://cell-innovation.nig.ac.jp/SurfWiki/R_errormes_lang.html
Sys.getenv("LANGUAGE") #
#
Sys.setenv(LANGUAGE="en") #
Sys.setenv(LANGUAGE="jp") #
```

- Yes
- (MDI / SDI)
  SDI MDI( ) 1 Window ( ) SDI( ) Window
- (Plain text / HTML help)
  Plain text Plain text HTML help (GoogleChrome)
- ( ) OK

2.3

R

3

R R

3.1 CRAN

CRAN R

https://cran.r-project.org/

R

https://cran.r-project.org/web/packages/available_packages_by_name.html

CRAN

```
#    (    )
options(repos = "https://cran.ism.ac.jp/")
# 1
install.packages("tidyverse")
#
pkg <- c("xlsx", "magrittr", "devtools")
install.packages(pkg)
```

( )

3.2 GitHub

CRAN GitHub

```
install.packages("devtools")
devtools::install_github("matutosi/ecan")
```

4 fs

4.1

Windows (dos) Mac Terminal Linux
Windows [Win] + [R] cmd

( ) dos (?) R (shell() system()) dos
dos shell()

R base list.files() file.rename() base
R

fs base

OS fs OS

fs base shell URL
https://cran.r-project.org/web/packages/fs/vignettes/function-comparisons.html

4.2 shell base , fs

a.pdf, b.pdf, ..., j.pdf 01.pdf, 02.pdf, ..., 10.pdf 10

4.2.1 shell

shell dos

```
rename a.pdf 01.pdf
rename b.pdf 02.pdf
rename c.pdf 03.pdf
...
rename j.pdf 10.pdf
```

4.2.2 base

tidyverse R sprintf()

```
old <- paste0(letters[1:10], ".pdf")
new <- paste0(sprintf("%02.f", 1:10), ".pdf")
file.rename(old, new)
```

4.2.3 fs

fs stringr stringr stringr str_ *fs* *path_* dir_ *file_*

```
library(stringr)
old <- str_c(letters[1:10], ".pdf")
new <- str_c(str_pad(1:10, width = 2, side = "left", pad = "0"), ".pdf")
file_move(old, new)
```

4.3

```
install.packages("fs")
```

```
library(fs)
```

4.4 fs

(path_*) (*dir_*) (file_*) base shell (fs)

fs base shell URL

https://cran.r-project.org/web/packages/fs/vignettes/function-comparisons.html

4.4.1

stringr ( )
fs

```
path("top_dir", "nested_dir", "file", ext = "ext") #
path_temp(), path_temp("path") #
path_expand("~/path") # "~"
path_dir("path") #
path_file("path") #
path_ext("path") #
path_ext_remove("path") #
path_home() #
path_package("pkgname", "dir", "file") #
path_norm("path") #   ".."
path_real("path") #   (       )
path_abs("path") #
path_rel("path/foo", "path/bar") #
path_common(c("path/foo", "path/bar", "path/baz")) #
path_ext_set("path", "new_ext") #
path_sanitize("path") #
path_join("path") #
path_split("path") #
```

4.4.2

shell base dir_map() dir_tree()

```
dir_ls("path") #
dir_info("path") #
dir_copy("path", "new-path") #
dir_create("path") #
dir_delete("path") #
dir_exists("path") #
dir_move() (see file_move) #
dir_map("path", fun) #
dir_tree("path") #
```

4.4.3

shell base

```
file_chmod("path", "mode") #
file_chown("path", "user_id", "group_id") #
file_copy("path", "new-path") #
file_create("new-path") #
file_delete("path") #
file_exists("path") #
file_info("path") #
file_move("path", "new-path") #
file_show("path") #
file_touch() #
file_temp() #
```

4.5 fs

R Rconsole RProfile.site R
R R fs

```
  # Script to copy Rconsole for updating R
  # R       Rconsole
  #   https://gist.github.com/matutosi/6dab3918402662f081be5c17cc7f9ce2
library(fs)
library(magrittr)
wd <-
  path_package("base") %>%
  path_split() %>%
  unlist() %>%
  .[-c((length(.) - 2):length(.))] %>%
  path_join()
setwd(wd)
dir <- dir_ls()
d_old <- dir[length(dir)-1]
d_new <- dir[length(dir)]
files <- c("Rconsole", "Rprofile.site")
f_old <- path(d_old, "etc", files)
f_new <- path(d_new, "etc")
file_copy(f_old, f_new, overwrite = TRUE)
```

fs fs stringr

5 stringr

5.1

stringr stringi stringi stringr stringi

stringr

5.2 stringr base

5.2.1 base

5.2.2 stringr

5.3

