

ASMS 2020 REBOOT • R SHORT COURSE

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# INSTALLING R & RSTUDIO

# R IS NOT RSTUDIO (AND VICE VERSA)



First, you'll install R

R is the “engine”

*There are some other fiddly bits to install too depending on the platform...*

A screenshot of the RStudio IDE interface. The top-left pane shows an R script named 'turing\_patterns.R' with several lines of R code. The top-right pane shows the 'Environment' tab with a message 'Environment is empty'. The bottom-left pane shows the 'Console' tab with the R startup message. The bottom-right pane shows the 'Files' browser with a list of files in the current directory, including 'turing\_patterns.Rproj', 'turing\_patterns.R', 'out1.png', 'out2.png', 'out3.png', 'README.md', and '.gitignore'.

Name	Size	Modified
.gitignore	40 B	Oct 22, 2018
.Rhistory	0 B	Oct 22, 2018
out1.png	467.8 KB	Oct 21, 2018
out2.png	4.5 MB	Oct 21, 2018
out3.png	70.2 MB	Oct 21, 2018
README.md	327 B	Oct 22, 2018
turing-patterns.Rproj	205 B	Oct 23, 2018
turing_patterns.R	2.6 KB	Oct 23, 2018

Then, you'll install RStudio

RStudio is the awesome  
“car body and paint job”

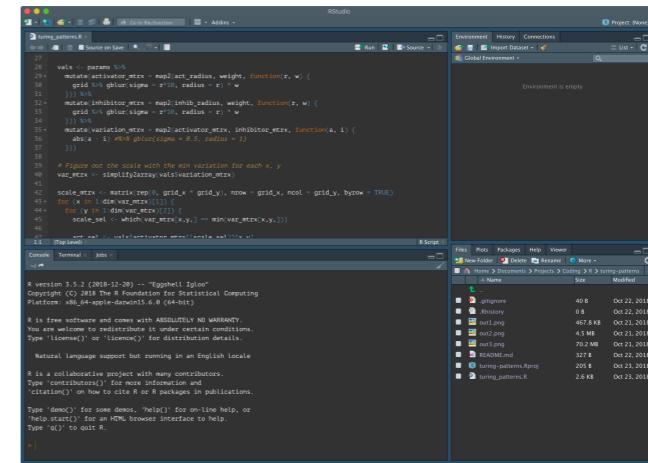
# MAC INSTRUCTIONS

# INSTALLING R ON MAC — THE OVERVIEW

## 1. Install R



## 2. Install RStudio



## OPTIONAL: 3. Install Xcode & Command Line Tools



# INSTALLING R ON THE MAC — R

Now it's time to install R – download at <https://www.r-project.org>



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## R Foundation

# 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

- **R version 3.6.0 (Planting of a Tree)** has been released on 2019-04-26.
- useR! 2020 will take place in St. Louis, Missouri, USA.
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# INSTALLING R ON THE MAC — R

## Choose a mirror

### CRAN Mirrors

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0-Cloud

This is a good choice

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Algeria

<https://cran.usthb.dz/>

<http://cran.usthb.dz/>

Argentina

<http://mirror.fcaglp.unlp.edu.ar/CRAN/>

Australia

<https://cran.csiro.au/>

Automatic redirection to servers worldwide, currently sponsored by Rstudio

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# INSTALLING R ON THE MAC — R

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[Software](#)  
[R Sources](#)  
[R Data](#)

**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!

# INSTALLING R ON THE MAC — R

Download the complete package, then install



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## R for Mac OS X

This directory contains binaries for a base distribution and packages to run on Mac OS X (release 10.6 and above). Mac OS 8.6 to 9.2 (and Mac OS X 10.1) are no longer supported but you can find the last supported release of R for these systems (which is R 1.7.1) [here](#). Releases for old Mac OS X systems (through Mac OS X 10.5) and PowerPC Macs can be found in the [old](#) directory.

Note: CRAN does not have Mac OS X systems and cannot check these binaries for viruses. Although we take precautions when assembling binaries, please use the normal precautions with downloaded executables.

As of 2016/03/01 package binaries for R versions older than 2.12.0 are only available from the [CRAN archive](#) so users of such versions should adjust the CRAN mirror setting accordingly.

