

# INTRODUCTION TO R PROGRAMMING

MASTER COURSE FOR SPECIALTY 1-31 80 01 BIOLOGY

Practical class #1.

**Vasily V. Grinev**

Ph.D., Associate Professor

Department of Genetics  
Faculty of Biology  
Belarusian State University  
Minsk  
Republic of Belarus

# LIST OF PRACTICAL TASKS

## Task by task.

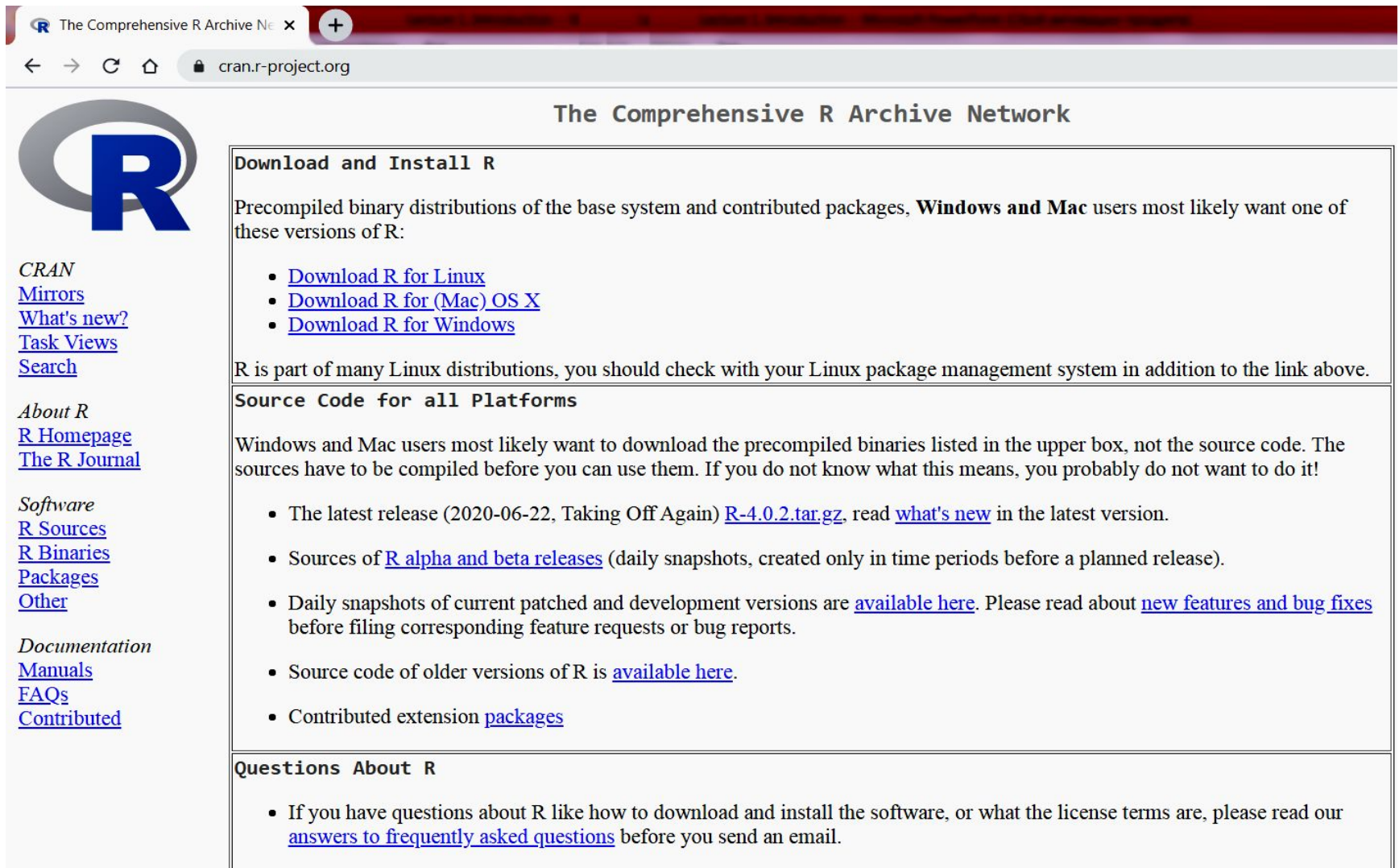
- Task #1: Installation of R on Windows.
- Task #2: Basic administration of R.
- Task #3: Handling with R workspace.
- Task #4: Life cycle of native R files.
- Task #5: Getting help on R issues.

## Duration.

Eighty minutes (in total) per group of students.

# PRACTICAL TASK #1: Installation of R on Windows

## Start page of CRAN



The screenshot shows the CRAN website start page. The browser address bar displays 'cran.r-project.org'. The page title is 'The Comprehensive R Archive Network'. On the left, there is a navigation menu with links for 'CRAN', 'Mirrors', 'What's new?', 'Task Views', 'Search', 'About R', 'R Homepage', 'The R Journal', 'Software', 'R Sources', 'R Binaries', 'Packages', 'Other', 'Documentation', 'Manuals', 'FAQs', and 'Contributed'. The main content area is divided into three sections: 'Download and Install R', 'Source Code for all Platforms', and 'Questions About R'. The 'Download and Install R' section provides precompiled binary distributions for Windows and Mac users, with links to download R for Linux, Mac OS X, and Windows. The 'Source Code for all Platforms' section explains that Windows and Mac users should download precompiled binaries instead of source code, and lists various sources including the latest release, alpha and beta releases, daily snapshots, and older versions. The 'Questions About R' section provides a link to frequently asked questions.

The Comprehensive R Archive Network

### Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

### Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2020-06-22, Taking Off Again) [R-4.0.2.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

