

Chapter 13-1

R, Rstudio 설치

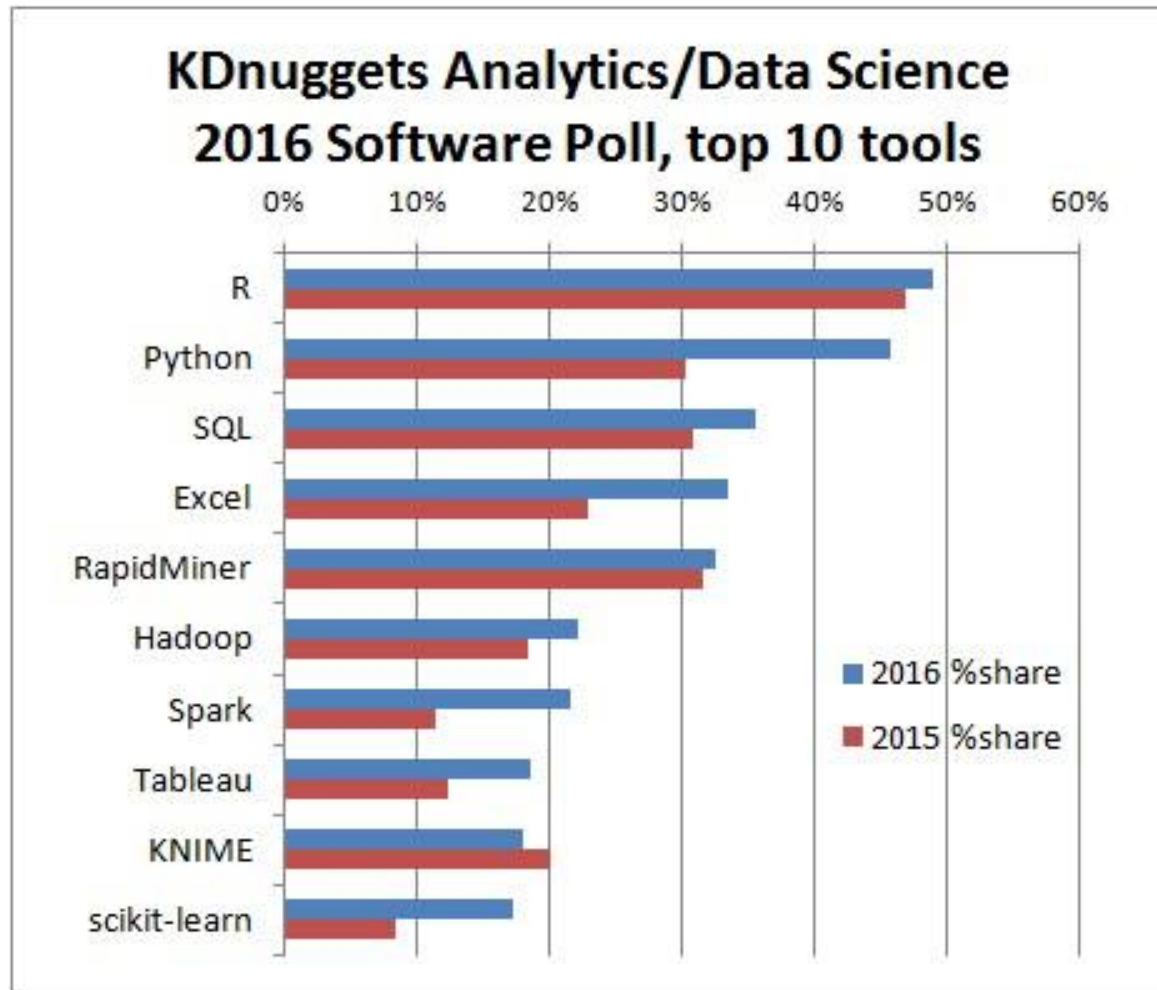
오 세 종

- R 의 특징
 - 자료분석, 통계작업에 특화된 공개 SW
 - R 은 계산기
 - R 은 프로그래밍 언어
 - 자료, 통계 분석을 위한 거의 모든 기능을 함수, 패키지 형태로 제공
 - Java, C 프로그램과 연동 가능
 - Compact size (< 100 Mb)
 - Open Source SW

뛰어난 시각화 기능 제공



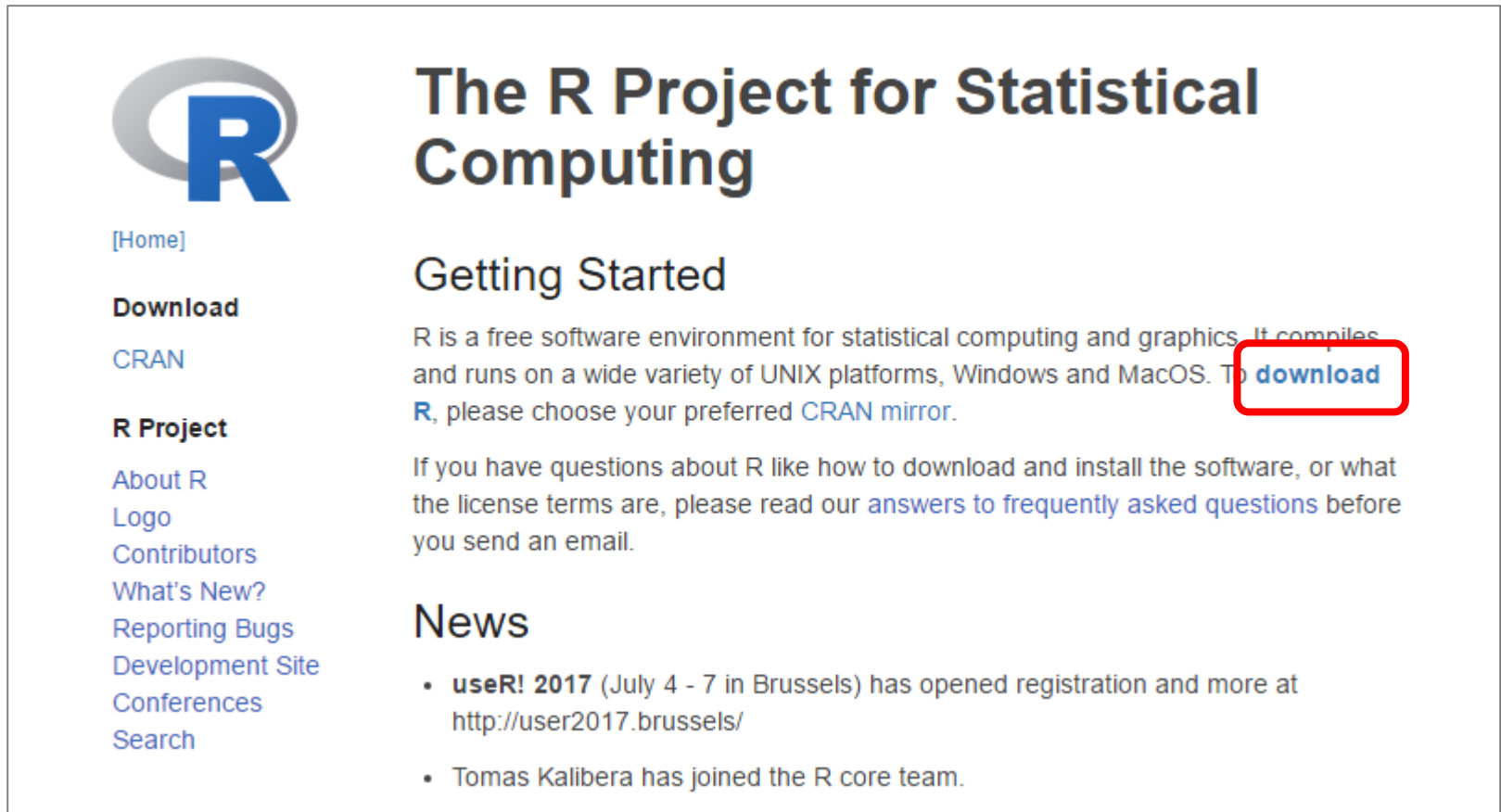
- 시장 점유율




<https://www.kdnuggets.com/2016/06/r-python-top-analytics-data-mining-data-science-software.html>

Install R, Rstudio

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



The screenshot shows the homepage of The R Project for Statistical Computing. On the left is a sidebar with navigation links. The main content area features the project's title, a 'Getting Started' section with a 'download' button highlighted by a red box, and a 'News' section with recent updates.



