Homework Assignment : Python and Latex Practice

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1 Introduction

In this Homework Assignment report, We learnt about the basic Python function codes and tasks and executing Python scripts with their Mathematical Explanations scripts.

2 Python Code

The Python Code for the assignment is shown below :
Task 1:

```
        x = 5  # integer
y = 2.5  # float


addition = x + y
subtraction = y - x
multiplication = x * y
power = x ** 2
floor_division = x // 2

print("Addition (x + y):", addition)
print("Subtraction (y - x):", subtraction)
print("Multiplication (x * y):", multiplication)
```

```
print("x raised to the power of 2:", power)
print("Floor division (x // 2):", floor_division)
```

Task 2:

```
    my_list = [1, 2, 3, 4, 5]
my_list[2] = "hello"
my_list.append("world")
my_list.pop(0)
print("Final list:", my_list)
```

Task 3:

```
  # Create the dictionary
student_scores = {
    'Alice': 85,
    'Bob': 90,
    'Charlie': 78
}

# Add a new student 'David' with a score of 88
student_scores['David'] = 88

# Update 'Alice''s score to 95
student_scores['Alice'] = 95

# Delete 'Charlie' from the dictionary
del student_scores['Charlie']

print("Final dictionary:", student_scores)
```

Task 4:

```
  # Define the function to calculate the area of a rectangle
def calculate_area(width, height):
    return width * height

# Call the function with width=5 and height=10
result = calculate_area(5, 10)
```

```
# Print the result
print("The area of the rectangle is:", result)
```

Task 5:

```
  # Define the Animal class
class Animal:
    def __init__(self, name):
        self.name = name

    def speak(self):
        print("The animal speaks")

# Define the Dog subclass that inherits from Animal
class Dog(Animal):
    def speak(self):
        print("Woof! Woof!")

# Create an instance of Dog with the name "Buddy"
buddy = Dog("Buddy")

# Call the speak method
buddy.speak()
```

3 Mathematical Explanation

In Task 4:
The formula for calculating the area of a rectangle is explained below:

$$A = \text{width} \times \text{height}$$

where A is the area, and the width and height are the dimensions of the rectangle which is the length and breadth of the triangle.
The other tasks mainly focused on programming concepts rather than mathematical calculations.

4 Conclusion

The assignment helped me learn about the basic concepts of Python and scripts executing them such as creating a class and dictionaries and also how to create documents in Latex.