**LAB- 4 Loop Structure**

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**1# Print all alphabets in upper case and in lower case.**

for i in range(65, 91):

print(chr(i), end=" ")

print()

for i in range(97, 123):

print(chr(i), end=" ")

**# Output:-**

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m n o p q r s t u v w x y z

**2# Print a multiplication table of a given number.**

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

for i in range(1, 11):

print(num, "x", i, "=", num \* i)

**# Output :-**

Enter a number: 7

7 x 1 = 7

7 x 2 = 14

7 x 3 = 21

7 x 4 = 28

7 x 5 = 35

7 x 6 = 42

7 x 7 = 49

7 x 8 = 56

7 x 9 = 63

7 x 10 = 70

**3# Count no. of alphabets and no. of digits in any given string.**

s = input("Enter a string: ")

alphabet count = 0

digit count = 0

for char in s:

if ('A' <= char <= 'Z') or ('a' <= char <= 'z'):

alphabet count += 1

elif '0' <= char <= '9':

digit count += 1

print("Number of alphabets:", alphabet count)

print("Number of digits:", digit count)

**# Output:-**

Enter a string: 24BCH000@sptpdpuacin

Number of alphabets: 14

Number of digits: 5

**4# Check whether a given number is prime, is perfect, is Armstrong, is palindrome, is automorphic.**

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

is prime = True

if num < 2:

is prime = False

else:

for i in range(2, num):

if num % i == 0:

is prime = False

break

sum factors = 0

for i in range(1, num):

if num % i == 0:

sum factors += i

is perfect = (sum factors == num)

sum digits = 0

temp = num

order = len(str(num))

while temp > 0:

digit = temp % 10

sum digits += digit \*\* order

temp //= 10

is armstrong = (sum digits == num)

temp = num

rev = 0

while temp > 0:

rev = rev \* 10 + temp % 10

temp //= 10

is palindrome = (num == rev)

square = num \* num

is automorphic = (str(square).ends with(str(num)))

print("Prime:", "Yes" if is prime else "No")

print("Perfect:", "Yes" if is perfect else "No")

print("Armstrong:", "Yes" if is armstrong else "No")

print("Palindrome:", "Yes" if is palindrome else "No")

print("Automorphic:", "Yes" if is automorphic else "No")

**#Output :-**

Enter a number: 37

Prime: Yes

Perfect: No

Armstrong: No

Palindrome: No

Automorphic: No

**5# Generate all Pythagorean Triplets with side length <= 30.**

for a in range(1, 31):

for b in range(a, 31):

for c in range(b, 31):

if a\*\*2 + b\*\*2 == c\*\*2:

print(a, b, c)

**#Output:-**

3 4 5

5 12 13

6 8 10

7 24 25

8 15 17

9 12 15

10 24 26

12 16 20

15 20 25

18 24 30

20 21 29

**6# Print 24 hours of day with suitable suffixes like AM, PM, Noon and Midnight.**

for hour in range(24):

if hour == 0:

print("12 Midnight")

elif hour == 12:

print("12 Noon")

elif hour < 12:

print(hour, "AM")

else:

print(hour - 12, "PM")

**#Output :-**

12 Midnight

1 AM

2 AM

3 AM

4 AM

5 AM

6 AM

7 AM

8 AM

9 AM

10 AM

11 AM

12 Noon

1 PM

2 PM

3 PM

4 PM

5 PM

6 PM

7 PM

8 PM

9 PM

10 PM

11 PM

**7#Print n Cr and nPr.**

n = int(input("Enter n: "))

r = int(input("Enter r: "))

fact n = 1

for i in range(1, n + 1):

fact n \*= i

fact n r = 1

for i in range(1, n - r + 1):

fact n r \*= i

fact r = 1

for i in range(1, r + 1):

fact r \*= i

nPr = fact n // fact n r

n Cr = fact n // (fact r \* fact n r)

print("nPr (Permutation):", nPr)

print("n Cr (Combination):", n Cr)

**#Output :-**

Enter n: 7

Enter r: 4

nPr (Permutation): 840

n Cr (Combination): 35

**8# Print factorial of a given number.**

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

fact = 1

for i in range(1, n + 1):

fact \*= i

print("Factorial of", n, "is:", fact)

**#Output:-**

Enter a number: 6

Factorial of 6 is: 720

**9# Print N natural nos. in reverse**

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

for i in range(N, 0, -1):

print(i, end=" ")

**#Output:-**

Enter a number: 13

13 12 11 10 9 8 7 6 5 4 3 2 1

**10# Generate N numbers of Fibonacci series.**

N = int(input("Enter the number of Fibonacci terms: "))

a = 0

b = 1

print("Fibonacci Series:", end=" ")

for i in range(N):

print(a, end=" ")

temp = a + b

a = b

b = temp

**#Output :-**

Enter the number of Fibonacci terms: 15

Fibonacci Series: 0 1 1 2 3 5 8 13 21 34 55 89 144 233 377

**11# Calculate sin(x); x is a radian value. The formula is as under:**

x = float(input("Enter the value of x in radians: "))

terms = 10

sin x = 0

for n in range(terms):

term = ((-1) \*\* n) \* (x \*\* (2 \* n + 1))

fact = 1

for i in range(1, (2 \* n + 1) + 1):

fact \*= i

sin x += term / fact

print("sin(", x, ") ≈", sin x)

**#Output:-**

Enter the value of x in radians: 2.64

sin( 2.64 ) ≈ 0.48082261497486406