[\[Home\]](#)

Download

[CRAN](#)

R Project

[About R](#)

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[Contributors](#)

[What's New?](#)

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[Development Site](#)

[Conferences](#)

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The R Project for Statistical Computing

Getting Started

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To [download](#) R, please choose your preferred [CRAN mirror](#).

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.

News

- **useR! 2017** (July 4 - 7 in Brussels) has opened registration and more at <http://user2017.brussels/>
- Tomas Kalibera has joined the R core team.

Install R, Rstudio

- 다운로드 사이트 선택

http://cran.stat.unipd.it/	University of Padua
http://dssm.unipa.it/CRAN/	Universita degli Studi di Palermo
Japan	
https://cran.ism.ac.jp/	The Institute of Statistical Mathematics, Tokyo
http://cran.ism.ac.jp/	The Institute of Statistical Mathematics, Tokyo
Korea	
http://cran.nexr.com/	NexR Corporation, Seoul
http://healthstat.snu.ac.kr/CRAN/	Graduate School of Public Health, Seoul National
http://cran.biodisk.org/	The Genome Institute of UNIST (Ulsan National In and Technology)
Lebanon	
http://rmirror.lau.edu.lb/	Lebanese American University, Byblos
Malaysia	
https://wbc.upm.edu.my/cran/	Univerisiti Putra Malaysia
http://wbc.upm.edu.my/cran/	Univerisiti Putra Malaysia

Install R, Rstudio

- 윈도우용 버전 선택

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 (Monday 2016-10-31, Sincere Pumpkin Patch) [R-3.3.2.tar.gz](#), read

Install R, Rstudio

- base 버전 선택

R for Windows

Subdirectories:

base	Binaries for base distribution (managed by Duncan Murdoch). This is what you want to install R for the first time.
contrib	Binaries of contributed CRAN packages (for R \geq 2.11.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 $<$ 2.11.x; managed by Uwe Ligges).
Rtools	Tools to build R and R packages (managed by Duncan Murdoch). 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 Duncan Murdoch or Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

Install R, Rstudio

- 현재 최신 버전은 R3.4.1

R-3.4.1 for Windows (32/64 bit)

[Download R 3.4.1 for Windows](#) (62 megabytes, 32/64 bit)

[Installation and other instructions](#)

[New features in this version](#)

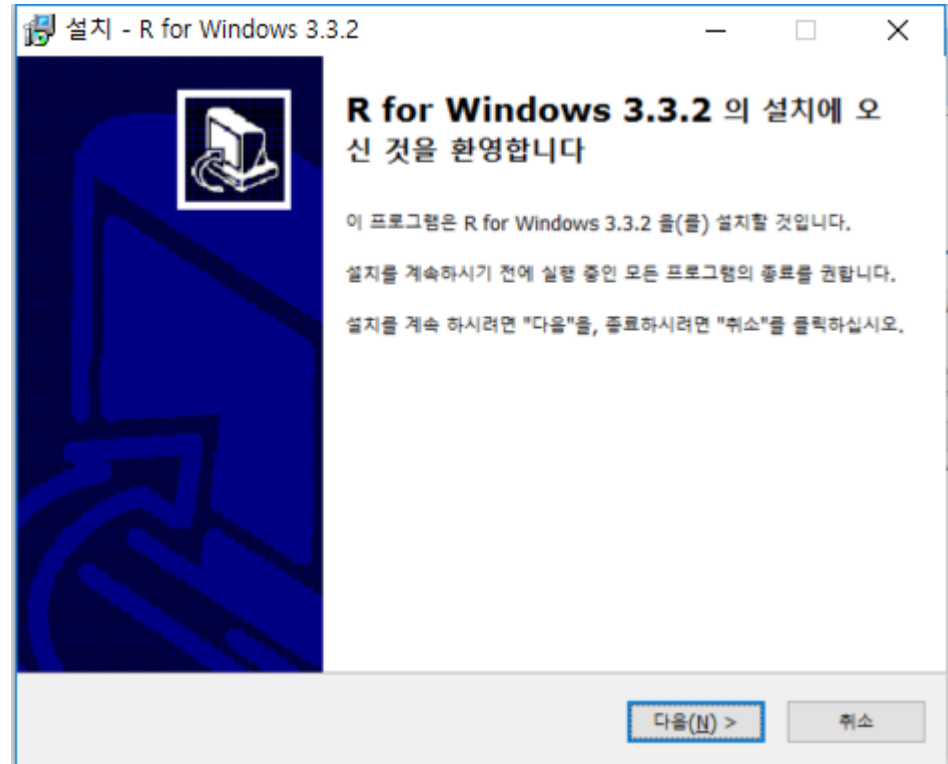
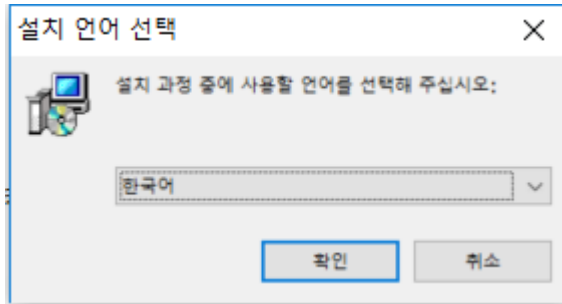
If you want to double-check that the package you have downloaded matches the package distributed by CRAN, you can check the [fingerprint](#) on the master server. You will need a version of md5sum for windows: both [graphical](#) and [command line version](#)

Frequently asked questions

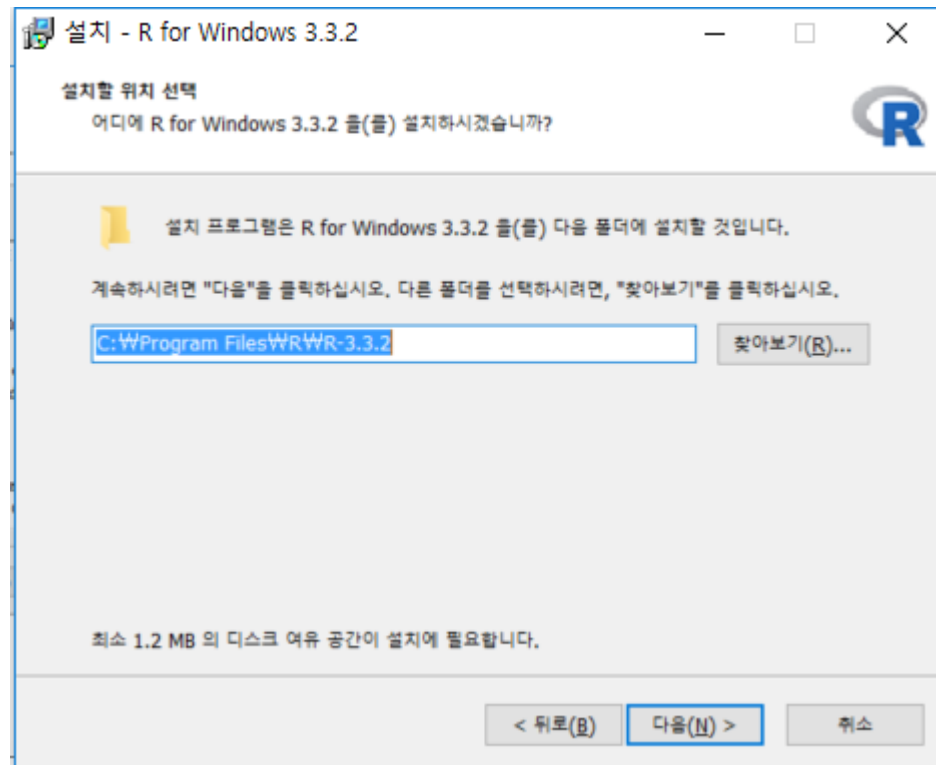
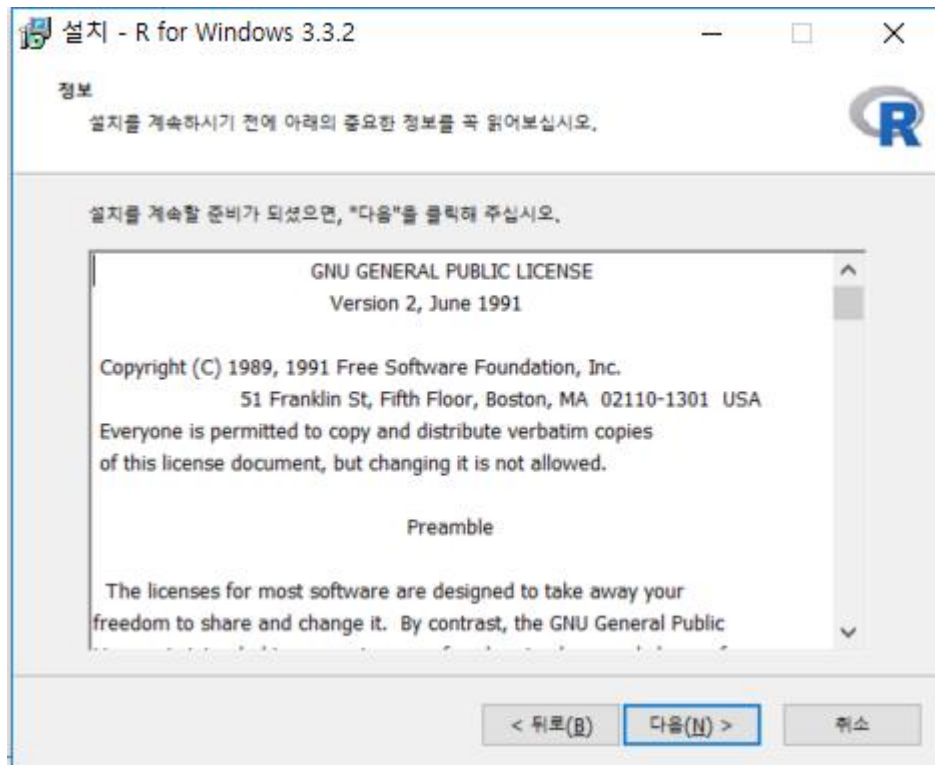
- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Install R, Rstudio

