WORKSHEET 3.2

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Branch: CSE **Section/Group:** 801-A

Semester: 4TH **Date of Performance:** 02/05/2023

Subject Name: PROGRAMMING IN PYTHON **Subject Code:** 21CSP-259

1. Aim: Program to implement concept of object-oriented programming such as classes, inheritance and polymorphism.

2. Objective:

1. Write a Python class named Student with two attributes student_id, student_name. Add a new attribute student_class and display the entire attribute and their values of the said class. Now remove the student_name attribute and display the entire attribute with values.

2. Write a Python class to find a pair of elements (indices of the two numbers) from a given array whose sum equals a specific target number.

3. Write a Python class named Rectangle constructed by a length and width and a method which will compute the area of a rectangle.

4. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.

5. Write a Python program to crate two empty classes, Student and Marks. Now create some instances and check whether they are instances of the said classes or not. Also, check whether the said classes are subclasses of the built-in object class or not

3. Source Code:

a.

```
class Student:
    def __init__(self, student_id, student_name):
        self.student_id = student_id
        self.student_name = student_name

    def set_class(self, student_class):
        self.student_class = student_class

    def display_attributes(self):
        print(f"Student ID: {self.student_id}")
        print(f"Student Name: {self.student_name}")
        print(f"Student Class: {self.student_class}")


student1 = Student("21BCS9200", "SABHYA MAHAJAN")

student1.set_class("Class 801-A")

student1.display_attributes()

delattr(student1, "student_name")

student1.display_attributes()
```

b.

```
class PairFinder:
    def __init__(self, nums):
        self.nums = nums

    def find_pair(self, target):
        num_dict = {}

        for i, num in enumerate(self.nums):
            complement = target - num
            if complement in num_dict:
                return [num_dict[complement], i]

            num_dict[num] = i

        return None


nums = [2, 4, 6, 8, 10]
target = 14
```

```
pair_finder = PairFinder(nums)
pair_indices = pair_finder.find_pair(target)

if pair_indices:
    print(f"Pair found at indices: {pair_indices}")
else:
    print("No pair found.")
```

c.

```
class Rectangle:
    def __init__(self, length, width):
        self.length = length
        self.width = width

    def compute_area(self):
        return self.length * self.width


rectangle = Rectangle(4, 6)
area = rectangle.compute_area()
print("Rectangle Area:", area)
```

d.

```
import math

class Circle:
    def __init__(self, radius):
        self.radius = radius

    def compute_area(self):
        return math.pi * self.radius**2

    def compute_perimeter(self):
        return 2 * math.pi * self.radius


circle = Circle(5)
area = circle.compute_area()
perimeter = circle.compute_perimeter()
print("Circle Area:", area)
print("Circle Perimeter:", perimeter)
```

e.

```
class Student:
    pass


class Marks:
    pass


student_instance = Student()
marks_instance = Marks()

print(isinstance(student_instance, Student))
print(isinstance(marks_instance, Marks))

print(issubclass(Student, object))
print(issubclass(Marks, object))
```

4. Output:

a.

```
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python> & C:/Users/lenovo/App
Data/Local/Programs/Python/Python311/python.exe c:/Users/lenovo/OneDr
ive/Desktop/PRO/Python/first.py
Student ID: 21BCS9200
Student Name: SABHYA MAHAJAN
Student Class: Class 801-A
Student ID: 21BCS9200
```

b.

```
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python> & C:/Users/lenovo/App
Data/Local/Programs/Python/Python311/python.exe c:/Users/lenovo/OneDr
ive/Desktop/PRO/Python/first.py
Pair found at indices: [2, 3]
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python>
```

c.

```
Pair found at indices: [2, 3]
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python> & C:/Users/lenovo/App
Data/Local/Programs/Python/Python311/python.exe c:/Users/lenovo/OneDr
ive/Desktop/PRO/Python/first.py
Rectangle Area: 24
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python>
```

d.

```
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python> & C:/Users/lenovo/App
Data/Local/Programs/Python/Python311/python.exe c:/Users/lenovo/OneDr
ive/Desktop/PRO/Python/first.py
Circle Area: 78.53981633974483
Circle Perimeter: 31.41592653589793
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python>
```

e.

```
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python> & C:/Users/lenovo/App
Data/Local/Programs/Python/Python311/python.exe c:/Users/lenovo/OneDr
ive/Desktop/PRO/Python/first.py
True
True
True
True
PS C:\Users\lenovo\OneDrive\Desktop\PRO\Python>
```