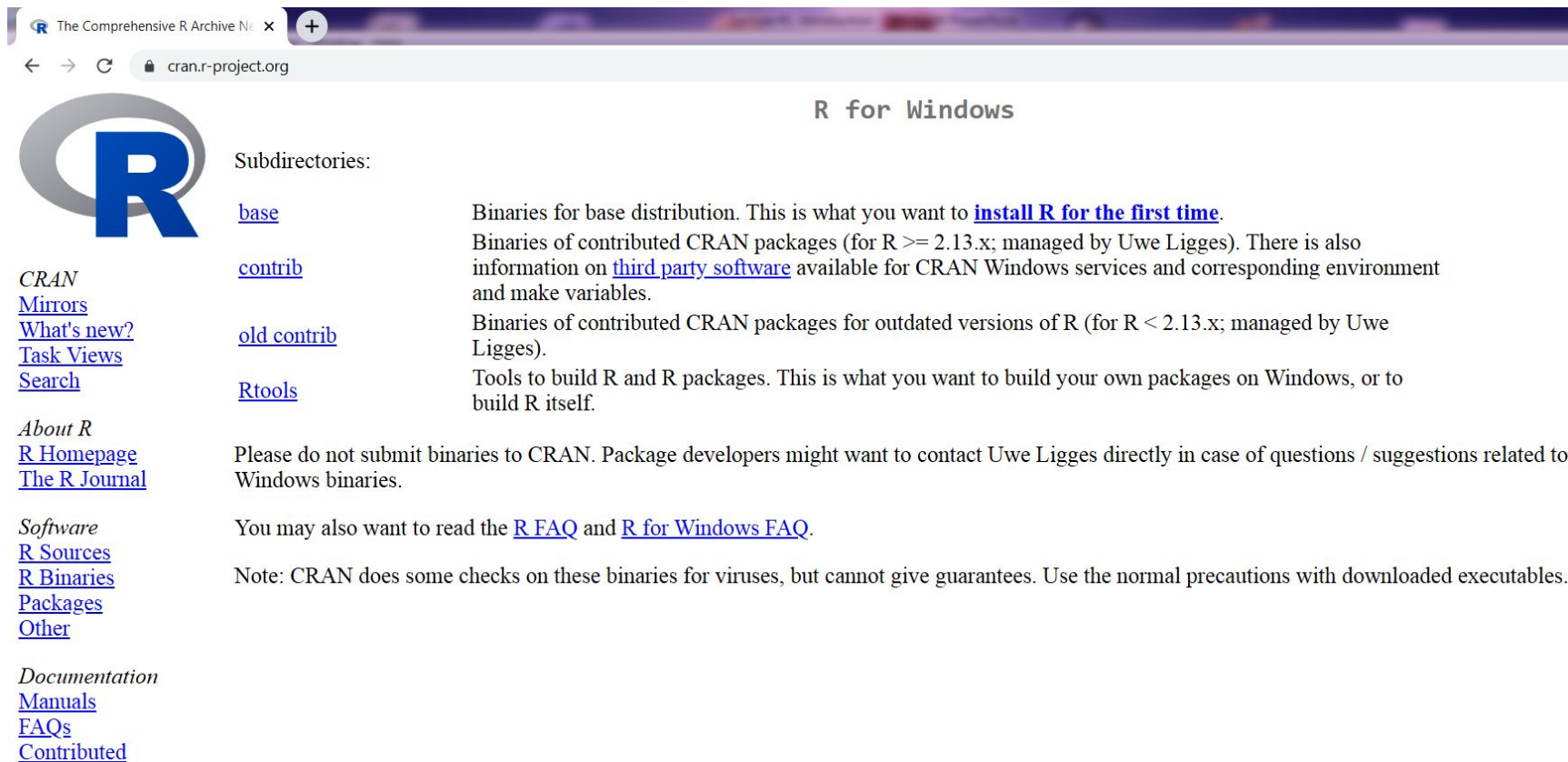
### Questions About R

- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

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

# PRACTICAL TASK #1: Installation of R on Windows

## R for Windows



The screenshot shows a web browser window with the address bar displaying "cran.r-project.org". The page title is "R for Windows". On the left side, there is a large blue "R" logo. Below the logo, there are several sections of links: "CRAN" with sub-links "Mirrors", "What's new?", "Task Views", and "Search"; "About R" with sub-links "R Homepage" and "The R Journal"; "Software" with sub-links "R Sources", "R Binaries", "Packages", and "Other"; and "Documentation" with sub-links "Manuals", "FAQs", and "Contributed". The main content area is titled "Subdirectories:" and lists four categories: "base", "contrib", "old contrib", and "Rtools". Each category has a brief description. The "base" section mentions "install R for the first time". The "contrib" section mentions "third party software". The "old contrib" section mentions outdated versions of R. The "Rtools" section mentions building R and R packages. At the bottom of the main content area, there is a note about submitting binaries to CRAN and a link to the R FAQ and R for Windows FAQ.

Subdirectories:

- [base](#): Binaries for base distribution. This is what you want to [install R for the first time](#).
- [contrib](#): Binaries of contributed CRAN packages (for R  $\geq$  2.13.x; managed by Uwe Ligges). There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.
- [old contrib](#): Binaries of contributed CRAN packages for outdated versions of R (for R  $<$  2.13.x; managed by Uwe Ligges).
- [Rtools](#): Tools to build R and R packages. This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the [R FAQ](#) and [R for Windows FAQ](#).

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.

*CRAN*  
[Mirrors](#)  
[What's new?](#)  
[Task Views](#)  
[Search](#)

*About R*  
[R Homepage](#)  
[The R Journal](#)

*Software*  
[R Sources](#)  
[R Binaries](#)  
[Packages](#)  
[Other](#)

*Documentation*  
[Manuals](#)  
[FAQs](#)  
[Contributed](#)

# PRACTICAL TASK #1: Installation of R on Windows

## R for Windows



R-4.1.1 for Windows (32/64 bit)

### Download R 4.1.1 for Windows

[Installation and other instructions](#)

[New features in this version](#)

If you want to double-check that the package you have downloaded matches the package distributed by CRAN, you can compare the [md5sum](#) of the .exe to the [fingerprint](#) on the master server. You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

#### Frequently asked questions

- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

#### Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#).
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is [<CRAN MIRROR>/bin/windows/base/release.html](#).

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Last change: 2021-08-10

CRAN

[Mirrors](#)

[What's new?](#)

[Task Views](#)

[Search](#)

About R

[R Homepage](#)

[The R Journal](#)

Software

[R Sources](#)

[R Binaries](#)

[Packages](#)

[Other](#)

Documentation

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[FAQs](#)

[Contributed](#)

# PRACTICAL TASK #1: Installation of R on Windows

## R for Windows

Просмотр основных сведений о вашем компьютере

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Издание Windows


Windows 7 Максимальная

© Корпорация Майкрософт (Microsoft Corp.), 2009. Все права защищены.

Service Pack 1

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Система

Оценка:  5.9 [Индекс производительности Windows](#)

Процессор: Intel(R) Core(TM) i5-4670K CPU @ 3.40GHz 3.40 GHz

Установленная память (ОЗУ): 8.00 ГБ (7.88 ГБ доступно)

Тип системы: 64-разрядная операционная система

Перо и сенсорный ввод: Перо и сенсорный ввод недоступны для этого экрана

---

Имя компьютера, имя домена и параметры рабочей группы

Компьютер: Гринев-ПК

Полное имя: Гринев-ПК

Описание:

Рабочая группа: WORKGROUP

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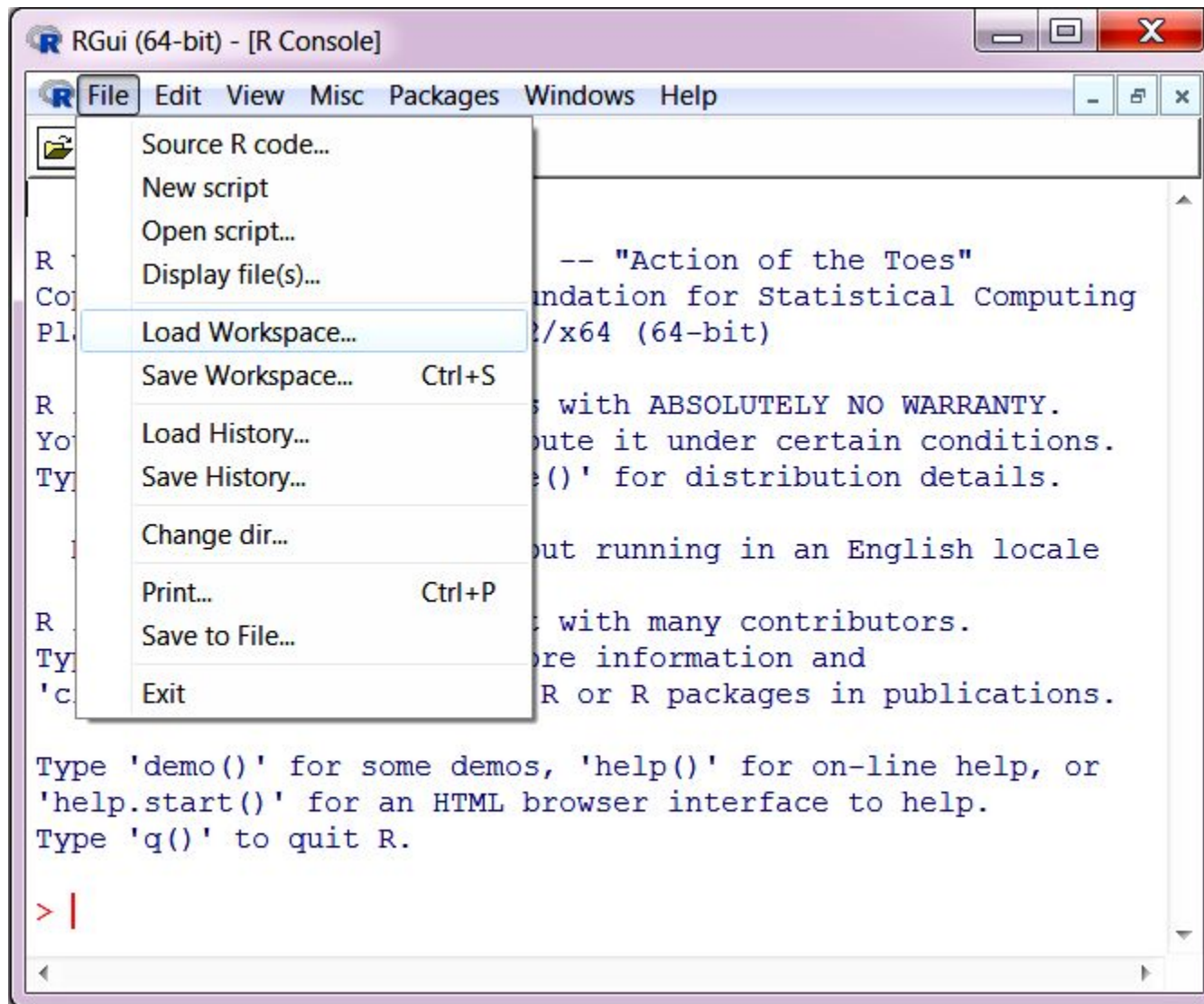
Активация Windows

