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Github link   https://github.com/NuzhatQureshi90/Pythons-lab-manual-IT-A-
/upload/main

LAB MANUAL # 01

TASK 01

Q-1   Make 2-2 programs of each datatype.

1. NUMERIC TYPES:

- Integer:

Program:

```python
num1 = 5
num2 = 3
sum = num1 + num2
print("The sum is:", sum)
```

```
The sum is: 8
```

Program:

```python
num1 = 6
num2 = 4
product = num1 * num2

print("The product is:", product)
```

```
The product is: 24
```

- Float:

Program:

```python
num1 = 7.5
num2 = 2.5
result = num1 - num2

print("The result is:", result)
```

```
The result is: 5.0
```

Program:

```
num1 = 9.0
num2 = 3.0

result = num1 / num2

print("The answer is:", result)
```

The answer is: 3.0

- Complex:

Program:

```
num1 = 2 + 3j
num2 = 1 + 4j
result = num1 + num2
print("The sum is:", result)
```

The sum is: (3+7j)

Program:

```
num1 = 2 + 3j
num2 = 1 + 2j

result = num1 * num2

print("The product is:", result)
```

The product is: (-4+7j)

2- SEQUENCE TYPES:

- String

Program:

```
first_name = "Ali"
last_name = "Khan"
full_name = first_name + " " + last_name
print("Full name is:", full_name)
```

Full name is: Ali Khan

Program:

```
message = "Hello, Python!"
print(message)
```

```
Hello, Python!
```

- List:

Program:

```
fruits = ["apple", "banana", "mango"]
for fruit in fruits:
    print(fruit)
```

```
apple
banana
mango
```

Program:

```
numbers = [1, 2, 3]
numbers.append(4)
print("Updated list:", numbers)
```

```
Updated list: [1, 2, 3, 4]
```

- Tuple:

Program:

```
colors = ("red", "green", "blue")
print("Second color is:", colors[1])
```

```
Second color is: green
```

Program:

```
fruits = ("apple", "banana", "cherry")

for fruit in fruits:
    print(fruit)
```

```
apple
banana
cherry
```

- Range:

Program:

```
for num in range(1, 6):
    print(num)
```

```
1
2
3
4
5
```

Program:

```
for num in range(2, 11, 2):
    print(num)
```

```
2
4
6
8
10
```

3- SET TYPES:

Program:

```
fruits = {"apple", "banana", "mango"}

print("Fruits set:", fruits)
```

```
Fruits set: {'apple', 'banana', 'mango'}
```

Program:

```
numbers = {1, 2, 3}
numbers.add(4)

print("Updated set:", numbers)
```

```
Updated set: {1, 2, 3, 4}
```

- **Frozen set:**

Program:

```
fruits = frozenset(["apple", "banana", "cherry"])

print("Fruits frozenset:", fruits)
```

Fruits frozenset: frozenset({'apple', 'banana', 'cherry'})

Program:

```
set1 = frozenset([1, 2, 3])
set2 = frozenset([3, 4, 5])
common = set1.intersection(set2)

print("Common items:", common)
```

Common items: frozenset({3})

MAPPING TYPE:

- Dictionary dict:

Program:

```
student = {
    "name": "Ali",
    "age": 20,
    "class": "BS IT"
}

print("Student Info:", student)
```

Student Info: {'name': 'Ali', 'age': 20, 'class': 'BS IT'}

Program:

```
person = {
    "name": "Sara",
    "city": "Karachi"
}

print("Name is:", person["name"])
```

Name is: Sara

BOLEAN TYPE:

Program:

```
a = 10
b = 5

result = a > b
print("Is a greater than b?", result)
```

```
Is a greater than b? True
```

Program:

```
x = 7
y = 7

print("Are x and y equal?", x == y)
```

```
Are x and y equal? True
```

TASK NO 02:

Q.2   Make up to 5 shapes programs using *

Programs:

```python
print("Square Shape:")
print("* * * * *")
print("* * * * *")
print("* * * * *")
print("* * * * *")
print("* * * * *")
print("Right-Angled Triangle:")
print("*")
print("* *")
print("* * *")
print("* * * *")
print("* * * * *")
print("Inverted Triangle:")
print("* * * * *")
print("* * * *")
print("* * *")
print("* *")
print("*")
```

```
Square Shape:
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
Right-Angled Triangle:
*
* *
* * *
* * * *
* * * * *
Inverted Triangle:
* * * * *
* * * *
* * *
* *
*
```

```python
print("Pyramid Shape:")
print("    *")
print("   * *")
print("  * * *")
print(" * * * *")
print("* * * * *")
print("Diamond Shape:")
print("    *")
print("   * *")
print("  * * *")
print("   * *")
print("    *")
```

```
Pyramid Shape:
     *
    * *
   * * *
  * * * *
 * * * * *
Diamond Shape:
     *
    * *
   * * *
    * *
     *
```

]:

TASK 03

Q.3   Make same shapes you have made in task 2,using * multiple by number.

