

ASTR 400B Research Assignment 5: Hack Day 2

Due: April 18 2022 9 AM + Meeting on April 18

Prepare for a code check-in. We will assign you a time slot to meet with the TA or Prof. Besla and a group of other students to discuss your code and plots.

The goal of this check in is to look over PLOTS. The aim is to have at minimum one plot completed by the code check in, but ideally two.

This assignment will be graded on a 2 point scale:

- 0 = didn't show up
- 1 = no plots but plan is detailed
- 2 = one plot completed. detailed plans for a 2nd plot (or ideally, 2nd plot complete).

1 The Assignment

You are expected to push your code for your research project to your Github account by the morning deadline (9 AM AZ time) in a new folder called ResearchAssignment5.

We expect the following:

1.1 Explain your Goal in Code Documentation

1. At the top of your code write a detailed set of comments (or use a markdown box) that states the topic of your research project.
2. Many of you have outlined multiple questions to pursue. For assignment 3 you were to pick ONE of those questions and add it to the comments (markdown). For this assignment include more documentation if you are pursuing other questions.
3. **Outline the exact nature of the planned plots in comments (or markdown): What is the x axis, y axis, what particles are you using, which snapshots will you examine, what is the goal of the plot and how does it answer your question.**
4. The title of your code should be informative with regards to what the code does.

1.2 Refine your Code and Create 2 Plots

1. Before you start writing code, OUTLINE as much of your code **in words** (that are commented out) as you can. Like the templates you've been using for In Class Labs or Homeworks, where the steps are laid out. It is very hard for us to help you debug your code if it is not documented.
2. Create python script or a Jupyter notebook to compute relevant equations.
3. **Specific to Assignment 5:** You must have TWO plots planned (you must know exactly what you are going to plot). AT LEAST one plot must be completed by the check in.
4. The first plot can be using code from previous labs or homeworks. The second must be generated using some code that you created yourself.
5. **The second plot must be QUANTITATIVE not Qualitative.** For example, if your project was to understand the evolution of SMBHs in the centers of the galaxies, one plot could show images of the galaxies, marking the location of the SMBHs. The second, however, must convey the physics: e.g. a plot of mass growth as a function of time. That second plot must ANSWER THE QUESTION you are after.

1.3 3-5 minute Presentation

You will be expected to present your methodology and code to the group.

You can discuss where you are stuck and need help. The goal is for us to see where you are at and provide feedback on how to fix any issues you have.

1.4 General Guidelines

- Your code should be getting close to working for at least ONE question by this check-in.
- You do not have to create a class. You can simply create a set of functions.
- You may work together to brainstorm how to write your code - but you must create a final function that is uniquely yours. This means there must be at least **one new function that was not part of a homework or lab or that was created by/or is the same as that of someone else.**
- Note that for the final project you will need to create at least two plots for your paper. This check in is mainly to make sure you will have at minimum two plots done in time.
- The next assignment will be to start writing up results based on your plots.