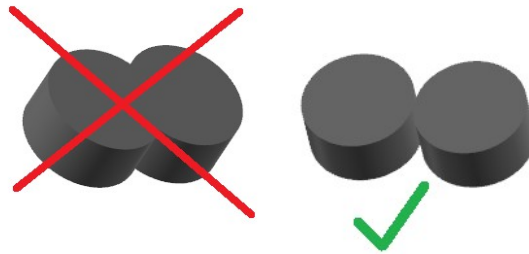# Material Deposition Question

Background:

A customer has provided a custom application in which they would like to create a path to deposit material. In this case the material is deposited in a flat cylindrical state. The user would like to define the shape they would like to build using the deposited material, and have the path automatically generated by these parameters. A 2D path will be generated at each of the step heights and we can assume that the step height will also indicate the height of the cylinder being deposited. On any given layer there is to be no overlap of the deposited material:


Scope:

Create a user interface which will allow users to set the following parameters:

1) Upper Rectangle Width and Length
2) Lower Rectangle Width and Length
3) Overall Part Height
4) Step Up Height
5) Radius of material deposition
6) Path Direction – either vertical (along Y-axis) or horizontal (along X-axis)

The Step Up Height must be a divisor of the Overall Part Height. The Upper rectangle may be smaller or larger than the Lower rectangle. Each Step Up height must be large enough to support a single cylinder.

In the event a Step Up height cannot be completely covered by the deposition, the gap shall be left at the edges of the material. Based on the above parameters, calculate a path for material deposition to create the part. All coordinates are using the bottom rectangles lower left hand corner as its point of reference.

Application Diagram
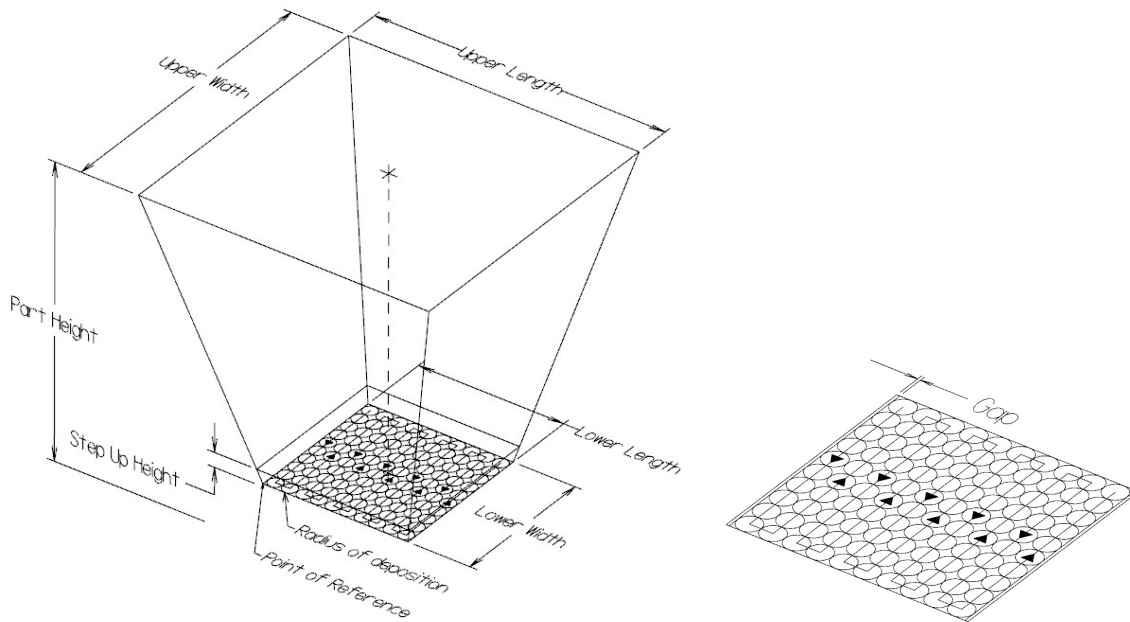
Output:

The resulting output should be a text file with each line containing an XYZ position where material is to be deposited. The coordinates should extend to 4 decimal places.

Example:

X0.5000,Y0.5000,Z0.0000
X0.5000,Y1.0000,Z0.0000
X0.5000,Y1.5000,Z0.0000
X1.0000,Y1.5000,Z0.0000
…

Programming Details

The application should run in a standard windows environment (no need to install specialized software). Please provide your source code. The programming language used is left to the preference of the developer, but keep in mind we develop in C++, C# and Python.