Introduction to R

Matthew Renze
DATA SCIENCE CONSULTANT

@matthewrenze www.matthewrenze.com

Overview

Introduction to R

Demo

What Is R?

Open source

Language and environment

Numerical and graphical

Cross platform

What Is R?

Active development

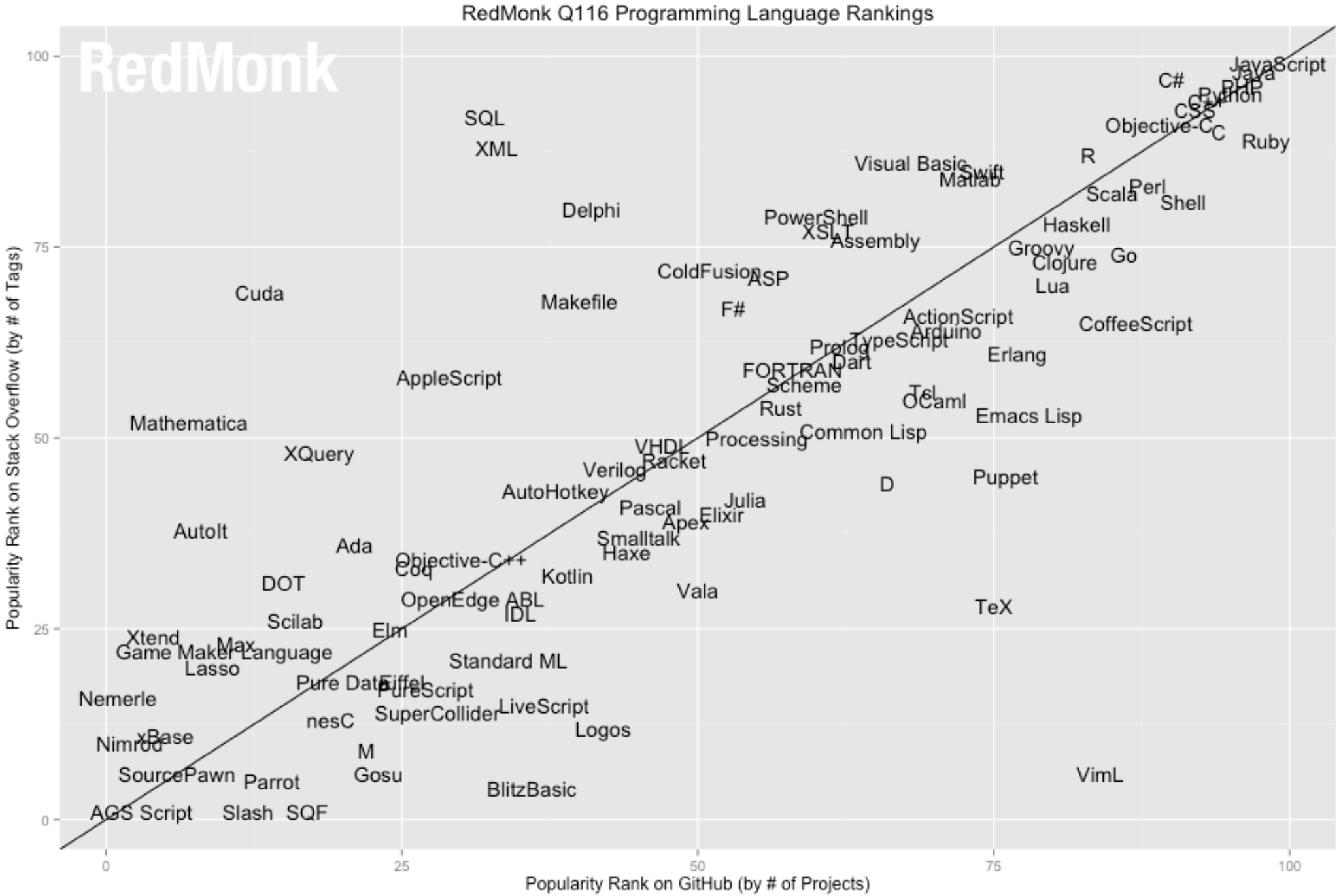
Large user community

Modular and extensible

9000+ extensions


FREE


FREE


RedMonk Q116 Programming Language Rankings
RedMonk
Popularity Rank on Stack Overflow (by # of Tags)
Popularity Rank on GitHub (by # of Projects)
0
25
50
75
100
JavaScript
Java
C#
PHP
Python
CSS
C++
Objective-C
C
Ruby
R
Visual Basic
Swift
Matlab
Perl
Scala
Shell
Haskell
PowerShell
XSLT
Assembly
Groovy
Clojure
Go
Lua
ColdFusion
ASP
F#
ActionScript
Arduino
CoffeeScript
Prolog
TypeScript
Erlang
Dart
FORTRAN
Scheme
Tcl
OCaml
Rust
Emacs Lisp
Common Lisp
Processing
VHDL
Racket
Verilog
Puppet
D
AutoHotkey
Julia
Pascal
Elixir
Apex
Smalltalk
Haxe
Objective-C++
Coq
Kotlin
Vala
OpenEdge ABL
IDL
TeX
Scilab
Elm
Xtend
Max
Game Maker Language
Lasso
Standard ML
Pure Data
Eiffel
PureScript
LiveScript
SuperCollider
Logos
nesC
Nemerle
xBase
Nimrod
M
Gosu
SourcePawn
Parrot
BlitzBasic
VimL
AGS Script
Slash
SQF
SQL
XML
Delphi
Cuda
Makefile
AppleScript
Mathematica
XQuery
AutoIt
Ada
DOT

RGui (64-bit)

