Ex.No.8	Classes and Objects in Python	Reg.No: URK23CS1261
20.3.24		

8 A) Design a class to represent a rectangle with length and breadth as instance attributes. Create two rectangle objects, r1 and r2. Initialize the attributes using the constructor and do the following operations.

- **r3 = r1 + r2, where r3 is an another Rectangle object**
- **r3's length = r1's length + r2's length**
- **r3's breadth = r1's breadth + r2's breadth**

Obtain a user-friendly string representation of the Rectangle object as Length is 30 and Breadth is 11 by overriding __str__( ).

- **print(r3)**
- **Compare the dimensions of r1 and r2 => r1 == r2, r1 < r2, r1 > r2, r1 >= r2, r1 <= r2**

Aim: The objective of this program is to design a class to represent a rectangle with length and breadth as instance attributes.

Algorithm:

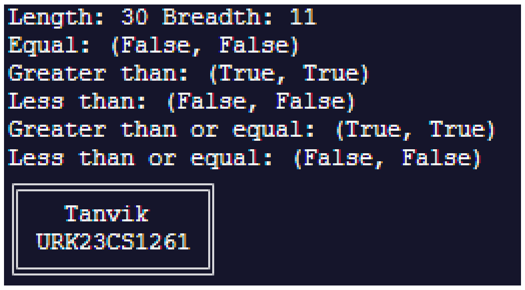
```
Step 1: Start the program.
Step 2: Define a class named Rectangle with appropriate methods for initialization, string representation, equality comparison, addition, and comparison operators.
Step 3: Create an instance of Rectangle called r1 with length 20 and breadth 6.
Step 4: Create an instance of Rectangle called r2 with length 10 and breadth 5.
Step 5: Add r1 and r2 and store the result in r3.
Step 6: Print the string representation of r3.
Step 7: Compare if r1 is equal to r2 and print whether r1 is equal to r2.
Step 8: Compare if r1 is greater than r2 and print whether r1 is greater than r2.
Step 9: Compare if r1 is less than r2 and print whether r1 is less than r2.
Step 10: End the program.
```

Program:

```
class Rectangle():
    def __init__(self: object, length: int, breadth: int) -> None:
        self.length = length
        self.breadth = breadth
    def __str__(self: object) -> str:
        return f"Length: {self.length} Breadth: {self.breadth}"
    def __eq__(self, other: object) -> bool:
        return self.length == other.length, self.breadth == other.breadth
    def __add__(self:object, other: object) -> int:
        return Rectangle(self.length + other.length, self.breadth + other.breadth)
    def __lt__(self, other: object) -> bool:
        return self.length < other.length, self.breadth < other.breadth
    def __gt__(self, other: object) -> bool:
        return self.length > other.length, self.breadth > other.breadth
    def __ge__(self, other: object) -> bool:
        return self.length >= other.length, self.breadth >= other.breadth
    def __le__(self, other: object) -> bool:
        return self.length <= other.length, self.breadth <= other.breadth

r1 = Rectangle(length=20, breadth=6)
```

```
  r2 = Rectangle(length=10, breadth=5)
  r3 = r1 + r2
  print(r3)
  r3 = r1 == r2
  print(f"Equal: {r3}")
  r3 = r1 > r2
  print(f"Greater than: {r3}")
  r3 = r1 < r2
  print(f"Less than: {r3}")
  r3 = r1 >= r2
  print(f"Greater than or equal: {r3}")
  r3 = r1 <= r2
print(f"Less than or equal: {r3}")
print("╔═══════════════╗\n║    Tanvik     ║\n║ URK23CS1261 ║\n╚═══════════════╝")
```

Output:



```
Length: 30 Breadth: 11
Equal: (False, False)
Greater than: (True, True)
Less than: (False, False)
Greater than or equal: (True, True)
Less than or equal: (False, False)
╔═════════════╗
║    Tanvik   ║
║ URK23CS1261 ║
╚═════════════╝
```

Result: Thus, The program has successfully produced the desired output.

8 B) Write a menu driven application to maintain the employee payroll details using Python. Your application must contain the following functionalities. Use constructors, getter and setter functions.

a. For each employee your application must have the details such as name, empid, department, designation, experience, basicPay, DA(10% BP), HRA(5%BP),EPF(5%BP), Tax(10% of BP), Net salary= BP+DA+HRA-EPF-Tax
b. Get the employee details from user(admin)
c. In the menu give the user options to add, edit, delete or display the employee details.

Aim: The objective of this program is to build a menu driven application to maintain the employee payroll details.