```
install.packages("stringr")
```

```
library(stringr)
```

5.4 stringr

5.5 stringr

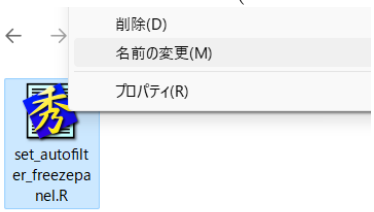
stringr stringr(dplyr) stringr base
( )

6

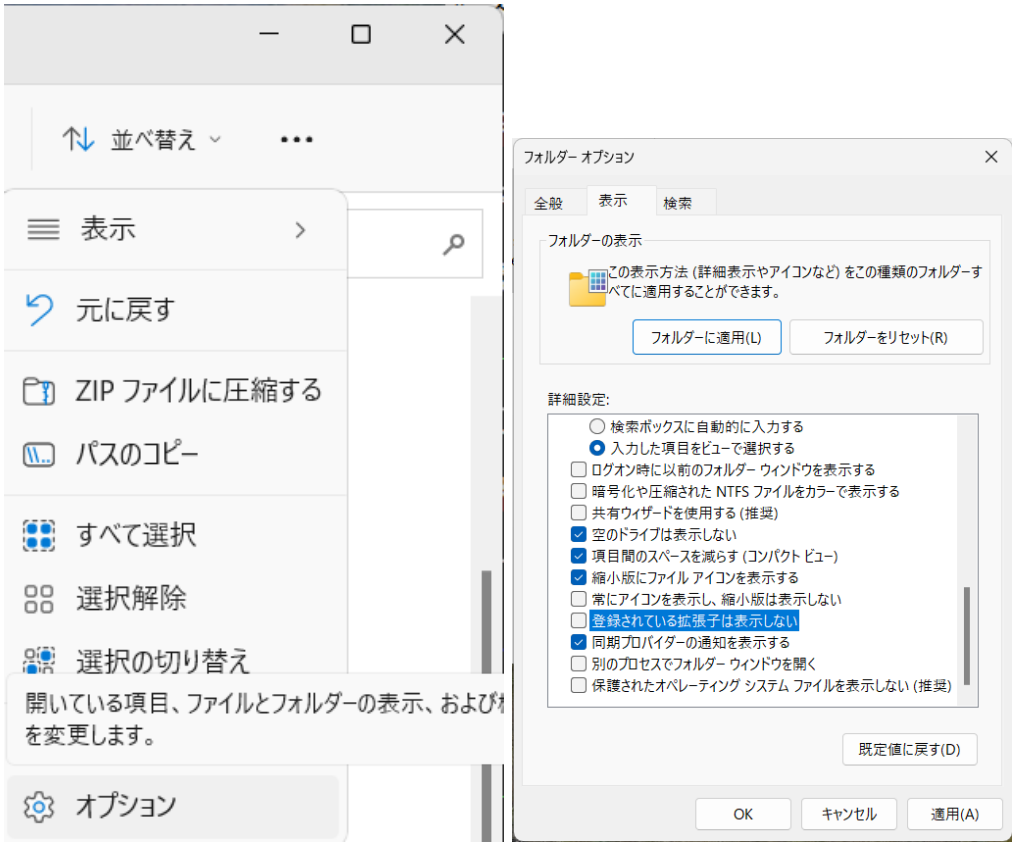
R script.R R *.docx* .xlsx * R R

R

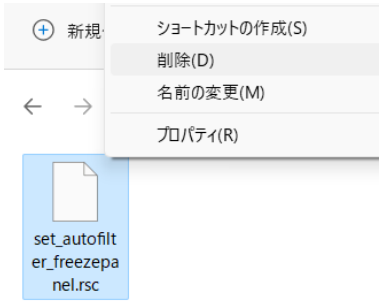
1. *.R* .scr (scr Rsc RSC OK)



2. ( ) OK

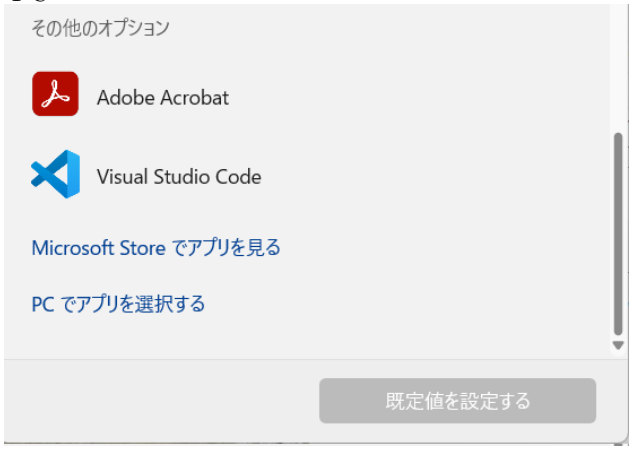

並べ替え
表示
元に戻す
ZIP ファイルに圧縮する
パスのコピー
すべて選択
選択解除
選択の切り替え
を変更します。
オプション
フォルダー オプション
全般
表示
検索
フォルダーの表示
この表示方法 (詳細表示やアイコンなど) をこの種類のフォルダーすべてに適用することができます。
フォルダーに適用(L)
フォルダーをリセット(R)
詳細設定:
検索ボックスに自動的に入力する
入力した項目をビューで選択する
ログオン時に以前のフォルダー ウィンドウを表示する
暗号化や圧縮された NTFS ファイルをカラーで表示する
共有ウィザードを使用する (推奨)
空のドライブは表示しない
項目間のスペースを減らす (コンパクト ビュー)
縮小版にファイル アイコンを表示する
常にアイコンを表示し、縮小版は表示しない
登録されている拡張子は表示しない
同期プロバイダーの通知を表示する
別のプロセスでフォルダー ウィンドウを開く
保護されたオペレーティング システム ファイルを表示しない (推奨)
既定値に戻す(D)
OK
キャンセル
適用(A)

3.

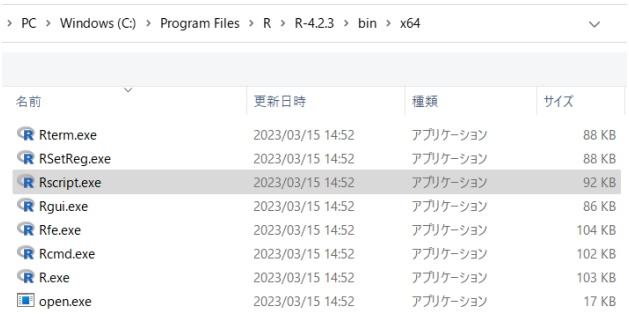

新規
ショートカットの作成(S)
削除(D)
名前の変更(M)
