COMP 115   Robots, Games, and Problem Solving

Lab #10

In this lab, you will practice writing functions and reading files. Since you will have to turn the lines that you read into lists of 'words', lists will be involved in a few places as well.

In this lab, you will read a file that encodes a picture and, using the graphics library, produce all the elements encoded in the file. The first line of the file will contain the width and the height of the image, then each pair of lines in the file contains an instruction about a parameter that should be changed, or a shape that should be drawn. For each pair of lines, the first line indicates the type of the instruction, the following line describes the details of the instruction. Look on the course schedule to find a .zip file containing several files with such encodings

1. Write a function `main` according to the following specifications:

   - the function should first ask the user for the name of the input file and open that file.
   - read the first line of the file, pass it to `openGraphWin` to get back a `GraphWin` object. (We will write the function `openGraphWin` later)
   - initialize a variable `fillColor` to "white" and a variable `outlineColor` to "black".
   - read all pairs of lines that follow until you read a first line that contains a 'q', that is the signal that you should stop reading the file. Interpret the pairs of lines as follows:
     - If the first line is an 'f', then the following line will contain a single word describing the new color that should be used to fill the future shapes.
     - If the first line is an 'o', then the following line will contain a single word describing the new color that should be used to draw the outline of future shapes.
     - If the first line is a 'p', then read the following line and make a call to the function `processPoint` with three parameters: the first parameter is the `GraphWin` object you got at the beginning of main, the second parameter should be the variable `fillColor`, the third parameter should be the second line you just read. The function `processPoint` will be written later.
     - If the first line is a 'q', then everything else in the file should be ignored, you should stop reading the file.
   - After reading the file, you should use an input statement to make your program pause until the user presses the return key, then close the graphic window.

   _____ Show me the result when you are done.

2. Write a function `openGraphWin` that takes a string called `line` as input parameter, assumes that the input parameter contains something like the first line of an input file. The function should use the info in the line to create a `GraphWin` object and return the `GraphWin` object it created.

3. Write a function `processPoint` that takes three parameters: a `GraphWin` object, a string containing a color and a string called `line`, assumes that the line contains two 'words', each of which is an integer, creates a `Point` object using the two integers as coordinates, sets the fill color of the Point to the color

the function received as input and draws the Line in the graphic window the function received as a parameter.

With this written, you should be able to read the files `pointsOnly.txt` and `lotsOfPoints.txt`

_____   Show me the result when you are done.

4. add an option to `main`, so that if the first line is an 'l', then a Line should be drawn. Read the following line and make a call to the function `processLine` that takes four parameters: a graphic window, a fill color and a line from the file.

5. Write a function `processLine` that takes three parameters: a `GraphWin` object, a string containing a color and a string called `line`, assumes that the line contains four 'words', each of which is an integer, creates two `Point` objects using the integers as coordinates, creates a Line object from the two points, sets the fill color of the Line to the color the function received as input and draws the Line in the graphic window the function received as a parameter.

6. add an option to `main`, so that if the first line is an 'r', then a rectangle should be drawn. Read the following line and make a call to the function `processRectangle` that takes four parameters: a graphic window, an outline color, a fill color and a line from the file.

7. Write a function `processRectangle` that proceeds similarly to `processLine`, except that both a fill color and an outline color should be set in Rectangle object in the function.

With this written, you should be able to read the files `pointsAndLines.txt` and `rectanglesAndPoints.txt`

_____   Show me the result when you are done.

If you finish all the exercises early, modify `main` so that it is also able to process Circles ('c') and Polygons('p'), figure out how to encode all the information necessary to create those objects on the following line, write corresponding functions `processCircle` and `processPolygon` and create an input file that enables you to test your code.

When you are done, write your name on the sheet and hand it to the lab instructor.

Name: _____