Program:

```
]: print("Square Shape:")
   print("* " * 5)
   print("* " * 5)
   print("* " * 5)
   print("* " * 5)
   print("* " * 5)
   print("Right-Angled Triangle:")
   print("* " * 1)
   print("* " * 2)
   print("* " * 3)
   print("* " * 4)
   print("* " * 5)
   print("Inverted Triangle:")
   print("* " * 5)
   print("* " * 4)
   print("* " * 3)
   print("* " * 2)
   print("* " * 1)
   print("Pyramid Shape:")
   print(" " * 4 + "* ")
   print(" " * 3 + "* " * 2)
   print(" " * 2 + "* " * 3)
   print(" " * 1 + "* " * 4)
   print(" " * 0 + "* " * 5)

   print("Diamond Shape:")
   print(" " * 4 + "* ")
   print(" " * 3 + "* " * 2)
   print(" " * 2 + "* " * 3)
   print(" " * 3 + "* " * 2)
   print(" " * 4 + "* ")
```

```
Square Shape:
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
Right-Angled Triangle:
*
* *
* * *
* * * *
* * * * *
Inverted Triangle:
* * * * *
* * * *
* * *
* *
*


Pyramid Shape:
    *
   * *
  * * *
 * * * *
* * * * *
Diamond Shape:
    *
   * *
  * * *
   * *
    *
```

TASK 1:

Q.1   Print numbers from 1 to 10 using a for loop.

Program:

```
[1]:  for num in range(1, 11):
          print(num)

      1
      2
      3
      4
      5
      6
      7
      8
      9
      10
```

Task 2:

Q.2.   Print all even numbers between 1 and 20 using a while loop.

Program:

```
[2]: num = 2
     while num <= 20:
         print(num)
         num += 2
```

```
2
4
6
8
10
12
14
16
18
20
```

TASK 3:

Q.1.   Calculate the sum of numbers from 1 to 100 using a loop.

Program:

```
[3]: total = 0
     for num in range(1, 101):
         total += num

     print(f"The sum of numbers from 1 to 100 is: {total}")
```

```
The sum of numbers from 1 to 100 is: 5050
```

TASK 4:

Q.1.   Print the multiplication table of 5 using a loop.
Program:

```
[4]: num = 5
     print(f"Multiplication Table of {num}:")

     for i in range(1, 11):
         print(f"{num} x {i} = {num * i}")
```

```
Multiplication Table of 5:
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
```

TASK 5:

Q.1. Find the factorial of a given number using a for loop.

Program:

```
[5]: num = int(input("Enter a number to find its factorial: "))
     factorial = 1
     if num < 0:
         print("Factorial does not exist for negative numbers.")
     else:
         for i in range(1, num + 1):
             factorial *= i

         print(f"The factorial of {num} is: {factorial}")
```

```
Enter a number to find its factorial:  4
The factorial of 4 is: 24
```

TASK 6:

Q.1. Create a list of numbers and print only the odd numbers using a loop.

Program:

```
[6]:  numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
      for num in numbers:
          if num % 2 != 0:
              print(num)
```

```
1
3
5
7
9
```

TASK 7:

Q.1.   Iterate over a list of fruits and print each item.

Program:

```
fruits = ["apple", "banana", "cherry", "date", "elderberry", "fig", "grape"]
for fruit in fruits:
    print(fruit)
```

```
apple
banana
cherry
date
elderberry
fig
grape
```

TASK 01

Q.1.   Write a python program to take 2 numbers as input and perform all arithmetic operations on them.

Program:

```python
num1 = float(input("Enter first number: "))
num2 = float(input("Enter second number: "))
print("Addition:", num1 + num2)
print("Subtraction:", num1 - num2)
print("Multiplication:", num1 * num2)
print("Division:", num1 / num2)
print("Modulus (Remainder):", num1 % num2)
print("Exponent (Power):", num1 ** num2)
print("Floor Division:", num1 // num2)
```

```
Enter first number:  5
Enter second number:  8
Addition: 13.0
Subtraction: -3.0
Multiplication: 40.0
Division: 0.625
Modulus (Remainder): 5.0
Exponent (Power): 390625.0
Floor Division: 0.0
```

TASK 02

Q.1.   Create a function that takes two numbers and return their sum, difference, product, and quotient.