プロパティ(R)
set_autofilter_freezepanel.rsc

4.

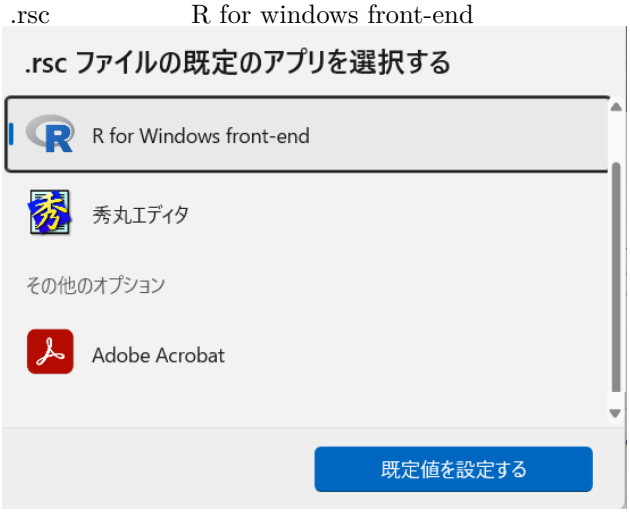
5. PC



6. R (c:\Program files\R\R-4.2.3\bin\x64) Rscript.exe



7. .rsc R for windows front-end



8. R for windows front-end OK

9. R OK

( )

7 ggplot2

7.1 R

- base(graphics)
- lattice

- grid
- ggplot2

7.2 ggplot2

ggplot2 tidy data

7.3 ggplot2

1 plot facet

magrittr %$% %T%

ggplot2

ggpubr

7.4 ggplot2

iris vegan dave tidy data

gather() spread() pivot_longer() pivot_wider() Hadley

aesthetics

geom_point() geom_bar() aes() colour group size

7.5 facet

for subset dplyr::filter

group VS facet

7.6 ggsave

- png PDF
  PDF png
-

7.7 (windows)

-cario?

7.8 theme

-

- theme_bw()

7.9 shiny

R reactive

7.10

- ggplot2
- ggplot2
- unwin GDA
-

8 magrritr

magrittr

magrittr (to be pronounced with a sophisticated french accent) 2

(%>%) set_colnames() `<- colnames()`
<- colnames ? # `[<-` set_colnames() dplyr rename() select()

