Inspiring Excellence

Course Code:	**CSE111**
Course Title:	**Programming Language II**
Classwork No:	**03**
Topic:	**OOP(Classes and objects)**
Number of tasks:	**5**

Task 1

You are the proud owner of a **mangoficent** mango orchard where you have different varieties of mango trees such as Fazlee, Langda, Harivanga, Himsagar, etc. But this year, demand for Gopalbhog and Amrapali is too high. To cater to this unsatisfied demand in the future, you have decided to plant these two varieties in your orchard.

(i) Now, based on the given driver code, you need to design a **MangoTree class**.
Initially, when you plant a tree, it will have a height of 1 meter and the number of mangoes will be 0.

Driver code

```
mangoTree1= MangoTree("Gopalbhog")
# Display the details of the mango tree
print("====================================")
print("Mango Tree Details:")
print(f"Variety: {mangoTree1.variety}")
print(f"Height: {mangoTree1.height} meter(s)")
print(f"Number of mangoes on the tree: {mangoTree1.number_of_mangoes}")
print("====================================")
mangoTree2= MangoTree("Amrapali")
# Display the details of the mango tree
print("Mango Tree Details:")
print(f"Variety: {mangoTree2.variety}")
print(f"Height: {mangoTree2.height} meter(s)")
print(f"Number of mangoes on the tree: {mangoTree2.number_of_mangoes}")
print("====================================")
```

Output:

```
====================================
Mango Tree Details:
Variety: Gopalbhog
Height: 1 meter(s)
Number of mangoes on the tree: 0
====================================
Mango Tree Details:
Variety: Amrapali
Height: 1 meter(s)
Number of mangoes on the tree: 0
====================================
```

(ii) Suppose 5 years have passed and these small trees have grown larger and started to bear fruit.

- A mango tree roughly grows 3 meters in one year.
- Amrapali bears 15 mangoes per meter and Gopalbhog bears 10 mangoes per meter.

Now, create an instance method named **growthUpdate( )** to match all the above conditions and generate the output below.

Driver code

```
print("Updated details after 5 years:")
mangoTree1= MangoTree("Gopalbhog")
print("====================================")
mangoTree1.growthUpdate(5)
print("====================================")
mangoTree2= MangoTree("Amrapali")
mangoTree2.growthUpdate(5)
print("====================================")
```

Output:

```
Updated details after 5 years:
====================================
Variety: Gopalbhog
Height: 16 meter(s)
Number of mangoes on the tree: 160
====================================
Variety: Amrapali
Height: 16 meter(s)
Number of mangoes on the tree: 240
====================================
```

Task 2

Design the **Customer** class with the necessary properties so that the following output is produced.

[**Hint:**

- If the visitor's age is greater than 10, then the ticket price is 100 taka. Otherwise, 50 taka.
- A customer can't buy more than 3 tickets.]

Driver Code	Output

`print('1-------------------------')`
`customer1 = Customer()`
`print('2-------------------------')`
`customer1.buyTicket('Bob', 23)`
`customer1.buyTicket('Henry', 7)`
`customer1.buyTicket('Alexa', 30)`
`customer1.buyTicket('Jonas', 43)`
`print('3-------------------------')`
`customer1.showDetails()`
`print('4-------------------------')`
`customer2 = Customer()`
`print('5-------------------------')`
`customer2.buyTicket('Harry', 60)`
`customer2.buyTicket('Tomas', 28)`
`print('6-------------------------')`
`customer2.showDetails()`
	`1-------------------------`
	`Welcome to ABC Memorial Park`
	`2-------------------------`
	`Successfully purchased a ticket for Bob!`
	`Successfully purchased a ticket for Henry!`
	`Successfully purchased a ticket for Alexa!`
	`You can't buy more than 3 tickets`
	`3-------------------------`
	`Amount of tickets: 3`
	`Total price: 250 Taka`
	`4-------------------------`
	`Welcome to ABC Memorial Park`
	`5-------------------------`
	`Successfully purchased a ticket for Harry!`
	`Successfully purchased a ticket for Tomas!`
	`6-------------------------`
	`Amount of tickets: 2`
	`Total price: 200 Taka`

Task 3

Suppose you are the CEO of "Green Phone". After a meeting with the R&D department and sales department, you decided to launch 3 smartphone series, 'A', 'M' and 'U' series. These series will get 2 years, 3 years and 4 years of software update respectively. Now, design a **GreenPhone** class with necessary properties so that it generates the output below for the given driver code.