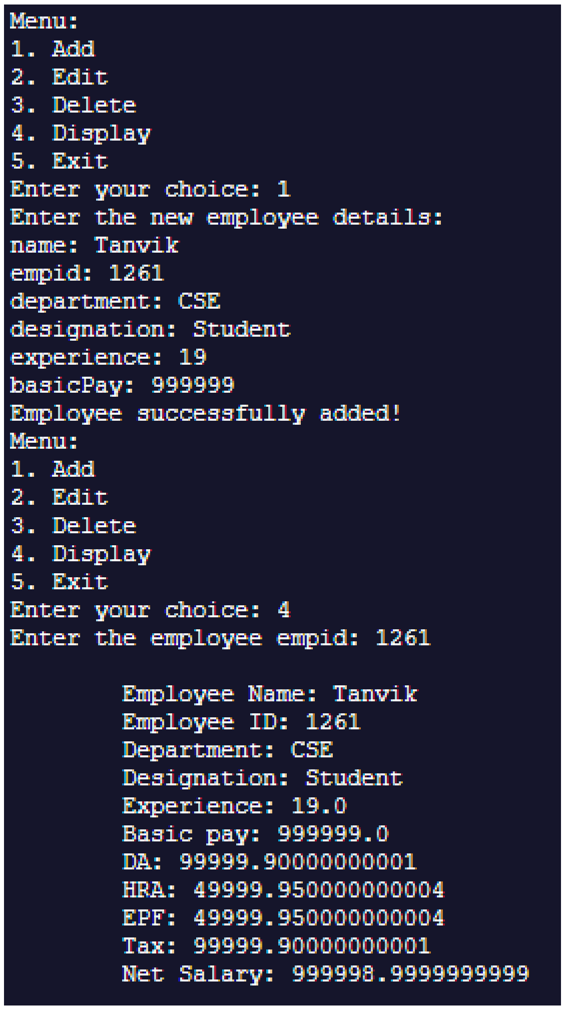
Algorithm:

Step 1: Start the program.
Step 2: Define a class named Employee with attributes for employee details and methods for calculating salary and displaying employee information.
Step 3: Inside the class, define an __init__ method to initialize the attributes to None.
Step 4: Define a method named other_data to calculate additional salary components based on the basic pay.
Step 5: Define a method named set_data to set the employee details by taking user input.
Step 6: Define a method named display to print the employee information along with calculated salary components.
Step 7: Create an empty list named Emp to store instances of Employee class.
Step 8: Display a menu with options to add, edit, delete, display employees, or exit the program.
Step 9: Based on the user's choice, perform the corresponding action such as adding, editing, deleting, displaying employee information, or exiting the program.
Step 10: End the program if the user chooses to exit.

Program:

```
class Employee:
    def __init__(self):
        self.name = None
        self.empid = None
        self.department = None
        self.designation = None
        self.experience = None
        self.basicPay = None
        self.da = None
        self.hra = None
        self.epf = None
        self.Tax = None
        self.NetSalary = None

    def other_data(self, basicPay):
        try:
            self.da = 10 / 100 * basicPay
            self.hra = 5 / 100 * basicPay
            self.epf = 5 / 100 * basicPay
            self.Tax = 10 / 100 * basicPay
            self.NetSalary = basicPay + self.da + self.hra - self.epf - self.Tax
        except Exception as e:
            print(f"Error in Em __dataset : {e}")

    def set_data(self):
        self.name = input("name: ")
        self.empid = int(input("empid: "))
        self.department = input("department: ")
        self.designation = input("designation: ")
        self.experience = float(input("experience: "))
        self.basicPay = float(input("basicPay: "))

    def display(self):
        self.other_data(self.basicPay)
        print(f"""
        Employee Name: {self.name}
        Employee ID: {self.empid}
        Department: {self.department}
        Designation: {self.designation}
        Experience: {self.experience}
        Basic pay: {self.basicPay}
        DA: {self.da}
        HRA: {self.hra}
        EPF: {self.epf}
        Tax: {self.Tax}
        Net Salary: {self.NetSalary}
        """)

Emp = []

while True:
    print("""Menu:
1. Add
2. Edit
3. Delete
4. Display
5. Exit""")
    option = int(input("Enter your choice: "))
    if option == 1:
        print("Enter the new employee details: ")
        emp = Employee()
        emp.set_data()
        Emp.append(emp)
        print("Employee successfully added!")
    elif option == 2:
        empid = int(input("Enter the employee empid: "))
        found = False
        for emp in Emp:
            if emp.empid == empid:
                emp.set_data()
                found = True
                print("Employee successfully Edited!")
                break
        if not found:
            print("ID not found")
    elif option == 3:
        empid = int(input("Enter the employee empid: "))
        for emp in Emp:
            if emp.empid == empid:
                Emp.remove(emp)
                print("Employee successfully Deleted!")
                break
        else:
            print("ID not found")
    elif option == 4:
        empid = int(input("Enter the employee empid: "))
        for emp in Emp:
            if emp.empid == empid:
                emp.display()
                break
        else:
            print("ID not found")
    elif option == 5:
        quit()
print("╔══════════════════╗\n║   Tanvik   ║\n║ URK23CS1261 ║\n╚══════════════════╝")
```

Output:



```
Menu:
1. Add
2. Edit
3. Delete
4. Display
5. Exit
Enter your choice: 1
Enter the new employee details:
name: Tanvik
empid: 1261
department: CSE
designation: Student
experience: 19
basicPay: 999999
Employee successfully added!
Menu:
1. Add
2. Edit
3. Delete
4. Display
5. Exit
Enter your choice: 4
Enter the employee empid: 1261

        Employee Name: Tanvik
        Employee ID: 1261
        Department: CSE
        Designation: Student
        Experience: 19.0
        Basic pay: 999999.0
        DA: 99999.90000000001
        HRA: 49999.950000000004
        EPF: 49999.950000000004
        Tax: 99999.90000000001
        Net Salary: 999998.9999999999
```

Result: Thus, The program has successfully produced the desired output.