```
hoge <- colnames(c("foo", "bar"))
hoge  %>%
  magrittr::set_colnames(c("foo", "bar")) %>%
  dplyr::filter(...)
```

magrittr

```
export("n'est pas")
export(add)
export(and)
export(equals)
export(not)
export(or)
export(pipe_nested)
export(set_colnames)
export(use_series)
```

8.1 tidyverse magrittr

tidyverse R R tidyverse tidyverse 1

```
library(tidyverse)
```

tidyverse (forcats tibble stringr dplyr tidyr purrr) %>% ( ) %>% tidyverse
%>% magrittr tidyverse %>%
R

tidyverse 1 tibble

8.2 %>%

%>%

- %<>%
- %T>%
- %$%

tidyverse magrittr %>%

```
library(magrittr)
```

```
##
## Attaching package: 'magrittr'
## The following object is masked from 'package:purrr':
##
##     set_names
## The following object is masked from 'package:tidyr':
##
##     extract
```

8.2.1 %<>%

%<>%

```
head(mpg) #
```

```
## # A tibble: 6 x 11
##   manufacturer model displ  year   cyl trans      drv     cty   hwy fl    class
##   <chr>        <chr> <dbl> <int> <int> <chr>      <chr> <int> <int> <chr> <chr>
## 1 audi         a4      1.8  1999     4 auto(l5)   f        18    29 p     compa~
## 2 audi         a4      1.8  1999     4 manual(m5) f        21    29 p     compa~
## 3 audi         a4      2    2008     4 manual(m6) f        20    31 p     compa~
## 4 audi         a4      2    2008     4 auto(av)   f        21    30 p     compa~
## 5 audi         a4      2.8  1999     6 auto(l5)   f        16    26 p     compa~
## 6 audi         a4      2.8  1999     6 manual(m5) f        18    26 p     compa~
```

```
tmp <- mpg
tmp <-
  tmp %>%
  dplyr::filter(year==1999) %>%
  tidyr::separate(trans, into=c("trans1", "trans2", NA)) %>%
  head() %>%
  print()
```

```
## # A tibble: 6 x 12
##   manufacturer model     displ  year   cyl trans1 trans2 drv     cty   hwy fl
##   <chr>        <chr>     <dbl> <int> <int> <chr>  <chr>  <chr> <int> <int> <chr>
## 1 audi         a4          1.8  1999     4 auto   l5     f        18    29 p
## 2 audi         a4          1.8  1999     4 manual m5     f        21    29 p
## 3 audi         a4          2.8  1999     6 auto   l5     f        16    26 p
## 4 audi         a4          2.8  1999     6 manual m5     f        18    26 p
## 5 audi         a4 quatt~   1.8  1999     4 manual m5     4        18    26 p
## 6 audi         a4 quatt~   1.8  1999     4 auto   l5     4        16    25 p
## # i 1 more variable: class <chr>
```

```
tmp <- mpg
tmp %<>%
  dplyr::filter(year==1999) %>%
  tidyr::separate(trans, into=c("trans1", "trans2", NA)) %>%
  head() %>%
  print()
```