- 다운로드 받은 설치 프로그램 실행

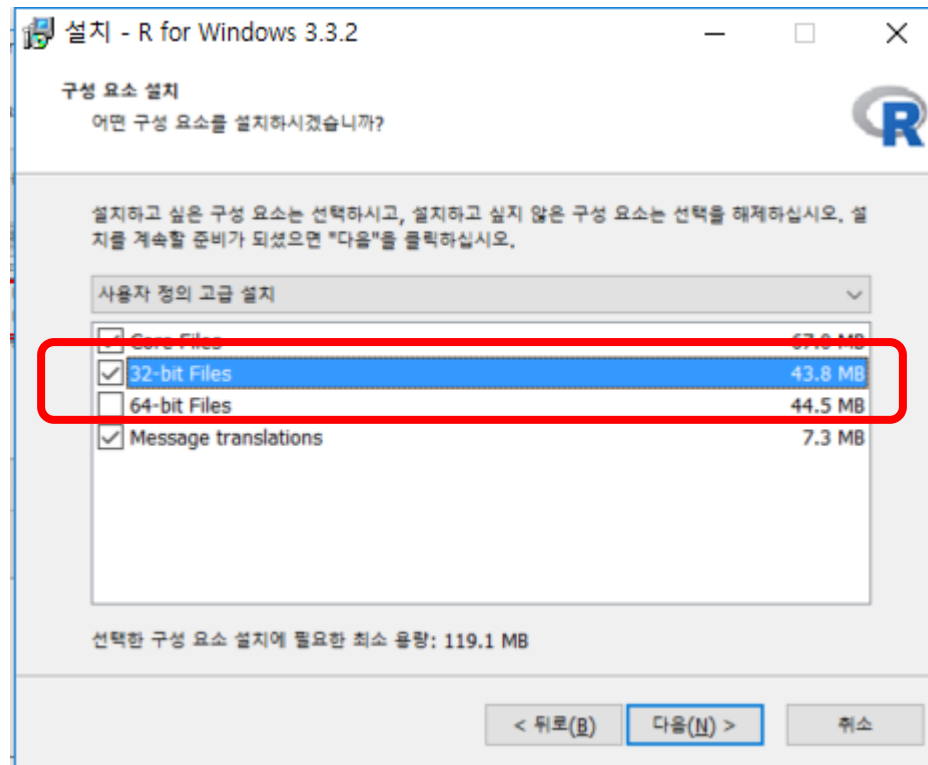


Install R, Rstudio



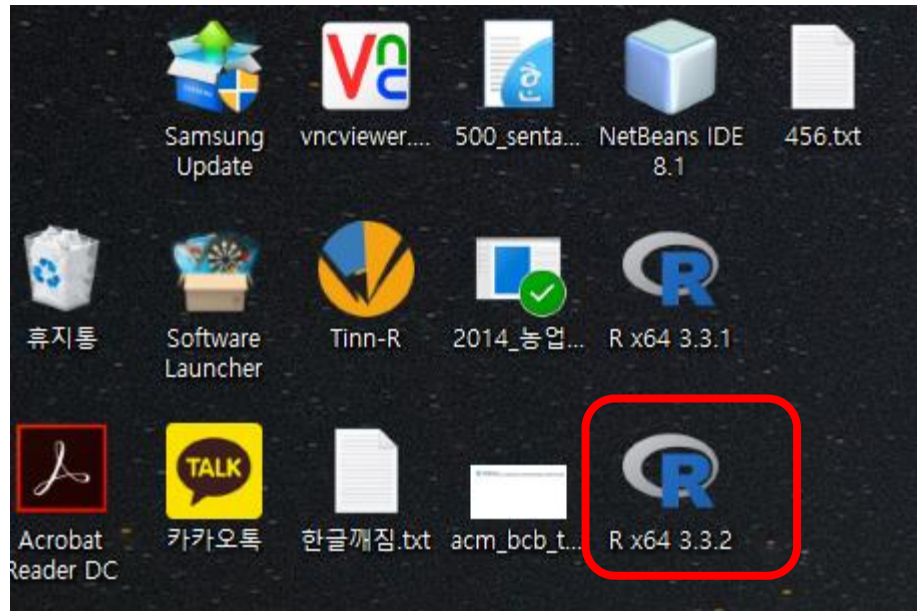
Install R, Rstudio

- 32 bit 또는 64 bit 버전 중 하나를 설치한다.
 - 운영체제의 버전에 따라 선택. 64 bit 버전이 더 큰 데이터를 더 효율적으로 처리할 수 있다