**R 3.6.0 "Planting of a Tree" released on 2019/04/26**

**Important:** since R 3.4.0 release we are now providing binaries for OS X 10.11 (El Capitan) and higher using non-Apple toolkit to provide support for OpenMP and C++17 standard features. To compile packages you may have to download tools from the [tools](#) directory and read the corresponding note below.

Please check the MD5 checksum of the downloaded image to ensure that it has not been tampered with or corrupted during the mirroring process. For example type

`md5 R-3.6.0.pkg`  
in the *Terminal* application to print the MD5 checksum for the R-3.6.0.pkg image. On Mac OS X 10.7 and later you can also validate the signature using

`pkgutil --check-signature R-3.6.0.pkg`

### LATEST RELEASE:

[R-3.6.0.pkg](#)  
MD5-hash: 64ede92058dde6c4e4c2c11e0ba8a60c  
SHA1-hash: fe1ffed2c74322196db331fc1ec41fab3c40c385  
(ca. 76MB)

**R 3.6.0** binary for OS X 10.11 (El Capitan) and higher, signed package.  
Contains R 3.6.0 framework, R.app GUI 1.70 in 64-bit for Intel Macs, Tcl/Tk 8.6.6 X11 libraries and Texinfo 5.2. The latter two components are optional and can be omitted when choosing "custom install", they are only needed if you want to use the `tcltk` R package or build package documentation from sources.

Note: the use of X11 (including `tcltk`) requires [XQuartz](#) to be installed since it is no longer part of OS X. Always re-install XQuartz when upgrading your macOS to a new major version.

**Important:** this release uses Clang 7.0.0 and GNU Fortran 6.1, neither of

Choose this one

Version number could be different in the future



# INSTALLING R ON THE MAC — RSTUDIO

Download RStudio Desktop at <https://www.rstudio.com>

1. Look for “Products” → RStudio



2. Scroll down...

A screenshot of the RStudio website's product page. It shows two main sections: 'Open Source Edition' and 'Commercial License'. The 'Open Source Edition' section lists features like syntax highlighting and smart indentation. The 'Commercial License' section adds priority support. Below these, tables compare 'Support', 'License', and 'Pricing' between the two editions. At the bottom are 'DOWNLOAD RSTUDIO DESKTOP' and 'BUY NOW' buttons.

Overview	Open Source Edition	Commercial License
	<ul style="list-style-type: none"><li>Access RStudio locally</li><li>Syntax highlighting, code completion, and smart indentation</li><li>Execute R code directly from the source editor</li><li>Quickly jump to function definitions</li><li>Easily manage multiple working directories using projects</li><li>Integrated R help and documentation</li><li>Interactive debugger to diagnose and fix errors quickly</li><li>Extensive package development tools</li></ul>	All of the features of open source; plus: <ul style="list-style-type: none"><li>A commercial license for organizations not able to use AGPL software</li><li>Access to priority support</li></ul>
Support	Community forums only	<ul style="list-style-type: none"><li>Priority Email Support</li><li>8 hour response during business hours (ET)</li></ul>
License	AGPL v3	<a href="#">RStudio License Agreement</a>
Pricing	Free	\$995/year

3. Then click this ↑

# INSTALLING R ON THE MAC — RSTUDIO

Download RStudio Desktop at <https://www.rstudio.com>

The screenshot shows the RStudio website's product selection interface. A vertical red arrow on the left points downwards, indicating the user should scroll down the page. At the bottom, another red arrow points to the first 'DOWNLOAD NOW' button.

**1. Scroll down...**

**R Studio**

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Manage Multiple R Sessions & Versions	Admin Dashboard	Load Balancing	One-Click Publishing	Self-Managed Content	Scheduled Reports
License	AGPL	Commercial	AGPL	Commercial	Commercial
Pricing	FREE	\$995/yr	FREE	\$9,995/yr	\$29,995/yr

