PHY499: Introduction to Python for Scientists

Homework Assignment 1 (16 Sept, 2016)

(NOTE: This assignment will NOT be graded!)

Only use functions, methods, and modules that we already discussed in class to solve these assignments! Although this assignment will not be graded, feel free to email your solution to `michael.mommert@nau.edu`.

1 Lists and Loops

1.1 Factorials

Write a code that determines the factorial of a number (make one up). Do not even think about using `numpy` or `math` for this task!
Output: Print the number and its factorial.
Hint: Combine `range(start, stop)` and the `for` loop to loop through integer numbers.

1.2 Factorization of 123456

Find all integer numbers that multiplied with another integer number result in 123456. These numbers are called factors of 123456 – there are 27 of them.
Output: Store the factors in a list and print this list.
Hint: Use the modulus function (`%`) to find the factors; `range(start, stop)` might be useful, too.

1.3 Find the 100 Smallest Prime Numbers

Modify your code from 1.2 and find the smallest 100 prime numbers.
Output: Print a list of the prime numbers.

2 Strings and Dictionaries

2.1 Word Count

Take a recent essay you wrote - or a newspaper article from your favorite paper-, copy it into your code, and assign it to a variable named `text` (basically one really long string). Identify and count the individual words in this text. Which is the most frequent word? Is it "and" or "the"?
Output: Print the most frequent words and their frequency in descending order on the screen.
Hint: You can use the `split` function to turn your text variable into a list. Create a dictionary that uses the word as key, and its frequency as value. Loop through the text list and check for each word if it already exists; if so, increment its value; if not, add it to the dictionary. At the end, find the most frequent word.