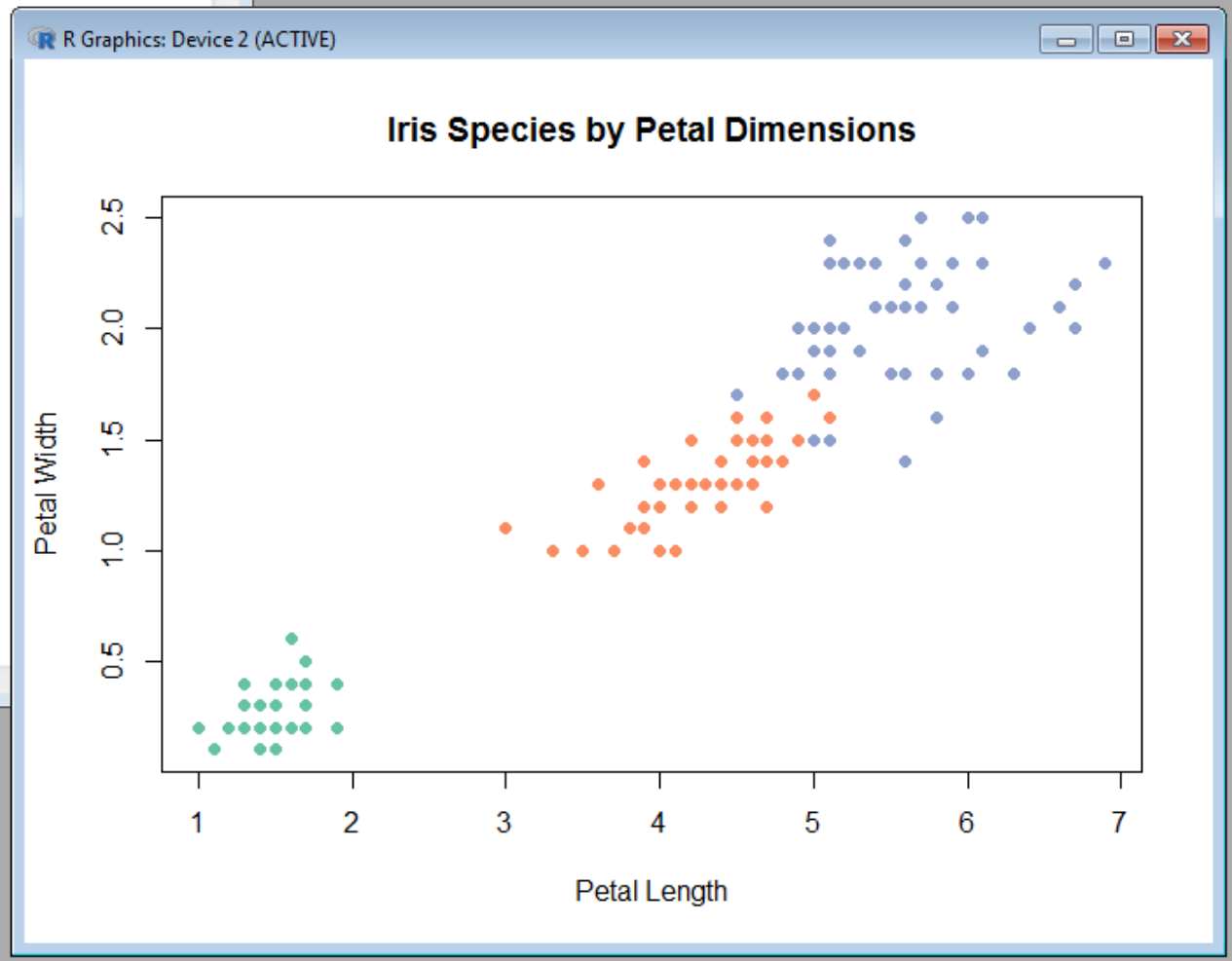
File History Resize Windows

R Console

```
> # Create a plot of species by dimension
> plot(
+     x = iris$Petal.Length,
+     y = iris$Petal.Width,
+     pch = 19,
+     col = palette[as.numeric(iris$Species)],
+     main = "Iris Species by Petal Dimensions",
+     xlab = "Petal Length",
+     ylab = "Petal Width")
>
> # Create a frequency table of species
> table(iris$Species)

    setosa versicolor  virginica
        50         50         50
>
> # Get the average petal length
> mean(iris$Petal.Length)
[1] 3.758
>
> # Get the correlation coefficient
> cor(
+     x = iris$Petal.Length,
+     y = iris$Petal.Width)
[1] 0.9628654
```

R Graphics: Device 2 (ACTIVE)



RStudio

File Edit Code View Plots Session Build Debug Tools Help

Go to file/function | Addins | Project: (None)

