



Inspiring Excellence

Course Code:	CSE111
Course Title:	Programming Language II
Classwork No:	11
Topic:	OOP (inheritance)
Number of tasks:	4

## Task 1

Write the **Mango** and the **Jackfruit** classes so that the following code generates the output below:

```
class Fruit:
    def __init__(self, formalin=False, name=''):
        self.__formalin = formalin
        self.name = name

    def getName(self):
        return self.name

    def hasFormalin(self):
        return self.__formalin

class testFruit:
    def test(self, f):
        print('----Printing Detail----')
        if f.hasFormalin():
            print('Do not eat the',f.getName(),'.')
            print(f)
        else:
            print('Eat the',f.getName(),'.')
            print(f)

m = Mango()
j = Jackfruit()
t1 = testFruit()
t1.test(m)
t1.test(j)
```

### **OUTPUT:**

```
----Printing Detail-----
Do not eat the Mango.
Mangos are bad for you
----Printing Detail-----
Eat the Jackfruit.
Jackfruits are good for you
```

## Task 2

You are given the parent class Point:

```
class Point:
    def __init__(self, x=0, y=0):
        self.x = x
        self.y = y
        self.area = 0

    def calculate_area(self):
        return self.area

    def print_details(self):
        print("----- Printing details -----")
        print(f'Co-ordinate: ({self.x},{self.y})')
        print(f'Area: {self.area}')
```

Some information about calculating the area of circle and sphere:

Area of a circle:  $\pi r^2$

Area of a sphere:  $4\pi r^2$

Here, the Inheritance tree will be Point=>Circle=>Sphere

Write **Circle** and **Sphere** classes to generate the following output.

Driver Code	Output
<pre>print("-----1-----") p1 = Point(2,3) print(f'Area of p1: {p1.calculate_area()}') print("-----2-----") p1.print_details() print("-----3-----") p2 = Point() p2.print_details() print("-----4-----") c1 = Circle(4,0,3) print(f'Area of c1: {c1.calculate_area()}')</pre>	<pre>-----1----- Area of p1: 0 -----2----- ----- Printing details ----- Co-ordinate: (2,3) Area: 0 -----3----- ----- Printing details ----- Co-ordinate: (0,0) Area: 0 -----4----- Area of c1: 50.2656 -----5----- ----- Printing details ----- Co-ordinate: (0,3)</pre>

<pre> print("-----5-----") c1.print_details() print("-----6-----") c2 = Circle(7) print(f'Area of c2: {c2.calculate_area()}') print("-----7-----") sph1 = Sphere(3,0,2) print(f'Area of sph1: {sph1.calculate_area()}') print("-----8-----") sph1.print_details() print("-----9-----") sph2 = Sphere(6) print(f'Area of sph2: {sph2.calculate_area()}') </pre>	<pre> Area: 50.2656 Radius: 4 -----6----- Area of c2: 153.9384 -----7----- Area of sph1: 113.0976 -----8----- ----- Printing details ----- Co-ordinate: (0,2) Area: 113.0976 Radius: 3 -----9----- Area of sph2: 452.3904 </pre>
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### Task 3

A bank has two types of accounts : **Savings account** and **Fixed-deposit account**. Some features of these accounts are:

- Savings account:
  - An interest rate can be applied
  - You can deposit money anytime you want.
  - Withdrawal can be made unless its crosses the lower limit of the account
- Fixed deposits account:
  - You can not deposit money anytime you want.
  - Withdrawal can be made after the account is matured.

The parent class Account is given below:

```

class Account:
    def __init__(self, account_number, balance):
        self.account_number = account_number
        self.balance = balance
        self.account_type = "General"
        self.maturity = 0

```

```

def print_details(self):
    print("----- Account details -----")
    print(f"Account Type: {self.account_type}, Maturity: {self.maturity} years")
    print(f"Account Number: {self.account_number}, Balance: ${self.balance:.2f}")

def deposit(self, amount):
    self.balance += amount
    print(f"Deposited ${amount:.2f}. New Balance: ${self.balance:.2f}")

def withdraw(self, amount):
    if self.balance >= amount:
        self.balance -= amount
        print(f"Withdrew ${amount:.2f}. New Balance: ${self.balance:.2f}")
    else:
        print("Insufficient funds.")

def year_passed(self, year):
    self.maturity += year
    print(f"Maturity of the account: {self.maturity} years")

```

Write the classes **SavingsAccount** and **FixedDepositAccount** derived from the **Account** class to generate the following output.

