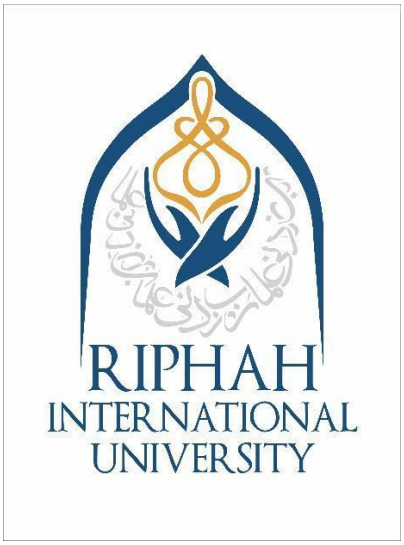
LAB # 05

Artificial Intelligence



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Task 01:

```python
def check_attendance(roll_number):  1 usage
    present_students = [101, 102, 103, 104]

    if roll_number in present_students:
        return "Present"
    else:
        return "Absent"

roll = int(input("Enter roll number: "))
print("Student is", check_attendance(roll))
```

Output:

```
C:\Users\user\PycharmProje
Enter roll number: 103
Student is Present
```

Task 02:

```python
class Student:  2 usages
    def __init__(self, name, roll):
        self.name = name
        self.roll = roll

student1 = Student( name: "Ali",  roll: 101)
student2 = Student( name: "Aisha",  roll: 102)

print("Student 1:", student1.name, student1.roll)
print("Student 2:", student2.name, student2.roll)

# Assigning new values
student1.name = "Ahmed"
student2.roll = 200

# Printing updated values
print("Updated Student 1:", student1.name, student1.roll)
print("Updated Student 2:", student2.name, student2.roll)
```

Output:

```
C:\Users\user\PycharmProjects\P
Student 1: Ali 101
Student 2: Aisha 102
Updated Student 1: Ahmed 101
Updated Student 2: Aisha 200
```

Task 03:

```python
class Student:  1 usage
    def __init__(self, name, age, grades):
        self.name = name
        self.age = age
        self.grades = grades

    def average_grade(self):  1 usage
        return sum(self.grades) / len(self.grades)

student1 = Student( name: "Ali",  age: 15,  grades: [85, 90, 78, 92])

print("Name:", student1.name)
print("Age:", student1.age)
print("Average Grade:", student1.average_grade())
```

Output:

```
C:\Users\user\PycharmProjec
Name: Ali
Age: 15
Average Grade: 86.25
```

Task 04:

```python
class Employee:  2 usages
    def __init__(self, name, salary):
        self.name = name
        self.salary = salary

    def display_details(self):
        print("Name:", self.name, ", Salary:", self.salary)

# Manager subclass
class Manager(Employee):  1 usage
    def __init__(self, name, salary, department):
        super().__init__(name, salary)
        self.department = department

    def display_details(self):  1 usage
        print("Name:", self.name, ", Salary:", self.salary, ", Department:", self.department)
```

```python
# Developer subclass
class Developer(Employee):  1 usage
    def __init__(self, name, salary, programming_language):
        super().__init__(name, salary)
        self.programming_language = programming_language

    def display_details(self):  1 usage
        print("Name:", self.name, ", Salary:", self.salary, ", Programming Language:", self.programming_language)

# Creating objects
manager1 = Manager( name: "Ali",  salary: 50000,  department: "HR")
developer1 = Developer( name: "Aisha",  salary: 60000,  programming_language: "Python")

# Displaying details
manager1.display_details()
developer1.display_details()
```

Output:

```
C:\Users\user\PycharmProjects\PythonProject\.venv\Scripts\py
Name: Ali , Salary: 50000 , Department: HR
Name: Aisha , Salary: 60000 , Programming Language: Python

Process finished with exit code 0
```

Task 05:

```python
import math  # Import math for π (pi) value
class Shape:  3 usages
    def area(self):
        pass  # Base class method (to be overridden)

# Circle subclass
class Circle(Shape):  1 usage
    def __init__(self, radius):
        self.radius = radius

    def area(self):  1 usage
        return math.pi * self.radius * self.radius  # π * r²

# Rectangle subclass
class Rectangle(Shape):  1 usage
    def __init__(self, length, width):
        self.length = length
        self.width = width

    def area(self):  1 usage
        return self.length * self.width  # length × width
```

```python
# Triangle subclass
class Triangle(Shape):  1 usage
    def __init__(self, base, height):
        self.base = base
        self.height = height

    def area(self):  1 usage
        return 0.5 * self.base * self.height  # 0.5 × base × height

# Creating objects
circle = Circle(5)
rectangle = Rectangle( length: 4,  width: 6)
triangle = Triangle( base: 3,  height: 8)

# Printing areas simply
print("Circle Area:", circle.area())
print("Rectangle Area:", rectangle.area())
print("Triangle Area:", triangle.area())
```

Output:

```
C:\Users\user\PycharmProjects\Py
Circle Area: 78.53981633974483
Rectangle Area: 24
Triangle Area: 12.0
```