### Intro

Python is a great language to know for rapid prototyping and for interviewing. However, a lot of times as an engineer, you won’t need to be an expert in the language you’re writing -- you’ll just need a grasp of the very fundamentals, and the ability to find other information you need. To that end, this assignment will mostly ask you to practice finding and using simple library calls to accomplish the tasks at hand. All of the below tasks can (and should) be accomplished using built-in Python libraries (for example, you can use the `math` library to find the value of pi in question 2).

Three meta notes:

* You are expected to have to Google around to complete the below functions. As this is the purpose of the exercise, any resource is allowed as long as you cite it in a comment (don’t worry about citing the Python docs).
* The rubric will tell you which libraries you need to use to accomplish certain tasks, but try to find that information on your own first! The ability to Google the correct terms is a surprisingly large part of being a good software engineer.
* **This assignment will be graded on completion and effort** rather than having perfectly correct programs, so don’t worry about the fact that some of these functions are hard to test. If you find yourself spending more than a couple hours on the below, reach out to myself or one of the TAs for help -- we’ll work to get you on track before we apply these skills on the project.

### Tasks

In a single file called `hw3.py` write a Python function to do each of the following. You should write **one function** **for each question.**

1. Write a function that takes a string as input and does the following:
   1. Returns True if the input string has more vowels than consonants
   2. Returns False if the input string has more consonants than vowels
   3. Returns None (this is the Python equivalent of null) if the input string has an equal number of consonants and vowels. We’ll ignore type safety for now!
2. The volume of a cylinder is given by the formula V = πhr^2. Given a radius R and height H as inputs return the volume of a cylinder with radius R and height H.
3. [Comma-separated values (CSV)](https://en.wikipedia.org/wiki/Comma-separated_values) is a popular format for storing data. For the first step of the CSV portion of this assignment, write a function that takes a list of strings as inputs, and returns a single string created by joining all the input strings together, with a comma separating them.
4. Now write another function that takes a **list of lists** of strings, applies the operation from question 3 to each list, and writes the result as a row of an output file. The function should return the path to the file where the strings were written.
5. Finally, write the reverse of question 4: write a function that takes in a filename (which we will assume is a CSV), and returns a list of lists of strings, where one row in the file corresponds to one list in the output list (and each value between the commas in the file row is one element in the list).
6. *Error-handling is an important part of writing web apps, especially when your app talks to potentially unreliable third-party APIs. This problem will have you practice the try/except keywords in Python.* Write a function that takes two numbers and divides the first one by the second. You should catch the error if the second number is zero and print a warning instead of crashing.
7. Write a function that takes a list of integers and returns the same list, but without any duplicates.
8. In Python, you can write code that interacts with other parts of your operating system. Write a function that creates a new folder called “hw3-folder” inside the current directory (the one where your code is running).

To submit this homework, create a **private** repo in the class GitHub organization called `hw3-<your campus ID>`. For example, mine would be called `hw3-jmartin191`. The repo should contain one file: hw3.py. When you’re done, follow the instructions on [this site](https://hmc-cs-131-spring2020.github.io/howtos/assignments.html) under “Submit the assignment on Gradescope.”

**Not sure where to find the class GitHub organization?** You will receive an email by EOD Monday inviting you to join. Myself and the TAs will send out invites to the GitHub usernames used to submit HW2, so if you were unable to finish that, please reach out ASAP with your GitHub account details.

### Rubric

I’m including this to be as transparent as possible and reduce the stress of this assignment. This homework is an opportunity for you to **practice**, so you don’t have to get things working perfectly to get credit, as the question criteria below will hopefully attest.

* (1 point) Assignment exists in GitHub organization and is named correctly.
* (.5 points per question)
  + Q1: Answer has logical branches that can return True, False, or None
  + Q2: Answer uses math library to calculate pi.
  + Q3: Answer is correct OR string.join() method is called in some fashion
  + Q4: Answer writes to a file in some way
  + Q5: Answer reads from a comma-separated file in some way.
  + Q6: Answer uses try/except statements and catches a ZeroDivisionError.
  + Q7: Answer is correct OR answer uses a Python set in some way
  + Q8: Answer uses the os library in some way.
* (50% off) Assignment is late.