Script.R

Source on Save | Run | Source

```
16 # Create a frequency table of species
17 table(iris$Species)
18
19 # Get the average petal length
20 mean(iris$Petal.Length)
21
22 # Get the correlation coefficient
23 cor(
24     x = iris$Petal.Length,
25     y = iris$Petal.Width)
```

21:1 (Top Level) R Script

Console ~/

```
> table(iris$Species)

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[1] 0.9628654
>
```

Environment History

Import Dataset | List

Global Environment

Data

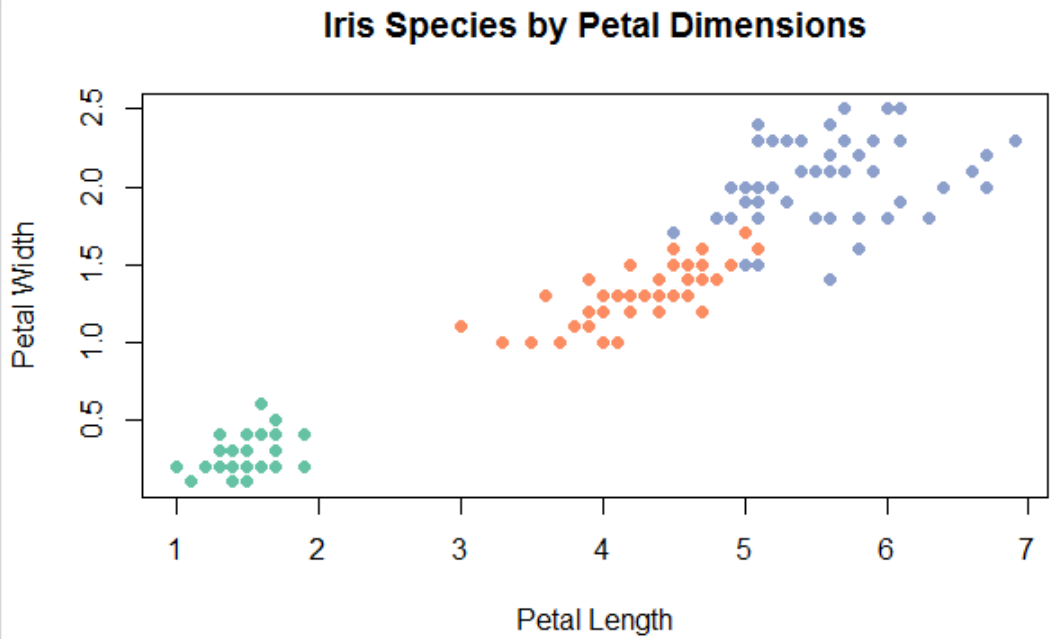
iris	150 obs. of 5 variables

Values

palette	chr [1:3] "#66C2A5" "#FC8D62" "#8DA0C…

Files Plots Packages Help Viewer

Zoom | Export | Publish



Script.R - Microsoft Visual Studio

File Edit View NCrunch Project Debug Team Tools Architecture Test ReSharper R Tools Analyze Window Help

