What is R

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- Implementation of S Programming language
  - Started as statistical environment
  - Explains the deep rootedness of R in statistics
  - Mostly written in C (earlier FORTRAN)
  - More info on Wikipedia!

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- Philosophy behind R (or S, S+)
  - Interactive environment
  - Transition from users to Programmers as per need!
  - You don’t need to be a programmer to learn (and) use basic R
  - More info at http://ect.bell-labs.com/sl/S/history.html

What is R (cont.)

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- Features
  - Very easy to follow and understand
    - Require understanding of vector and matrix indexing!
    - Interactive
  - Runs on all platforms.
    - Small software to download and load. Use packages as per need.
  - Free of cost. Open source software (GNU GPL). More info at www.fsf.org
  - Wide availability of user developed packages!
  - Very active development
    - Frequent updates and releases
    - Very active and responsive user community – Stackoverflow!

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- Drawbacks
  - Limited 3-D graphics capability
    - Rarely needed in management research or applications
  - Everything must be in RAM – big data?
    - Buy more RAM or use AWS!
  - If a functionality is missing you got to code it yourself!
    - Very rare! Opens new avenues for research!

Alternatives to R

Alternatives to R

- There are several high-level and interpreted languages around
  - Most common are Python and MATLAB
  - MATLAB is used much more in engineering than in statistics
    - It may not support the great variety of linear/non-linear/regression models
    - Syntax is similar to R (Read: http://mathesaurus.sourceforge.net/octave-r.html)
  - Python is also very popular although its more used in data science
    - Computation heavy research (like text analysis and ML) also employ Python routinely
  - Nobody stops you from using multiple languages for your research
    - Several researchers also perform regressions in Stata as well

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- Statistical Alternatives?
  - SAS and Stata
    - Paid and closed software
    - If Stata implements an algorithm, I can't see their code. Only source is their documentation.
  - Very different than R in syntax!
    - Non-interactive
    - Limited user community support (huge deal-breaker)
  - Despite the differences Stata is very popular in management research.
  - SAS has a lot of legacy code and hence it is still used a lot in Finance research

Downloading and Installing R

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- Download R: https://cran.r-project.org/
  - Choose base package for your OS
    - Windows: https://cran.r-project.org/bin/windows/base/R-4.0.3-win.exe
    - Linux: Use apt-get (Debian based) OR yum install (RPM based) from terminal.
    - Mac: https://cran.r-project.org/bin/macosx/R-4.0.3.pkg
  - Install R

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- Download RStudio IDE
  - Choose the free RStudio Desktop edition
  - https://www.rstudio.com/products/rstudio/download/#download
  - Choose the appropriate one according to your OS
  - Install RStudio