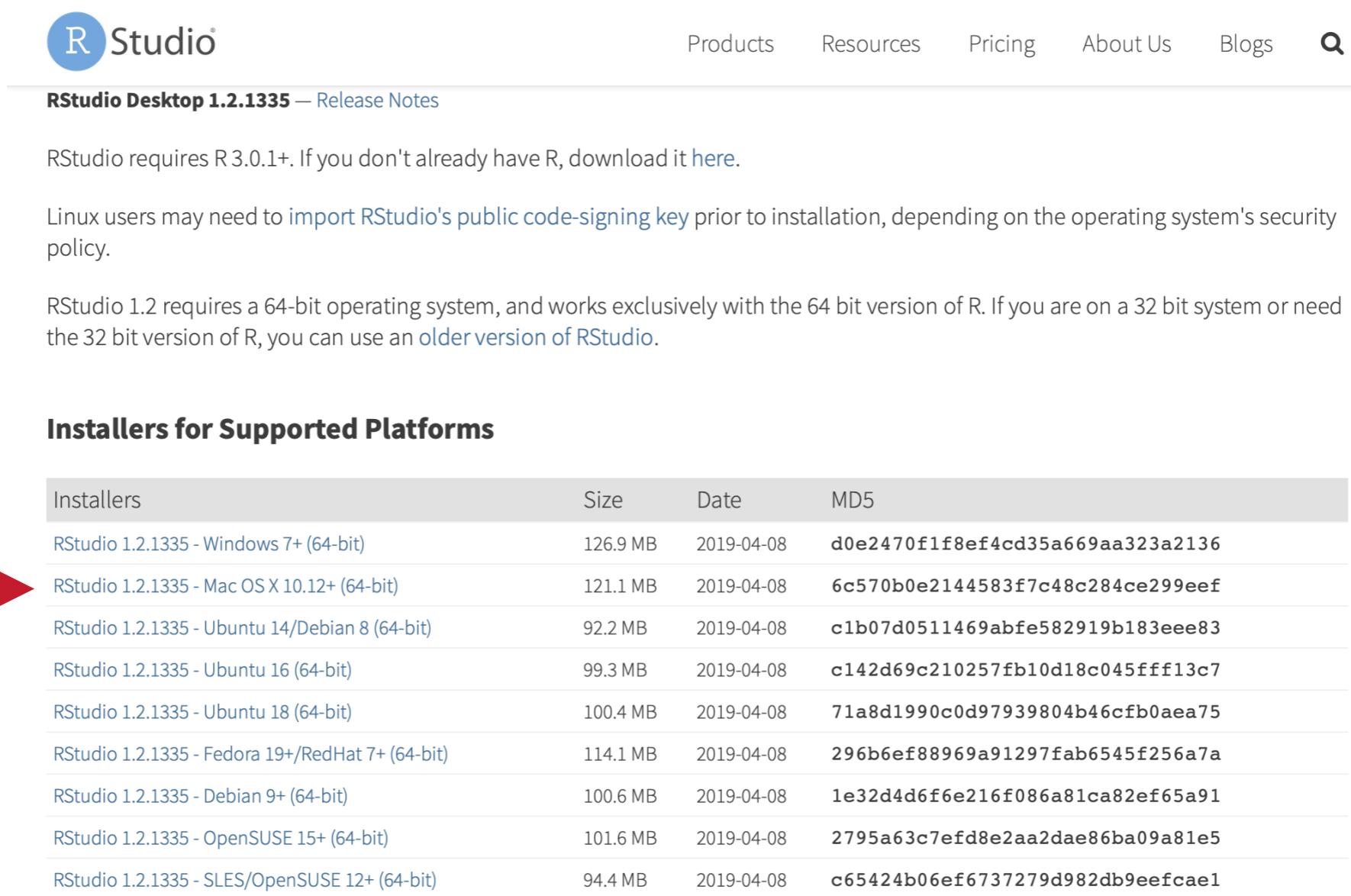
RStudio Desktop Open Source    RStudio Desktop Commercial    RStudio Server Open Source    RStudio Server Pro    RStudio Server Pro + RStudio Connect

**2. click this one** → →

<b>DOWNLOAD NOW</b> Learn More	<b>BUY NOW</b> Learn More	<b>DOWNLOAD NOW</b> Learn More	<b>DOWNLOAD NOW</b> Learn More	<b>CONTACT SALES</b> Learn More about RStudio Connect
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# INSTALLING R ON THE MAC — RSTUDIO

Download RStudio Desktop, and install package as usual



R Studio

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**RStudio Desktop 1.2.1335 — Release Notes**

RStudio requires R 3.0.1+. If you don't already have R, download it [here](#).

