Introduction to Julia

Huda Nassar

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Outline

- Julia description and functionality
- Demo with examples from linear algebra
- Comparison with other programming languages

Julia Description & Functionality

From Julia's website:

"Julia is a high-level, high-performance dynamic programming language for technical computing, with syntax that is familiar to users of other technical computing environments. It provides a sophisticated compiler, distributed parallel execution, numerical accuracy, and an extensive mathematical function library."

Julia Description & Functionality

- Types
  - Float64
  - Int64
  - More in demo
- Syntax
  - A[1,1] to access the first entry in the first row, first column of a matrix
  - “this is a string”
  - More in demo
- Functions

Julia Description & Functionality

Where to run Julia from?

- Juliabox.org
- Julia command line
- Jupyter Notebook
- Juno

Julia Description & Functionality

Packages

- Base
- Pkg.status()
- Pkg.update()
- Pkg.add()
- Pkg.rm

Demo with examples from Linear Algebra

- “HelloWorld”
- Basic Matrix Computations
- Sparse Linear Algebra
- Calling other languages from Julia

More info

- ? for help
- ; for terminal commands
- Julia files are stored in *.jl files

Watch out list

- dynamic vectors
- for loops / if statements
- booleans
- mixed types
- rough edges
  https://github.com/JuliaLang/julia/issues/12118
- equal sign? what does it do?

Comparison with other programming languages

From Julia's website:

	Fortran gcc 5.1.1	Julia 0.4.0	Python 3.4.3	R 3.2.2	Matlab R2015b	Octave 4.0.0	Mathematica 10.2.0	JavaScript V8 3.28.71.19	Go go1.5	LuaJIT gsl-shell 2.3.1	Java 1.8.0_45
fib	0.70	2.11	77.76	533.52	26.89	9324.35	118.53	3.36	1.86	1.71	1.21
parse_int	5.05	1.45	17.02	45.73	802.52	9581.44	15.02	6.06	1.20	5.77	3.35
quicksort	1.31	1.15	32.89	264.54	4.92	1866.01	43.23	2.70	1.29	2.03	2.60
mandel	0.81	0.79	15.32	53.16	7.58	451.81	5.13	0.66	1.11	0.67	1.35
pi_sum	1.00	1.00	21.99	9.56	1.00	299.31	1.69	1.01	1.00	1.00	1.00
rand_mat_stat	1.45	1.66	17.93	14.56	14.52	30.93	5.95	2.30	2.96	3.27	3.92
rand_mat_mul	3.48	1.02	1.14	1.57	1.12	1.12	1.30	15.07	1.42	1.16	2.36

Julia Resources – just a few

- http://julialang.org/
- https://github.com/JuliaLang/julia
- http://stackoverflow.com/questions/tagged/julia-lang
- https://groups.google.com/forum/#!forum/julia-users
- http://math.mit.edu/~stevenj/Julia-cheatsheet.pdf
- http://julia.readthedocs.org/en/latest/manual/performance-tips/

Thank you

- hnassar@purdue.edu
- @nassarhuda