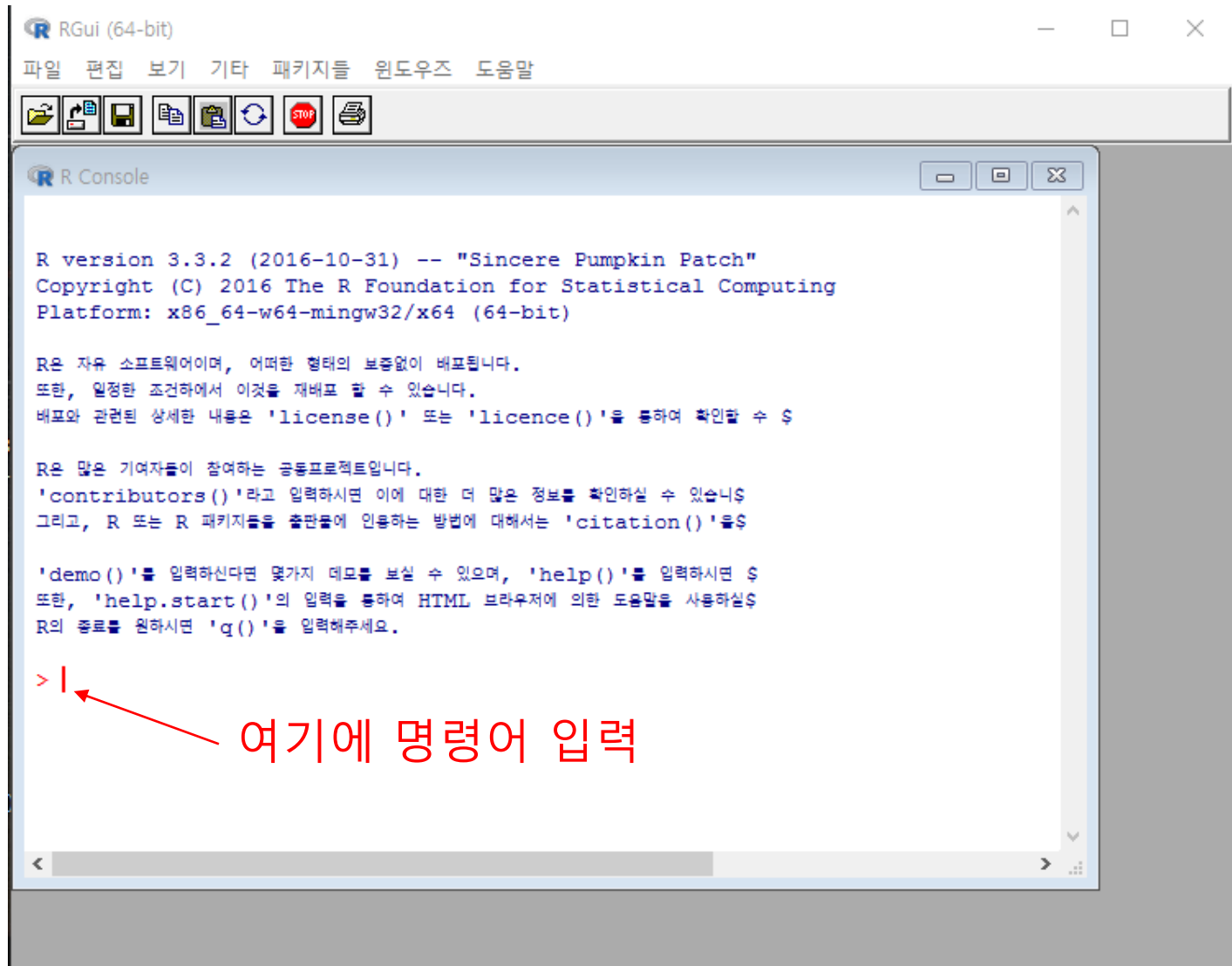
Install R, Rstudio

- 설치가 완료되면 바탕화면에 실행 아이콘 생성



Install R, Rstudio

- R 을 실행 화면



The screenshot shows the RGui (64-bit) window. The title bar says "RGui (64-bit)". Below the title bar is a menu bar with "파일", "편집", "보기", "기타", "패키지들", "윈도우즈", and "도움말". Below the menu bar is a toolbar with icons for file operations and R-specific functions. The main window is the "R Console", which contains the following text:

```
R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R은 자유 소프트웨어이며, 어떠한 형태의 보증없이 배포됩니다.
또한, 일정한 조건하에서 이것을 재배포 할 수 있습니다.
배포와 관련된 상세한 내용은 'license()' 또는 'licence()'을 통하여 확인할 수 $

R은 많은 기여자들이 참여하는 공동프로젝트입니다.
'contributors()'라고 입력하시면 이에 대한 더 많은 정보를 확인하실 수 있습니다
그리고, R 또는 R 패키지들을 출판물에 인용하는 방법에 대해서는 'citation()'을$

'demo()'를 입력하신다면 몇가지 데모를 보실 수 있으며, 'help()'를 입력하시면 $
또한, 'help.start()'의 입력을 통하여 HTML 브라우저에 의한 도움말을 사용하실$
R의 종료할 원하시면 'q()'을 입력해주세요.
```

At the bottom of the console, there is a prompt character ">" followed by a vertical bar "|". A red arrow points from the text "여기에 명령어 입력" (Enter command here) to the prompt character.

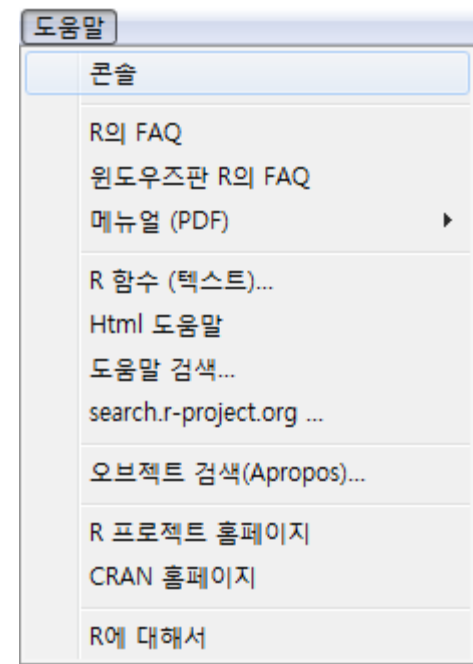
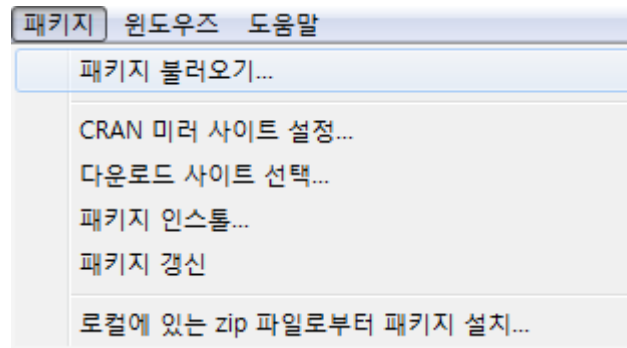
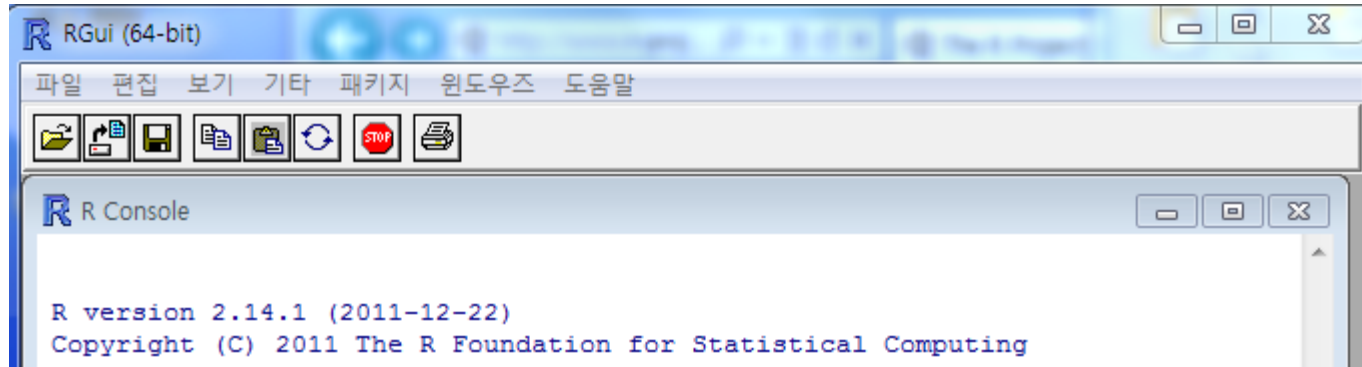
Install R, Rstudio

```
> 20+4  
[1] 24  
> a<-10  
> b<-20  
> a+b  
[1] 30  
>
```

```
> 20+4  
[1] 24  
> a<-10  
> b<-20  
> a+b  
[1] 30  
> |
```

