

Homework Assignment: Python and LaTeX Practice

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September 22, 2024

1 Introduction

This report covers the solutions to the Python tasks and the associated mathematical explanations. The tasks involved manipulating dictionaries, defining functions, and implementing classes with inheritance in Python.

2 Python Code

Below is the Python code for the assignment:

2.1 Task 1: Basic Data Types

```
x = 5
y = 2.5
print(x + y)
print(y - x)
print(x * y)
print(x ** 2)
print(x // 2)
```

2.2 Task 2: List Manipulation

```
my_list = [1, 2, 3, 4, 5]
my_list[2] = 'hello'
my_list.append('world')
del my_list[0]
print(my_list)
```

2.3 Task 3: Dictionaries

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

2.4 Task 4: Functions

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

2.5 Task 5: Classes and Inheritance

```
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!")  
  
buddy = Dog("Buddy")  
buddy.speak()
```

3 Mathematical Explanation

In Task 4, we calculated the area of a rectangle using the formula:

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

where A is the area, and width and height are the dimensions of the rectangle. Substituting the given values:

$$A = 5 \times 10 = 50$$

Thus, the area of the rectangle is 50 square units.

4 Conclusion

This assignment helped me practice basic Python concepts such as dictionary manipulation, function definition, and class inheritance. Integrating Python code and mathematical explanations into a LaTeX document reinforced my understanding of both programming and document preparation.