Program:

```python
def calculate(num1, num2):
    sum_result = num1 + num2
    difference = num1 - num2
    product = num1 * num2
    quotient = num1 / num2
    return sum_result, difference, product, quotient
a = float(input("Enter first number: "))
b = float(input("Enter second number: "))
add, sub, mul, div = calculate(a, b)
print("Sum:", add)
print("Difference:", sub)
print("Product:", mul)
print("Quotient:", div)
```

```
Enter first number:  7
Enter second number:  4
Sum: 11.0
Difference: 3.0
Product: 28.0
Quotient: 1.75
```

TASK 03

Q.1. Write a python script to find the remainder when one number is divided by another.

Program:

```
num1 = int(input("Enter the first number: "))
num2 = int(input("Enter the second number: "))
remainder = num1 % num2
print("The remainder is:", remainder)
```

```
Enter the first number:  6
Enter the second number:  2
The remainder is: 0
```

TASK 04

Q.1. Write a program to calculate the area of a circle using the formula: area=pi*r^2.

Program:

```
import math
r = float(input("Enter the radius of the circle: "))
area = math.pi * r ** 2

# Showing the result
print("Area of the circle is:", area)
```

```
Enter the radius of the circle:  5
Area of the circle is: 78.53981633974483
```

Task 05:

Q.1. Implement a program that takes a number as input and returns its square and cube using exponentiation.

Program:

```
num = float(input("Enter a number: "))
square = num ** 2
cube = num ** 3
print("Square of the number is:", square)
print("Cube of the number is:", cube)
```

```
Enter a number:  7
Square of the number is: 49.0
Cube of the number is: 343.0
```

TASK 06:

Q.1. Create a simple calculator in python that allows the user to choose an operation (addition, subtraction, etc) and inputs two numbers.

Program:

```
]: print("Select operation:")
   print("1. Addition")
   print("2. Subtraction")
   print("3. Multiplication")
   print("4. Division")
   choice = input("Enter choice (1/2/3/4): ")
   num1 = float(input("Enter first number: "))
   num2 = float(input("Enter second number: "))
   if choice == '1':
       print("Result:", num1 + num2)
   elif choice == '2':
       print("Result:", num1 - num2)
   elif choice == '3':
       print("Result:", num1 * num2)
   elif choice == '4':
       if num2 != 0:
           print("Result:", num1 / num2)
       else:
           print("Error: Cannot divide by zero.")
   else:
       print("Invalid choice.")
```

```
Select operation:
1. Addition
2. Subtraction
3. Multiplication
4. Division
Enter choice (1/2/3/4):  6
Enter first number:  9
Enter second number:  4
Invalid choice.
```

LAB MANUAL 6:

TASK 1:

Q.1.   Basic Task: Write a program that checks if a given number is positive, negative, or zero.

Program:

```
[]:  number = float(input("Enter a number: "))

     if number > 0:
         print("The number is positive.")
     elif number < 0:
         print("The number is negative.")
     else:
         print("The number is zero.")

     Enter a number:  5
     The number is positive.
```

TASK 2:

Q.1.   Intermediate Task: Write a program that takes user input and determines whether it's a even or odd.

Program:

```
:  number = int(input("Enter a number: "))

   if number % 2 == 0:
       print("The number is even.")
   else:
       print("The number is odd.")

   Enter a number:  7
   The number is odd.
```

TASK 3:

Advanced Task: Create a program that asks user to print:
"Excellent" if marks are above 80
"Good" if marks are between 60 and 80
"Needs Improvement" if marks are below 60

Program:

```
marks = float(input("Enter your marks: "))

if marks > 80:
    print("Excellent")
elif 60 <= marks <= 80:
    print("Good")
else:
    print("Needs Improvement")
```

```
Enter your marks:  70
Good
```

TASK 1:

Q.1.   Basic Task: Write a for loop to print the first 10 natural numbers.

Program:

```
for i in range(1, 11):
    print(i)
```

```
1
2
3
4
5
6
7
8
9
10
```

TASK 2:

Q.1.   Intermediate Task: Write a while loop that prints numbers from 10 down to 1

Program:

```
i = 10
while i >= 1:
    print(i)
    i -= 1
```

```
10
9
8
7
6
5
4
3
2
1
```

TASK 3:

 Q.1.   Advanced Task: Create a program that uses a for loop to iterate over a string and count the number of vowels.

Program:

```
text = input("Enter a string: ")
vowels = "aeiouAEIOU"
count = 0

for char in text:
    if char in vowels:
        count += 1

print("Number of vowels:", count)
```

```
Enter a string:  a
Number of vowels: 1
```

TASK4:

Q.1.   Write a program that prints the Fibonacci series up to n terms using a while loop.

Program:

```
n = int(input("Enter the number of terms: "))
a, b = 0, 1
count = 0

while count < n:
    print(a)
    a, b = b, a + b
    count += 1
```

```
Enter the number of terms:  3
0
1
1
```