Install R, Rstudio

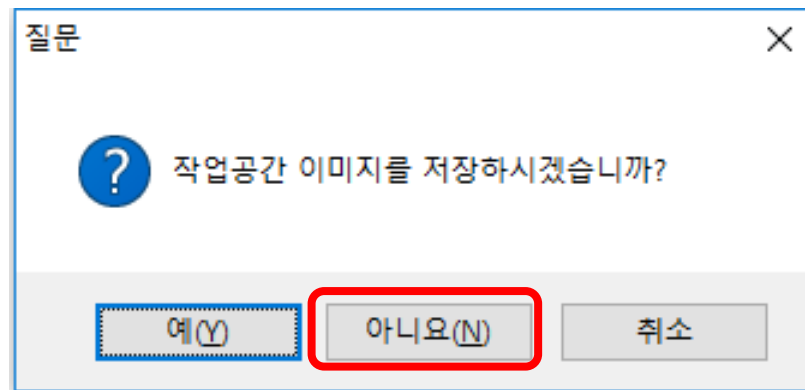
- R user interface



Install R, Rstudio

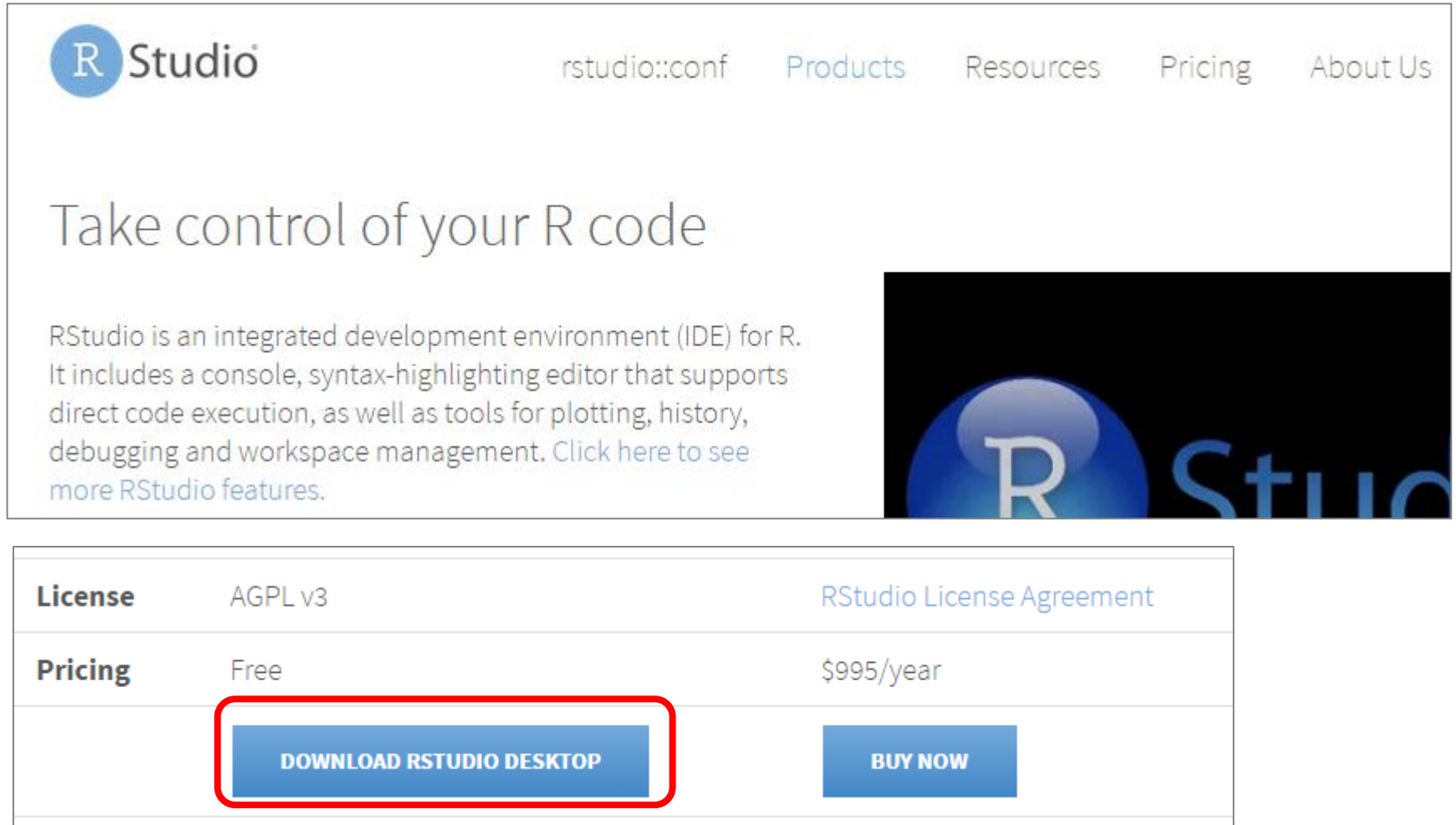
- R 실행 종료

- 종료버튼 클릭시 다음과 같은 화면이 나오는데, 현재까지 작업한 결과를 저장할 것인지를 묻는 것이다.
- 대부분의 경우는 실행한 명령어(R script)만 저장하고 작업공간 이미지(R script, 생성한 데이터 등)는 저장하지 않는다



Install R, Rstudio

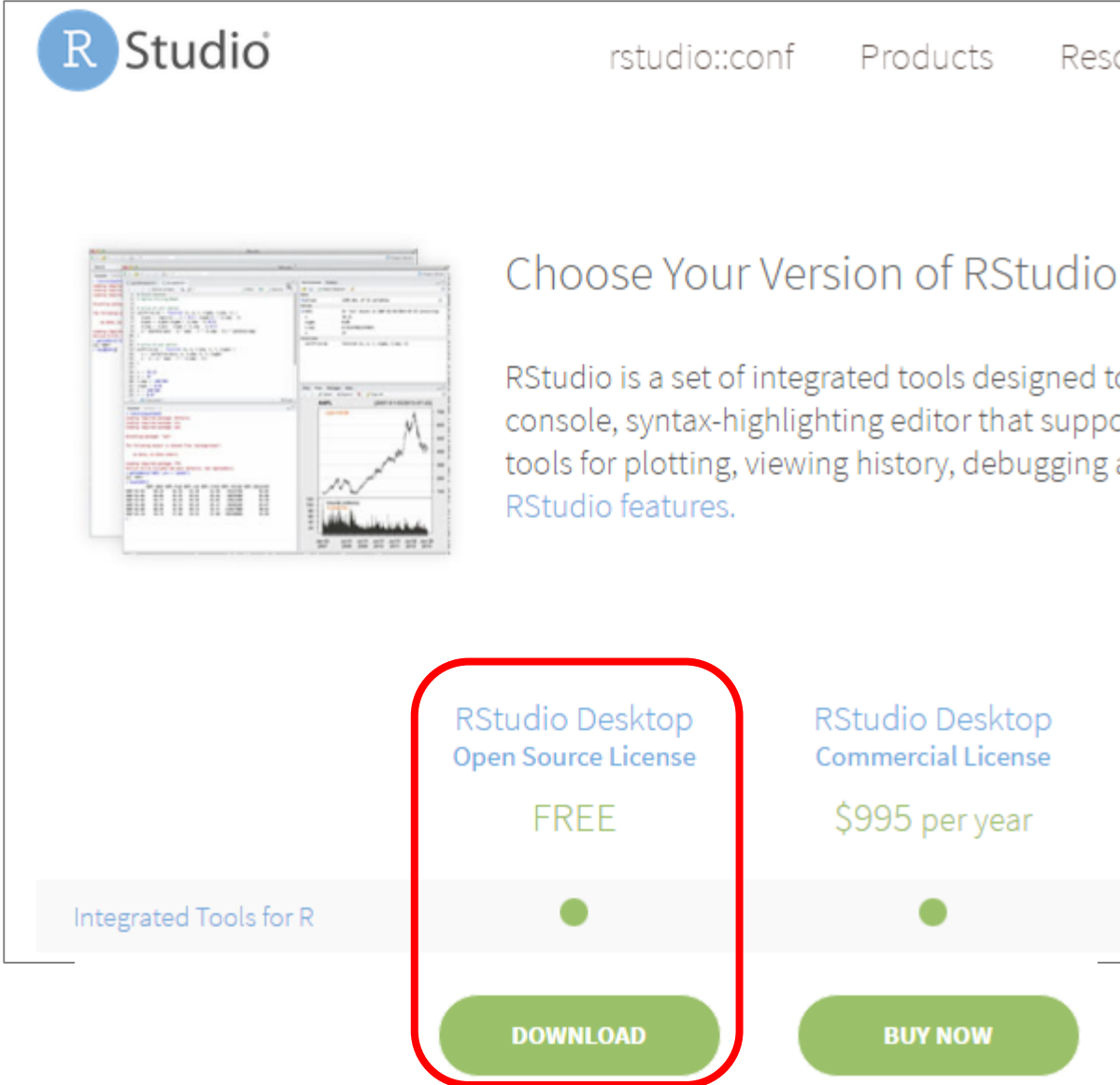
- <https://www.rstudio.com/products/rstudio/>
 - R 을 보다 편리하게 사용할 수 있는 환경 제공



The screenshot shows the RStudio website homepage. At the top is the RStudio logo and navigation links: `rstudio::conf`, [Products](#), [Resources](#), [Pricing](#), and [About Us](#). The main heading is "Take control of your R code". Below it, a paragraph describes RStudio as an integrated development environment (IDE) for R, listing features like a console, syntax-highlighting editor, direct code execution, plotting, history, debugging, and workspace management. A link "Click here to see more RStudio features." is provided. To the right is a large image of the RStudio logo. Below the main content is a table with pricing and license information.

