Homework 2

Due January 23, 9:30am

50 points

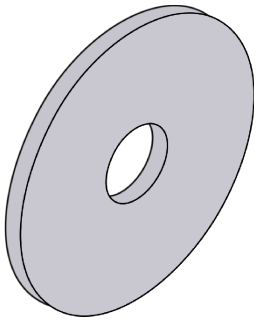
NE 4499/5599

CS 4499/5599

Computational Engineering with C++

Dr. Leslie Kerby

1. Write a program that calculates the volume of a washer (as pictured below). The program will ask the user for the two radii, r_1 and r_2, and the height of the washer, then will send these parameters to a function to compute the volume, and lastly output the volume to the screen. Don't forget units and make sure to allow the user to input decimal measurements. Submit a screenshot of the results and your code.



2. Write a program that creates a linear congruential pseudorandom number generator (LCG). Remember, LCGs have the form

$$r_{n+1} = (gr_n + c)(mod\ p)$$

Use a modulus of 2^{24} so as not to overflow a *long int* (which has a limit generally of $2^{31} - 1$ or approximately 2e9), and a multiplier of 61 with an adder of 1. Write the LCG within a function, *randlcg()*, which when called will return the next random number in the sequence, keeping track of where it is. Note that in order to keep track of where it is, the *randlcg()* function only needs to remember the last random number it returned. Use a seed of 100,001. Normalize your LCG so that it returns random numbers in between 0 and 1.

Print the first 30 random numbers to the screen and submit a screenshot of the results and your code.