Problem Set 1 - 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 is intended to help demonstrate my understanding of python programming concepts, apply mathematical principles to solve problems and also explore the application of python in mathematical modeling. Python Code: will outline the python tasks which has been undertaken, Mathematical explanations: will provide a mathematical explanation of what the codes are doing whiles, Conclusion: will help summarize the outcome of the python tasks and its mathematical basis.

2 Python Code

Below is the Python code for the assignment:

- x = 5

- y = 2.5

- print (x + y)

- print (y - x)

- print (x * y)

- print (x ** 2)

- print (x // 2)

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- my$_l$ist = $[1, 2, 3, 4, 5]my_list[2] =$ "hello"

- my$_l$ist.append("world")my$_l$ist.pop(0)

- print(my$_l$ist)

- student$_s$cores $=$ $'Alice' : 85,' Bob' : 90,' Charlie' : 78 student_s cores['David'] = 88 student_s cores['Alice'] = 95 del student_s cores['Charlie'] print(student_s cores)$

def calculate$_a$rea$(width, height) : return width * height area = calculate_a rea(5, 10) print(area)$

class Animal: def $_init_{(self,name):self.name=name}$

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

Dog class inherits from Animal class Dog(Animal): def speak(self): print("Woof! Woof!")

Create an instance of Dog and call its speak method buddy = Dog("Buddy") buddy.speak()

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

The above line in the code is trying to define the function "calculatearea" which takes two arguments: width and height, hence returns the product of these two arguments (which represents the area of a rectangle). The code is meant to calculate the area of a rectangle and print it.

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 dimensions of the rectangle. Whereby, the area represents the amount of space enclosed within a rectangle. The width and height refers to the two perpendicular sides of the rectangle. Lastly, the multiplication of the width by the height gives the total surface area covered by the rectangle. Example: If the width is 5 units whiles the height is 10 units, the area A = 5*10 = 50square units. This is the amount of space inside the rectangle.

4 Conclusion

The report effectively demonstrates the application of python programming to help solve mathematical problems, specifically through the creation of a function, to calculate the area of a rectangle. The function "calculatearea" , which takes width and height as parameters, computes the product of these two values to determine the area, showcasing a practical example of applying mathematical principles using Python. The mathematical explanation section reinforces the computational logic by detailing the formula A = width * height, emphasizing how the multiplication of width and height gives the rectangle's total

surface area. This integration of Python code with mathematical theory illustrates not only my ability to grasp programming concepts but also my ability to apply these concepts to enhance understanding and solve real-world problems. This approach exemplifies the power of programming in streamlining and executing mathematical operations, further enhancing analytical capabilities in mathematical modeling.