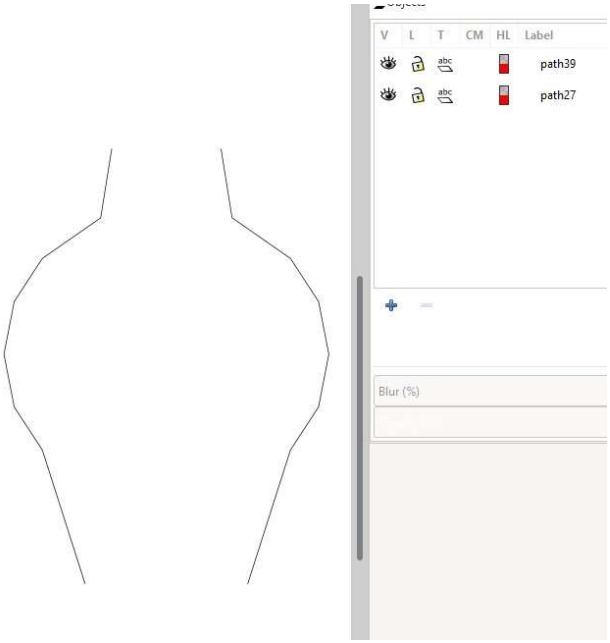
upc.pyw -- Help sheet

02/2020: New version with simplified input and output compatible with Cricut Design Space.

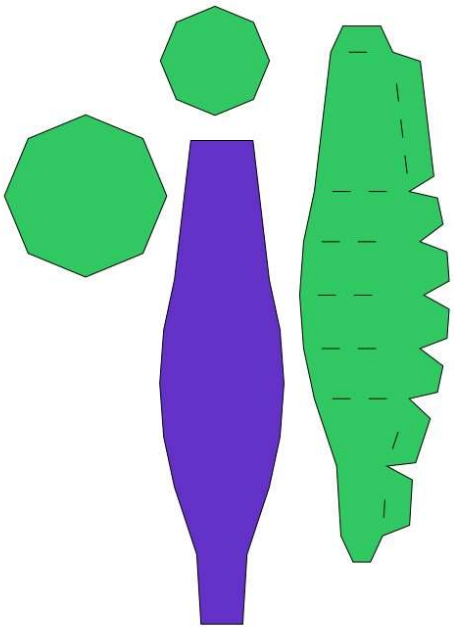
REQUIREMENTS: Inkscape 1 beta or higher; Python and necessary libraries. See "Installation" below.

What is the UPC Program?

Using Inkscape 1 (beta or higher) you create an .svg file that has two paths that outline silhouette of a simple vase-like shape. **upc.pyw** used this file as input and creates an .svg file that contains the paths for the shapes necessary to construct the 3d structure, using polygons. If your input looks like



...then your output would look somthing like shown on the left (the pictures are not equally scaled and pieces were moved/separated to show better.) And, an example of the piece built is the vase part of the lamp on the right. (The shape of the shade was also made using upc.pyw.)



The output has five paths. These are the score lines, the path around the build piece, the wrapper (for cutting decorative paper to cover the base structure. Inset it in Inkscape if you prefer a margin of structure colore to show around the wrapper pieces.)

Use the main piece and its score lines to construct your structure. You must duplicate the build piece, with its score lines, for as many times as you have sides in the underlying polygon. If you build on a hexagon, you need six, or if you build on an octagon, you would need 8... etc. If you are using the overlay pieces, you duplicate that as well. You'll also get matching polygons to fit the top and bottom. These don't have to be duplicated.

You can duplicate in Design Space or in Inkscape, whichever you prefer. [If using solid score lines, it is easier to do in Design Space, change the score lines to a line type of "Score" (not cut) and then attach before duplicating.]

Where to download it?

Please see the installation instructions below for details on installing Python and this program.

Using the upc program.

The program was designed to work in Inkscape 1 (still beta as of this writing). It will not work correctly in earlier Inkscape releases because of the orientation of the canvas.

