Python Calypso's Cylinder Calculator Using Functions

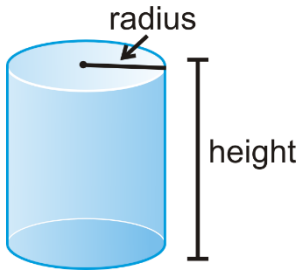
Time required: 60 minutes

- Comment each line of code as shown in the tutorials and other code examples.
- Follow all directions carefully and accurately.
- Think of the directions as minimum requirements.

Pseudocode or TODO

1. Write pseudocode or TODO for the exercise.
2. Comment your code to show evidence of understanding.

Requirements



Ask the user to enter the radius and height of a cylinder. Calculate and display the cylinder's surface area and volume.

1. Create a Python program named **cylinder_calculator_functions.py**
2. Create each of the following functions.
3. Call each function from the main() function.
    - **program_title()** – Print a creative program title.
    - **get_radius() -** This function will ask the user to enter the cylinder's radius then return that value as a float.
    - **get_height() -** This function will ask the user to enter the cylinder's height then return that value as a float.
    - **get_volume() -** This method should accept the cylinder's radius and height as arguments and return the cylinder's volume.
      Volume of a cylinder: $v = \pi r^2 h$
    - **get_surface_area() -** This function should accept the cylinder's radius and height as arguments and return the cylinder's surface area as a float.
      Surface area of the cylinder: $a = 2\pi rh + 2\pi r^2$

- **display_results() -** This function should accept the cylinder's radius, height, surface area, and volume as arguments and display them in an appropriate message on the screen.

4. Ask the user if they wish to continue or exit

If you ask a user to type in an uppercase Y, they might type in a lowercase y. In Python, these are two different values. To compare apples to apples, use the **.lower()** method. If they type in a capital N, **.lower()** changes the case to lower case as shown in the example below.

```
if menu_choice.lower() == "n":
```

TODO Outline of Program

You can use the following TODO outline to get started with your program.

```
"""
    Name: cylinder_calculator_functions.py
    Author:
    Created:
    Purpose: Python program to calculate
    the surface area and volume of a cylinder
"""
# TODO: Import math module

# TODO: program_title() Print creative program title

# TODO: get_radius() Get user input for radius as float

# TODO: get_height() Get user input for height as float

# TODO: get_volume() Calculate volume of cylinder Math formula: v = πr2h

# TODO: get_surface_area() Calculate surface area of cylinder Math formula:
A = 2πrh + 2πr2

# TODO: Echo user input

# TODO: Display results
# Use f-strings to format float to 2 decimal places
# use comma (,) as a 1,000's separator

# TODO: Ask user to run program again
```

F-strings formatting example:

```
print(f" Perimeter: {perimeter:,.2f}")
```

```
: indicates formatting codes are coming up
, comma formats 1,000 separators
.2f formats a float to 2 decimal places
```

Example run:

```
------------------------------------------------------
|    Calypso's Master Cylinder Calculator in Python    |
| Calculate the surface area and volume of a cylinder  |
------------------------------------------------------
Enter radius: 23.2
Enter height: 10
You entered: radius 23.2 - height 10.0
      Volume: 16,909.31
Surface Area: 4,839.56
Again? (Y/N) y
Enter radius: 102.5
Enter height: 214.3
You entered: radius 102.5 - height 214.3
      Volume: 7,073,262.48
Surface Area: 204,027.59
Again? (Y/N) n
```

Assignment Submission

1. Use pseudocode or TODO.
2. Comment your code to show evidence of understanding.
3. Attach the program files.
4. Attach screenshots showing the successful operation of the program.
5. Submit in Blackboard.