

What is R?

A combined version of the files README and THANKS from the R source tree.

by the R Core Team

Introduction

R is “GNU S” — A language and environment for statistical computing and graphics. R is similar to the award-winning S system, which was developed at Bell Laboratories by John Chambers et al. It provides a wide variety of statistical and graphical techniques. R is free software distributed under a GNU-style copyleft.

The core of R is an interpreted computer language with a syntax superficially similar to C, but which is actually a “functional programming language” with capabilities similar to Scheme. The language allows branching and looping as well as modular programming using functions. Most of the user-visible functions in R are written in R, calling upon a smaller set of internal primitives. It is possible for the user to interface to procedures written in C, C++ or FORTRAN languages for efficiency, and also to write additional primitives.

The R distribution contains functionality for a large number of statistical procedures. Among these are: linear and generalized linear models, nonlinear regression models, time series analysis, classical parametric and nonparametric tests, clustering and smoothing. There is also a large set of functions which provide a flexible graphical environment for creating various kinds of data presentations.

A package specification allows the production of loadable modules for specific purposes, and several contributed packages are made available through the CRAN sites (see the article on “R Resources” in this issue).

History

R was initially written by Robert Gentleman and Ross Ihaka of the Statistics Department of the University of Auckland. In addition, a large group of individuals has contributed to R by sending code and bug reports.

Since mid-1997 there has been a core group who can modify the R source code CVS archive. The group currently consists of

Douglas Bates, John Chambers, Peter Dalgaard, Robert Gentleman, Kurt Hornik, Ross Ihaka, Friedrich Leisch, Thomas Lumley, Martin Maechler, Guido Masarotto, Paul Murrell, Brian Ripley, Duncan Temple Lang and Luke Tierney.

Present status

The present version implements most of the functionality in the 1988 book “*The New S Language*” (the “Blue Book”) and many of the applications. In addition, we have implemented a large part of the functionality from the 1992 book “*Statistical Models in S*” (the “White Book”).

All the R functions have been documented in the form of help pages in an “output independent” form which can be used to create versions for HTML, L^AT_EX, text etc. An 800+ page Reference Index (a collection of all the help pages) can be obtained in a variety of formats. The document “*An Introduction to R*” provides a more user-friendly starting point, and there is an “*R Language Definition*” manual and more specialized manuals on data import/export and extending R. See the file ‘INSTALL’ in the R sources for instructions on how to generate these documents.

Goals

Our aim at the start of this project was to demonstrate that it was possible to produce an S-like environment which did not suffer from the memory-demands and performance problems which S has. Somewhat later, we started to turn R into a “real” system, but unfortunately we lost a large part of the efficiency advantage in the process, so have recently revised the memory management mechanism and are looking for other candidates for optimization.

Longer-term goals include to explore new ideas: e.g., virtual objects and component-based programming, and expanding the scope of existing ones like formula-based interfaces. Further, we wish to get a handle on a general approach to graphical user interfaces (preferably with cross-platform portability), and to develop better 3-D and dynamic graphics.

Thanks

R would not be what it is today without the invaluable help of these people, who contributed by donating code, bug fixes and documentation:

Valerio Aimale, Thomas Baier, Ben Bolker, Göran Broström, Saikat DebRoy, Lyndon Drake, Paul Gilbert, Robert King, Kjetil Kjærnsmo, Philippe Lambert, Jim Lindsey, Patrick Lindsey, Catherine Loader, Gordon Maclean, John Maindonald, Duncan Murdoch, Jens Oehlschlägel-Akiyoshi, Steve Oncley, Richard O’Keefe,

Hubert Palme, Jose C. Pinheiro, Martyn Plummer, Jonathan Rougier, Heiner Schwarte, Bill Simpson, Adrian Trapletti, Terry Therneau, Bill Venables, Gregory R. Warnes and Andreas Weingessel.

We have probably omitted some important names here because of incomplete record keeping.

If we have overlooked you, please let us know and we'll update the list. Many more, too numerous to mention here, have contributed by sending bug reports and suggesting various improvements.

A special debt is owed to John Chambers who has graciously contributed advice and encouragement in the early days of R and later became a member of the core team.

R Resources

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Frequently Asked Questions

A collection of Frequently Asked Questions (FAQs) and their answers is maintained by Kurt Hornik and can be found at the URL <http://www.ci.tuwien.ac.at/~hornik/R/R-FAQ.html>.

A text version is in file 'FAQ' in the top directory of the R sources, and an HTML version is available via the on-line help (on the index page given by `help.start()`).

Archives

The Comprehensive R Archive Network (CRAN) is a collection of sites which carry identical material, consisting of the R distribution(s), the contributed extensions, documentation for R, and binaries.

The CRAN master site (in Vienna, Austria) can be found at the URLs

<http://cran.r-project.org/>
<ftp://cran.r-project.org/pub/R/>

and is mirrored daily at many sites: see the list at <http://cran.r-project.org/mirrors.html>.

Mailing Lists

Thanks to Martin Maechler there are number of mailing lists which are used by R users and developers. They are

r-announce@lists.r-project.org:
 announcements of new R releases or applications.

r-help@lists.r-project.org:
 general inquiries and discussion about R.

r-devel@lists.r-project.org:
 discussions about the future of R and pre-testing of new versions.

To subscribe (or unsubscribe) to these mailing list send 'subscribe' (or 'unsubscribe') in the *body* of the message (not in the subject!) to

r-announce-request@lists.r-project.org
r-help-request@lists.r-project.org
r-devel-request@lists.r-project.org

Browsable archives of the mailing lists can be found at <http://www.r-project.org/>. Text files (in Unix mail folder format) of the archives are made available monthly; see the 'doc/mail/mail.html' file on any CRAN node.

Bug-tracking System

R has a bug-tracking system (or perhaps a bug-filing system is a more precise description) available on the net at

<http://bugs.r-project.org/>

and via e-mail to r-bugs@r-project.org. The R function `bug.report()` can be used to invoke an editor from within an R session and send the report to the right address. It also fills in some basic information, such as your R version and operating system, which has proved helpful in the debugging process.

The source distribution has a file 'BUGS' at the top level giving a summary of the entries at the time the R distribution was prepared.