Matthew Renze

Quick Launch (Ctrl+Q)

Attach...

Script.R

```
        main = "Iris Species by Petal Dimensions",
        xlab = "Petal Length",
        ylab = "Petal Width")

# Create a frequency table of species
table(iris$Species)

# Get the average petal length
mean(iris$Petal.Length)

# Get the correlation coefficient
cor(
    x = iris$Petal.Length,
    y = iris$Petal.Width)
```

100 %

R Interactive

Attach Debugger

```
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> mean(iris$Petal.Length)
[1] 3.758
> # Get the correlation coefficient
> cor(
+     x = iris$Petal.Length,
+     y = iris$Petal.Width)
[1] 0.9628654
>
```

100 %

Variable Explorer

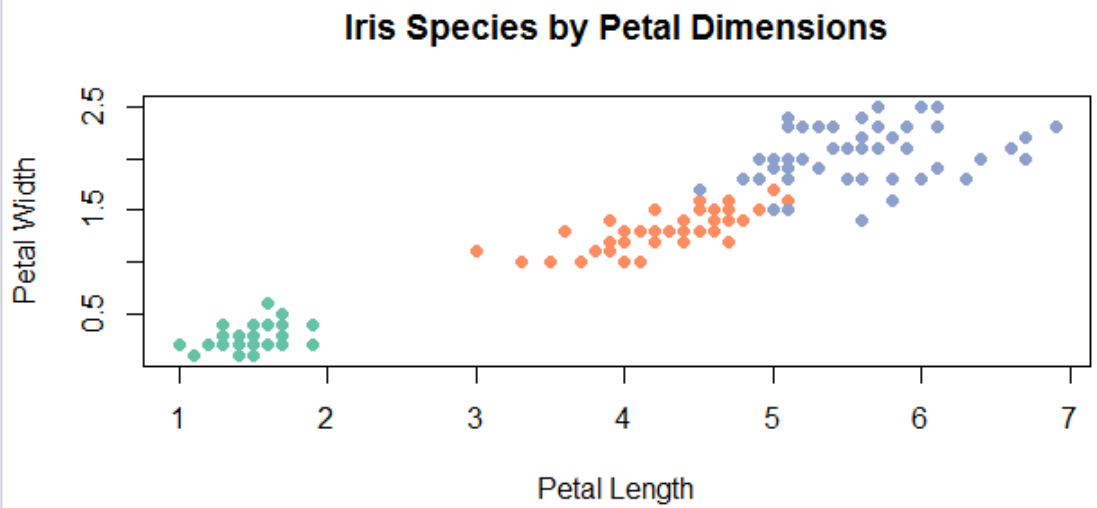
Search

.GlobalEnv

Name	Value	Class	Type
iris	150 obs. of 5 variables	data.frame	list
palette	chr [1:3] "#66C2A5" "#FC8D62" "#8DA0CB"	character	character

Variable Explorer | R History

R Plot



Solution Explorer | R Plot | R Package Manager | R Help

Error List | Output | Azure App Service Activity

Ready | Ln 30 | Col 1 | Ch 1 | INS | 7 | 0 | Root | master

Install R

www.r-project.org

Install RStudio

www.rstudio.com

Hello World Demo

RStudio Walkthrough

Scripts vs. Console

Hello World in R Studio

Assignment Operators

Implicit Printing

Creating Variables

Displaying Variables

Functions

Vectors

Sequences

Matrices

Arrays

Lists

Factors

Data Frame

Indexing

Subsetting

Subsetting (cont.)

Vectorized Operations

Named Arguments

Installing Packages

Getting Help

Other Language Features

Control structures

Mathematical operators

String manipulation

Summary

Introduction to R

Demo