**PROBLEMS ON CONTROL STATEMENTS**

**Number series:**

**1.Write a Program to print series 0 2 6 12 20 30 42 ...N.**

**CODE:**

n=int(input("Enter the range of number:"))

1. The sequence is 1×2,2×3,3×4,4×5,5×6,6×7,......

i=1

while i<=n:

print((i\*i)-i,end=" ")

i+=1

**OUTPUT:**

Enter the range of number:7

0 2 6 12 20 30 42

**2.Write a Program to print series 0,2,8,14,24,34 ...N.**

1. The sequence is

1\*1 -1=0

2\*2 -2=2

3\*3 -1=8

4\*4 -2=14

5\*5 -1=24

6\*6 -2=34

**CODE:**

n=int(input("Enter the range of number(Limit):"))

i=1

pr=0

while i<=n:

if(i%2==0):

pr=pow(i, 2) - 2

print(pr,end=" ")

else:

pr = pow(i, 2) - 1

print(pr, end=" ")

i+=1

**OUTPUT:**

Enter the range of number(Limit):7

0 2 8 14 24 34 48

**3.Write a program to print Arithmetic series 1 4 7 10…**

**CODE:**

print("Series:")

1. a(first term)=1 and

d(common difference)=3

Sum of n elements of series = n\*(2a + (n-1)\*d)/2

for i in range(1,10 , 3) :

print(i, end = ' ')

**OUTPUT:**

Series:

1 4 7

**4.Write a Program to Find the sum of series 1³+2³+3³+4³.....+N³.**

**CODE:**

4.1\*1\*1=1=1\*1  
 1\*1\*1+2\*2\*2 = 9=3\*3  
 1\*1\*1+2\*2\*2+3\*3\*3=36=6\*6

1\*1\*1+2\*2\*2+3\*3\*3+4\*4\*4=100=10\*10

n=int(input("Enter the range of number:"))

sum=0

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

sum+=(i\*i\*i)

print("The sum of the series = ",sum)

**OUTPUT:**

Enter the range of number:5

The sum of the series = 225

**5.Write a Program to Find the sum of series 2+4+6+8.....+N.**

**CODE:**

n=int(input("Enter the range of number:"))

5. WKT formula for sum of continuous series that is n(n+1)2

2(n(n+1)2)

n(n+1)

50(51)

50×51=2550

Sum of this series is 2550

sum=0

i=0

while i<=n:

sum+=i

i+=2

print("The sum of the series = ",sum)

**OUTPUT:**

Enter the range of number:8

The sum of the series = 20

**6.Write a Program to Find the sum of series 1+11+111+1111.....+N.**

**CODE:**

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

6.1o^n+i-10-9n/81

print()

sum = 0

str = ''

for i in range(n):

str = str + '1'

sum = sum + int(str)

print(f'Sum: {sum}')

**OUTPUT:**

Enter number N: 5

Sum: 12345

**7.Write a program to find the sum of series 1/2!+2/3!+3/5!+4/6!+.....N/(N+1)!**

**CODE:**

x = int(input("Enter the value of x: "))

sum = 0

m = 1

7.1/2! = 1/2 = 0.5

2/3!= 2/(3\*2\*1) = 1/3 = 0.33

So the series becomes =0.5+0.33+0.125+0.033+0.006944…

for i in range(1, 7) :

fact = 1

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

fact \*= j

term = x \*\* i / fact

sum += term \* m

m = m \* -1

print("Sum =", sum)

**OUTPUT:**

Enter the value of x: 2

Sum = 0.8444444444444444

8.Write a Program to print the Fibonacci series.

CODE:

n = int(input("Enter the value of 'n': "))

8 .Fn=Fn-1+Fn-2

F0=0 and F1=1

Fibinocci series is 0,1,1,2,3,5,8

a = 0

b = 1

sum = 0

count = 1

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

while(count <= n):

print(sum, end = " ")

count += 1

a = b

b = sum

sum = a + b

**OUTPUT:**

Enter the value of 'n': 5

Fibonacci Series: 0 1 1 2 3

**9.Write a program to find the sum of series 1+3+5+7..+N.**

**CODE:**

print("Enter the range of number:")

n=int(input())

9.The sum of n terms of the series 1, 3, 5, 7, …… is n2

sum=0

i=1

while(i<=n):

sum+=i

i+=2

print("The sum of the series = ",sum)

**OUTPUT:**

Enter the range of number:

6

The sum of the series = 9

**10.Write a program to find the sum of series 1+2+3..+N.**

**CODE:**

n=int(input("Enter the value of 'n' = "))

sum = 0

10.Sum of 1,2,3…n is n(n+1)/2

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

sum+=i

print("Sum of the series is",sum)

**OUTPUT:**

Enter the value of 'n' = 7

Sum of the series is 28

**11.Write a Program to find the sum of series 1!+2!+3!...+n!**

**CODE:**

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

fact = 1

if(n==0):

fact = 1

sum = 0

11. 1! + 2! + 3! + 4! + 5! = 1 + 2 + 6 + 24 + 120 = 153.

