CI4810/6810
Fall 2019

Assignment: *Program 3 (20 points)*
Due Date: *October 15, 2019 - Tuesday*

Implement each of the following functions:

- **BasicTranslate** (Tx , Ty)
  { Translation - `Tx' is the horizontal and `Ty' is the vertical displacements. }
- **BasicScale** (Sx, Sy)
  { Scale - `Sx' and `Sy' are the horizontal and vertical scaling factors;
  center of scale is at the origin of the Coordinate System. }
- **BasicRotate** (angle)
  { Rotation - angle of rotation is `angle' degrees (clockwise); Center of rotation is at the origin of the Coordinate System. }
- **Scale** *(Sx, Sy, Cx, Cy)*
  { Scale - `Sx' and `Sy' are the horizontal and vertical scaling factors; center of scale is at Cx, Cy. }
- **Rotate** *(angle, Cx, Cy)*
  { Rotation - angle of rotation is `angle' degrees (clockwise); Center of rotation is at Cx, Cy. }
- **ApplyTransformation** *(matrix, datalines)*
  {applies the transformation matrix to the lines that appear in "datalines"}
- **Displaypixels** (datalines, num)
  { Displays (i.e., scan-converts) 'datalines' containing `num' lines }
- **Inputlines** (datalines, num)
  { Reads 'datalines' from an external file (name of file is provided by the user). On return `num' will contain the number of lines read from the file. }
- **Outputlines** (datalines, num)
  { Outputs 'datalines' containing `num' lines to an external file (name of file is provided by the user). }

Embed the functions above (together with other functions that may be needed) into a complete program to build a simple graphics system.

Notes:

- Build a suitable user-interface so that the functionality of your program can easily be demonstrated.
- Your program must be well structured.
- Use one of your line drawing routines to scan-convert the image.
- Use the matrix representation of the transformations.
- Concatenation must be done during execution time.