

Homework Assignment 1

I'd like for each of you to complete the assignment as a jupyter notebook that you will turn in and that I can then evaluate to see if it works. Please email to me your notebook by class on Monday

Question 1: The variance of a sample of n numbers, Y_1, Y_2, \dots, Y_n , is calculated as

$$s^2 = \frac{1}{n-1} \sum_{i=1}^n (Y_i - \bar{Y})^2$$

where \bar{Y} is the average of the Y_i s. Write a function that will compute the sample variance of a list of numbers using this formula. Show that your function is working properly by using the `statistics` module which has a function called `statistics.variance()`

Question 2: Write a function that will compute the reverse complement of a DNA sequence which has been stored as a string. If you are unsure of what that even means take a look at this wikipedia page on DNA complementarity. **Hint:** while the reversal is simple enough, the complementation might not be. Try using a Dictionary for this. To show that your function is working reverse complement the sequence "TACAGAT".

Question 3: Write a function that will simulate rolling a 6-sided die using the functions available in the `random` module. Now using your function, perform an experiment in which you simulate 1000 rolls of your die. What is the average of those 1000 rolls? Does this result make sense to you?