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

fact = fact\*i

sum = sum + fact

print(sum)

**OUTPUT:**

Enter n value:5

153

**12.Write a Program to Find the sum of series 9+99+999+9999.....+N.**

**CODE:**

n = int(input("Enter the range of number:"))

sum = 0

num = 9

12.9+99+999+9999+99999=10(105−1)−9(5)9=111105

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

sum = sum + num

num = (num\*10)+9

print("The sum of the series=", sum)

**OUTPUT:**

Enter the range of number:9

The sum of the series= 1111111101

**Number Pattern:**

**13.Python program to print the following simple number pattern using a for loop.**

**CODE:**

n=5

for num in range(n+1):

for i in range (num ):

print(num,end= " ")

print("\r")

**OUTPUT:** 1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

**14.print the following half pyramid pattern of numbers**

**CODE:**

n = int(input("Enter number of rows: "))

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

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

print(j, end="")

print()

**OUTPUT:**

Enter number of rows: 5

1

12

123

1234

12345

**15.Inverted pyramid pattern of numbers**

**CODE:**

row=5

a=0

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

a+=1

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

print(a,end=" ")

print('\r')

**OUTPUT:**

1 1 1 1 1

2 2 2 2

3 3 3

4 4

5

16**.Inverted Pyramid pattern with the same digit**

**CODE:**

rows = 5

num = rows

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

for j in range(0, i):

print(num, end=' ')

print("\r")

**OUTPUT:**

5 5 5 5 5

5 5 5 5

5 5 5

5 5

5

1**7.Alternate numbers pattern using while loop**

**CODE:**

rows = 5

i = 1

while i<= rows:

j = 1

while j <= i:

print((i \* 2 - 1), end=" ")

j = j + 1

i = i + 1

print('')

**OUTPUT:**

1

3 3

5 5 5

7 7 7 7

9 9 9 9 9

**18.Reverse Pyramid of Numbers**

**CODE:**

size= int(input("Enter the size of the series"))

i=1

while(i<=size):

j=i

while(j>=1):

print(j, end = ' ')

j=j-1

i=i+1

print("")

**OUTPUT:**

Enter the size of the series5

1

2 1

3 2 1

4 3 2 1

5 4 3 2 1

**Pyramid Pattern:**

**19.Simple half pyramid pattern:**

**CODE:**

for i in range(0,5):

print()

for j in range(0, i+1):

print("\* ",end="")

**OUTPUT:**

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

**20.Downward half-Pyramid Pattern of Star**

**CODE:**

rows = int(input("Enter number of rows: "))

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

for j in range(0, i):

print("\* ", end=" ")

print("\n")

**OUTPUT:**

Enter number of rows: 5

\* \* \* \* \*

\* \* \* \*

\* \* \*

\* \*

\*

**21.Downward full Pyramid Pattern of star**

**CODE:**

rows = int(input("Enter number of rows: "))

for i in range(rows, 1, -1):

for space in range(0, rows-i):

print(" ", end="")

for j in range(i, 2\*i-1):

print("\* ", end="")

for j in range(1, i-1):

print("\* ", end="")

print()

**OUTPUT:**

Enter number of rows: 6

\* \* \* \* \* \* \* \* \*

\* \* \* \* \* \* \*

\* \* \* \* \*

\* \* \*

\*

**22.Right down mirror star Pattern**

**CODE:**

rows = int(input("Please Enter the Total Number of Rows : "))

print("Reverse Mirrored Right Triangle Star Pattern")

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

for j in range(1, rows + 1):

if(j <i):

print(' ', end = ' ')

else:

print('\*', end = ' ')

print()

**OUTPUT:** Please Enter the Total Number of Rows : 5

Reverse Mirrored Right Triangle Star Pattern

\* \* \* \* \*

\* \* \* \*

\* \* \*

\* \*

\*

**23.Equilateral triangle pattern of star**

CODE:

n=5

for i in range(1, 6):

print(' '\*n, end='')

print('\* '\*(i))

n-=1

OUTPUT:

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

**24.Right start pattern of star**

**CODE:**

n = 5

for i in range(n):

for j in range(i + 1):

print('\*', end="")

print()

for i in range(n):

for j in range(n - i - 1):

print('\*', end="")

print()

**OUTPUT:**

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

\*\*\*\*

\*\*\*

\*\*

\*

**25.Convert decimal to binary number**

**CODE:**

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

a=[]

while(n>0):

d=n%2

a.append(d)

n=n//2

a.reverse()

print("Binary Equivalent is: ")

for i in a:

print(i,end=" ")

**OUTPUT:**

Enter a number: 15

Binary Equivalent is:

1 1 1 1

**26.Convert binary to decimal number**

**CODE:**

print("Enter the Binary Number: ")

b= int(input())

