**PROBLEM**:

Write a program to compute the perimeter and area of a polygon using an input data file and an output file. A file **lab4.c** is provided with some of the print statements in it.

* It is your responsibility to read the Power Point files:
  + C-3 Characters ControlStructures.pptx, #20-57 on the various Ifs and Switch
  + C-4 Loops.pptx, #1-24
  + Ask any needed questions in class

To get the files you need, first move to your **csc60** directory: **cd csc60**

The following command will create a directory named **lab4** and put all the needed files into it below your csc60 directory.

Type: **cp -R /gaia/home/faculty/bielr/files\_csc60/lab4 .**

Spaces needed: (1) After the **cp ↑** space & dot

(2) After the **-R**

(3) After the directory name at the end & before the dot.

After the files are in your account and you are still in **csc60**, you need to type: **chmod 755 lab4**

This will give permissions to the directory.

Next move into lab4 directory [**cd lab4**], and type: **chmod 644 lab4\*.\***

This will give permissions to the files.

Your new lab4 directory should now contain: lab4.c, lab4.dat, lab4sample.dat

**INPUT/OUTPUT DESCRIPTION**:

* The **test data** will be a file called **lab4sample.dat.** Use it to verify the correctness of your program. It has 3 sets of data.
* The **final data** will be a file called **lab4.dat**. It has 6 sets of data.
* Each line or record of the file will consist of two numbers: the radius and the number of sides of the polygon.
* Print your name and assignment (use fprintf)
* Use an *fscanf* statement in a *while* loop to repeatedly get each set of values. It would be a good idea to make these variable type *double*.
* **The output** will be a file, **lab4.out.** The output of the sample data will follow.

**FORMULAS**

* Remember to translate the algebra of the two formulas into the C language.

**Perimeter** of the polygon = 2n R sin PI

n

**Area** of the polygon = ½ n R2 sin 2 PI

n

**DATA FILES**:

There are two data files:

* lab4sample.dat – Use it to verify the correctness of your program
* lab4.dat

**ALGORITHM DEVELOPMENT**:

Open the data file **lab4sample.dat** or **lab4.dat**

Do the appropriate error checking

Open the output file **lab4.out**

Do the appropriate error checking

Print your name and assignment. Then print the column header lines needed. (use fprintf)

while ((fscanf(..., &radius, &nsides)) == 2)

| Compute the perimeter and area of the polygon.

|\_ fprintf the radius, nsides, perimeter, and area as in the Defined Output Appearance.

Close the two files

**VIEWING OUTPUT**

When you run the program, the whole thing is going to **lab4.out**. Open that file to see your output. Use either “cat” or “vim”.

**REMINDERS**:

* Include your name and lab4 in your comment block, and in your output.
* All numeric variables are to be type **double**.
* Most of the print and fprintf statements are included in lab4.c for you. You need to write the fprintf in the loop.
* The input file name, which will be changed, ought to be in a #define statement. The file will come with two #define statements, for the test file and the final file. Just move the **//** from in front of one #define statement to the other #define statement.

**#define INFILE lab4sample.dat**

**// #define INFILE lab4.dat**

* FOR THE VALUE OF PI, use **M\_PI** from math.h (which we already have included).
* To compile, you will need to add **–lm** so math.h can be found. Type: **gcc –lm lab4.c**

**DEFINED OUTPUT APPEARANCE (*using lab4sample.out*)**:

Your Name. Lab 4.

Number Perimeter Area Of

Radius Of Sides Of Polygon Polygon

-------- -------- ------------ -----------

12.60 24.00 78.9422 493.0813

5.60 8.00 34.2884 88.6995

7.85 12.00 48.7615 184.8675

**PREPARE YOUR FILE FOR GRADING:**

Make sure your program has been corrected from:

using **lab4sample.dat** to using **lab4.dat**

and has been re-complied.

When all is well and correct,

at the prompt, type: **script StudentName\_lab4.txt** [Script will keep a log of your session.]

At the prompt, type: **gcc -lm lab4.c** to compile the code

At the prompt, type: **a.out** to run the program

At the prompt, type: **cat lab4.out** to show contents of the output file

After the program run is complete,

type: **exit** to leave the script session

**Turn in your completed session:**

Go to Canvas and turn in two files:

1. lab4.c
2. StudentName\_lab4.txt