INPUT FILE

Your input file is important!!

Set your document properties so you are using inches.

Your input file must contain **exactly** two paths, one an identical mirror image of the other. They must contain exactly the same number of points and **not be grouped or be within a layer.** Do not connect the paths at the top and bottom. See the example above.

The simplest way to do that is to create your outline path on one side, duplicate it and flip it horizontally (ctl-d, h). Then simply move it over to the width you prefer. Draw from the top down.

BE SURE TO SAVE YOUR INPUT FILE AS A PLAIN SVG FILE.

Now run the upc.py program, using your file as the input. You can change the number of sides for the polygonal shape you are building, the tab height, the size of the score cuts or whether you want them solid (use 0 for score size)--or not there at all, except on the tabs.

Comments, suggestions and known issues

The Output file

The output will have the build piece, the score lines, and the overlay piece stacked on top of each other, so it is not obvious that the overlay piece is there also. Keep the score lines with the build piece. Group if you like. You would attach them in Design Space (changing any solid score lines to the "Score" line type)

NO OUTPUT? Strange dimensions?

If you do not follow the requirements for the input file , you won't get any output. If that happens, double check that all is as it should be. (**The most common problem**, in my experience, is forgetting to **"save as" as a PLAIN Inkscape file.**) If you get back a report that the finished size is insanely large, you probably left your paths grouped. Ungroup them, remove from under any layers, and try again.

SCALING

When the program runs, it will report the dimensions of the output file. Make note of these in case your software interprets the size differently, so you can re-scale.

FILL

The paths are filled with default colors. Change as you like.

STARTING OUT ...something to try.

Try importing a picture of a vase. Use the pen tool to draw a path along the left side (not top or bottom). Duplicate that path (ctl-d). Flip the duplicate horizontally (h). Now use your arrow keys to move that path to be along the right edge. Delete the image. Make sure you don't have your paths grouped. Then **SAVE AS a PLAIN SVG** file. Use this as your input file.

Take a look at your output. See if there are any adjustments that you want to fix. Save as plain svg, and upload and use it in Design Space. Be sure to duplicate the pieces that need multiple copies.

Can I use the output directly in Design Space?

Design space can import the output svg. As of this writing, it will do so with the correct dimensions. Generally, though, there are adjustments that are most easily handled in Inkscape 1.

NOTE: If you modify the file in Inkscape, be sure that if you have groups in your adjusted output, that you ungroup/re-group each of the groups immediately before uploadinginto DS. You might need to move paths out of layers as well. This is due to an incompatibility between Inkscape and Design Space.

INSTALLATION:

(assumes you already have Inkscape 1 beta or higher installed, if not, get it at https://inkscape.org/release/inkscape-1.0/?latest=1)

Installing Python 3 and the needed libraries (you only need to do this part once It enables you to run Python programs. If you have Python 3, but not the needed libraries, skip to step 3)

1. **Download Python 3** from https://www.python.org/ (not the Windows store) Choose the version that is appropriate for your system

2. Launch(double-click) the executable -- the .exe file (defaults are okay, but choose the option to modify the PATH variable).

3. On Windows 10: Open a command window: Type **`cmd`** in your windows search box.

4. Install needed libraries

Now we need to add a couple of libraries to Python. In your command window, type the following (in this order)

```
pip install numpy

pip install svgwrite

pip install svgpathtools
```

...and you are done installing Python. You can close your command window now.

IMPORTANT upc.pyw was developed for an upcoming **1.0 version of Inkscape**, which is in beta at the time of this writing. Unlike the previous versions, this one places the origin in the upper-left. The application doesn't support a lower-left origin.

Getting and running the upc.pyw

1. Click the green "Clone or Download" button on **https://github.com/obzerving/upc**

2. Unzip the downloaded files. (you only need to do steps 1 and 2 once)

3. Double click on the upc`.pyw` file. Complete the info needed in the dialogue. See "input" above for details.