Linux users may need to [import RStudio's public code-signing key](#) prior to installation, depending on the operating system's security policy.

RStudio 1.2 requires a 64-bit operating system, and works exclusively with the 64 bit version of R. If you are on a 32 bit system or need the 32 bit version of R, you can use an [older version of RStudio](#).

**Installers for Supported Platforms**

Installers	Size	Date	MD5
<a href="#">RStudio 1.2.1335 - Windows 7+ (64-bit)</a>	126.9 MB	2019-04-08	<a href="#">d0e2470f1f8ef4cd35a669aa323a2136</a>
<a href="#">RStudio 1.2.1335 - Mac OS X 10.12+ (64-bit)</a>	121.1 MB	2019-04-08	<a href="#">6c570b0e2144583f7c48c284ce299eef</a>
<a href="#">RStudio 1.2.1335 - Ubuntu 14/Debian 8 (64-bit)</a>	92.2 MB	2019-04-08	<a href="#">c1b07d0511469abfe582919b183eee83</a>
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<a href="#">RStudio 1.2.1335 - SLES/OpenSUSE 12+ (64-bit)</a>	94.4 MB	2019-04-08	<a href="#">c65424b06ef6737279d982db9eefcae1</a>

Choose the  
Mac one 

## INSTALLING R ON THE MAC — SOME NOTES

- ▶ In certain cases, R might need tools to build/compile certain packages
- ▶ In this case, you'll need to install Xcode and the Command line tools
- ▶ The following slides have some tips on how to install them..