26.decimal = *d*0×2^o + *d*1×2^1 + *d*2×22^2+ ...

d = 0

i = 1

while b!=0:

rem = b%10

d = d + (rem\*i)

i = i\*2

b= int(b/10)

print("\nEquivalent Decimal Value = ", d)

**OUTPUT:**

Enter the Binary Number:

1011

Equivalent Decimal Value = 11

**27.Check the given number is Armstrong number**

**CODE:**

n=int(input("enter the number:"))

num=n

27. 153,370,371 and 407 are examples of Armstrong numbers

For 153, the operation is 1^3 5^3 3^3=153

For 370 the operation is 3^3 7^3 0^3=370

For 371 the operation is 3^3 7^3 1^3=371

For 407 the operation is 4^3 0^3 7^3=407

sum=0

while(n>0):

rem=n%10

sum=sum+(rem\*\*3)

n=n//10

if(sum==num):

print("armstrong no")

else:

print("not a armstrong no")

**OUTPUT:**

enter the number:153

armstrong no

28.lastdigit = number % 10

reverse = (reverse \* 10) + lastdigit

number = number / 10

while (number > 0)

**28.Reversing a Number**

**CODE:**

number = int(input("Enter the integer number: "))

revs\_number = 0

while (number > 0):

remainder = number % 10

revs\_number = (revs\_number \* 10) + remainder

number = number // 10

print("The reverse number is : {}".format(revs\_number))

**OUTPUT:**

Enter the integer number: 123

The reverse number is : 3

The reverse number is : 32

The reverse number is : 321

**29.Print all the prime numbers from 1 -50**

**CODE:**

lower\_value = int(input ("Enter the Lowest Range Value: "))

upper\_value = int(input ("Enter the Upper Range Value: "))

print ("The Prime Numbers in the range are: ")

for number in range (lower\_value, upper\_value + 1):

if number > 1:

for i in range (2, number):

if (number % i) == 0:

break

else:

print (number,end=",")

**OUTPUT:**

Enter the Lowest Range Value: 1

Enter the Upper Range Value: 50

The Prime Numbers in the range are:

2,3,5,7,11,13,17,19,23,29,31,37,41,43,47

**30.Print all the leap year from 1900 – 2000**

**CODE:**

startYear = int(input("Enter start year:"))

endYear = int(input("Enter end year:"))

for year in range(startYear,endYear):

if(year%4==0) and (year%100!=0) or (year%400==0):

print(year,end=" ")

**OUTPUT:**

Enter start year:1900

Enter end year:2001

1904 1908 1912 1916 1920 1924 1928 1932 1936 1940 1944 1948 1952 1956 1960 1964 1968 1972 1976 1980 1984 1988 1992 1996 2000

**EXPLANATION OF PROGRAMS**:

1. The sequence is 1×2, 2×3,3×4,4×5,5×6,6×7,......
2. The sequence is

1\*1 -1=0

2\*2 -2=2

3\*3 -1=8

4\*4 -2=14

5\*5 -1=24

6\*6 -2=34

3. a(first term)=1 and

d(common difference)=3

Sum of n elements of series = n\*(2a + (n-1)\*d)/2

1\*1\*1=1=1\*1  
 1\*1\*1+2\*2\*2 = 9=3\*3  
 1\*1\*1+2\*2\*2+3\*3\*3=36=6\*6  
 1\*1\*1+2\*2\*2+3\*3\*3+4\*4\*4=100=10\*10

5. WKT formula for sum of continuous series that is n(n+1)2

2(n(n+1)2)

n(n+1)

50(51)

50×51=2550

Sum of this series is 2550

6.1o^n+i-10-9n/81

7.1/2! = 1/2 = 0.5

2/3!= 2/(3\*2\*1) = 1/3 = 0.33

So the series becomes =0.5+0.33+0.125+0.033+0.006944…

8 .Fn=Fn-1+Fn-2

F0=0 and F1=1

Fibinocci series is 0,1,1,2,3,5,8

9.The sum of n terms of the series 1, 3, 5, 7, …… is n2

10.Sum of 1,2,3…n is n(n+1)/2

11.1! + 2! + 3! + 4! + 5! = 1 + 2 + 6 + 24 + 120 = 153. 12.9+99+999+9999+99999=10(105−1)−9(5)9=111105

25.Divide the number by 2.

Get the integer quotient for the next iteration.

Get the remainder for the binary digit.

Repeat the steps until the quotient is equal to 0

26.decimal = *d*0×2^o + *d*1×2^1 + *d*2×22^2+ ...

27. 153,370,371 and 407 are examples of Armstrong numbers

For 153, the operation is 1^3 5^3 3^3=153

For 370 the operation is 3^3 7^3 0^3=370

For 371 the operation is 3^3 7^3 1^3=371

For 407 the operation is 4^3 0^3 7^3=407

28.lastdigit = number % 10

reverse = (reverse \* 10) + lastdigit

number = number / 10

while (number > 0)