CHE290 Programming for Chemical Engineers
Day 4 Practice Problem Statements

Program descriptions

1. `03_prime_counter`

   The function `is_prime` has `n` as an input argument and returns `True` if `n` is prime and `False` if `n` is not prime. Do not modify `is_prime`.

   In the file, complete the function `prime_range`, which will determine how many prime numbers are on the range from `start` to `stop`. The function will return a variable that contains the total amount of prime numbers determined.

   Example:

   - If you were to use the command: `N = prime_range(7, 10)`
   - The function would determine which numbers between 7 and 10 are prime.
     - 7 is prime; 8, 9 and 10 are not
   - After the function has completed, `N = 1`.

2. `04_Archimedes`

   In the file, complete the function `Archimedes`, which will determine an estimate of π using the following algorithm:

   Set A = 1 and N = 6

   Iterate on the following calculations:
   - Replace N with 2N
   - Replace A with $\left[2-\sqrt{4-A^2}\right]^{1/2}$
   - $L=\frac{N\cdot A}{2}$
   - $U=\frac{L}{\sqrt{1-\frac{A^2}{2}}}$

   The program will iterate `n` times (the input to the function). After the iterations are complete, the value of π can be estimated by:

   $$\pi \approx \frac{U+L}{2}$$