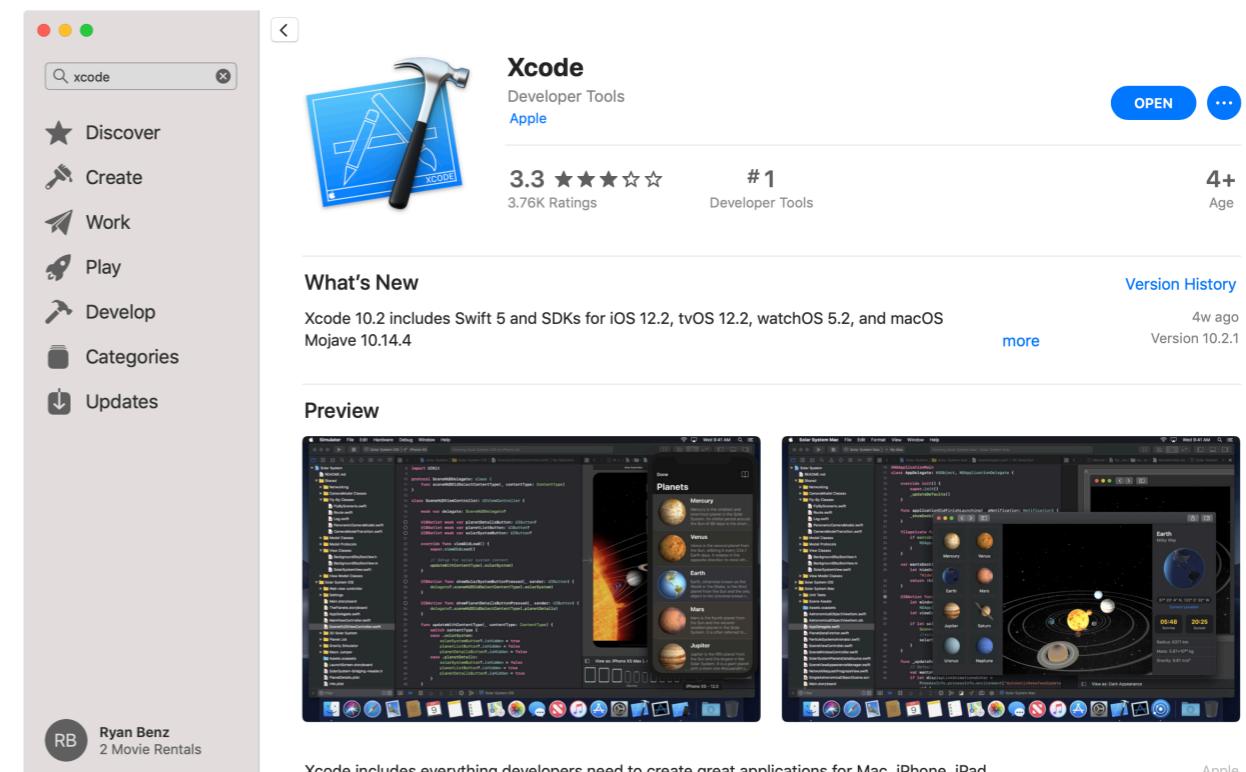
# INSTALLING R ON THE MAC — XCODE

We need to install Xcode because it provides tools we need to install certain R packages

1. Open the “App Store”

2. Search for Xcode

3. Install Xcode



## INSTALLING R ON THE MAC — COMMAND LINE TOOLS

The command line tools are actually what we really need, but we install them after Xcode is installed

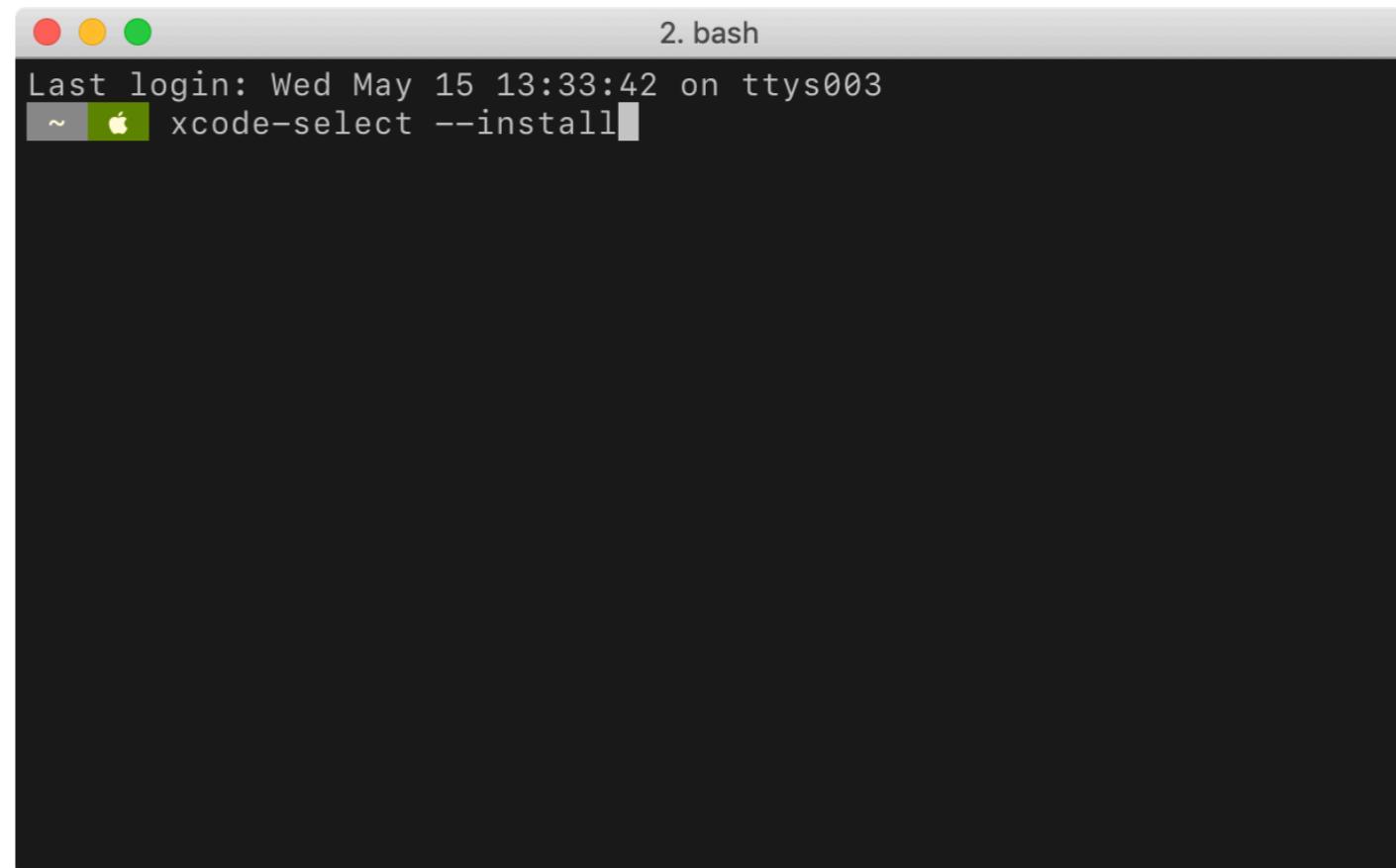
### 1. Open the “Terminal”