```
## # A tibble: 6 x 12
##   manufacturer model     displ  year   cyl trans1 trans2 drv     cty   hwy fl
##   <chr>        <chr>     <dbl> <int> <int> <chr>  <chr>  <chr> <int> <int> <chr>
## 1 audi         a4          1.8  1999     4 auto   l5     f        18    29 p
## 2 audi         a4          1.8  1999     4 manual m5     f        21    29 p
## 3 audi         a4          2.8  1999     6 auto   l5     f        16    26 p
## 4 audi         a4          2.8  1999     6 manual m5     f        18    26 p
## 5 audi         a4 quatt~   1.8  1999     4 manual m5     4        18    26 p
## 6 audi         a4 quatt~   1.8  1999     4 auto   l5     4        16    25 p
## # i 1 more variable: class <chr>
```

8.2.2 %T>%

imap

%T>% - <- <<- - . - {} - %>%

```
  #  mpg %T>%
  #    {
  #      tmp <<- dplyr::select(., )
  #    } %>%
```

%T>%

8.2.3 %$%

%$% %>% .$

```
mpg %>% .$manufacturer %>% head()
```

```
## [1] "audi" "audi" "audi" "audi" "audi" "audi"
```

```
mpg %$%   manufacturer %>% head()
```

```
## [1] "audi" "audi" "audi" "audi" "audi" "audi"
```

. R CMD CHECK(???) possible problem Warning CRAN ( ) auto-mater Github Check Warning

DESCRIPTION %$% %>% %>% usethis::use_pipe() DESCRIPTION importFrom(magrittr,"

```
importFrom(magrittr,"%>%")
importFrom(magrittr,"%$%")
```

$ [[]] [] 1

```
mpg %>% .$manufacturer      %>% head()
```

```
## [1] "audi" "audi" "audi" "audi" "audi" "audi"
```

```
mpg %>% .[["manufacturer"]] %>% head()
```

```
## [1] "audi" "audi" "audi" "audi" "audi" "audi"
```

```
mpg %>% .["manufacturer"]   %>% head()
```

```
## # A tibble: 6 x 1
##   manufacturer
##   <chr>
## 1 audi
## 2 audi
## 3 audi
## 4 audi
## 5 audi
## 6 audi
```

[[ ]] [ ] [[[1 .

```
mpg %>% `$`(manufacturer)    %>% head()
```

```
## [1] "audi" "audi" "audi" "audi" "audi" "audi"
```

```
mpg %>% `[[`("manufacturer") %>% head() # mpg %>% `[[`(., "manufacturer")
```

```
## [1] "audi" "audi" "audi" "audi" "audi" "audi"
```

```
mpg %>% `[`("manufacturer")  %>% head()
```

```
## # A tibble: 6 x 1
##   manufacturer
##   <chr>
## 1 audi
## 2 audi
## 3 audi
## 4 audi
## 5 audi
## 6 audi
```

9 rvest

9.1

R rvest rvest

R rvest

(CRAN) RStudio usethis, testthat, devtools

9.2 rvest RSelenium

R rvest RSelenium rvest URL
RSelenium Selenium Javascript
rvest polite

9.3 rvest

- HTML
- DOM : id, class, tagName
- table
  - HTML table table
-

- stringr
- stringi
- tidyverse magrittr
- Form radio moranajp::html_radio_set() radio radio
  polite

9.4

```
# install.packages("rvest")
# library(rvest)
```

9.5 HTML

9.5.1

9.5.2

9.6 DOM

9.6.1

9.6.2

10 Rselenium

Selenium

Javascript PHP URL rvest

10.1

- RSelenium: CRAN
- Selenium:
  - : ver3.xxx
    ver4.0 RSeleniumu (Python)
- ChromeDriver
  - : ( ) GoogleChrome update
  - Selenium

10.2

10.3

10.3.1

10.3.2

10.4

id document.getElementByID()

xpath document.selectQueryAll()[]

JavaScript script <- “ ” rem$excute(script)

BiSS

- 5

HTML

HTML

10.5

- R
  - png PDF
  -
  - Seleniumu
  - MeCab GINZA

11 reticulate

R Python Python logging(R futile.logger) R logger https://cran.r-project.org/web/packages/logger/index.html R ggplot2 dplyr Python

R reticulate Python reticulate R Python Pytho

11.1 Python

11.2 Python ( )

Rstudio python (reticulate) https://qiita.com/Wa___a/items/42129e529cfb6c38e046

py_install() conda_install() - pip
- pip python reticulate::use_python()

11.3

- Python
- pdf2docx