Активация Windows выполнена

Код продукта: 00426-OEM-8992662-00009

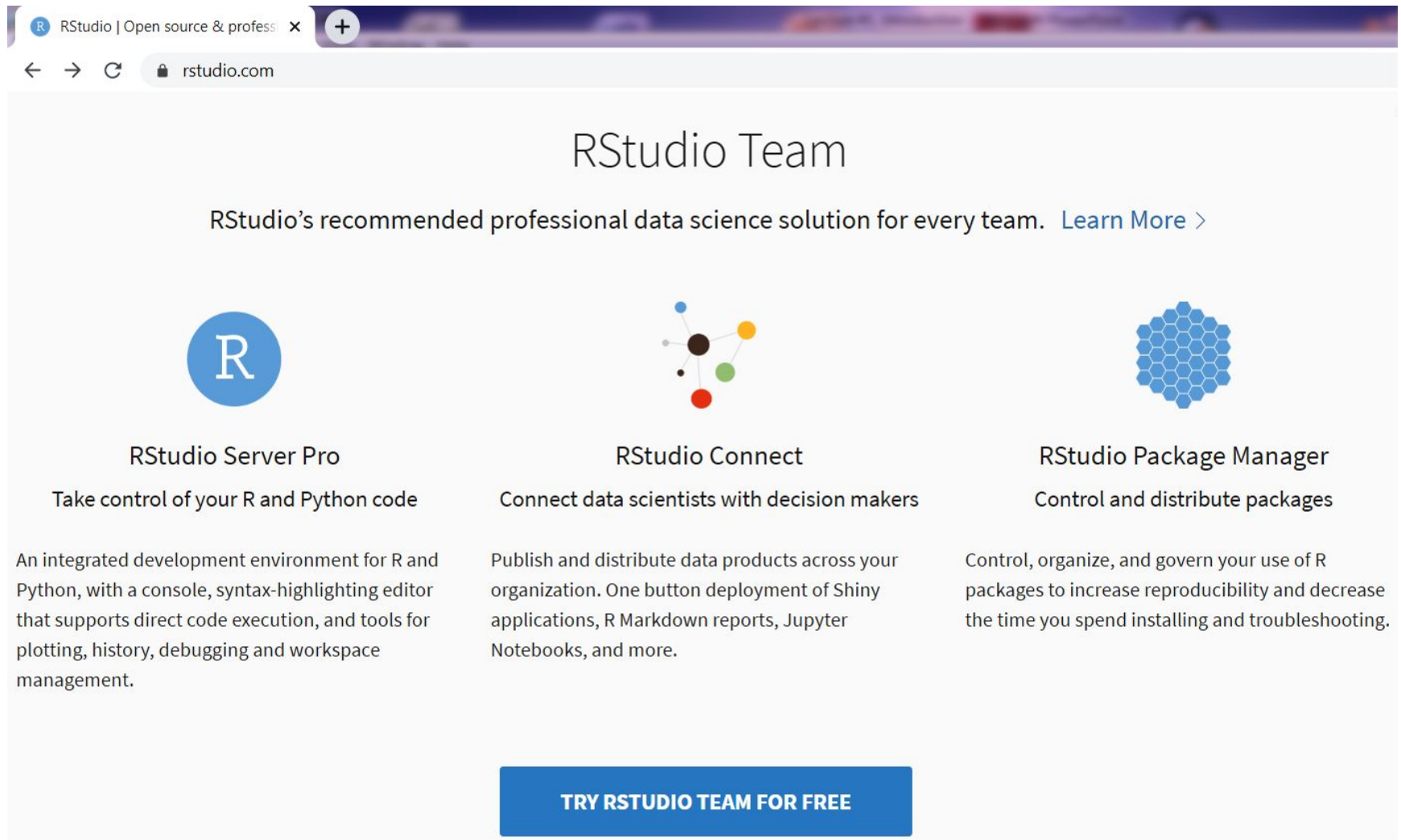
# PRACTICAL TASK #2: Basic administration of R

## R Console



# PRACTICAL TASK #2: Basic administration of R


## RStudio



The screenshot shows a web browser window with the URL `rstudio.com`. The main heading is "RStudio Team". Below it is a sub-heading: "RStudio's recommended professional data science solution for every team. [Learn More >](#)". There are three columns of content, each with an icon, a title, a subtitle, and a description. At the bottom, there is a blue button that says "TRY RSTUDIO TEAM FOR FREE".

### RStudio Team


RStudio's recommended professional data science solution for every team. [Learn More >](#)



#### RStudio Server Pro

Take control of your R and Python code


An integrated development environment for R and Python, with a console, syntax-highlighting editor that supports direct code execution, and tools for plotting, history, debugging and workspace management.



#### RStudio Connect

Connect data scientists with decision makers

Publish and distribute data products across your organization. One button deployment of Shiny applications, R Markdown reports, Jupyter Notebooks, and more.



#### RStudio Package Manager

Control and distribute packages

Control, organize, and govern your use of R packages to increase reproducibility and decrease the time you spend installing and troubleshooting.