Applications → Utilities → Terminal.app

### 2. Copy and pasted this:

xcode-select --install

### 3. Press enter and wait for install to complete



A screenshot of a Mac OS X Terminal window titled "2. bash". The window shows the command "xcode-select --install" being typed at the prompt. The terminal interface includes standard Mac OS X window controls (red, yellow, green) and a dark background.

If you already have the command line tools installed, it will print a message that says so; just continue on

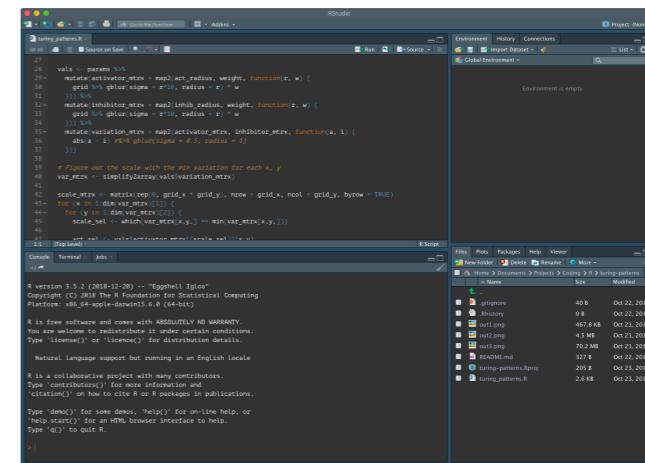
# WINDOWS INSTRUCTIONS

# INSTALLING R ON WINDOWS — THE OVERVIEW

## 1. Install R



## 2. Install RStudio



## OPTIONAL: 3. Install RTools



# INSTALLING R ON WINDOWS — R

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University of Science and Technology Houari Boumediene

University of Science and Technology Houari Boumediene

Argentina

<http://mirror.fcaglp.unlp.edu.ar/CRAN/>

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Australia

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# INSTALLING R ON WINDOWS — R

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**The Comprehensive R Archive Network**

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# INSTALLING R ON WINDOWS — R

Download the base package and install as usual



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## R for Windows

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 >= 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](#)  
[Rtools](#)

Binaries of contributed CRAN packages for outdated versions of R (for R < 2.13.x; managed by Uwe Ligges).

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.

You'll need to get back to this web page if  
you want to install Rtools (more later)

# INSTALLING R ON WINDOWS — RSTUDIO

Follow the same path as of the Mac, but choose the Windows version

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**Choose the Windows one** 

## INSTALLING R ON WINDOWS — SOME NOTES

- ▶ Like Xcode on the Mac, you can install RTools for Windows so that we can compile R packages that require it
- ▶ If you try to install an R package that needs compilation, a dialog box might pop-up asking if you want to use RTools to get the job done... be on the look out

# INSTALLING R ON WINDOWS — RTOOLS

Get back to this page, and select Rtools this time



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## R for Windows

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|--|---|
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# INSTALLING R ON WINDOWS — RTOOLS

Download and install the “recommended” one



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## Building R for Windows

This document is a collection of resources for building packages for R under Microsoft Windows, or for building R itself (version 1.9.0 or later). The original collection was put together by Prof. Brian Ripley and Duncan Murdoch; it is currently maintained by Jeroen Ooms.

The authoritative source of information for tools to work with the current release of R is the "R Administration and Installation" manual. In particular, please read the ["Windows Toolset" appendix](#).

