

## 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:"))
```

```
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

1. The sequence is  
 $1 \times 2, 2 \times 3, 3 \times 4, 4 \times 5, 5 \times 6, 6 \times 7, \dots$

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

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=" ")
```

2. The sequence is  
 $1*1 -1=0$

$2*2 -2=2$

$3*3 -1=8$

$4*4 -2=14$

$5*5 -1=24$

$6*6 -2=34$

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:")
```

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

```
    print(i, end = ' ')
```

OUTPUT:

Series:

1 4 7

3.  $a(\text{first term})=1$  and

$d(\text{common difference})=3$

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

4. Write a Program to Find the sum of series  $1^3+2^3+3^3+4^3+....+N^3$ .

CODE:

```
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)
```

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4.  $1*1*1=1*1$

$1*1*1+2*2*2 = 9=3*3$

$1*1*1+2*2*2+3*3*3=36=6*6$

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

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:"))
```

```
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

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

$$2(n(n+1)/2)$$

$$n(n+1)$$

$$50(51)$$

$$50 \times 51 = 2550$$

Sum of this series is 2550

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

CODE:

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

```
print()
```

```
sum = 0
```

```
str = "
```

```
for i in range(n):
```

```
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```

```
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```

$$6.10^{n+1}-10-9n/81$$

```
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  $1/2! + 2/3! + 3/5! + 4/6! + \dots N/(N+1)!$

CODE:

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

```
sum = 0
```

```
m = 1
```

```
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)
```

$$7. \frac{1}{2!} = \frac{1}{2} = 0.5$$

$$\frac{2}{3!} = \frac{2}{(3 \times 2 \times 1)} = \frac{1}{3} = 0.33$$

So the series becomes  
 $= 0.5 + 0.33 + 0.125 + 0.033 + 0.006944 \dots$

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': "))
```

```
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

8.  $F_n = F_{n-1} + F_{n-2}$

$F_0 = 0$  and  $F_1 = 1$

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

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

CODE:

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```
print("Enter the range of number:")
```

```
n=int(input())
```

```
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

9. The sum of n terms of the series 1, 3, 5, 7, ..... is  $n^2$

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
```

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

```
    sum+=i
```

10. Sum of  $1, 2, 3, \dots, n$  is  $\frac{n(n+1)}{2}$

```
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  $1!+2!+3!+\dots+n!$

CODE:

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

```
fact = 1
```

```
if(n==0):
```

```
    fact = 1
```

```
sum = 0
```

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

```
    fact = fact*i
```

```
    sum = sum + fact
```

```
print(sum)
```

OUTPUT:

Enter n value:5

153

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

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

CODE:

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

```
sum = 0
```

```
num = 9
```

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

```
    sum = sum + num
```

```
    num = (num*10)+9
```

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$$12. 9+99+999+9999+99999=10(10^5-1)-9(5)9=111105$$

```
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

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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
```

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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("\n")
```

OUTPUT:

5 5 5 5 5

5 5 5 5

5 5 5

5 5

5

#### 17. Alternate numbers pattern using while loop

CODE:

```
rows = 5
i = 1
while i <= rows:
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```

```
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
```

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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

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\* \* \* \* \*

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\* \* \*

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## 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

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

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

\* \* \* \* \*

\* \* \*

\*

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## 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):
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```

```
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:

```
*
```

```
**
```

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## 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

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.Convert binary to decimal number

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CODE:

```
print("Enter the Binary Number: ")
b= int(input())
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

$$26_{\text{decimal}} = d_0 \times 2^0 + d_1 \times 2^1 + d_2 \times 2^2 + \dots$$

27. Check the given number is Armstrong number

CODE:

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

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  $4^3 + 0^3 + 7^3 = 407$

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OUTPUT:

enter the number:153

armstrong no

## 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))
```

```
28. lastdigit = number % 10
reverse = (reverse * 10) +
lastdigit
number = number / 10
while (number > 0)
```

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
```

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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

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