Programming in Python (CSE 3142)

MINOR ASSIGNMENT-11: CLASSES II

1. Define a class ComplexNumbers. Write operations for addition, subtraction, and multiplication, using the notion of operator overloading.

2. Define function overloading. How function overloading works in python. Explain. What will be the output of the following python script define all the functioning of the script.

```
'''Class'''
class Compute:
     '''area method'''
    def area(self, x = None, y = None):
        if x != None and y != None:
            return x * y
        elif x != None:
            return x * x
        else:
            return 0

'''object'''
obj = Compute()
```

   a. print("Area Value: ", obj.area())
   b. print("Area Value: ", obj.area(4))
   c. print("Area Value: ", obj.area(3, 5))

3. Write short note on the following with examples.

   a. Data Hiding (Include advantages and disadvatage of data hiding)
   b. Encapsulation
   c. Modifier and Accessor Methods
   d. Static Method
   e. Inheritance

4. Write a class Point having x and y coordinates as data members. Write another class LineSegment that derives the class Point Also, list appropriate methods.

5. Why might a class need to manually call the __init__ method in a superclass?

6. Examine the following class Shape:

```
class Shape:
   def __init__(self, shapeType, x, y):
        self.shapeType = shapeType
       self.length = x
       self.width = y
   def computeArea():
       pass
```

The class Shape should be inherited by the classes Rectangle and Triangle. Both the derived classes should invoke the method __init__ to initialize data members. Note that length and width correspond to height and base for a triangle. The derived classes should override the method computeArea of the superclass Shape.

7. Define a base class Vehicle, having attributes registration number, make, model, and colour. Also, define classes PassengerVehicle and CommercialVehicle that derive from the class Vehicle. The PassengerVehicle class should have additional attribute for maximum passenger capacity. The CommercialVehicle class should have an additional attribute for maximum load capacity. Define __init__ method for all these classes. Also, define get and set methods to retrieve and set the value of the data attributes.

8. Define classes Car, Autorickshaw, and Bus which derive from the PassengerVehicle class mentioned in the previous question. The Car and Bus should have attributes for storing information about the number of doors, not shared by Autorickshaw. The Bus should have Boolean attribute doubleDecker not shared by Car and Autorickshaw. Define __init__ method for all these classes. Also, define get and set methods to determine and set the value of the data attributes.

9. Define a class Account, having attributes account holder's name, account number, account type, the amount deposited and minimum deposit amount. Define two classes, namely Savings and Current. The Savings class should have a property interest. Define __init__ method for all these classes. Also, define get and set methods to determine and set the value of the data attributes.

10. Using Python built-in functions, write the statements to

a. Determine whether A is a subclass of B.

b. Determine whether attribute attr exists in the namespace of object ob of class A.

c. Assign value 70 to attribute attr of object ob of class A.

d. Delete an attribute attr of object ob of class A.

11. Define a base MyDate[take it from previous chapter no need to define] and MyTime. Base class MyTime having attributes and methods setHours, setMinutes and setSeconds. Also, define class Appointment derive from the class MyTime and MyDate. The Appointment class contains attributes description. The Appointment class should have method __str__ which call __str__ function of MyDate, MyTime and description paased as argument. Define __init__ method for all these classes. Also, define get and set methods to retrieve and set the value of the data attributes.