

CS 121 – Lab #2 – Basic Calculations and Formatted Output

Let's solve a complete problem. This will feature basic I/O and arithmetic, but no fancy control flow. This problem is called "the garden hose." The output of your program should be formatted exactly how it appears in the example I/O below.

It's easy to measure the length and width of a hose, and a water meter can display how much water is pumping through the hose. You will write a Python program that will manipulate these figures to give the user more useful information about what is going on inside the hose.

Input... Ask the user for these quantities:

1. the width of the hose, in inches
2. the length of the hose, in feet
3. the water pressure (how fast the water is gushing), in gallons per second

Output... Tell the user:

1. the weight of the empty hose, in pounds
2. the weight of the hose when it is filled with water, in pounds
3. how fast the water is moving through the hose, in feet per second
4. how long it will take to fill an empty hose, in seconds

Assumptions and hints:

1. The empty hose will weigh exactly 1 ounce per linear foot.
2. The water inside the hose is in the shape of a cylinder. The volume of this water is $(\pi) * (\text{radius of hose})^2 * (\text{length of hose})$.
3. To use the built-in value of pi, first tell Python to "import math", and then in your formula use the value math.pi.
4. One cubic foot of water weighs 62½ pounds and one gallon of water weighs 8 pounds.
5. You should format all floating-point output to exactly one decimal place.
6. You will use more than the seven variables needed for I/O. Do not derive magical formulas that will get you all of the results in one assignment statement. Rather, use extra variables to make intermediate computations.

Example I/O:

How wide is the hose (in inches)? **0.625**

How long is the hose (in feet)? **175**

What is the water pressure (in gallons per second)? **0.5**

Weight of empty hose 10.9 pounds

Weight of hose filled with water 34.2 pounds

Speed of water inside the hose 30.0 feet/second

Time to fill the hose 5.8 seconds

Thank you for using the Garden Hose program.

Good bye.