```
pip install pdf2docx
```

11.4

```
  # pdf2docx
  #   reticulate::use_python() python
  #   pip pdf2docx     python
library(reticulate)
  # reticulate::py_install("pdf2docx")
  # https://anaconda.org/conda-forge/python-docx
  # reticulate::conda_install(channel = "conda-forge", packages = "python-docx")  #    pdf2docx
reticulate::use_python("C:/Python/Python39/python.exe")
reticulate::py_run_string("from pdf2docx import parse")
reticulate::py_run_string("pdf_file = 'D:/a.pdf'")
reticulate::py_run_string("docx_file = 'D:/a.docx'")
reticulate::py_run_string("parse(pdf_file, docx_file)")
```

11.5 Pytho R

variable

```
  # R Python (Python   )
r.variable
```

```
  # Python R (R   )
py$variable
```

12 shell

- R
  –
  – PDF
  – png PDF

CUI R Linux Mac shell Windows shell (R) R

PDF 1 PDF

windows Linux Mac

dos ls, dir move, copy, remove, rename , cd

R shell(), system() setwd() cd paste0() stringr stringi stringr stringi purrr::map() for loop #

concatPDF PDF (win10 OK win11 NG) # ConcatPDF /outfile Merged.pdf File1.pdf File2.pdf File3.pdf

pdftk PDF (win11 OK) pdftk File1.pdf File2.pdf File3.pdf cat output Merged.pdf

ImageMagick

12.1

12.2 Python

```
wd <- "D:/matu/work/tmp"
setwd(wd)
system("c:/windows/py.exe pdf.py", intern = TRUE)
shell("pdf.py")
```

13 DBI

13.1

CRAN Task View: Databases with R https://cran.r-project.org/web/views/Databases.html

DBI https://cran.r-project.org/web/packages/DBI/index.html

13.2 DBI

-
- SQL

SQL SQL R R DBI dplyr tidyverse ggplot2

13.3

```
install.packages(c("DBI", "RSQLite"))
```

```
library(DBI)
library(RSQLite)
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.2     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.2     v tibble    3.2.1
## v lubridate 1.9.2     v tidyr     1.3.0
## v purrr     1.0.1
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
  #
con <- dbConnect(RSQLite::SQLite(), dbname = ":memory:")
dbWriteTable(con, "mpg", mpg)
dbListTables(con)
```

```
## [1] "mpg"
```

13.4

```
  # SQL
res <- dbSendQuery(con, "SELECT year, model, displ, cyl FROM mpg WHERE cyl = 4")
df <- dbFetch(res)
dbClearResult(res)
tibble::as_tibble(df)
```

```
## # A tibble: 81 x 4
##     year model      displ   cyl
##    <int> <chr>      <dbl> <int>
##  1  1999 a4           1.8     4
##  2  1999 a4           1.8     4
##  3  2008 a4           2       4
##  4  2008 a4           2       4
##  5  1999 a4 quattro   1.8     4
##  6  1999 a4 quattro   1.8     4
##  7  2008 a4 quattro   2       4
##  8  2008 a4 quattro   2       4
##  9  1999 malibu       2.4     4
## 10  2008 malibu       2.4     4
## # i 71 more rows
```

```
  #         dplyr
res <- dbSendQuery(con, "SELECT * FROM mpg")
df <- dbFetch(res)
dbClearResult(res)
df %>%
  tibble::as_tibble() %>%
  print() %>%
```

```
  dplyr::select(year, model, displ, cyl) %>%
  dplyr::filter(cyl == 4) %>%
  head()
```

```
## # A tibble: 234 x 11
##    manufacturer model      displ  year   cyl trans drv     cty   hwy fl    class
##    <chr>        <chr>      <dbl> <int> <int> <chr> <chr> <int> <int> <chr> <chr>
##  1 audi         a4           1.8  1999     4 auto~ f        18    29 p     comp~
##  2 audi         a4           1.8  1999     4 manu~ f        21    29 p     comp~
##  3 audi         a4           2    2008     4 manu~ f        20    31 p     comp~
##  4 audi         a4           2    2008     4 auto~ f        21    30 p     comp~
##  5 audi         a4           2.8  1999     6 auto~ f        16    26 p     comp~
##  6 audi         a4           2.8  1999     6 manu~ f        18    26 p     comp~
##  7 audi         a4           3.1  2008     6 auto~ f        18    27 p     comp~
##  8 audi         a4 quattro   1.8  1999     4 manu~ 4        18    26 p     comp~
##  9 audi         a4 quattro   1.8  1999     4 auto~ 4        16    25 p     comp~
## 10 audi         a4 quattro   2    2008     4 manu~ 4        20    28 p     comp~
## # i 224 more rows
```

