



Inspiring Excellence

Course Title: Programming Language II

Course Code: CSE111

Lab Assignment no: 8

Task - 1

Let's Play with **Numbers!!!**

Write the **ComplexNumber** class so that the following code generates the output below.

<pre>class RealNumber: def __init__(self, r=0): self.__realValue = r def getRealValue(self): return self.__realValue def setRealValue(self, r): self.__realValue = r def __str__(self): return 'RealPart: '+str(self.getRealValue()) cn1 = ComplexNumber() print(cn1) print('-----') cn2 = ComplexNumber(5,7) print(cn2)</pre>	<p>OUTPUT: RealPart: 1.0 ImaginaryPart: 1.0 ----- RealPart: 5.0 ImaginaryPart: 7.0</p>
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Task - 2

Write the **ComplexNumber** class so that the following code generates the output below.

<pre>class RealNumber: def __init__(self, number=0): self.number = number def __add__(self, anotherRealNumber): return self.number + anotherRealNumber.number def __sub__(self, anotherRealNumber): return self.number - anotherRealNumber.number def __str__(self): return str(self.number) r1 = RealNumber(3) r2 = RealNumber(5) print(r1+r2) cn1 = ComplexNumber(2, 1) print(cn1) cn2 = ComplexNumber(r1, 5) print(cn2) cn3 = cn1 + cn2 print(cn3) cn4 = cn1 - cn2 print(cn4)</pre>	<p>OUTPUT:</p> <pre>8 2 + 1i 3 + 5i 5 + 6i -1 - 4i</pre>
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Task - 3

Write the **CheckingAccount** class so that the following code generates the output below:

```
class Account:
    def __init__(self, balance):
        self._balance = balance

    def getBalance(self):
        return self._balance

print('Number of Checking Accounts: ', CheckingAccount.numberOfAccount)
print(CheckingAccount())
print(CheckingAccount(100.00))
print(CheckingAccount(200.00))
print('Number of Checking Accounts: ', CheckingAccount.numberOfAccount)
```

OUTPUT:
Number of Checking
Accounts: 0
Account Balance: 0.0
Account Balance: 100.00
Account Balance: 200.00
Number of Checking
Accounts: 3

Task - 4

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 - 5

Write the **ScienceExam** class so that the following code generates the output below:

```
class Exam:
    def __init__(self,marks):
        self.marks = marks
        self.time = 60

    def examSyllabus(self):
        return "Maths , English"
    def examParts(self):
        return "Part 1 - Maths\nPart 2 - English\n"

engineering = ScienceExam(100,90,"Physics","HigherMaths")
print(engineering)
print('-----')
print(engineering.examSyllabus())
print(engineering.examParts())
print('=====')
architecture =
ScienceExam(100,120,"Physics","HigherMaths","Drawing")
print(architecture)
print('-----')
print(architecture.examSyllabus())
print(architecture.examParts())
```

OUTPUT:

```
Marks: 100 Time: 90 minutes Number of
Parts: 4
-----
Maths , English , Physics , HigherMaths
Part 1 - Maths
Part 2 - English
Part 3 - Physics
Part 4 - HigherMaths
=====
Marks: 100 Time: 120 minutes Number of
Parts: 5
-----
Maths , English , Physics , HigherMaths
, Drawing
Part 1 - Maths
Part 2 - English
Part 3 - Physics
Part 4 - HigherMaths
Part 5 - Drawing
```

Task - 6

Given the following class, write the code for the **Sphere** and the **Cylinder** class so that the following output is printed.

```
class Shape3D:
```

```
    pi = 3.14159
```

```
    def __init__(self, name = 'Default', radius = 0):
```

```
        self._area = 0
```

```
        self._name = name
```

```
        self._height = 'No need'
```

```
        self._radius = radius
```

```
    def calc_surface_area(self):
```

```
        return 2 * Shape3D.pi * self._radius
```

```
    def __str__(self):
```

```
        return "Radius: "+str(self._radius)
```

```
sph = Sphere('Sphere', 5)
```

```
print('-----')
```

```
sph.calc_surface_area()
```

```
print(sph)
```

```
print('=====')
```

```
cyl = Cylinder('Cylinder', 5, 10)
```

```
print('-----')
```

```
cyl.calc_surface_area()
```

```
print(cyl)
```

OUTPUT:

Shape name: Sphere, Area Formula: $4 * \pi * r * r$

Radius: 5, Height: No need

Area: 314.159

=====

Shape name: Cylinder, Area Formula: $2 * \pi * r * (r + h)$

Radius: 5, Height: 10

Area: 471.2385

Task - 7

Write the **PokemonExtra** class so that the following code generates the output below:

```
class PokemonBasic:

    def __init__(self, name = 'Default', hp = 0,
weakness = 'None', type = 'Unknown'):
        self.name = name
        self.hit_point = hp
        self.weakness = weakness
        self.type = type

    def get_type(self):
        return 'Main type: ' + self.type

    def get_move(self):
        return 'Basic move: ' + 'Quick Attack'

    def __str__(self):
        return "Name: " + self.name + ", HP: " +
str(self.hit_point) + ", Weakness: " + self.weakness

print('\n-----Basic Info:-----')
pk = PokemonBasic()
print(pk)
print(pk.get_type())
print(pk.get_move())

print('\n-----Pokemon 1 Info:-----')
charmander = PokemonExtra('Charmander', 39, 'Water',
'Fire')
print(charmander)
print(charmander.get_type())
print(charmander.get_move())

print('\n-----Pokemon 2 Info:-----')
charizard = PokemonExtra('Charizard', 78, 'Water',
'Fire', 'Flying', ('Fire Spin', 'Fire Blaze'))
print(charizard)
print(charizard.get_type())
print(charizard.get_move())
```

OUTPUT:

```
-----Basic Info:-----
Name: Default, HP: 0, Weakness: None
Main type: Unknown
Basic move: Quick Attack

-----Pokemon 1 Info:-----
Name: Charmander, HP: 39, Weakness: Water
Main type: Fire
Basic move: Quick Attack

-----Pokemon 2 Info:-----
Name: Charizard, HP: 78, Weakness: Water
Main type: Fire, Secondary type: Flying
Basic move: Quick Attack
Other move: Fire Spin, Fire Blaze
```


Task – 8

Implement the design of the **FootBallTeam** and the **CricketTeam** classes that inherit from **Team** class so that the following code generates the output below:

Driver Code	Output
<pre>class Team: def __init__(self, name): self.name = "default" self.total_player = 5 def info(self) print("We love sports") <i># Write your code here.</i> class Team_test: def check(self, tm): print("=====") print("Total Player:", tm.total_player) tm.info() f = FootBallTeam("Brazil") c = CricketTeam("Bangladesh") test = Team_test() test.check(f) test.check(c)</pre>	<pre>===== Total Player: 11 Our name is Brazil We play Football We love sports ===== Total Player: 11 Our name is Bangladesh We play Cricket We love sports</pre>

Task – 9

Implement the design of the **Pikachu** and **Charmander** classes that are derived from the **Pokemon** class so that the following output is produced:

Driver Code	Output
<pre>class Pokemon: def __init__(self, p): self.pokemon = p self.pokemon_type = "Needs to be set" self.pokemon_weakness = "Needs to be set" def kind(self): return self.pokemon_type def weakness(self): return self.pokemon_weakness def what_am_i(self): print("I am a Pokemon.") pk1 = Pikachu() print("Pokemon:", pk1.pokemon) print("Type:", pk1.kind()) print("Weakness:", pk1.weakness()) pk1.what_am_i() print("=====") c1 = Charmander() print("Pokemon:", c1.pokemon) print("Type:", c1.kind()) print("Weakness:", c1.weakness()) c1.what_am_i()</pre>	<pre>Pokemon: Pikachu Type: Electric Weakness: Ground I am a Pokemon. I am Pikachu. ===== Pokemon: Charmander Type: Fire Weakness: Water, Ground and Rock I am a Pokemon. I am Charmander.</pre>

Task – 10

Implement the design of the **CSE** and **EEE** classes that are derived from the Department class so that the following output is produced:

Driver Code	Output
<pre>class Department: def __init__(self, s): self.semester = s self.name = "Default" self.id = -1 def student_info(self): print("Name:", self.name) print("ID:", self.id) def courses(self, c1, c2, c3): print("No courses Approved yet!") s1 = CSE("Rahim", 16101328, "Spring2016") s1.student_info() s1.courses("CSE110", "MAT110", "ENG101") print("=====") s2 = EEE("Tanzim", 18101326, "Spring2018") s2.student_info() s2.courses("Mat110", "PHY111", "ENG101") print("=====") s3 = CSE("Rudana", 18101326, "Fall2017") s3.student_info() s3.courses("CSE111", "PHY101", "MAT120") print("=====") s4 = EEE("Zainab", 19201623, "Summer2019") s4.student_info() s4.courses("EEE201", "PHY112", "MAT120")</pre>	<pre>Name: Rahim ID: 16101328 Courses Approved to this CSE student in Spring2016 semester : CSE110 MAT110 ENG101 ===== Name: Tanzim ID: 18101326 Courses Approved to this EEE student in Spring2018 semester : Mat110 PHY111 ENG101 ===== Name: Rudana ID: 18101326 Courses Approved to this CSE student in Fall2017 semester : CSE111 PHY101 MAT120 ===== Name: Zainab ID: 19201623 Courses Approved to this EEE student in Summer2019 semester : EEE201 PHY112 MAT120</pre>