Machine Vision Development Engineer Coding Exercise

Congratulations on your decision to apply for the open Machine Vision Development Engineer Position! As part of the application process, we would like you to complete a coding exercise. You have been provided with a file that contains the definitions of several shapes, such as circles, ellipses, triangles, squares, and simple polygons. In this exercise, you will programmatically read this file, calculate geometric properties, and save the calculated data to a new file.

Requirements

- Source code must be submitted via a GitHub repository link.
- Your program must be written in C# or vb.net.

Directions

- Write code to read shape data from the provided csv file. See the description of the file's contents below.
- Calculate the area and perimeter of each shape. Optionally, calculate the X and Y coordinate of each shape's centroid.
  - Do not use a 3rd part mathematics library.
- Save a new csv file containing the geometric properties of each shape using the shape ID as a row header.

Tips

- Use object oriented programming practices.
- The shoelace formula can be used to calculate the area of simple polygons.
- An incomplete submission is acceptable. Complete what your skillset allows.
- This is not a closed book test. You are encouraged to use all available sources of information.
- *(internal candidates only)* Do not use any internally developed references in your solution. Do not include any proprietary code.
- Don't hesitate to reach out to your hiring manager with questions.
- Unit testing can be used to verify code functionality.

Shape Definition File

Each row of the provided file defines a new shape. The first column of each row is the shape's unique ID and the following columns define the shape itself. All orientation values are in radians and are relative to the positive X-axis.

- Circles are specified by their center and radius.
- Ellipses are specified by their center, the orientation of the larger axis, the length of the larger half axis Radius1, and the length of the smaller half axis Radius2.
- Squares and equilateral triangles are specified by their center, the orientation of the one of their sides (radians), and their side length.
- Polygons are specified via a list of X,Y vertices.