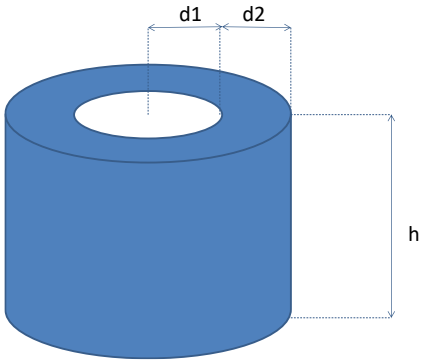
CMPT 275 Assignment 2

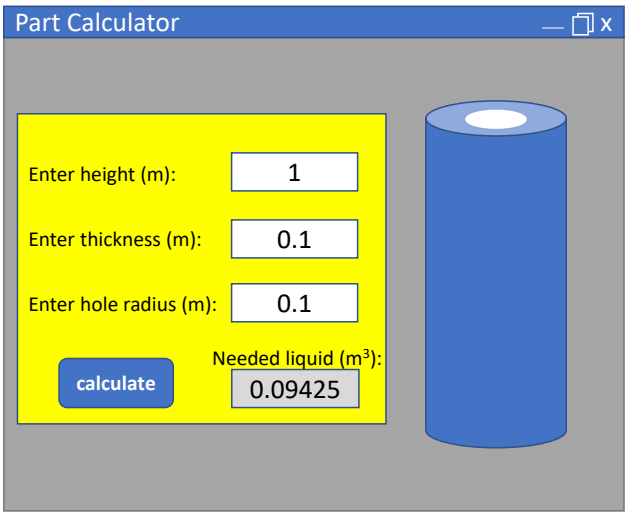
Fall 2020

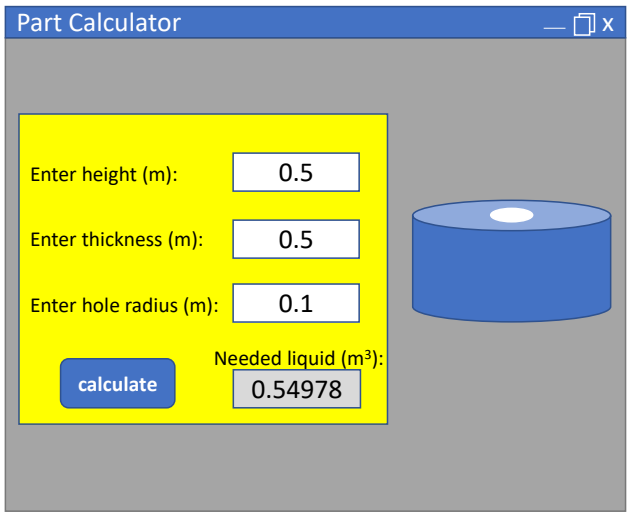
You are using a 3D printer to manufacture an engineering part as shown in the figure below. The center hole will be occupied by a shaft, while the hollow cylinder will be filled with a liquid chemical. We wish to calculate the volume of liquid needed to fill it. The calculation of the volume uses the following input: the height of the cylinder (*h*), the radius of the hole (*d1*), and the thickness of the hollow cylinder (*d2*). The hole and the hollow cylinder are concentric and their bases are full circles.



Write a Java program that calculates the volume of liquid in meters cubed (m^3) needed to fill the part, with the following features:

1. The user shall be able to enter the dimensions *d1*, *d2*, and *h*, through a GUI.
2. The GUI shall display the part itself, visually, with the correct proportions according to *d1*, *d2*, and *h*. See the visuals below as examples:





Please restrict yourself to Java's built-in Graphics2D class, and do the best that can be done with that. Do not use external packages such as Java3D or JavaFX.

3. The program should display the needed volume of liquid.

Your solution should consist of all your code (code must be commented) and 3 different test cases.