License	AGPL v3	RStudio License Agreement
Pricing	Free	\$995/year
	DOWNLOAD RSTUDIO DESKTOP	BUY NOW


Install R, Rstudio



The screenshot shows the RStudio website with the following elements:

- Header:** RStudio logo, navigation links for `rstudio::conf`, Products, and Resources.
- Image:** A collage of RStudio interface windows showing code, console, and plots.
- Section:** "Choose Your Version of RStudio"
- Description:** "RStudio is a set of integrated tools designed to... console, syntax-highlighting editor that supports... tools for plotting, viewing history, debugging and... RStudio features."
- License Options:**
 - RStudio Desktop Open Source License:** FREE. This option is highlighted with a red rounded rectangle. Below the text is a green dot and a green "DOWNLOAD" button.
 - RStudio Desktop Commercial License:** \$995 per year. Below the text is a green dot and a green "BUY NOW" button.
- Footer:** "Integrated Tools for R"

Install R, Rstudio

 **RStudio**

[rstudio::conf](#) [Products](#) [Resource](#)

RStudio Desktop 1.0.136 — [Release Notes](#)

RStudio requires R 2.11.1+. If you don't already have R, download it [here](#).

Installers for Supported Platforms

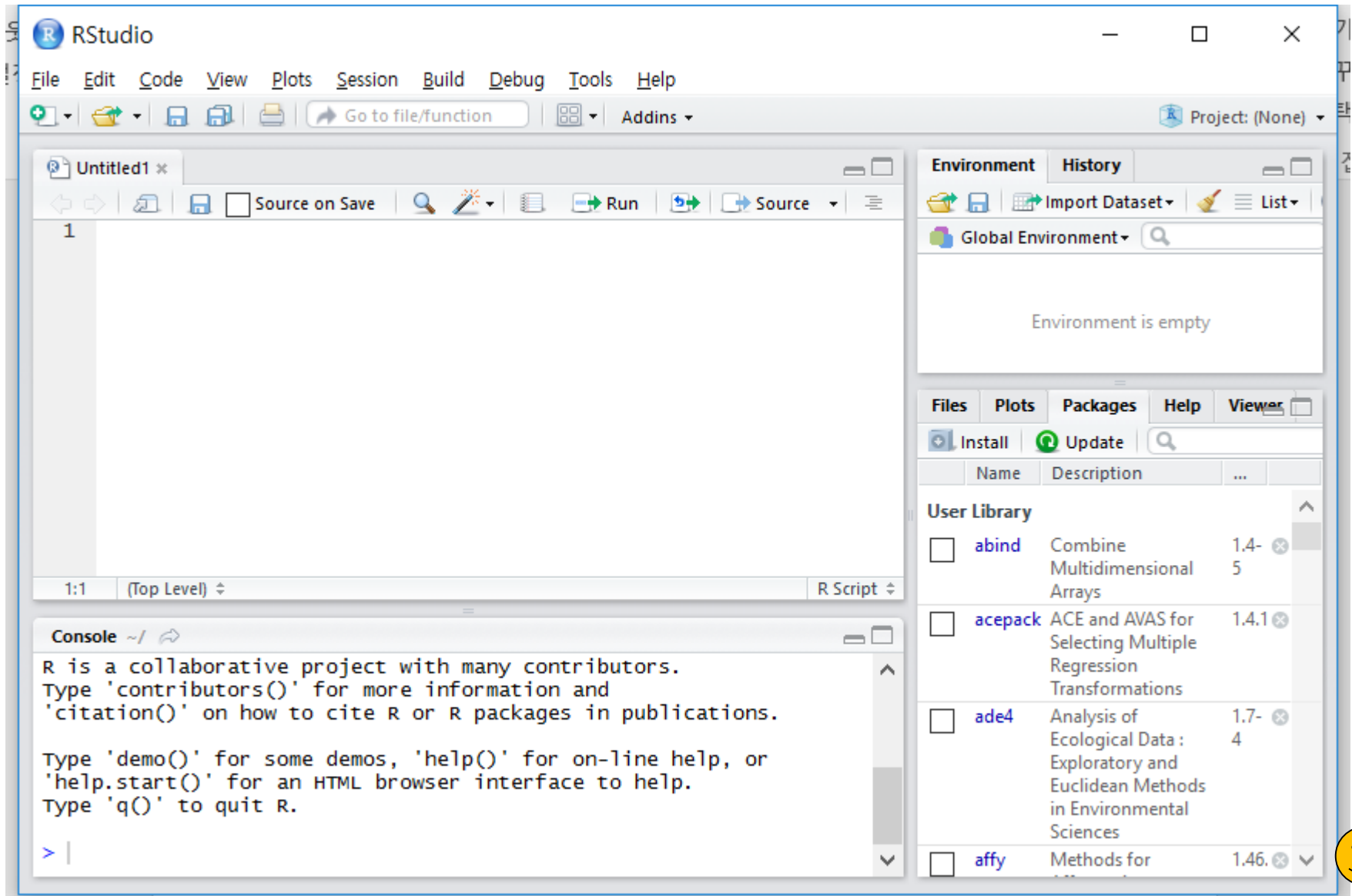
Installers	Size	Date
RStudio 1.0.136 - Windows Vista/7/8/10	81.9 MB	2016-12-21
RStudio 1.0.136 - Mac OS X 10.6+ (64-bit)	71.2 MB	2016-12-21
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (32-bit)	85.5 MB	2016-12-21
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (64-bit)	92.1 MB	2016-12-21
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	84.7 MB	2016-12-21
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	85.7 MB	2016-12-21

Zip/Tarballs

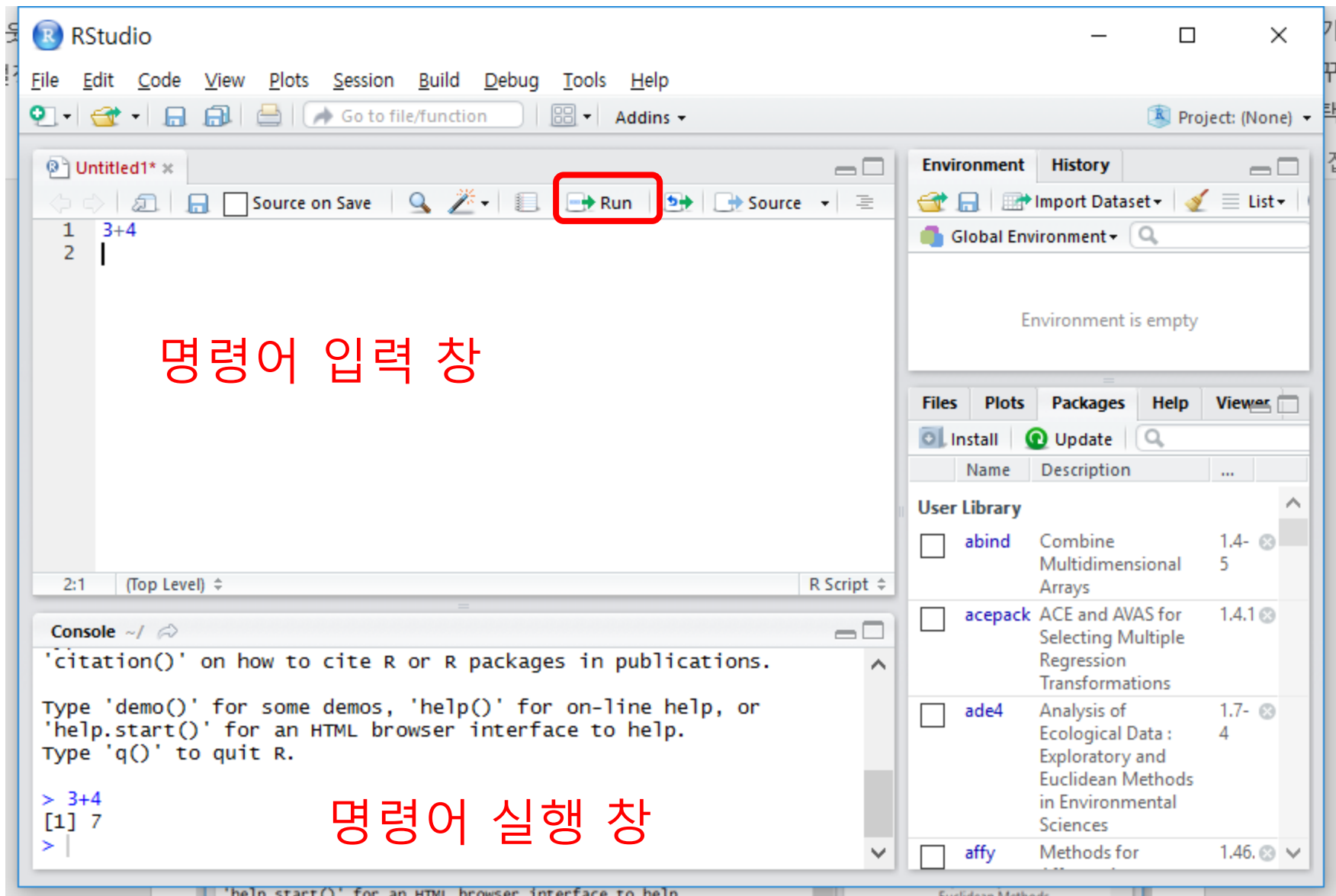
Zip/tar archives	Size	Date
RStudio 1.0.136 - Windows Vista/7/8/10	117.5 MB	2016-12-21
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (32-bit)	86.2 MB	2016-12-21
RStudio 1.0.136 - Ubuntu 12.04+/Debian 8+ (64-bit)	93.2 MB	2016-12-21
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	85.4 MB	2016-12-21
RStudio 1.0.136 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	86.6 MB	2016-12-21