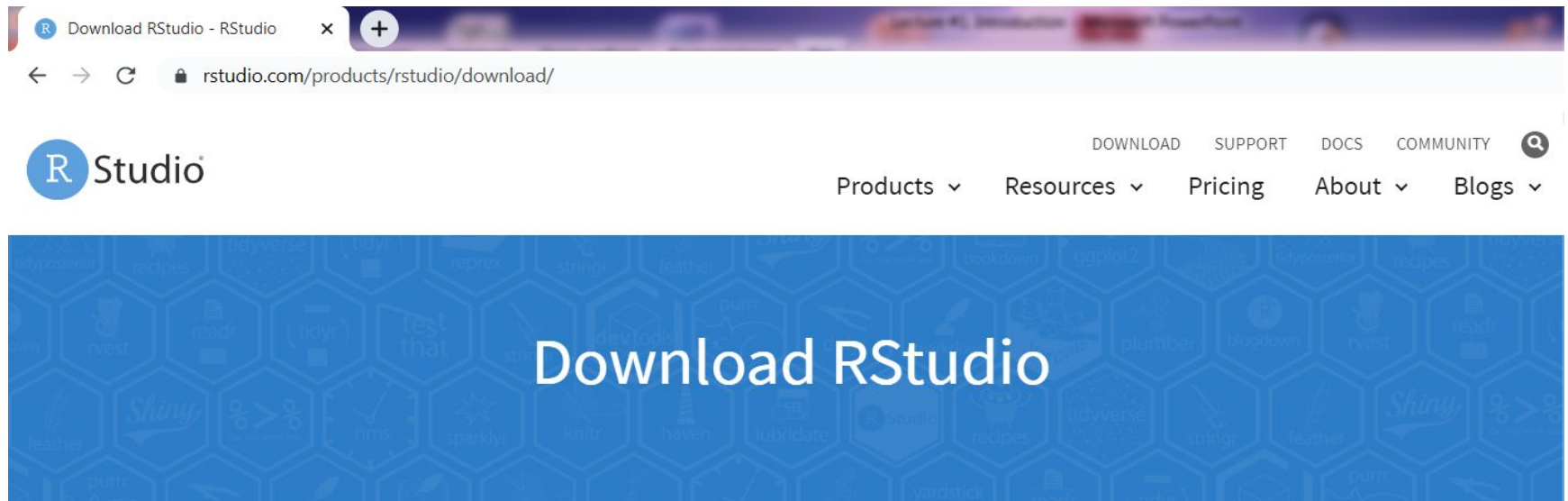
[TRY RSTUDIO TEAM FOR FREE](#)

<https://rstudio.com/>



# PRACTICAL TASK #2: Basic administration of R

## RStudio



## Choose Your Version

RStudio is a set of integrated tools designed to help you be more productive with R. It includes a console, syntax-highlighting editor that supports direct code execution, and a variety of robust tools for plotting, viewing history, debugging and managing your workspace.

[LEARN MORE ABOUT RSTUDIO FEATURES](#)



RStudio's new solution for every professional data science team. RStudio Team includes RStudio Server Pro, RStudio Connect and RStudio Package Manager.

[LEARN MORE](#)

# PRACTICAL TASK #2: Basic administration of R

## RStudio

The screenshot displays the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu bar is a toolbar with icons for file operations and a search bar. The main workspace is divided into several panels:

- Console:** Shows the R version 3.6.1 (2019-07-05) and copyright information. It also displays the R license text and a prompt for help.
- Environment:** Shows the Global Environment and indicates that the environment is empty.
- Files:** Shows the current project files.
- Plots:** Shows any plots generated by the code.
- Packages:** Shows a list of installed and available packages.
- Help:** Provides access to R documentation.
- Viewer:** Displays the output of the code, including plots and text.

The **Packages** panel is currently active, showing a list of packages with their names, descriptions, and versions. The **base** package is checked, indicating it is installed.

| Name                                      | Description  | Version  |
|---|--|----------|
| <input type="checkbox"/> abind            | Combine Multidimensional Arrays  | 14-5     |
| <input type="checkbox"/> acepack          | ACE and AVAS for Selecting Multiple Regression Transformations                             | 1.4.1    |
| <input type="checkbox"/> annotate         | Annotation for microarrays   | 1.62.0   |
| <input type="checkbox"/> AnnotationDbi    | Manipulation of SQLite-based annotations in Bioconductor                                   | 1.46.0   |
| <input type="checkbox"/> AnnotationFilter | Facilities for Filtering Bioconductor Annotation Resources                                 | 1.8.0    |
| <input type="checkbox"/> apIpack          | Another Plot Package: 'Bagplots', 'Iconplots', 'Summaryplots', Slider Functions and Others | 1.3.3    |
| <input type="checkbox"/> arm              | Data Analysis Using Regression and Multilevel/Hierarchical Models                          | 1.11-1   |
| <input type="checkbox"/> askpass          | Safe Password Entry for R, Git, and SSH  | 1.1      |
| <input type="checkbox"/> assertthat       | Easy Pre and Post Assertions   | 0.2.1    |
| <input type="checkbox"/> backports        | Reimplementations of Functions Introduced Since R-3.0.0                                    | 1.1.4    |
| <input checked="" type="checkbox"/> base  | The R Base Package   | 3.6.1    |
| <input type="checkbox"/> base64enc        | Tools for base64 encoding  | 0.1-3    |
| <input type="checkbox"/> BayesPeak        | Bayesian Analysis of CHIP-seq Data   | 1.36.0   |
| <input type="checkbox"/> BH               | Boost C++ Header Files   | 1.69.0-1 |
| <input type="checkbox"/> Biobase          | Biobase: Base functions for Bioconductor   | 2.44.0   |
| <input type="checkbox"/> BiocGenerics     | S4 generic functions used in Bioconductor  | 0.30.0   |

# PRACTICAL TASK #2: Basic administration of R

## .Renviron

```
> Sys.getenv()
```

```
...
```

```
APPDATA C:\Users\Гринеv\AppData\Roaming
```

```
...
```

```
COMPUTERNAME ГРИНЕВ-ПК
```

```
...
```

```
HOME C:\Users\Гринеv\Documents
```

```
HOMEDRIVE C:
```

```
HOMEPATH \Users\Гринеv
```

```
LOCALAPPDATA C:\Users\Гринеv\AppData\Local
```

```
...
```

```
R_HOME D:/Software/R-4.1.1
```

```
R_LIBS_USER C:\Users\Гринеv\Documents\R/win-library/4.1
```

```
...
```

```
TEMP C:\Users\6416~1\AppData\Local\Temp
```

```
TMP C:\Users\6416~1\AppData\Local\Temp
```

```
...
```

```
USERNAME Гринеv
```

# PRACTICAL TASK #2: Basic administration of R

## .Renviron

```
C:\Users\user_name\Documents
```

```
TMP = 'D:\Software\R-4.1.1\Temp'
```

```
APPDATA = 'D:\Software\R-4.1.1\AppData'
```

```
LOCALAPPDATA = 'D:\Software\R-4.1.1\AppData\Local'
```

```
TEMP = 'D:\Software\R-4.1.1\AppData\Local\Temp'
```

```
HOME = 'D:\Software\R-4.1.1\Documents'
```

```
R_LIBS_USER = 'D:\Software\R-4.1.1\library\user'
```

```
> Sys.getenv("TEMP")
```

