EECS 10: Assignment 2

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Due Monday 9 Oct 2006 at 11:59 am

1 Homework Problem 1: Exercise 2.15, pg. 52 [10 points]

In order to receive credit for this problem, answer this question in a file called **`ex2_15.txt`** and submit this file.

2 Homework Problem 2: Volume of a hollow cylinder [30 Points]

Write a program that calculates the volume of a hollow cylinder (pipe). See Figure 1. Your program should ask for the length (height of the cylinder) L, inner (r) and outer radius (R) of the pipe, and then output the thickness (R-r) and the volume of the pipe. You may assume that **pi** = 3.14159 and use floating point variables.

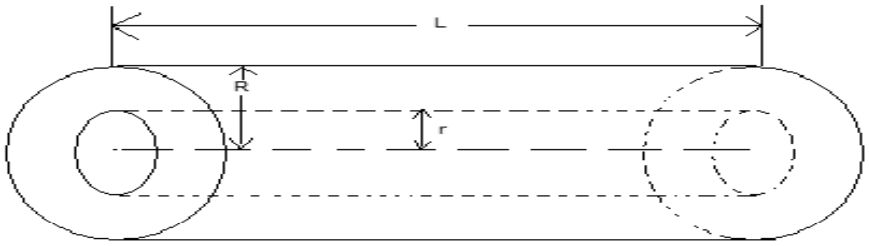

Figure 1: Hollow cylinder (pipe) with inner radius r, outer radius R and length L.

When executed, your program output should look as follows:

```
Please enter the inner radius of the pipe (r) : 3.2
Please enter the outer radius of the pipe (R): 4.2
Please enter the length of the pipe (L): 4
The thickness of the pipe is:  1.000000
The volume of the pipe is :   92.991040
```

The files that you should submit for this assignment are: **`pipe.c`**, **`pipe.txt`**, **`pipe.script`**.

NOTE: In the **`pipe.txt`** file, explain the formulae that you used and limit this to a few sentences only. Your **`pipe.script`** should contain program output for length = 5 , outer radius = 5.2 and inner radius = 4.2

3 Bonus: Total Surface Area of a pipe [5 points]

Extend the previous program to calculate the total surface area of the pipe using the the length, inner and outer radius of the pipe . The total surface area is defined as :

`Total surface area = Area of outer cylinder + Area of inner cylinder + Twice the area of the cross section(area of the rings at the ends)`

You may assume that **pi** = 3.14159 and use floating point variables for the calculations. When executed, your program should print.

```
Please enter the inner radius of the pipe (r): 3.2
Please enter the outer radius of the pipe (R): 4.2
Please enter the length of the pipe (L): 4
The thickness of the pipe is:  1.000000
The volume of the pipe is : 92.991040
Surface area of the inner cylinder: 80.424705
Surface area of the outer cylinder: 105.557419
Surface area of the rings: 46.495520
The total surface area of the pipe: 232.477644
```

NOTE: Include the code for this calculation in the same **`pipe.c`** file that you submit for Problem 2. In the **`pipe.txt`** file, explain the formulae that you used and limit this to a few sentences only. Your **`pipe.script`** should contain program output for length = 5 , outer radius = 5.2 and inner radius = 4.2

4 Submission

Submission for these files will be similar to last week's assignment. The only difference is that you need to create a directory called **`hw2/`**. Put all the files for assignment 2 in that directory and run the **`/ecelib/bin/turnin`** command to submit your homework.