Driver Code	Output
<pre> print("-----1-----") account = Account("A203", 2000) account.print_details() print("-----2-----") account.deposit(400) account.withdraw(1500) account.year_passed(2) print("-----3-----") account.print_details() print("-----4-----") savings_account = SavingsAccount("Savings","SA123", </pre>	<pre> -----1----- ----- Account details ----- Account Type: General, Maturity: 0 years Account Number: A203, Balance: \$2000.00 -----2----- Deposited \$400.00. New Balance: \$2400.00 Withdrew \$1500.00. New Balance: \$900.00 Maturity of the account: 2 years -----3----- ----- Account details ----- Account Type: General, Maturity: 2 years Account Number: A203, Balance: \$900.00 -----4----- ----- Account details ----- Account Type: Savings, Maturity: 0 years </pre>

```

1000, 0.05, 500)
savings_account.print_details()
print("-----5-----")
savings_account.deposit(400)
print("-----6-----")
savings_account.withdraw(1000)
print("-----7-----")
savings_account.withdraw(800)
print("-----8-----")
savings_account.apply_interest()
print("-----9-----")
savings_account.print_details()
print("-----10-----")
fixed_account1= FixedDepositAccount("Fixed
Deposit","FDA321", 10000, 5)
fixed_account1.print_details()
print("-----11-----")
fixed_account1.deposit(400)
print("-----12-----")
fixed_account1.year_passed(6)
print("-----13-----")
fixed_account1.withdraw(10000)
print("-----14-----")
fixed_account1.print_details()
print("-----15-----")
fixed_account2 = FixedDepositAccount("Fixed
Deposit","FDA300", 50000, 7)
fixed_account2.print_details()
print("-----16-----")
fixed_account2.withdraw(10000)

```

```

Account Number: SA123, Balance: $1000.00
Interest Rate: 0.05, Minimum Limit: $500
-----5-----
Deposited $400.00. New Balance: $1400.00
-----6-----
Insufficient funds.
-----7-----
Withdrew $800.00. New Balance: $600.00
-----8-----
Interest applied. New Balance: $630.00
-----9-----
----- Account details -----
Account Type: Savings, Maturity: 0 years
Account Number: SA123, Balance: $630.00
Interest Rate: 0.05, Minimum Limit: $500
-----10-----
----- Account details -----
Account Type: Fixed Deposit, Maturity: 0 years
Account Number: FDA321, Balance: $10000.00
-----11-----
You can not deposit in a fixed deposit account.
-----12-----
Maturity of the account: 6 years
-----13-----
Withdrew $10000.00. New Balance: $0.00
-----14-----
----- Account details -----
Account Type: Fixed Deposit, Maturity: 6 years
Account Number: FDA321, Balance: $0.00
-----15-----
----- Account details -----
Account Type: Fixed Deposit, Maturity: 0 years
Account Number: FDA300, Balance: $50000.00
-----16-----
Can not withdraw, Account is not matured

```

## Task 4

1	<code>class A:</code>
2	<code>    temp = 4</code>
3	<code>    def __init__(self):</code>
4	<code>        self.sum = 0</code>
5	<code>        self.y = 0</code>
6	<code>        self.y = A.temp - 2</code>
7	<code>        self.sum = A.temp + 1</code>
8	<code>        A.temp -= 2</code>
9	<code>    def methodA(self, m, n):</code>
10	<code>        x = 0</code>
11	<code>        self.y = self.y + m + (A.temp)</code>
12	<code>        A.temp += 1</code>
13	<code>        x = x + 1 + n</code>
14	<code>        self.sum = self.sum + x + self.y</code>
15	<code>        print(x, self.y, self.sum)</code>
16	
17	<code>class B(A):</code>
18	<code>    x = 0</code>
19	<code>    def __init__(self, b=None):</code>
20	<code>        super().__init__()</code>
21	<code>        self.sum = 0</code>
22	<code>        if b==None:</code>

23	<code>self.y = A.temp + 3</code>
24	<code>self.sum = 3 + A.temp + 2</code>
25	<code>A.temp -= 2</code>
26	<code>else:</code>
27	<code>self.sum = b.sum</code>
28	<code>B.x = b.x</code>
29	<code>b.methodB(2, 3)</code>
30	<code>def methodB(self, m, n):</code>
31	<code>y = 0</code>
32	<code>y = y + self.y</code>
33	<code>B.x = self.y + 2 + A.temp</code>
34	<code>self.methodA(B.x, y)</code>
35	<code>self.sum = B.x + y + self.sum</code>
36	<code>print(B.x, y, self.sum)</code>

Write the output of the following code:

<pre> a1 = A() b1 = B() b2 = B(b1) b1.methodA(1, 2) b2.methodB(3, 2) </pre>	Output:		
	x	y	sum