

Lab2 - CIT315

Goals

The primary goal of this first project is to write, test and complete a basic C program that takes inputs, completes some basic calculations and provides some output. It will emphasize the use of basic ANSI C language syntax, experience with types and variables and explore the use of user interaction. The secondary goal of this second project is input verification and checking.

Specifications

In this exercise, you will ask a user for input relative to calculating the size, water capacity and cost required to fill a pool and hot tub. The pool and hot tub are not connected, but will be specified at the same time. You will write code so the user can enter the dimensions and then calculate the capacity of the pool and hot tub.

Hot Tub/Pool

The hot tub has two dimensions, width (WHT) and Depth (DHT) to calculate its water capacity. It will also maintain the water level 6 inches below the top.

The pool is a bit more complex. The pool has a deep end, a shallow end, an area transitioning from the shallow to the deep end and a zero entry that transitions to the shallow end. The user will have to enter values for the length (L), width (W), depth (D), length of the deep end (LD), length of the shallow end (LS), and length of the walk in section (WI). Don't forget about the transition from the shallow to the deep end. The standard water level is 6 inches below the top of the pool and hot tub.

For each input, you must specify an acceptable range of values to the user. For example:

Please enter the depth of the deep end (6 - 15 feet): 0

THAT IS AN INCORRECT ENTRY, PLEASE ENTER A VALUE BETWEEN 3 AND 15 FEET!!!!

If the value is not within the acceptable range, the program must ask them again for the same input value.

Please enter the depth of the deep end (6 - 15 feet): 5

Once the input is correct, move to the next input value.

Acceptable ranges:

~~Depth of the shallow end: 0-5 feet~~

~~Depth of the deep end: 6-15 feet~~

~~Width of the pool: 15-30 feet~~

~~Length of the pool: 35-70 feet~~

~~Length of the walk in: 5 feet minimum to 1/3 of the pool length~~

~~Length of the shallow end: 10 feet minimum to 1/2 of the pool length~~

~~Length of the deep end: 12 feet to 1/2 of the pool length~~

~~Width of the hot tub: 8-14 feet~~

~~Depth of the hot tub: 3-5 feet~~

Once the process is complete and the output has been printed, the program must ask the user if they want to calculate another POOL and HOT TUB configuration. This process will continue until the user does not want to continue and exits the program. So, you will need an external loop to query the user.

Tips

Give your variables more meaningful names than W or H. Decompose your program in the following three steps:

- 1) Get the input values
- 2) Use the inputs to calculate the outputs
- 3) Write the outputs

Remember that to calculate the hot tub, use the area of a circle $\pi * r^2$

1 cubic foot of water is 7.481 gallons of water

1 quart of water will cost 7 cents

1 gallon = 4 quarts

Output

Pool Dimensions (feet)

Depth of the shallow end: 3.0

Depth of the deep end: 10.0

Width of the pool: 20.0

Length of the pool: 35.0

Length of the walk-in: 5.0

Length of the shallow end: 10.0

Length of the deep end: 15.0

Width of the hot tub: 10.0

Depth of the hot tub: 3.0

Pool Volume

Total volume of pool: 4050.0

Gallons of water to fill 30298.1

Hot Tub Volume

Total volume of hot tub 196.4

Gallons of water to fill 1468.9

Total gallons for both: 31767.0

Total cost for both: \$8894.76

Submission

Submit the project file(s) by the required date and time on Brightspace.

Rubric - 25 points total

- 5 points - Correct use of interactive statements to get input.
- 5 points - Correct use of math operations to arrive at output
- 5 points - Correct display of output. You can format more than required, but what is show is sufficient.
- 5 points - Within 8% of the given answers using the same input given. Make sure to consider all possible areas of the pool and hot tub, no matter how small.
- 2 points - Documentation project title and short description at the top.
- 2 points - Inline documentation describing the input, processing and output parts of the program.
- 1 points - Your name, email and lab time in comments at the top.

Diagram

