Name:_____ ID:_____

Introduction to Computer and Programming (Python)
Laboratory #3

1. TV class

Create TV_module.py and TV_main.py Type the following code and observe the result.

TV_module.py

```
class TV:
    def __init__(self):
        self.channel = 1
        self.max_channel = 999
        self.volume = 3
        self.on = False

    def turnOn(self):
        self.on = True
    def turnOff(self):
        self.on = False

    def channelUp(self):
        if self.channel < self.max_channel:
            self.channel += 1
            print("Current channel:", self.channel)
        else:
            print("Channel doesn't exist.")
def channelDown(self):
        if self.channel > 1:
            self.channel -= 1
            print("Current channel:", self.channel)
        else:
            print("Channel doesn't exist.")

    def volumeUp(self):
        if self.volume < 10:
            self.volume += 1
        print("Current volume:", self.volume)
    def volumeDown(self):
        if self.volume > 0:
            self.volume -= 1
        print("Current volume:", self.volume)

    def showStatus(self):
        if self.on:
            print("Channel:", self.channel)
            print("Volume:", self.volume)
        else:
            print("TV is off")
```

main.py

```
from TV_module import TV

def main():
    tv = TV()

    tv.showStatus()
    tv.turnOn()

    for i in range(4):
        tv.volumeDown()
    for i in range(2):
        tv.volumeUp()

    tv.channelUp()
    tv.channelUp()

    tv.showStatus()

    tv.turnOff()

main()
```

Output:

2. Inheritance

Create GeometricObject.py, Rectangle.py Type the following code and observe the result.

GeometricObject.py

```
class GeometricObject:
    def __init__(self, color = "green"):
        self.color = color

    def getColor(self):
        return self.color

    def setColor(self, color):
        self.color = color

    def __str__(self):
        return "Color: " + self.color
```

Rectangle.py

```
from GeometricObject import *

class Rectangle(GeometricObject):
    def __init__(self, width, height):
        super().__init__()
        self.width = width
        self.height = height

    def getWidth(self):
        return self.width

    def setWidth(self, width):
        self.width = width

    def getHeight(self):
        return self.height

    def setHeight(self, height):
        self.height = height

    def getArea(self):
        return self.width * self.height

    def getPerimeter(self):
        return 2 * (self.width + self.height)
```

```
    def __str__(self):
        return super().__str__() + \
               "\nArea: " + str(self.getArea()) + \
               "\nPerimeter: " + str(self.getPerimeter())
```

main.py

```
from Rectangle import *

def main():
    rect = Rectangle(2, 4)
    print(rect)

main()
```

Output

3. Bank Account

Design and write a BankAccount class with following methods and attributes
Attributes: *owner_name, balance*
Methods: *withdraw(amount), deposit(amount), transfer(amount, target_account)*

*The account balance must not less than zero.
**Cannot deposit less than zero and cannot withdraw more than balance.
**Target account for transferring must be another object, and the balance in the target account must change accordingly.

4. Circle family

Design and write a Circle class with following methods and attributes
Attributes: *radius*
Methods: setRadius(radius), getRadius(), *getCircumference(), getArea(), printInfo()*

Then create a Cylinder class which inherits from Circle class and contain these attributes and methods.
Attributes: *radius, height*
Methods: setHeight(height), getHeight(), getVolume(), getSurfaceArea(), *printInfo()*

Examples of printInfo()

```
Circle:
        Radius: 10
        Circumference: 62.832
        Area: 314.159

Cylinder:
        Height: 10
        Radius: 10
        Circumference: 62.832
        Area: 314.159
        Surface Area: 1256.637
        Volume: 3141.593
```

5. Classroom Class

Create a Student class that contains these following attributes and method.
Attributes: *__ name, __id_number*
Methods: *getName(), setName(name), getID(), printInfo()*

Design and write a Classroom class that contains these following attributes and method.
Attributes: *__grade, __room_number, __student_list*
Methods: *addStudent(student), removeStudentByID(id_num), printInfo()*

*student_list must not contain students with same id number.

Main.py

```
def main():
    student1 = Student("Tawan", 1001)
    student2 = Student("Eit", 1002)
    student3 = Student("Most", 1003)
    student4 = Student("Guy", 1004)

    ic04 = Classroom(2, 1)

    ic04.addStudent(student4)
    ic04.addStudent(student3)
    ic04.addStudent(student2)
    ic04.addStudent(student1)
    ic04.addStudent(student4)

    ic04.printInfo()

    ic04.removeStudentByID(1001)
    ic04.removeStudentByID(1003)
    ic04.removeStudentByID(1002)
    ic04.removeStudentByID(1004)
    ic04.removeStudentByID(1001)

    ic04.printInfo()
```

```
1004 Guy is added.
1003 Most is added.
1002 Eit is added.
1001 Tawan is added.
Student with ID 1004 already exist.
Room: 2/1
Students:
        1004 Guy
        1003 Most
        1002 Eit
        1001 Tawan
1001 Tawan is removed.
1003 Most is removed.
1002 Eit is removed.
1004 Guy is removed.
No student found.
Room: 2/1
Students:
        --No student--
>>>
```