AFS 505 Fall 2022 Module 1 Final Exam
Due before noon on Wednesday September 28th.

This is a take-home exam. You can refer to course material /internet resources. This is however an "individual" examl and you are not allowed to collaborate/discuss the exam.. If you have a question reach out to the instructors directly. Also, make sure you comment your code well to allow us to track your thought process (otherwise we wont be able to provide partial credits). Good luck!

1. What are the basic R data structures? What are the differences between them? In what context would you use one versus the other?

2. You are provided a folder with three location (county) names, each of which has subfolders for one or two crops, which in turn has a data file.
    a. Iterate through the folders to read all the files and merge them into a single data frame. You can use a "loop" to iterate or for efficiency check out the list.files() function.
    b. Add four additional columns to the merged dataframe corresponding to the county name, crop name, latitude and longitude of the data. You must get this information from the directory structure you are looping through or the strings returned by the call to list.files().
    c. Rename the column **irrig** to irrigation_demand and **precip** to **precipitation** and export the dataframe as a csv file.
    d. Summarize the annual irrigation demand by crop name and county name.
    e. What is the average yield of Winter Wheat in Walla Walla at 46.03125N118.40625W for the year ranges (1981-1990), (1991-2000), and (2001-2019)?
    f. Which location has highest yield (average) for the time period (2001-2019) for grain corn?

3. Was the data provided to you well described ? If not, what information was missing? Comment on what kind of metadata (description about the data) should be included as as best practice while sharing datasets?

4. Extra Credit (Optional)
   Create an R Markdown file with different tabs for each of the six parts of question 2. In a seventh tab add the Github link which has your R script/ R markdown file and the csv file generated from 2 (c).