```
## # A tibble: 6 x 4
##    year model      displ   cyl
##   <int> <chr>      <dbl> <int>
## 1  1999 a4           1.8     4
## 2  1999 a4           1.8     4
## 3  2008 a4           2       4
## 4  2008 a4           2       4
## 5  1999 a4 quattro   1.8     4
## 6  1999 a4 quattro   1.8     4
```

SQL SQL SQL R dplyr ggplot2 dplyr gg-plot2 R https://r4ds.hadley.nz/

DBI

https://cran.r-project.org/web/packages/DBI/vignettes/DBI-1.html

14 xlsx

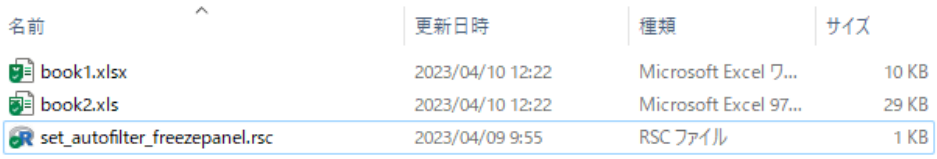
xlsx

14.1

xlsx

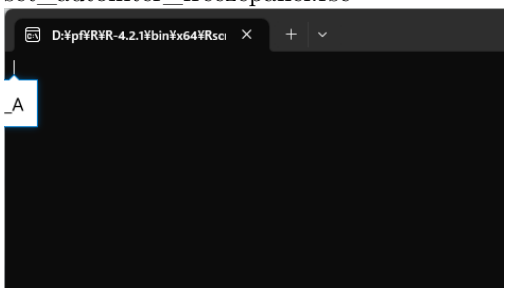
14.1.1

- R
- set_autofilter_freezepanel.rsc ( )
- .rsc Rscript.exe (Windows) Mac Mac -
- set_autofilter_freezepanel.rsc



- 

- set__autofilter__freezepanel.rsc



1 A Z 1 1
xlsx 2

14.1.2

```
  # Package,
if(! "xlsx" %in% installed.packages()[,1]){  # xlsx
  #
  options(repos = "https://cran.ism.ac.jp/") #
  install.packages("xlsx")                   #
}

  # Functions,
  #    xlsx
  #                  ?
  #               ?
  #      R

  #
set_auto_filter <- function(sh){
  # A1 Z1
  #            "A1:Z1"
  xlsx::addAutoFilter(sh, "A1:Z1")
}

  #
set_freeze_panel <- function(sh){
  # 1  1
  #
  #     2          2  4   3
  #     3          3  5   4
  xlsx::createFreezePane(sh, 2, 2, 2, 2)
}

  #
set_af_fp <- function(file){
  wb <- xlsx::loadWorkbook(file)   #
```

```
  for(sh in xlsx::getSheets(wb)){  #
    set_auto_filter(sh)            #
    set_freeze_panel(sh)           #
  }
  xlsx::saveWorkbook(wb, file)     #
}

  # Main,
files <- list.files(pattern = "xls") # ".xls" "xlsx"
for(file in files){                  #
  set_af_fp(file)                    # set_af_fp()
}
```

14.2 ( )

15 qpdf PDF

15.1

```
library(qpdf)
  #     show the number of pages in a pdf
pdf_length(input, password = "")
  # 1     split a single pdf into separate files, one for each page
pdf_split(input, output = NULL, password = "")
  #      create a new pdf with a subset of the input pages
pdf_subset(input, pages = 1, output = NULL, password = "")
  #   join several pdf files into one
pdf_combine(input, output = NULL, password = "")
  #   compress or linearize a pdf file
pdf_compress(input, output = NULL, linearize = FALSE, password = "")
  #    rotate selected pages
pdf_rotate_pages(input, pages, angle = 90, relative = FALSE, output = NULL, password = "")
  #
pdf_overlay_stamp(input, stamp, output = NULL, password = "")
```