### Rtools Downloads

Some of the tools are incompatible with obsolete versions of R. We maintain one actively updated version of the tools, and other "frozen" snapshots of them. We recommend that users use the latest release of Rtools with the latest release of R.

The current version of this file is recorded here: [VERSION.txt](#).

Download	R compatibility	Frozen?
<a href="#">Rtools40 (experimental)</a>	Special R-testing build only, see <a href="#">documentation</a>	-
<a href="#">Rtools35.exe (recommended)</a>	R 3.3.x and later	No
<a href="#">Rtools34.exe</a>	R 3.3.x and later	Yes
<a href="#">Rtools33.exe</a>	R 3.2.x to 3.3.x	Yes
<a href="#">Rtools32.exe</a>	R 3.1.x to 3.2.x	Yes
<a href="#">Rtools31.exe</a>	R 3.0.x to 3.1.x	Yes
<a href="#">Rtools30.exe</a>	R > 2.15.1 to R 3.0.x	Yes
<a href="#">Rtools215.exe</a>	R > 2.14.1 to R 2.15.1	Yes
<a href="#">Rtools214.exe</a>	R 2.13.x or R 2.14.x	Yes
<a href="#">Rtools213.exe</a>	R 2.13.x	Yes

Version number could be  
different in the future

# NEXT STEPS

## AFTER INSTALLATION...

- ▶ Launch the RStudio application
- ▶ It should pick-up your installation of R, and you should be ready to go
- ▶ If not, you'll get a warning message saying that you need to install R
- ▶ You can start installing packages in RStudio via:  
Tools → Install packages...

## NOTES ABOUT PACKAGE INSTALLATION

- ▶ Lots of packages have “binary” versions, which mean they should just install with no problems
- ▶ Some package require compilation – this is where you’ll need to install Xcode tools / RTools
- ▶ During package installation, you might be asked if you want to install a package from source (i.e. needs compilation); if you don’t want to deal with that, just enter *no*, and the installation should continue
- ▶ If you do install from source and something goes wrong, check the R Console window for any messages... there might be A LOT of text to scroll through, but there can be informative messages

## NOTES ABOUT PACKAGE INSTALLATION

This is an example error message that is actually useful

```
...
Using PKG_CFLAGS=
Using PKG_LIBS=-lxml2
----- ANTICONF ERROR -----
Configuration failed because libxml-2.0 was not found. Try installing:
 * deb: libxml2-dev (Debian, Ubuntu, etc)
 * rpm: libxml2-devel (Fedora, CentOS, RHEL)
 * csw: libxml2_dev (Solaris)
If libxml-2.0 is already installed, check that 'pkg-config' is in your
PATH and PKG_CONFIG_PATH contains a libxml-2.0.pc file. If pkg-config
is unavailable you can set INCLUDE_DIR and LIB_DIR manually via:
R CMD INSTALL --configure-vars='INCLUDE_DIR=... LIB_DIR=...'

----- ERROR -----
ERROR: configuration failed for package 'xml2'
* removing '/usr/local/lib/R/site-library/xml2'
ERROR: dependency 'xml2' is not available for package 'tm'
* removing '/usr/local/lib/R/site-library/tm'

The downloaded source packages are in
  '/tmp/RtmpLb48pu/downloaded_packages'
Warning messages:
1: In install.packages("tm") :
  installation of package 'xml2' had non-zero exit status
2: In install.packages("tm") :
  installation of package 'tm' had non-zero exit status
```

We need the  
libxml-2.0 library

Installation  
suggestions are  
noted



## NOTES ABOUT PACKAGE INSTALLATION

- ▶ If you still have problems, grab a piece of text in the Console output and Google it...
- ▶ This can be frustrating... hopefully Google will be your friend

## NOTES ABOUT UPGRADING R

- ▶ Once you have R and RStudio installed, there may come a time when you want to update to a new version
- ▶ RStudio
  - ▶ You can (typically) just install a new version over the top of the old version, just follow the same steps as before
  - ▶ This won't affect your current R installation/version
- ▶ R
  - ▶ You can (typically) just install a new version over the top of the old version, just follow the same steps as before
  - ▶ IMPORTANT: for major R releases, you'll need to reinstall your packages; if you have critical work to do, you might consider waiting a bit before upgrading R (let packages get updated, bugs worked out, etc)