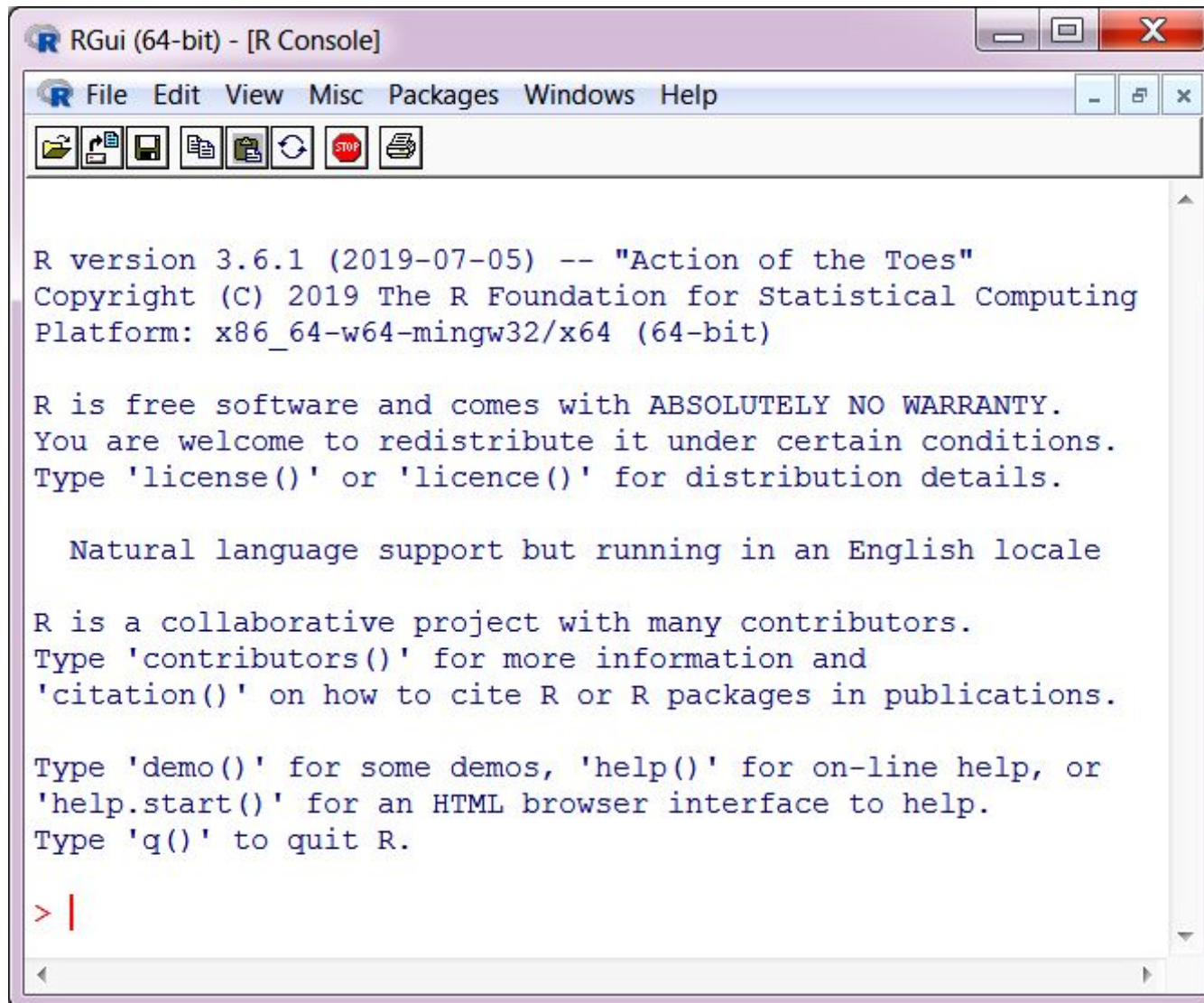
```
[1] "C:\\Users\\6416~1\\AppData\\Local\\Temp"
```

```
> Sys.getenv("TEMP")
```

```
[1] "D:\\Software\\R-4.1.1\\AppData\\Local\\Temp"
```

# PRACTICAL TASK #2: Basic administration of R

## R version



```
RGui (64-bit) - [R Console]
File Edit View Misc Packages Windows Help
R version 3.6.1 (2019-07-05) -- "Action of the Toes"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> |
```

# PRACTICAL TASK #2: Basic administration of R

## R version



CRAN

[Mirrors](#)  
[What's new?](#)  
[Task Views](#)  
[Search](#)

About R

[R Homepage](#)  
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Software

[R Sources](#)  
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Documentation

[Manuals](#)  
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[Contributed](#)

R-4.1.1 for Windows (32/64 bit)

[Download R 4.1.1 for Windows](#) (86 megabytes, 32/64 bit)

[Installation and other instructions](#)  
[New features in this version](#)

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- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is [<CRAN MIRROR>/bin/windows/base/release.html](#).

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Last change: 2021-08-10

# PRACTICAL TASK #2: Basic administration of R

## R version

Calling of current R version from command console.

```
> R.Version()$version.string  
[1] "R version 4.1.1 (2021-08-10)"
```

Updating R from command console using the package *installr*. The main work horse of this package is function `updateR()`. This function performs the following: finding the latest R version, downloading it, running the installer, deleting the installation file, copy and updating old packages to the new R installation.

```
### Installing the package
```

```
> install.packages(pkgs="installr")
```

```
### Loading the package
```

```
> suppressMessages(expr=library(package=installr))
```

```
### Using the package
```

```
> updateR()
```

**CRAN** [cran.r-project.org/web/packages/installr/index.html](https://cran.r-project.org/web/packages/installr/index.html)

**Tutorial** [r-statistics.com/2013/03/updating-r-from-r-on-windows-using-the-installr-package](https://r-statistics.com/2013/03/updating-r-from-r-on-windows-using-the-installr-package)

# PRACTICAL TASK #2: Basic administration of R

## R version

**Old versions** of R at <https://cran.r-project.org/bin/windows/base/old>

### Previous Releases of R for Windows

This directory contains previous binary releases of R for Windows.

The current release, and links to development snapshots, are available [here](#). Source code for these releases and others is available through [the main CRAN page](#).

In this directory:

- [R 4.1.1](#) (August, 2021)
- [R 4.1.0](#) (May, 2021)
- [R 4.0.5](#) (March, 2021)
- [R 4.0.4](#) (February, 2021)
- [R 4.0.3](#) (October, 2020)
- [R 4.0.2](#) (June, 2020)
- [R 4.0.1](#) (June, 2020)
- [R 4.0.0](#) (April, 2020)
- [R 3.6.3](#) (February, 2020)
- [R 3.6.2](#) (December, 2019)
- [R 3.6.1](#) (July, 2019)
- [R 3.6.0](#) (April, 2019)
- [R 3.5.3](#) (March, 2019)
- [R 3.5.2](#) (December, 2018)
- [R 3.5.1](#) (July, 2018)
- [R 3.5.0](#) (April, 2018)
- [R 3.4.4](#) (March, 2018)
- [R 3.4.3](#) (November, 2017)
- [R 3.4.2](#) (September, 2017)
- [R 3.4.1](#) (June, 2017)
- [R 3.4.0](#) (April, 2017)
- [R 3.3.3](#) (March, 2017)



# PRACTICAL TASK #3: Handling with R workspace

## Basic definitions

The **workspace** is current R working environment. It includes any **user-defined objects** (vectors, matrices, data frames, lists, functions). At the end of an R session, the user can save an image of the current workspace that is automatically reloaded the next time R is started.

