Homework Assignment: Python and LaTeX Practice

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1 Introduction

This report covers the solutions to the Python tasks and the associated mathematical explanations. This assignment aims to practice writing Python code for simple calculations and using LaTeX to document the work.

2 Python Code

Task 1

1. Create two variables: ‘x = 5‘ (integer) **and** ‘y = 2.5‘ (**float**).
2. Perform the following operations **and print** the result:
   - Add ‘x‘ **and** ‘y‘.
   - Subtract ‘x‘ **from** ‘y‘.
   - Multiply ‘x‘ by ‘y‘.
   - Raise ‘x‘ to the power of 2.
   - Use floor division (‘//‘) to divide ‘x‘ by 2.

```
x = 5  # integer
y = 2.5  # float
print(x + y)  # Addition
print(y - x)  # Subtraction
print(x * y)  # Multiplication
print(x ** 2)  # Exponentiation (x to the power of 2)
print(x // 2)  # Floor division
```

Task 2

1. Create a **list** ‘my **list** = [1, 2, 3, 4, 5]‘.
2. Replace the third element with ‘"hello"‘.
3. Add the element ‘"world"‘ to the end of the **list**.
4. Remove the first element **from** the **list**.
5. Print the final **list**.

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

Task 3

1. Create a dictionary ‘student_scores‘ with the following key–value pa
   - ‘’Alice’: 85‘
   - ‘’Bob’: 90‘
   - ‘’Charlie’: 78‘
2. Add a new student ‘’David’‘ with a score of ‘88‘.
3. Update ‘’Alice’‘’s score to ‘95‘.
4. Delete ‘’Charlie’‘ from the dictionary.
5. Print the final dictionary.

```
student_scores = {'Alice': 85,'Bob': 90,'Charlie': 78}
student_scores['David'] = 88
student_scores['Alice'] = 95
del student_scores['Charlie']
print(student_scores)
```

Task 4

1. Define a function ‘calculate_area‘ that calculates the area of a rect
2. Call the function with ‘width = 5‘ **and** ‘height = 10‘, **and print** the

```
  def calculate_area(width, height):
    return width * height
result = calculate_area(5, 10)
print(result)
```

Task 5

1. Create a **class** ‘Animal‘ with the following methods:
   - ‘__init__(self, name)‘: Initializes the name of the animal.
   - ‘speak(self)‘: Prints ‘"The animal speaks"‘.
2. Create a subclass ‘Dog‘ that inherits **from** ‘Animal‘ **and** overrides the
3. Create an instance of ‘Dog‘ with the name ‘"Buddy"‘ **and** call its ‘spe

```
class Animal:
    def __init__(self, name):
        self.name = name
    def speak(self):
        print("The animal speaks")
class Dog(Animal):
    def speak(self):
        print("Woof! Woof!")
my_dog = Dog("Buddy")
my_dog.speak()
```

3 Mathematical Explanation

The formula for calculating the area of a rectangle is given by:

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

where A is the area, and the width and height are the rectangle's dimensions.

4 Conclusion

This assignment helped me practice Python coding and LaTeX editing skills that I learned in the previous lessons.