Department of Computer Science and Engineering

Couse Name: Computer Graphics Lab

3. Transformations: To implement a set of basic transformations on an (object) Polygon i.e. Translation, Rotation and Scaling. To study and implement a set of composite transformations on polygons i.e. reflection, shear (x &y), and rotation about an arbitrary point and line. Aim is to study and implement Mouse and Keyboard interaction with Python programs; To study events in Python; How to handle them and use them inside an Python Program.

Use your experimentation with the object or Polygon defined in Assignment 1. Apply all transformations studied in class and as explained in your textbook to answer the following questions: (BE SURE to reset the parameters between each question to isolate the cause and effects. All the transformations should be key driven. For example for translation in +ve x direction press „t‟, and for –ve x direction „Shift t‟, etc.) This can be done using the key function menu that appears if the right mouse button is held down while over the textual area or by typing "m".)

Please use graphics terminology such as translation, scale, and rotation, and if rotation, about which axis and whether clockwise or counterclockwise. If the polygon did not change as you expect, hypothesizing why would be helpful to you. For example, Rotation about an arbitrary point:

This is done by three transformation steps: translation of the arbitrary point (Xc,Yc) to the origin, rotate about the origin, and then translate the center of rotation back to where it belongs. To transform a point, we would multiply all the transformation matrices together to form an overall transformation matrix.

Assessment

After transformations assignments you should be able to answer:

How does the image change if you change the x/y/z argument of the translate parameter list to negative? to positive?

How does the image change if you change the angle argument of the rotation parameter list to negative? to positive? (rotation about the X/Y/Z axis)

How does the image change if you are transforming (translate/rotate/scale/reflect/shear) an object about an arbitrary point or line?

How does the image change if you make the x/y/z scale factor smaller? larger?

Rotate the object by 360 degrees so that you can see the entire side of the object.