CS5001 HW1

Instructions

- Write your name as well as your NU ID on your assignment. Please number your problems.
- Submit both results and your code.
- Give complete answers. Do not just give the final answer; instead, show steps you went through to get there and explain what you are doing. Do not leave out critical intermediate steps.
- This assignment must be submitted electronically through Gradescope by September 23rd, 2024 (Monday) by 11:59 PM.
- All of your codes must be commented.

Written Questions

1. **What is the purpose of using comments in a Python program?**
   Answer: Comments are used to explain the code and make it more readable for others. Python ignores comments during execution. Comments are also useful for debugging and for providing details about the code's functionality.
2. **How do you import a module in Python? Provide an example.**
   Answer: You can import a module using the `import` statement. Example:

   ```
   import math
   print(math.pi)
   ```

3. **What are the three most commonly used data types in Python?**
   Answer: The three most commonly used data types are `int` (integers), `float` (floating-point numbers), and `str` (strings).
4. **What function would you use to display the type of a variable in Python?**
   Answer: You would use the `type()` function to display the type of a variable. For example:

```
x = 5
print(type(x))  # Output: <class 'int'>
```

1. Introduction to Python Statements

Write a Python program that displays the following sentences in the terminal:

```
Hello, World!
Python is a powerful and easy-to-learn programming language.
```

Hint: Use the `print()` function to display statements.

2. Working with Variables

Write a Python program that assigns your first name and your age to two variables. Then, the program should display:

```
Hello, <name>! You are <age> years old.
```

Example Output:

```
Hello, Alice! You are 21 years old.
```

3. Printing the Type of Variables

Write a Python program that assigns a string, an integer, and a floating-point number to three different variables. Then, use the `type()` function to print out the type of each variable.

Example Output:

```
The type of variable 'name' is: <class 'str'>
The type of variable 'age' is: <class 'int'>
The type of variable 'height' is: <class 'float'>
```

Hint: Use the `type()` function to display the data type of each variable.

4. Displaying Statements

You are given a circle of radius $r = 4$, and a rectangle of length $l = 3$ and width $w = 5$. Write a Python program that computes and displays the perimeter and area of both the circle and rectangle.

Expected Output:

```
The perimeter of the rectangle is 16.0.
The area of the rectangle is 15.0.
The perimeter of the circle is 25.1327.
The area of the circle is 50.26548.
```

Hints:

- The formula for the perimeter of a rectangle is $2 \times (l + w)$.
- The formula for the area of a rectangle is $l \times w$.
- The formula for the perimeter (circumference) of a circle is $2 \times \pi \times r$.
- The formula for the area of a circle is $\pi \times r^2$.

Use Python's `math` library to access the value of π.