[**Hint:** updatePhone() method will upgrade the android version of the phone.]

Driver Code	Output

```
print('1======================')
p1 = GreenPhone('A1', 12, 3)
p2 = GreenPhone('M11', 12, 4)
p3 = GreenPhone('U20', 12, 5)
p1.showSpecification()
print('2======================')
p2.showSpecification()
print('3======================')
p1.updatePhone()
print('4======================')
p1.updatePhone()
p2.updatePhone()
p3.updatePhone()
print('5======================')
p1.updatePhone()
p2.updatePhone()
p3.updatePhone()
print('6======================')
p2.updatePhone()
p3.updatePhone()
print('7======================')
p1.showSpecification()
p3.showSpecification()
```

```
1==============================
Phone Company: GreenPhone
Model Name: A1
Android Version: 12
Number of Cameras: 3
2==============================
Phone Company: GreenPhone
Model Name: M11
Android Version: 12
Number of Cameras: 4
3==============================
Your phone Greenphone A1 is upgraded to
Android Version: 13.
4==============================
Your phone Greenphone A1 is upgraded to
Android Version: 14.
Your phone Greenphone M11 is upgraded to
Android Version: 13.
Your phone Greenphone U20 is upgraded to
Android Version: 13.
5==============================
Your phone Greenphone A1 is already up to
date.
Your phone Greenphone M11 is upgraded to
Android Version: 14.
Your phone Greenphone U20 is upgraded to
Android Version: 14.
6==============================
Your phone Greenphone M11 is upgraded to
Android Version: 15.
Your phone Greenphone U20 is upgraded to
Android Version: 15.
7==============================
Phone Company: GreenPhone
Model Name: A1
Android Version: 14
Number of Cameras: 3
Phone Company: GreenPhone
Model Name: U20
Android Version: 15
Number of Cameras: 5
```

TASK 4

		Output
1	`class Student:`	
2	`    def __init__(self):`	
3	`        self.name = None`	
4	`        self.cgpa = 0.0`	
5	`s1 = Student()`	
6	`s2 = Student()`	
7	`s3 = None`	
8	`s1.name = "Student One"`	
9	`s1.cgpa = 2.3`	
10	`s3 = s1`	
11	`s2.name = "Student Two"`	
12	`s2.cgpa = s3.cgpa + 1`	
13	`s3.name = "New Student"`	
14	`print(s1.name)`	
15	`print(s2.name)`	
16	`print(s3.name)`	
17	`print(s1.cgpa)`	
18	`print(s2.cgpa)`	
19	`print(s3.cgpa)`	
20	`s3 = s2`	
21	`s1.name = "old student"`	
22	`s2.name = "older student"`	
23	`s3.name = "oldest student"`	
24	`s2.cgpa = s1.cgpa - s3.cgpa + 4.5`	
25	`print(s1.name)`	
26	`print(s2.name)`	
27	`print(s3.name)`	
28	`print(s1.cgpa)`	
29	`print(s2.cgpa)`	
30	`print(s3.cgpa)`	

Task 5

```
1  class Test3:
2      def __init__(self):
3          self.sum, self.y = 0, 0
4      def methodA(self):
5          x, y = 2, 3
6          msg = [0]
7          msg[0] = 3
8          y = self.y + msg[0]
9          self.methodB(msg, msg[0])
10         x = self.y + msg[0]
11         self.sum = x + y + msg[0]
12         print(x, y, self.sum)
13     def methodB(self, mg2, mg1):
14         x = 0
15         self.y = self.y + mg2[0]
16         x = x + 33 + mg1
17         self.sum = self.sum + x + self.y
18         mg2[0] = self.y + mg1
19         mg1 = mg1 + x + 2
20         print(x, self.y, self.sum)
```

Write the output of the following code:

```
t3 = Test3()
t3.methodA()
t3.methodA()
t3.methodA()
t3.methodA()
```

x	y	sum