STARFISH SCHOOL

A Virtual Bootcamp for Astronomy Graduate Students

WEEK 5 EXERCISES

Version 1.0

Exercise 1

- Open R studio
- Start a new R markdown document template. Save the file (it will automatically give it the extension .Rmd)
- What happens when you click the little ball of yarn? What are the options in the little down arrow?
- Try changing/adding some things and knitting! E.g.,
    - New title
    - Heading sizes (#, ##, ###)
    - Make a bullet point list
    - Insert some math:
    - $$ M(r<R) = 4\pi\int \rho (r) r^2 dr $$

Exercise 2

- Take a Jupyter Notebook we give you (**`Get_SDSS_spectra.ipynb`**), turn it into a production script, and then package-ify it

Stretch Exercise: Start an R Package

- Start an R package in a new folder
- Write a few R scripts that contain functions for this package
- Fill in some of the basic helpfiles
- Here are some resources to get started:
    - Install the devtools package using install.packages("devtools") in the R command line

Exercise 3

1. Take the code from **`error_generating_script.py`**, follow the traceback, and make a minimal reproducible example

Exercise 4

1. Add logging and a unit test to a function in error_generating_script.py

Exercise 5

- Open the week5_exercise.R in R studio
- Read the comments and work through the code, running the lines
- Try the different debugging tools, and fix the bugs

Exercise 6

- Run through a debugging session to fix an issue in **`error_generating_script.py`**

Exercise 7: Plot Data Multiple Ways

- Using the 'Summary_info.txt' from the previous exercise, make two plots of the data to show different things. For each plot, include *at least three* bit of information (e.g. ra, dec, *z* or, z, flux, SNR etc.)
- As you make the plots, develop *common styles* to make the data consistent between plots. Experiment with colour, gradients, symbols. What story are you trying to tell? Which pieces of information teach you something?

Stretch Exercise: ggplot2 in R

- Go back to the week5_exercise.R script
- Breakdown and understand the code that is making the ggplot
- Make a new ggplot, using the SDSS quasar data set
    - Try setting the theme to something different!
    - Change the labels
    - Try making a multi-panel plot (see cut_interval)
- Make a ggplot using the spectra data set