```
input <- ""
pdf_split(input, output = "d:/", password = "")
```

16 pdf docx

16.1 RDCOMClient

https://github.com/omegahat/RDCOMClient CRAN

16.1.1

```
install.packages("RDCOMClient",
  repos = "http://www.omegahat.net/R",
  type = "win.binary")
```

16.1.2

https://stackoverflow.com/questions/32846741/convert-pdf-file-to-docx/73720411#73720411

```
library(RDCOMClient)
wordApp <- COMCreate("Word.Application")
wordApp[["Visible"]] <- TRUE
wordApp[["DisplayAlerts"]] <- FALSE
path_To_PDF_File <- "xxx.pdf"
path_To_Word_File <- "xxx.docx"
doc <-
  wordApp[["Documents"]]$Open(normalizePath(path_To_PDF_File),
    ConfirmConversions = FALSE)
doc$SaveAs2(path_To_Word_File)
```

16.1.3

```
library(RDCOMClient)
pdf2docx <- function(pdf, docx = NULL){
  if(is.null(docx)){
    docx <- paste0(getwd(), sub("pdf", "docx", pdf))
  }
  wordApp <- RDCOMClient::COMCreate("Word.Application")
  wordApp[["Visible"]] <- TRUE
  wordApp[["DisplayAlerts"]] <- FALSE
  doc <-
    wordApp[["Documents"]]$Open(normalizePath(pdf), ConfirmConversions = FALSE)
  doc$SaveAs2(docx)
  doc$close()
}

wd <- "d:/matu/work/tmp/"
setwd(wd)
path_docx <- function(path_pdf){
  if(grepl("[A-z]:", path_pdf)){
    return(sub("pdf", "docx", path_pdf))
  }
  path <- file.path(getwd(), sub("pdf", "docx", path_pdf))
  return(sub("//", "/", path))
}
testthat::expect_equal(path_docx("a.pdf"                 ), "d:/matu/work/tmp/a.docx"     )
testthat::expect_equal(path_docx("d:/matu/work/tmp/a.pdf"), "d:/matu/work/tmp/a.docx"     )
testthat::expect_equal(path_docx("test/a.pdf"            ), "d:/matu/work/tmp/test/a.docx")
testthat::expect_equal(path_docx("/test/a.pdf"           ), "d:/matu/work/tmp/test/a.docx")


wd <- "d:/"
setwd(wd)
pdf2docx("a.pdf")
```

16.2 pdf2docx

17 Microsoft365R

https://cran.r-project.org/web/packages/Microsoft365R # Outlook # https://cran.r-project.org/web/packages/Microsoft365R/vignettes/outlook.html

17.1 Outlook

TO CC BCC TO 1

ML

3 1

&

17.1.1

1 OK.

```
  #
install.packages("Microsoft365R")
  #
library(Microsoft365R)
 #
Microsoft365R::get_business_outlook()
 #
  # Microsoft365R::get_personal_outlook()
```

17.1.2

```
 #
outlook <- Microsoft365R::get_business_outlook()
 #
  # outlook <- Microsoft365R::get_personal_outlook()

  #   email
  #
  #   outlook
em <-
  outlook$create_email(
    body = "Hello from R\nHello from R\n",
    subject = "Hello",
    to = "matutosi@gmail.com",
    cc = "matutosi@konan-wu.ac.jp"
  )

  #
em$send()

  # outlook
drafts <- outlook$get_drafts()$list_emails()
  #
drafts
  #       1
drafts[[1]]$send()

  #
inbox <- outlook$get_inbox()$list_emails()
  #    1
inbox[[1]]
```

17.1.3

- : send( ) 1: 0:
- : to( )
- CC: cc( )
- BCC: bcc( )
- : subject( )
- : body( )
- : attachment( )

CC BCC

path( ) path

```
  #
  #

  #
source("https://gist.githubusercontent.com/matutosi/bed00135698c8e3d2c49ef08d12eef9c/raw/6acc2de844eeea

outlook <- Microsoft365R::get_business_outlook()
  #
  #   working directory
  #     ("c:/user/documents/outlook.xlsx" )
path <- "outlook.xlsx"
  #
create_email(path, outlook, send = TRUE)

  #
  #   "send = FALSE"
create_email(path, outlook, send = FALSE)
```