Some standard commands for managing R workspace:

```
### Get work directory
```

```
> getwd()
```

```
[1] "C:/Users/Гринеv/Documents"
```

```
### Set custom work directory
```

```
> setwd(dir="D:/Vasily Grinev")
```

```
> getwd()
```

```
[1] "D:/Vasily Grinev"
```

```
### List the objects in the current workspace
```

```
> ls()
```

```
character(0)
```

# PRACTICAL TASK #3: Handling with R workspace

## Session info

```
> sessionInfo()
```

```
R version 4.1.1 (2021-08-10)
```

```
Platform: x86_64-w64-mingw32/x64 (64-bit)
```

```
Running under: Windows 7 x64 (build 7601) Service Pack 1
```

```
Matrix products: default
```

```
locale:
```

```
[1] LC_COLLATE=English_United States.1252
```

```
[2] LC_CTYPE=English_United States.1252
```

```
[3] LC_MONETARY=English_United States.1252
```

```
[4] LC_NUMERIC=C
```

```
[5] LC_TIME=English_United States.1252
```

```
system code page: 1251
```

```
attached base packages:
```

```
[1] stats    graphics  grDevices  utils      datasets  methods    base
```

```
loaded via a namespace (and not attached):
```

```
[1] compiler_3.6.1
```

# PRACTICAL TASK #3: Handling with R workspace

## Options

**Options** are **global parameters** that affect the way in which R computes and displays its results. Just one example:

```
> options("digits")
```

```
$digits
```

```
[1] 7
```

```
> 3/4.5
```

```
[1] 0.6666667
```

```
### The names of the options
```

```
> names(x=options())
```

```
[1] "add.smooth" "askYesNo"
```

```
[3] "browserNLdisabled" "CBoundsCheck"
```

```
[5] "check.bounds" "citation.bibtex.max"
```

```
[7] "continue" "contrasts"
```

```
[9] "defaultPackages" "demo.ask"
```

```
[11] "deparse.cutoff" "device"
```

```
[13] "device.ask.default" "digits"
```

```
[15] "echo" "editor"
```

```
[17] "encoding" "example.ask"
```

```
...
```

# PRACTICAL TASK #3: Handling with R workspace

## Options

### View current (default) options settings

```
>options()
```

```
$add.smooth
```

```
[1] TRUE
```

```
$askYesNo
```

```
function (msg, ...)
```

```
{
```

```
  flush.console()
```

```
  ans <- winDialog("yesnocancel", msg)
```

```
  switch(ans, YES = TRUE, NO = FALSE, NA)
```

```
}
```

```
<bytecode: 0x00000000097acd40>
```

```
<environment: namespace:utils>
```

```
$browserNLdisabled
```

```
[1] FALSE
```

```
...
```

# PRACTICAL TASK #3: Handling with R workspace

## Options

```
> options("digits")
```

```
$digits
```

```
[1] 7
```

```
> getOption(x="digits")
```

```
[1] 7
```

```
### Re-settings of option value
```

```
> options(digits=4)
```

```
> 3/4.5
```

```
[1] 0.6667
```

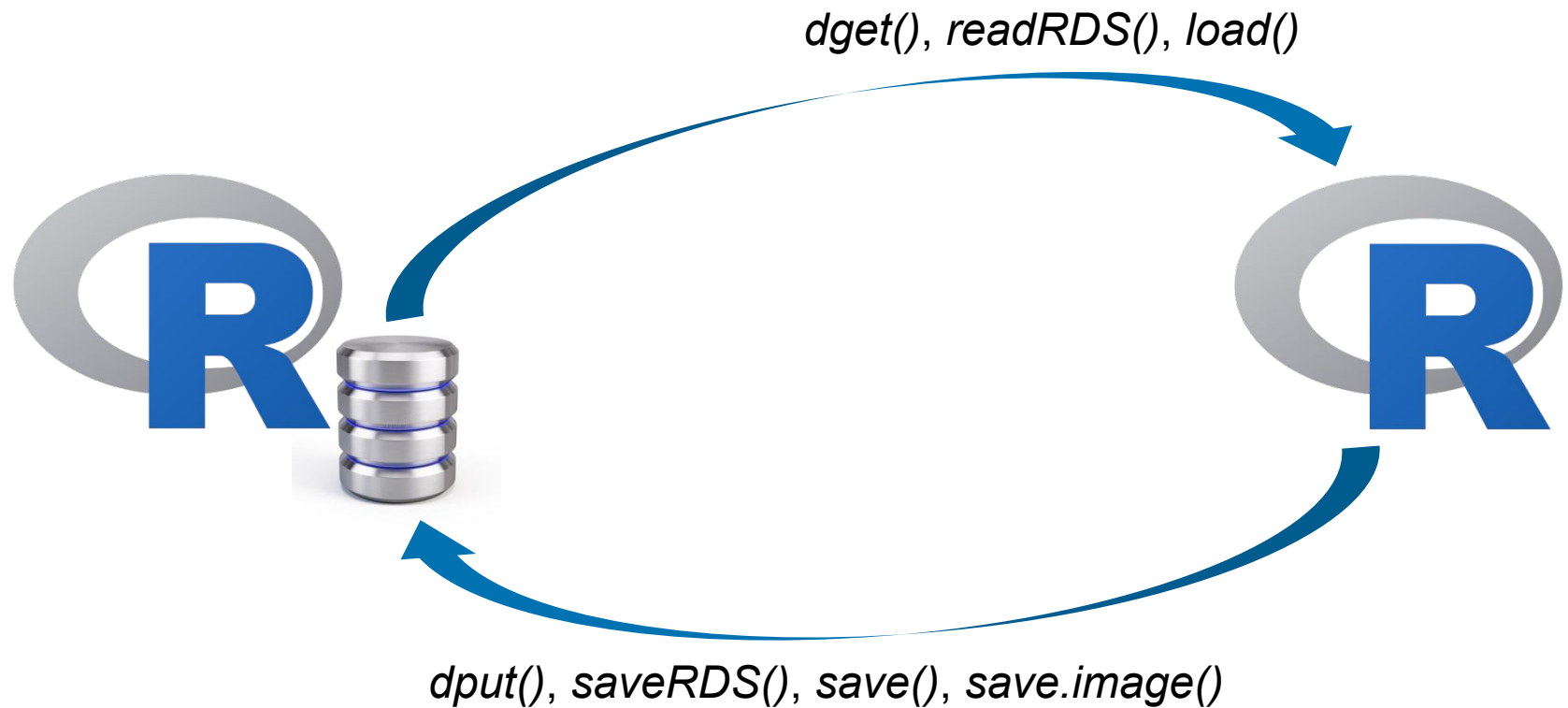
```
> options(digits=20)
```

```
> 3/4.5
```

```
[1] 0.66666666666666666663
```

# PRACTICAL TASK #4: Life cycle of native R files

## Native R files



- > `saveRDS(object=my_R_object, # R object to serialize  
file="my_R_object.rds")` # the name of the file where the  
# R object is saved to
- > `readRDS(file="my_R_object.rds")` # the name of the file where the  
# R object is read from

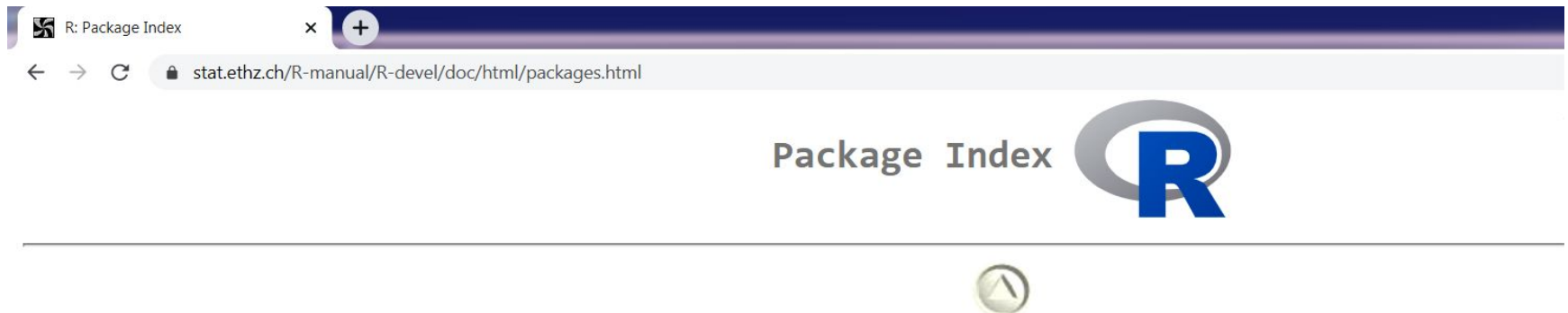
# PRACTICAL TASK #4: Life cycle of native R files

## Built-in functions

- dget()* – reads in active memory of single R object from the R text file;
- load()* – reads the R environment objects;
- readRDS()* – reads a single R object from \*.RDS file.
  
