PFC - Workshop 05

Question 1 (2.5 marks): Write a program to perform these tasks:

1. Creating a list in PythonCreate a Class with instance attributes

Write a Python program to create a Vehicle class with max_speed and mileage instance attributes.

Expected Output:

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q1.1.py
240 18
```

2. Create a Vehicle class without any variables and methods

Question 2 (2.5 marks): Write a program to perform these tasks:

1. Create a child class Bus that will inherit all of the variables and methods of the Vehicle class

Given:

```python
class Vehicle:

    def __init__(self, name, max_speed, mileage):
        self.name = name
        self.max_speed = max_speed
        self.mileage = mileage
```

Expected Output:

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q2.1.py
Vehicle Name: School Volvo Speed: 180 Mileage: 12
```

2. Class Inheritance

Create a **Bus** class that inherits from the **Vehicle** class. Give the capacity argument of Bus.seating_capacity() a **default** value of 50.

Use the following code for your parent Vehicle class.

```
class Vehicle:
    def __init__(self, name, max_speed, mileage):
        self.name = name
        self.max_speed = max_speed
        self.mileage = mileage

    def seating_capacity(self, capacity):
        return f"The seating capacity of a {self.name} is {capacity} passengers"
```

Expected Output:

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q2.2.py
The seating capacity of a School Volvo is 50 passengers
```

Question 3 (2.5 marks): Write a program to perform these tasks:

1. Define a property that must have the same value for every class instance (object)

   Define a **class** attribute"**color**" with a default value **white**. I.e., Every Vehicle should be white.

   Use the following code for this exercise.

```
class Vehicle:

    def __init__(self, name, max_speed, mileage):
        self.name = name
        self.max_speed = max_speed
        self.mileage = mileage

class Bus(Vehicle):
    pass

class Car(Vehicle):
    pass
```

   Expected Output:

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q3.1.py
White School Volvo Speed: 180 Mileage: 12
White Audi Q5 Speed: 240 Mileage: 18
```

2. Class Inheritance

Given:

Create a **Bus** child class that inherits from the Vehicle class. The default fare charge of any vehicle is **seating capacity * 100**. If Vehicle is **Bus** instance, we need to add an extra 10% on full fare as a maintenance charge. So total fare for bus instance will become the **final amount = total fare + 10% of the total fare.**

Note: The bus seating capacity is **50**. so the final fare amount should be **5500.** You need to override the fare() method of a Vehicle class in Bus class.

Use the following code for your parent Vehicle class. We need to access the parent class from inside a child class method.

```python
class Vehicle:
    def __init__(self, name, mileage, capacity):
        self.name = name
        self.mileage = mileage
        self.capacity = capacity

    def fare(self):
        return self.capacity * 100

class Bus(Vehicle):
    pass

School_bus = Bus("School Volvo", 12, 50)
print("Total Bus fare is:", School_bus.fare())
```

Expected Output:

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q3.2.py
Total Bus fare is: 5500.0
```

Question 4 (2.5 marks): Write a program to perform these tasks:

1. Check type of an object

Write a program to determine which class a given Bus object belongs to.

Given:

```python
class Vehicle:
    def __init__(self, name, mileage, capacity):
        self.name = name
        self.mileage = mileage
        self.capacity = capacity


class Bus(Vehicle):
    pass


School_bus = Bus("School Volvo", 12, 50)
```

Expected Output

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q4.1.py
<class '__main__.Bus'>
```

2. Determine if School_bus is also an instance of the Vehicle class

Given:

```python
class Vehicle:
    def __init__(self, name, mileage, capacity):
        self.name = name
        self.mileage = mileage
        self.capacity = capacity


class Bus(Vehicle):
    pass


School_bus = Bus("School Volvo", 12, 50)
```

Expected Output:

```
C:\Excercises>C:/Users/AD/AppData/Local/Programs/Python/Python39/python.exe c:/Excercises/Labworks/Lab05b/Q4.2.py
True
```