#### PROBLEM:

Write a program dealing with cylinders to compute the top area and the volume using an input data file and an output file. A file **lab5.c** is provided with some of the print statements in it.

To get the files you need, first move to your class folder by typing: cd csc60

The following command will create a directory named **lab5** and put all the needed files into it below your csc60 directory.

Type: cp -R /gaia/home/faculty/bielr/classfiles\_csc60/lab5 .

Spaces needed: (1) After the cp

↑ Don't miss the space & dot.

(2) After the -R

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

After the files are in your account, you need to type: chmod 644 lab5\*

Your new lab5 directory should now contain: lab5.c, lab5.dat, lab5sample.dat

#### **INPUT/OUTPUT DESCRIPTION:**

- The **final input** will be a file called **lab5.dat**. It has 4 sets of data.
- The **test data** will be a file called **lab5sample.dat.** Use it to verify the correctness of your program. It has only two sets of data.
- Each line or record of the file will consist of two numbers: the radius and the height of the cylinder.
- Use an *fscanf* statement in a *while* loop to repeatedly get each set of values.
- The output will be a file, lab5.out. The output of the sample data will be a model to follow.

#### **ALGORITHM DEVELOPMENT:**

Open the data file lab5sample.dat or lab5.dat

Do the appropriate error checking

Open the output file lab5.out

Do the appropriate error checking

Print your name

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

Compute the area and volume of the cylinder.

print the radius, height, area, and volume as shown in the Defined Output Appearance.

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Close the two files

#### **REMINDERS:**

Include your name and lab5 in your comment block, and in your output.

All numeric variables are to be type **double**.

The input file name, which will be changed, ought to be in a #define statement.

Most of the print and fprintf statements are included in lab5.c for you. You need to write the fprintf in the loop.

FOR THE VALUE OF PI, use **M\_PI** from math.h (which we already have included).

To compile, you will need to add -Im so math.h can be found. Type: gcc -Im lab5.c

#### **FORMULAS**

The **area** of the top of the cylinder = M\_PI \* radius \* radius

The **volume** of the cylinder = M\_PI \* radius \* radius \* height

### **VIEWING OUTPUT**

When you run the program, the whole thing is going to lab5.out. Open that file to see your output.

# **DEFINED OUTPUT APPEARANCE (using lab5sample.out)**:

Ruthann Biel. Lab5.

Cylinder 1

The radius is: 5.000
The height is: 2.000
The top area is: 78.540
The volume is: 157.080

Cylinder 2

The radius is: 40.000
The height is: 15.000
The top area is: 5026.548
The volume is: 75398.224

### **DATA FILES:**

There are two data files:

- lab5sample.dat Use it to verify the correctness of your program. It has two sets of data.
- lab5.dat It has 4 sets of data.

# **PREPARE YOUR FILE FOR GRADING:**

Make sure your program has been corrected to use lab5.dat and has been re-complied.

When all is well and correct,

Type: script StudentName\_lab5.txt [Script will keep a log of your session.]

Type: **cat lab5.c** to display the code in your session.

Type: **gcc lab5.c** to compile the code to run the program

Type: cat lab5.out to show contents of the output file

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

### Turn in your completed session:

Go to SacCT and turn in your script session (StudentName\_lab5.txt).