Install R, Rstudio


- R Studio 초기화면



Install R, Rstudio

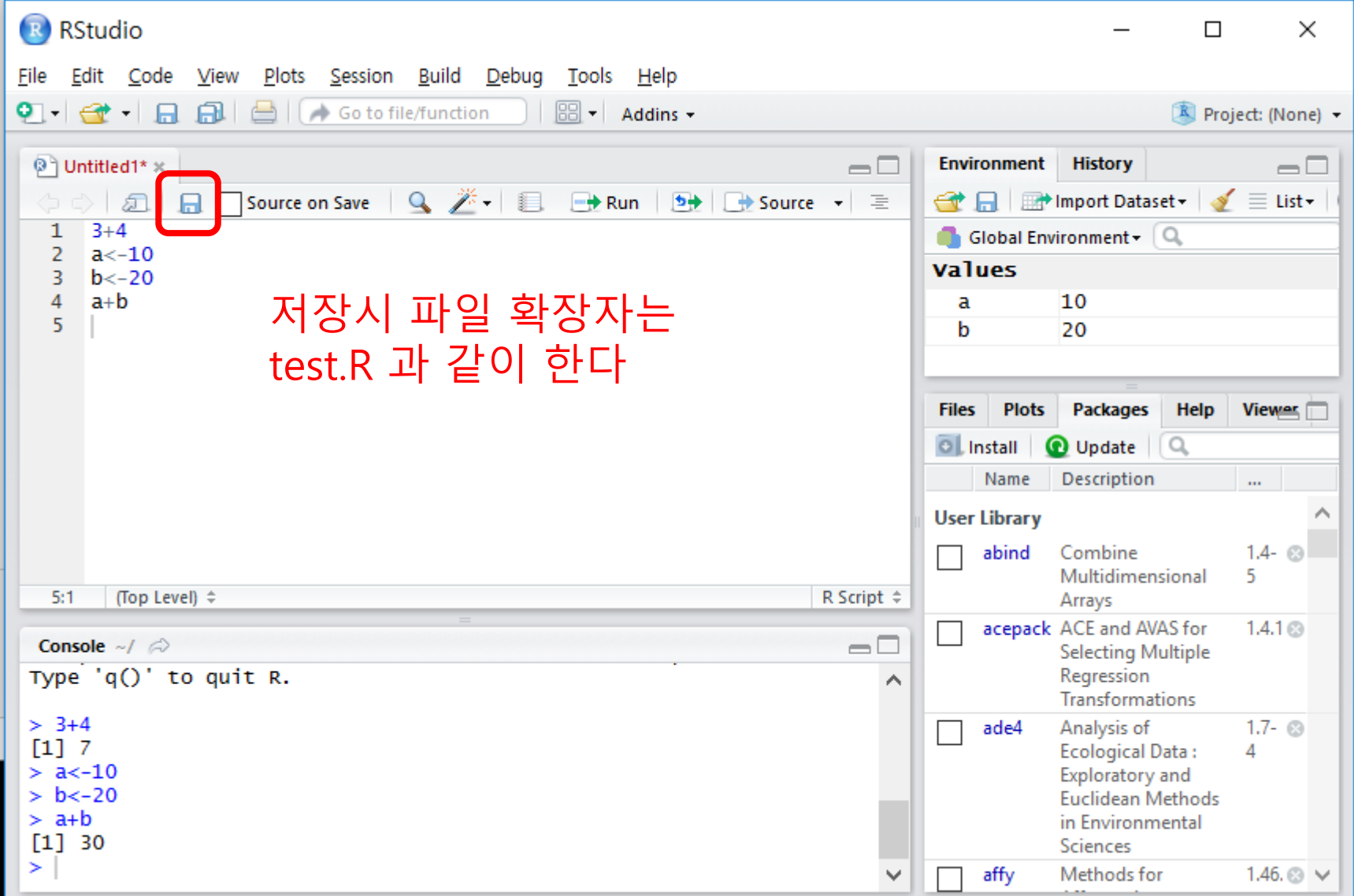


Install R, Rstudio

-  : 명령어 실행 버튼
 - 현재 커서가 위치한 라인의 명령어 실행
 - 여러 명령어 라인을 선택한 상태이면 선택한 명령어들을 실행
 - 명령어 실행 버튼을 클릭하는 대신 <Ctrl> + <Enter> 를 해도 된다

Install R, Rstudio

- 현재 작업 내용 (명령어들) 파일에 저장하기



The screenshot shows the RStudio application window. The main editor pane displays a script with the following R code:

```
1 3+4
2 a<-10
3 b<-20
4 a+b
5
```

The toolbar above the editor has a red box highlighting the 'Save' icon (a floppy disk). Below the editor, the console shows the execution of the code:

```
> 3+4
[1] 7
> a<-10
> b<-20
> a+b
[1] 30
>
```

On the right side, the 'Environment' pane shows the 'Global Environment' with the following values:

values	
a	10
b	20

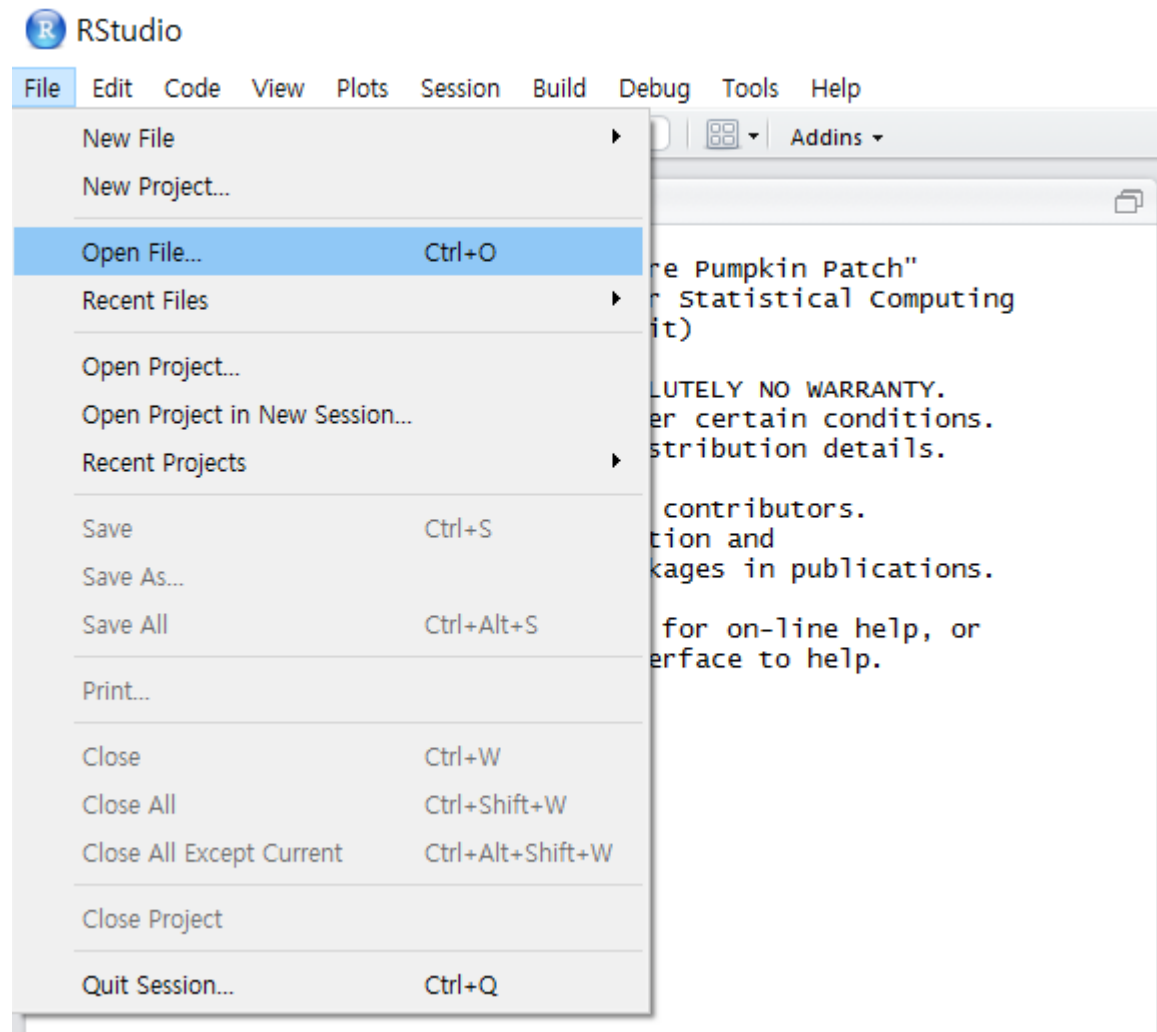
Below the Environment pane is the 'Packages' pane, which lists installed and available packages:

Name	Description	Version
abind	Combine Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
ade4	Analysis of Ecological Data : Exploratory and Euclidean Methods in Environmental Sciences	1.7-4
affy	Methods for	1.46.

Red text overlaid on the image reads: 저장시 파일 확장자는 test.R 과 같이 한다 (When saving, the file extension should be like test.R).

Install R, Rstudio

- R script 파일 불러오기



Install R, Rstudio

- 콘솔 화면이 오른쪽으로 가도록 조정하기

The screenshot displays the RStudio IDE interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a 'Go to file/function' search bar. The main editor window shows a script named 'Untitled1*' with R code for generating random data, calculating system time, and analyzing the iris dataset. The console on the right shows the R startup message and the current workspace. The bottom pane is split into 'Environment' and 'History' tabs, showing the current environment with variables like 'batch_xs', 'batch_ys', 'label', 'a', 'acc', 'accuracy', 'b', and 'batches'. The 'Plots' tab is also visible, showing a search bar and a list of topics.

```
1 ds = runif(1000000, 0,1)
2 system.time(
3   result = 0
4   for (i in 1:1000000)
5     for (j in 1:4)
6       result = result + mean(ds[i])
7 )
8 system.time(
9   lapply(ds,sqrt)
10 )
11 system.time(
12   sqrt(ds) # vectorization
13 )
14
15 result = split(iris, iris$Species)
16 result
17 result[[1]]
18 result[[2]]
19 result[[3]]
20
21 idx = which.max(iris[,1])
22 idx
23 iris[idx,1]
24 idx = which.min(iris[,1])
25 idx
26 iris[idx,1]
27
```

R version 3.3.2 (2016-10-31) -- "Sincere Pumpkin Patch"
Copyright (C) 2016 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.

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.

[workspace loaded from ~/.RData]

> |

Environment History

Global Environment

Data

Variable	Class	Range	Summary
batch_xs	num	[1:50, 1:4]	6.7 6.3 5.6 5.5 4.6 4.8 5.4 6.3 ...
batch_ys	num	[1:50, 1:3]	0 0 0 1 1 1 0 1 1 ...
label	num	[1:150, 1:3]	1 1 1 1 1 1 1 1 1 1 ...

Values

Variable	Class	Range	Summary
a	num	[1:6]	1 2 9 10 85 90
acc	num		0.946666657924652
accuracy	Environment		
b	Environment		
batches	Large list		(2 elements, 620.8 Kb)

Files Plots Packages Help Viewer

R: Where is the Min() or Max() or first TRUE or FALSE ? Find in Topic

which.min (base) R Documentation

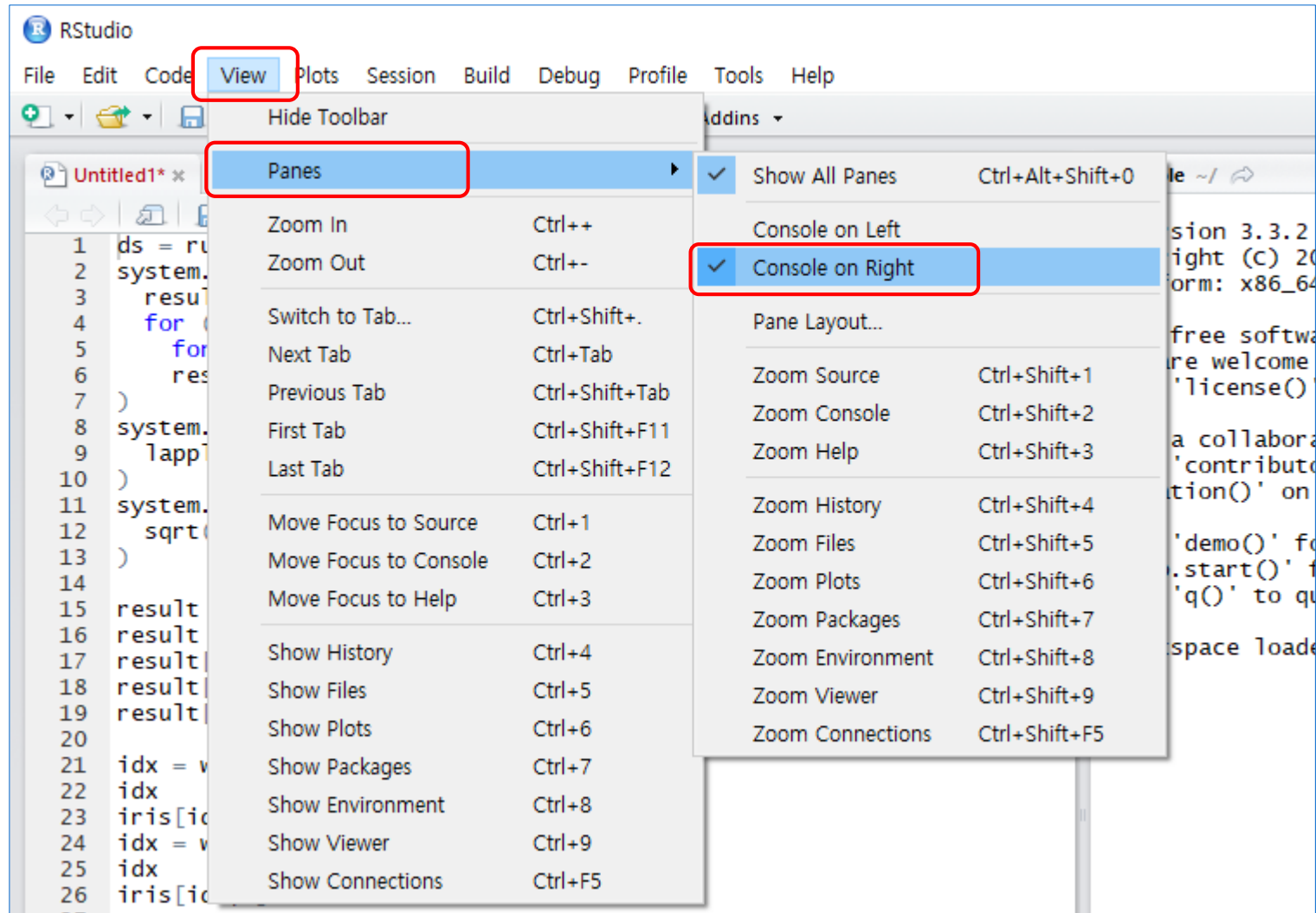
Where is the Min() or Max() or first TRUE or FALSE ?

Description

Determines the location, i.e., index of the (first) minimum or maximum of a numeric (or logical) vector.

Install R, Rstudio

- 콘솔 화면이 오른쪽으로 가도록 조정하기



[R Tip]

- Rstudio 단축키

- ✓ 코드실행 :
- ✓ 주석처리/제거:
- ✓ 콘솔창이동 :
- ✓ 스크립트창 이동 :

[Ctrl] + [Enter]

[Ctrl] + [Shift] + [c]

[Ctrl] + [1]

[Ctrl] + [2]

