MFE Programming Workshop

Week 1

Brett Dunn

Fall 2016

Goals

- Learn to program in R.
- What does programming mean?
  - Language syntax
  - Debugging
  - Finding solutions
  - Translating math to code
- This is just the beginning, you'll develop these skills throughout the program.

R vs C++

- Both are useful and you will use both in the MFE program
- R is a high-level language
  - Low programmer time
  - It is a great tool for data munging, statistics, regressions, ect.
  - However, certain tasks in R can be slow (e.g. loops)
- C++ is very fast, but it takes longer to write programs
- We can use both together!
- Write most of the program in R, and convert the slow parts of the program to C++

Structure

- I will talk for 30-60 minutes at the beginning of each class
- For the remainder of the time you will break into groups and work on programming tasks
- Tasks are designed to introduce you to the building blocks that will be used for course assignments throughout the MFE program
- This course is a programming course with emphasis on methods for finance:
  - You will see finance terms and math
  - You *may* not understand all of the finance, but you will learn it throughout the program
- The key skills will be translating mathematical algorithms into code and developing the ability to find helpful resources

Questions

Any questions before we start?

R Environment

- First, you need an R distribution
  - I recommend Microsoft R Open
  - https://mran.revolutionanalytics.com/download/
- Second, you need an integrated development environment (IDE) for R
  - **R Studio** is a fantastic environment to interact with R
  - Other options:
    - **R Tools for Visual Studio** if you use Visual Studio
    - **Emacs Speaks Statistics (ESS)** if you use Emacs
- I am going to assume that you have a working installation of R Studio and that you have a basic understanding of how it works
- My focus is going to be on R programming

R Resources

- R Cookbook by Paul Teetor (free at UCLA LearnIT)
- R for Everyone by Jared P. Lander
- The Art of R Programming by Norman Matloff
- Software for Data Analysis by John Chambers
- Use R! Springer series
    - FYI: Many Springer textbooks are just $25 through `http://link.springer.com/`. You need to be on campus or signed into the UCLA VPN. You can download the pdfs for free.
- O'Reilly R Books (free at UCLA LearnIT)
- Built in documentation!
    - `?funcname`
- Data science courses on Coursera
- Google

Basics of R