- dput()* – write an R object to a text file or connection;
- dump()* – write R objects into a text file;
- save()* – write an object of the R environment into a text file;
- save.image()* – write a current R workspace in .rdata file;
- saveRDS()* – write a single R object to a file.

# PRACTICAL TASK #5: Getting help on R issues

## Packages in the standard R library



### Packages in the standard library

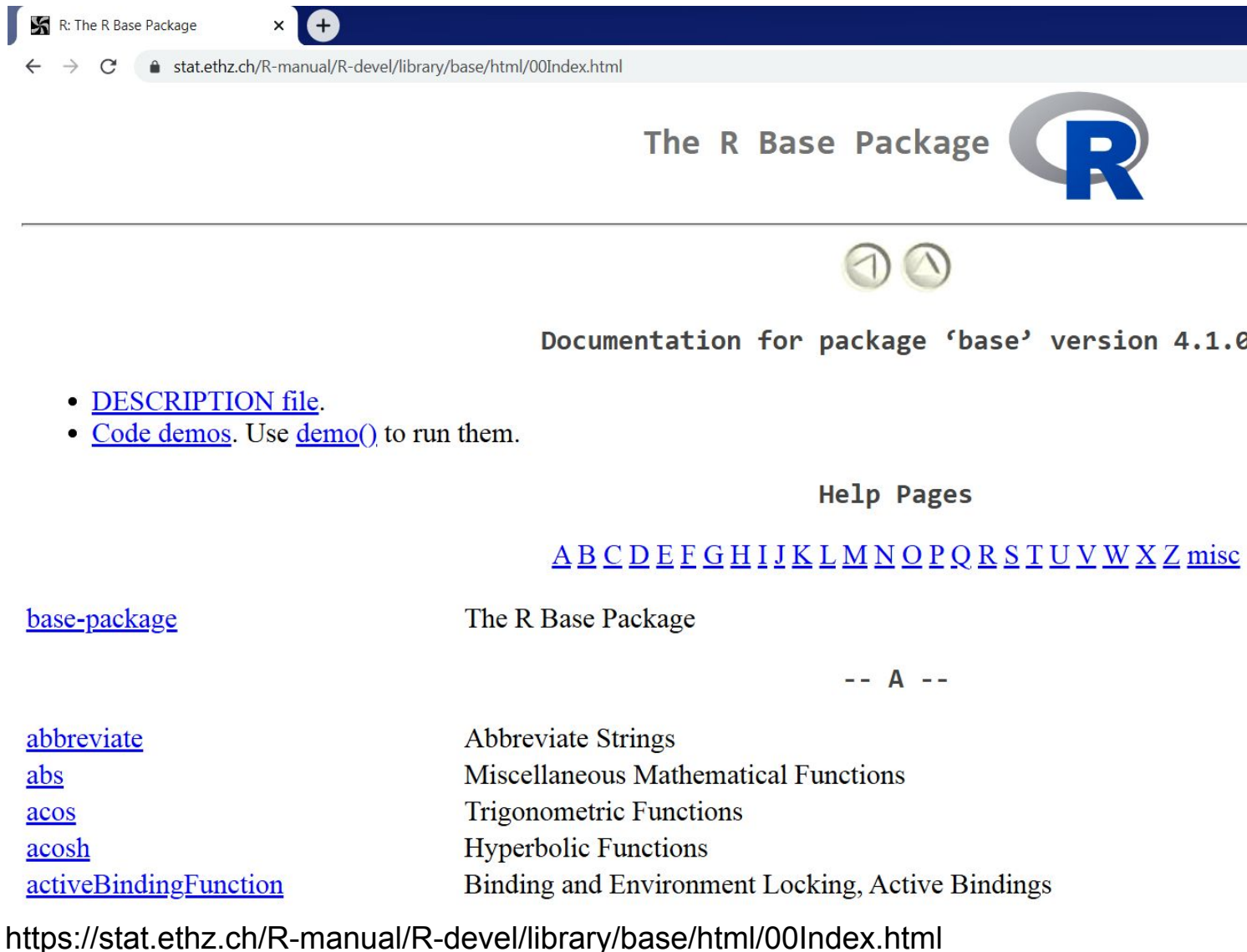
|                            |  |
|----------------------------|--|
| <a href="#">base</a>       | The R Base Package   |
| <a href="#">boot</a>       | Bootstrap Functions (Originally by Angelo Canty for S)                                     |
| <a href="#">class</a>      | Functions for Classification   |
| <a href="#">cluster</a>    | "Finding Groups in Data": Cluster Analysis Extended Rousseeuw et al.                       |
| <a href="#">codetools</a>  | Code Analysis Tools for R  |
| <a href="#">compiler</a>   | The R Compiler Package   |
| <a href="#">datasets</a>   | The R Datasets Package   |
| <a href="#">foreign</a>    | Read Data Stored by 'Minitab', 'S', 'SAS', 'SPSS', 'Stata', 'Systat', 'Weka', 'dBase', ... |
| <a href="#">graphics</a>   | The R Graphics Package   |
| <a href="#">grDevices</a>  | The R Graphics Devices and Support for Colours and Fonts                                   |
| <a href="#">grid</a>       | The Grid Graphics Package  |
| <a href="#">KernSmooth</a> | Functions for Kernel Smoothing Supporting Wand & Jones (1995)                              |
| <a href="#">lattice</a>    | Trellis Graphics for R   |
| <a href="#">MASS</a>       | Support Functions and Datasets for Venables and Ripley's MASS                              |

[stat.ethz.ch/R-manual/R-devel/doc/html/packages.html](http://stat.ethz.ch/R-manual/R-devel/doc/html/packages.html)



# PRACTICAL TASK #5: Getting help on R issues


## Package description page



The screenshot shows a web browser window with the address bar containing the URL `stat.ethz.ch/R-manual/R-devel/library/base/html/00Index.html`. The page title is "The R Base Package" and features the R logo. Below the title, there are navigation arrows and the text "Documentation for package 'base' version 4.1.0". A list of links is provided, including "DESCRIPTION file" and "Code demos". A section titled "Help Pages" contains a list of links from A to Z, with "A" selected. Below this, a list of help pages is shown, including "base-package", "abbreviate", "abs", "acos", "acosh", and "activeBindingFunction".

R: The R Base Package

stat.ethz.ch/R-manual/R-devel/library/base/html/00Index.html

The R Base Package 

Documentation for package 'base' version 4.1.0

- [DESCRIPTION file](#).
- [Code demos](#). Use [demo\(\)](#) to run them.

Help Pages

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#) [misc](#)

[base-package](#) The R Base Package

-- A --

[abbreviate](#) Abbreviate Strings

[abs](#) Miscellaneous Mathematical Functions

[acos](#) Trigonometric Functions

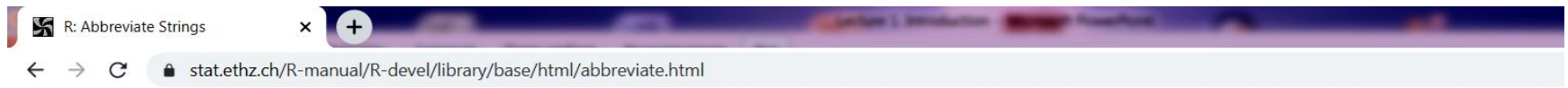
[acosh](#) Hyperbolic Functions

[activeBindingFunction](#) Binding and Environment Locking, Active Bindings

<https://stat.ethz.ch/R-manual/R-devel/library/base/html/00Index.html>

# PRACTICAL TASK #5: Getting help on R issues

## Function description page



abbreviate {base}

### Abbreviate Strings

#### Description

Abbreviate strings to at least `minlength` characters, such that they remain *unique* (if they were), unless `strict = TRUE`.

