**Assignment -2 - Problems on Control Statements**

**Number series**

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

**Program:**

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

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

print(i\*(i+1),end=" ")

**Output:**

enter the n:10

0 2 6 12 20 30 42 56 72 90 110

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

**Program:**

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

i=1

m=0

while(i <=n):

if(i%2==0):

m=(i\*\*2)-2

print(m,end=" ")

else:

m=(i\*\*2)-1

print(m,end=" ")

i+=1

**Output:**

enter the range:5

0 2 8 14 24

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

**Program:**

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

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

print(i,end=' ')

**Output:**

enter n:30

1 4 7 10 13 16 19 22 25 28

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

**Program:**

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

i=1

sum=0

while(i<n):

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

i=i+1

print(sum)

**Output:**

enter the n:4

36

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

**Program:**

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

sum=0

i=0

while i<=n:

sum=sum+i

i=i+2

print(sum)

**Output:**

enter the range n:10

30

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

**Program:**

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

s=0

sum1=0

for i in range(0,n):

s=s\*10+1

sum1=sum1+s

print("sum of series=",sum1)

**Output:**

Enter n:5

sum of series= 12345

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

Program:

**s=0**

**f=1**

**n=int(input("Enter the number:"))**

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

**f=(f+1)\*i**

**s=s+(i/f)**

**print(s)**

**Output:**

**Enter the number:3**

**0.976190476190476**

**8. Write a Program to print the Fibonacci series.**

**Program:**

f1=int(input("enter the 1st value:"))

f2=int(input("enter the 2nd value:"))

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

print(f1)

print(f2)

i=0

while(i<n-2):

f3=f1+f2

print(f3)

f1=f2

f2=f3

i=i+1

**Output:**

enter the 1st value:0

enter the 2nd value:1

enter n:8

0

1

1

2

3

5

8

13

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

**Program:**

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

i=1

sum=0

while(i<n+1):

sum=sum+i

i=i+2

print("sum=",sum)

**output:**

enter the number:10

sum = 25

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

**Program:**

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

i=1

sum=0

while(i<n+1):

sum=sum+i

i=i+1

print("sum=",sum)

**Output:**

enter the number:10

sum= 55

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

**Program:**

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:3

9

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

**program:**

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

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

**Output:**

Enter the range of number:3

The sum of the series= 1107

**Number Patterns :**

1.Python program to print the following simple number pattern using a [for loop](https://pynative.com/python-for-loop/).

Program:

for i in range(1,6):

print()

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

print(i,end=' ')

Output:

1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

**2. Pyramid pattern of numbers**

Let’s see how to print the following half pyramid pattern of numbers

Program:

for i in range(1,6):

print()

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

print(j,end=' ')

Output:

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

**3. Inverted pyramid pattern of numbers**

An inverted pyramid is a downward pattern where numbers get reduced in each iteration, and on the last row, it shows only one number. Use reverse for loop to print this pattern.

Program:

row=5

b=0

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

b+=1

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

print(b,end=' ')

print('\r')

Output:

1 1 1 1 1

2 2 2 2

3 3 3

4 4

5

4. Inverted Pyramid pattern with the same digit

**Program:**

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

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

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

print(n,end=" ")

print("")

**Output:**

Enter a number: 5

5 5 5 5 5

5 5 5 5

5 5 5

5 5

5

5. **Alternate numbers pattern using while loop**

Let’s see how to use the [while loop](https://pynative.com/python-while-loop/) to print the number pattern

Program:

n=5

x=1

for i in range(1,6):

for j in range(i):

print(x,end='')

x+=2

print()

Output:

1

33

555

7777

99999

6. Reverse Pyramid of Numbers:

Program:

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

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

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

a=j

print(a,end=" ")

a = j+1

print()

Output:

Enter number of rows:5

1

2 1

3 2 1

4 3 2 1

5 4 3 2 1

**Pyramid Patterns**

**1. Simple half pyramid pattern**

**Program:**

str1='\*'

i=1

while i<=5:

print(str1\*i)

i+=1

**Output:**

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**\*\***

**\*\*\***

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

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

2. Downward half-Pyramid Pattern of Star

**Program:**

str1='\*'

i=5

while(i>=1):

print(str1\*i)

i-=1

**Output:**

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

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

**\*\*\***

**\*\***

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3. Downward full Pyramid Pattern of star

**Program:**

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

for i in range(0,n):

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

print(end=" ")

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

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

print()

**Output:**

Enter range value:6

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

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

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

**\* \* \***

**\* \***

**\***

4. Right down mirror star Pattern

Program:

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

i=1

while(i<=rows):

j=1

while(j<=rows):

if(j<i):

print('',end=' ')

else:

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

j=j+1

i=i+1

print()

Output;

enter number of rows:5

\* \* \* \* \*

\* \* \* \*

\* \* \*

\* \*

\*

### 5. Equilateral triangle pattern of star

Program:

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

for i in range(0,n):

for j in range(0,n-i-1):

print(end=" ")

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

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

print()

Output:

Enter range value:6

\*

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### 6. Right start pattern of star

Pattern: –

Program:

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

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:

Enter range value:5

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\*

Problems:  
1. Convert decimal to binary number:

Program:

dec = int(input('Enter a decimal number: '))

binary = ''

while dec != 0:

binary = str(dec % 2) + binary

dec = dec // 2

print('The binary value is:', binary)

Output:

Enter a decimal number: 10

The binary value is: 1010

2. Convert binary to decimal number:

Program:

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

num=n

sum=0

base=1

while(n>0):

rem=n%10

sum=sum+rem\*base

n=n//10

base=base\*2

print(sum)

Output:

Enter the num:1010

10

3. Check the given number is Armstrong number.

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

num=n

sum=0

while(n>0):

rem=n%10

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

n=n//10

if(sum==num):

print("Armstrong number")

else:

print("Not Armstrong number")

Output:

Enter the num:153

Armstrong number

Enter the num:135

Not Armstrong number

4. Reversing a Number:

Program:

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

num=n

sum=0

while(n>0):

rem=n%10

sum=(sum\*10)+rem

n=n//10

print(sum)

Output:

Enter the num:21

12

5. Print all the prime numbers from 1 –50

Program:

n=1

while(n&lt;=50):

count=0

i=2

while(i&lt;=n//2):

if(n%i==0):

count=count+1

break

i=i+1

if(count==0 and n!=1):

print(n,end=&#39; &#39;)

n=n+1

output:

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

6. Print all the leap year from 1900 – 2000

Program:

start=int(input("Enter the lower year:"))

stop=int(input("Enter the higher year:"))

years=[]

for year in range(start,stop+1):

if (year%400==0):

years.append(year)

elif ((year%4==0)and(year%100!=0)):

years.append(year)

print(years)

Output :

Enter the lower year:1900

Enter the higher year:2000

[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]