OOP_PCOM7E September 2022 Object Oriented Programming

Unit 5: Polymorphism: UML in Practice

An example of a Python program which uses polymorphism is shown below.

```
class Cat:
    def __init__(self, name, age):
        self.name = name
        self.age = age
    def info(self):
        print(f"I am a cat. My name is {self.name}. I am {self.age} years old.")
    def make_sound(self):
        print("Meow")

class Dog:
    def __init__(self, name, age):
        self.name = name
        self.age = age
    def info(self):
        print(f"I am a dog. My name is {self.name}. I am {self.age} years old.")
    def make_sound(self):
        print("Bark")

cat1 = Cat("Kitty", 2.5)
dog1 = Dog("Fluffy", 4)

for animal in (cat1, dog1):
    animal.make_sound()
    animal.info()
    animal.make_sound()
```

Source: Programiz. (n.d.) **Polymorphism in Python**.

Write a Python program with polymorphism that is usable within the summative assessment for the driverless car.

Notes to readers:
In this exercise, the polymorphism is to be used in the driverless car program. In the driverless program, A super-class “user” is set up and sub-class “driver” is also set. Please see below extract of the program. If you are interested, the whole source code is attached as a separate file. The result of is also attached to show the program is working.

Extract of program – relevant section demonstration

```
class USER():
    def __init__(self, user_name, user_age, user_weight,user_seatNum):
        self.user_name = user_name
        self.user_age = user_age
        self.user_weight = user_weight
        self.user_seatNum = user_seatNum

    def displayU(self):
        print("The user details are:")
        print("User Name:", self.user_name)
        print("User Age:", self.user_age)
        print("User weight", self.user_weight)
        print("User seat:", self.user_seatNum)

# subclass
class DRIVER(USER):
    def __init__(self, driver_name, driver_age, driver_license, driver_weight, dpassword,dpin,d_consumption,d_millage, h_add, o_add):
        USER.__init__(self, driver_name, driver_age, driver_weight,"Driver")
        self.driver_license = driver_license
        self.driver_weight = driver_weight
        self.dpassword = dpassword
        self.dpin = dpin
        self.d_consumption = d_consumption
        self.d_millage = d_millage
        self.h_add = h_add
        self.o_add = o_add

    def displayD(self):
        print("Details of the driver are:")
        USER.displayU(self)
        print("License:", self.driver_license)
        print(self.user_name, "'s usual weight: ", self.driver_weight)
        print("Pre-set password of", self.user_name, ": ", self.dpassword, ", Pin for skipping safty test of",self.user_name,":", self.dpin)
        print("Total consumption to-date of ", self.user_name,": ", self.d_consumption, ", Total millage to-date before this trip of",self.user_name,": ", se
```

Result

```
C:\Windows\py.exe
======================================================================
Details of the driver are:
The user details are:
User Name: John
User Age: 30
User weight 39
User seat: Driver
License: LX123-555808
John 's usual weight:  39
Pre-set password of John :  1234 , Pin for skipping safty test of John : 1
Total consumption to-date of  John :  6000 , Total millage to-date before this trip of John :  30000
John 's home address is : 2 Happy Grove, London SW6 1AB , John 's office address is: 1 Rainbow Street, London, NW1 1AB
======================================================================
Press [Enter] to end.
```

Program

```
class USER():
    def __init__(self, user_name, user_age, user_weight,user_seatNum):
        self.user_name = user_name
        self.user_age = user_age
        self.user_weight = user_weight
        self.user_seatNum = user_seatNum

    def displayU(self):
        print("The user details are:")
        print("User Name:", self.user_name)
        print("User Age:", self.user_age)
        print("User weight", self.user_weight)
        print("User seat:", self.user_seatNum)

# subclass
class DRIVER(USER):
    def __init__(self, driver_name, driver_age, driver_license, driver_weight,
dpassword,dpin,d_consumption,d_millage, h_add, o_add):
        USER.__init__(self, driver_name, driver_age, driver_weight,"Driver")
        self.driver_license = driver_license
        self.driver_weight = driver_weight
        self.dpassword = dpassword
        self.dpin = dpin
        self.d_consumption = d_consumption
        self.d_millage = d_millage
        self.h_add = h_add
        self.o_add = o_add

    def displayD(self):
        print("Details of the driver are:")
        USER.displayU(self)
        print("License:", self.driver_license)
        print(self.user_name, "'s usual weight: ", self.driver_weight)
        print("Pre-set password of", self.user_name, ": ", self.dpassword, ", Pin for skipping safty test
of",self.user_name,":", self.dpin)
        print("Total consumption to-date of ", self.user_name,": ", self.d_consumption, ", Total millage to-
date before this trip of",self.user_name,": ", self.d_millage)
        print(driver1.user_name,"'s home address is :", self.h_add, ",", driver1.user_name, "'s office
address is:", self.o_add)


pw = "1234" # Driver's pre-set password
pin = "1" # Driver's pre-set pin
driver1=DRIVER("John", 30, "LX123-555808", 39, pw, pin, 6000, 30000, "2 Happy Grove, London
SW6 1AB", "1 Rainbow Street, London, NW1 1AB")  # creating object of subclass
#passenage1=USER("Mary", 8, 20,"P1")
#passenage3=USER("David", 20, 20,"P3")
#passlist=[passenage1, passenage3]
```

```
print("=============================================================")
driver1.displayD()
print("=============================================================")
```