Project 0 – An Introduction to Julia

The purpose of this short project is to help in setting up the environment to program in Julia language, which will be used throughout this course.

Installing Julia

To install Julia for Mac, follow the simple procedure below:[1]

1. Download **Julia version 1.7.2** from `https://julialang.org/downloads/oldreleases/` and choose the appropriate version.[2]
2. To ensure that the system can find the Julia executable file, you need to add the folder containing the binary to the path. This can be done by following these instructions:
   a) Run the following command to add/edit the file named '.bashrc' or '.bashprofile' in your home folder.
   ```
   $ vim ~/.bashrc
   ```
   b) Add the following line at the end of the file.
   ```
   export PATH="$PATH:<Path to Julia directory>/bin"
   ```
   Note that you need to edit "<Path to Julia directory >" in the above to match with where you extracted the downloaded files in the previous step. If you have installed Julia in your Applications folder, you should have the following path:
   ```
   export PATH="$PATH:/Applications/Julia-1.7.app/Contents/Resources/julia/bin"
   ```
   c) Close your terminal and open it again.
   d) Now, you should be able to check for the version of Julia installed by running the following command in the terminal.
   ```
   $ julia --version
   ```

Hello World!

You can run Julia commands in two different ways: you can either write the program in a file and run it, or you can run the commands directly in the command line. Let us give a simple demonstration here.

Running a program

Using your favourite editor, create a file named 'helloWorld.jl' with the following content:

```
println("Hello World!")
```

Now open your terminal and run the program using the following command:

```
$ julia helloWorld.jl
```

[1] If you have a Linux machine, let us know: we have a tutorial also for that.
[2] Please be careful when selecting the Julia version: all the solutions you provide must work flawlessly with version 1.7.2!

Using Julia command line

To launch the command line in Julia, simply run the following in your terminal:

```
$ julia
```

Now, you can run the print command that you wrote in the file earlier directly in the command window!

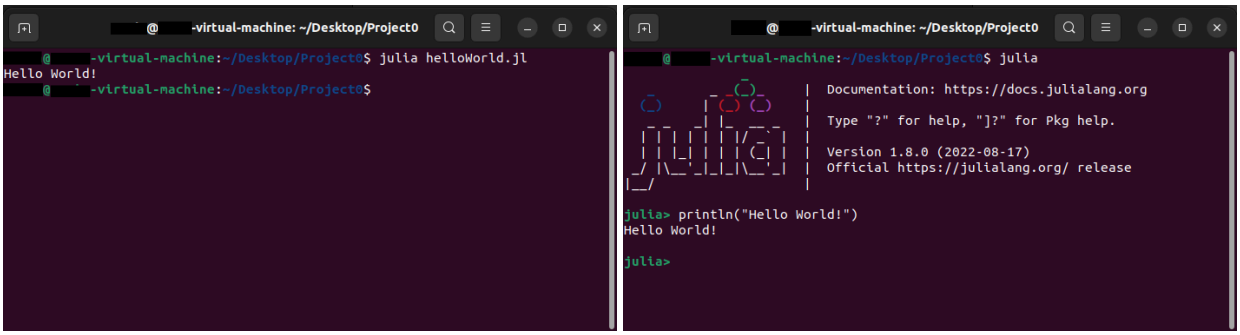

Figure 1: "Hello world" - running as a program and running in the command line respectively

Setting up Julia with Visual Studio Code

Visual Studio Code is a pretty good editor that could potentially save you a lot of time and effort as a developer. We highly recommend that you use the same. There is an extension in Visual Studio Code to support Julia. The instructions on how to install Visual Studio Code and from Julia on how to install the extension are linked below:

- `https://code.visualstudio.com/docs/setup/mac`
- `https://www.julia-vscode.org/docs/dev/gettingstarted/#Installation-and-Configuration-1`

A guide to installing packages in Julia through an example

There are instances wherein you may need to install additional packages to run certain code. In this exercise, we attempt to make a plot of some random numbers.
To get started, create a file named 'plotExample.jl' with the following content:

```
using Plots

# Let's generate some points to plot
x = 1:10;
y = rand(10);

plot(x, y, show=true)
readline() # Just to wait for the plot to show up, might take about 10 seconds
```

If you try to run the code now, you are likely to receive an error message stating that the package named Plots is not found in the current path.
We need to install the package so that we can run this program. To accomplish the same we can activate Julia command line and running the command to install the package, as shown below:

1. Run the following command to activate Julia command prompt

```
$ julia
```

2. Now you can run the package installation command as shown below:

```
julia> import Pkg; Pkg.add("Plots")
```

Now, you should be able to run 'plotExample.jl' and you should see a plot coming up.

In-class assistance

If you experience difficulties in setting up your Julia programming environment, please join us in class either on Tuesdays 16:30-18:15 in room C1.03 or on Wednesdays 14:30-16:15 in room D1.15.

References

[1] Platform Specific Instructions for Official Binaries, `https://julialang.org/downloads/platform/`

[2] Install - Julia Plots, `https://docs.juliaplots.org/latest/install/`