#### Usage

```
abbreviate(names.arg, minlength = 4, use.classes = TRUE,  
           dot = FALSE, strict = FALSE,  
           method = c("left.kept", "both.sides"), named = TRUE)
```

#### Arguments

`names.arg`

a character vector of names to be abbreviated, or an object to be coerced to a character vector by [as.character](#).

`minlength`

the minimum length of the abbreviations.

`use.classes`

logical: should lowercase characters be removed first?

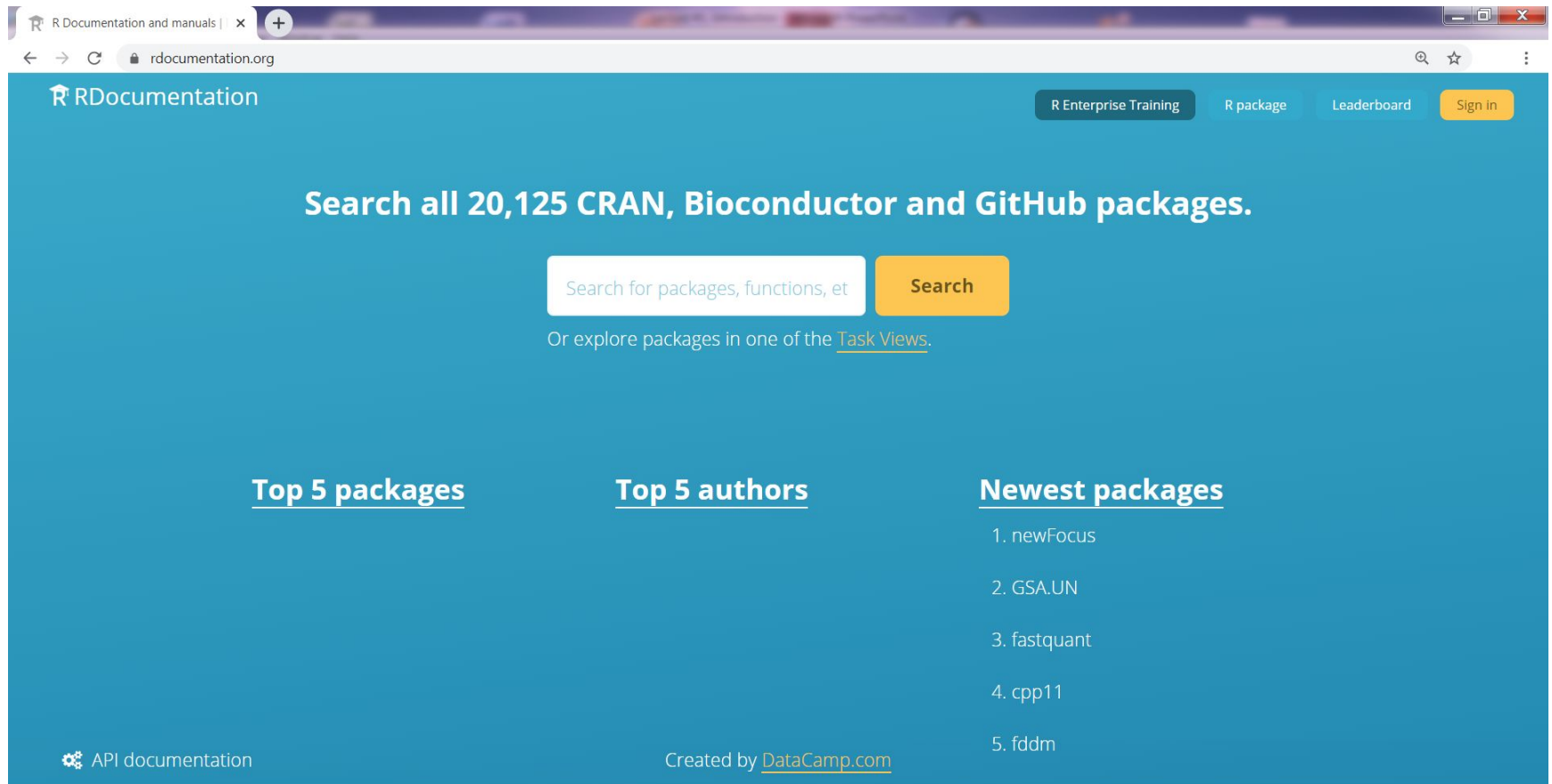
`dot`

logical: should a dot (".") be appended?

<https://stat.ethz.ch/R-manual/R-devel/library/base/html/abbreviate.html>

# PRACTICAL TASK #5: Getting help on R issues

## R documentation



The screenshot shows the RDocumentation website homepage. The browser address bar displays 'rdocumentation.org'. The page features a search bar with the placeholder text 'Search for packages, functions, et' and a yellow 'Search' button. Below the search bar, there is a link to 'Task Views'. The page is divided into three columns: 'Top 5 packages', 'Top 5 authors', and 'Newest packages'. The 'Newest packages' column lists five packages: newFocus, GSA.UN, fastquant, cpp11, and fddm. The footer includes a link to 'API documentation' and a note 'Created by DataCamp.com'.

RDocumentation

R Enterprise Training R package Leaderboard Sign in

Search all 20,125 CRAN, Bioconductor and GitHub packages.

Search for packages, functions, et Search

Or explore packages in one of the [Task Views](#).

Top 5 packages Top 5 authors Newest packages

1. newFocus
2. GSA.UN
3. fastquant
4. cpp11
5. fddm

API documentation Created by [DataCamp.com](#)

<https://www.rdocumentation.org/>

# PRACTICAL TASK #5: Getting help on R issues

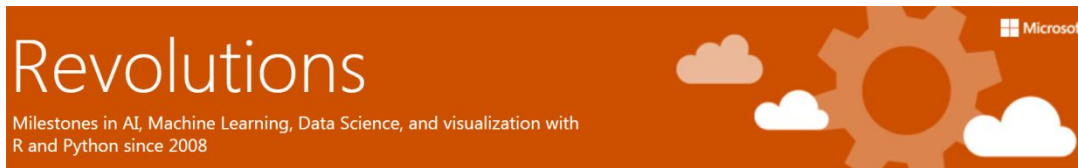
## R community: blogs and blog aggregators

 **R-bloggers** (<https://www.r-bloggers.com>)

R-Bloggers is a blog aggregator of content contributed by bloggers who write about R.

 **RStudio Community** (<https://community.rstudio.com>)

RStudio Community is a blog aggregator for all things R and RStudio.



(<https://blog.revolutionanalytics.com/about.html>)

Revolutions is a blog dedicated to news and information of interest to members of the R community

 **R-exercises** (<https://www.r-exercises.com/>)

R-exercises aims to help people develop and improve their R programming skills



(<https://r-analytics.blogspot.com/>)

Этот блог посвящен языку программирования и системе статистических

# PRACTICAL TASK #5: Getting help on R issues

## Internal R documentation

### List of installed packages

```
> attr(installed.packages()[, 1], "names")
```

### Get help on a package

```
> ?base
```

```
> library(help="base")
```

### Get help on a function

```
> ls(pos="package:base")
```

```
> ?sqrt
```

```
> ??abs
```

### Get help on an operator

```
> ?"+"
```

```
> ??"+"
```

**THANKS FOR YOUR ATTENTION!**

**R**