Lab01: Water Well

Points: 100 points

Objectives:
- To use introductory and closing messages
- To use numerical calculations and Mathematical operations **"+, -, *, /, %"** to solve a real-life challenge.
- To use the Backslash "\" to display special characters if any.
- To use **\n \t \"** to produce a pretty and indented format.

Instructions:
- Using IDLE, create a project called **WaterWell.py**.
- Be sure to document your code (I mean add header comments on top of your Python file).
- In the comments add your name, ID, date, course, homework number, and statement of problem.
- Once you are done coding, upload your **WaterWell.py** submission through Canvas.

Project: Water Well

Write a program called **WaterWell**. Many private water wells produce only 1 or 2 gallons of water per minute. One way to avoid running out of water with these low-yield wells is to use a holding tank. A family of 4 will use about 250 gallons of water per day. However, there is a "natural" water holding tank in the casing (i.e. the hole) of the well itself. The deeper the well, the more water that will be stored that can be pumped out for household use. But how much water will be available?

Write a program that allows the user to *input* the radius of the well casing in inches (a typical well will have a 3-inch radius) and the depth of the well in feet (assume water will fill this entire depth, although in practice that will not be true since the static water level will generally be 50 feet or more below the ground surface). The program should output the number of gallons stored in the well casing. For your reference:

- The volume of a cylinder is in $\pi r^2 h$ where **r** is the radius, and **h** is the height.
- π = 3.1415.
- 1 cubic foot = 7.48 gallons of water.

For example, a 300-foot well full of water with a radius of 3 inches for the casing holds about 441 gallons of water -- plenty for a family of 4 and no need to install a separate holding tank.

For example, here is a demo, the dialogue **should be exactly** like this:
Please remember that the highlighted and bold entries are the user entries from the keyboard.

```
This program calculates how much water will be available in a well.

    What is the radius of the casing in inches? 10
    What is the depth of the well in feet? 10
    The well contains 163.18 gallons.

The Program successfully ended.
Please run the program again to do another calculation.
```

Here is another demo:

```
This program calculates how much water will be available in a well.

    What is the radius of the casing in inches? 50
    What is the depth of the well in feet? 6
    The well contains 2447.75 gallons.

The program successfully ended.
Please run the program again to do another calculation.
```

Hints:

- *Convert Math Expression to Python Statements:*
- The math equation $\pi r^2 h$ can be written to Python statement as $PI * \textbf{radius} * \textbf{radius} * \textbf{height}$
- *Variable Declarations*: all variables need to be of type `float` (We need decimal numbers for accurate calculations).
- *Pi*: Have a variable for Pi (π) and assign a value of 3.1415 to.
- *Unit of measurements*: you will receive inputs from the user in terms of inches and feet, but still you need to convert those inches into feet for consistency. (1 foot = 12 inches).
- *Number of gallons*: Once you get the number of feet, count how many gallons you have after using the equation (1 cubic foot = 7.48 gallons of water).
- *Format*: Your output dialogue should match mine. You lose points not doing so.