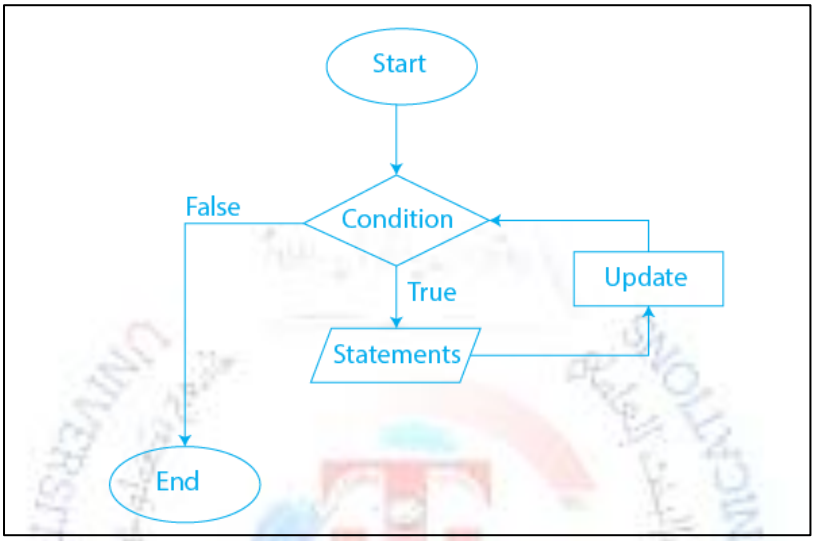
LECTURE THREE

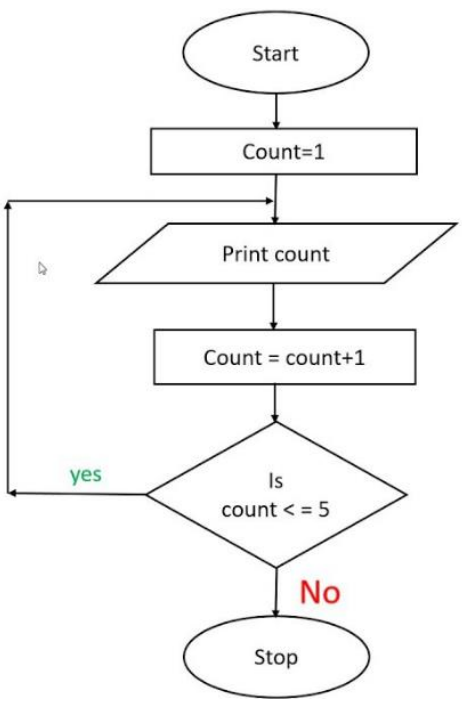
Loop in Algorithm & Flowcharts

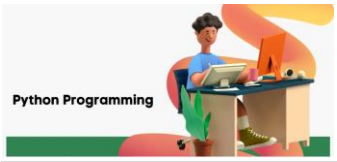
Loop allows sequence of statement(s) to be repeatedly executed based on some loop condition. You must ensure that the condition for the termination of the looping must be satisfied after some finite number of iterations, otherwise it ends up as an infinite loop. Loop Representation as Flowchart: -



Example (1): Write an algorithm and the corresponding flowchart for print numbers between 1 to 5.

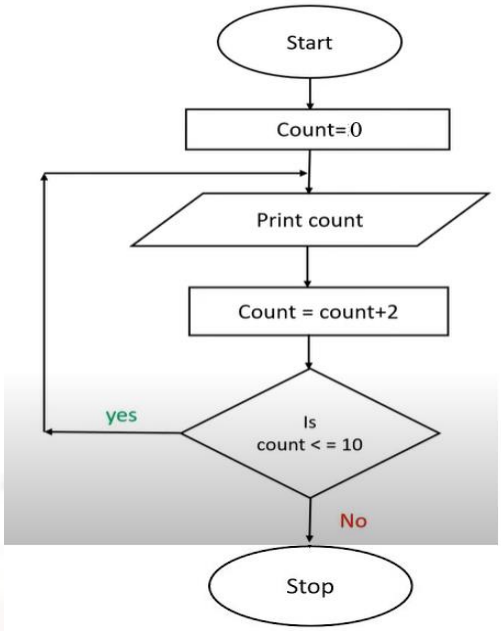
Step 1: Start
Step 2: i=1
Step 3: Print i
Step 4: i=i+1
Step 5: If i < 6 then goto step 3
Step 6: End





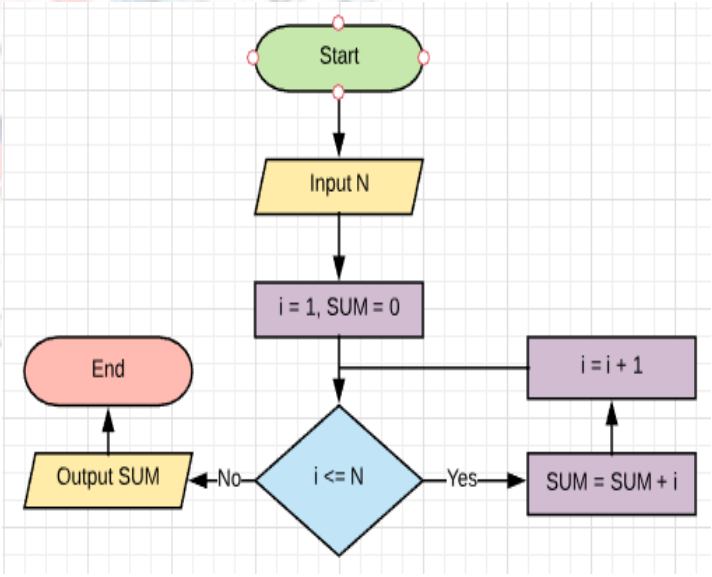
Example (2): Write an algorithm and the corresponding flowchart for print even numbers between 0 to 10.

Step 1: Start
Step 2: i=0
Step 3: Print i
Step 4: i=i+2
Step 5: If i <= 10 then goto step 3
Step 6: End



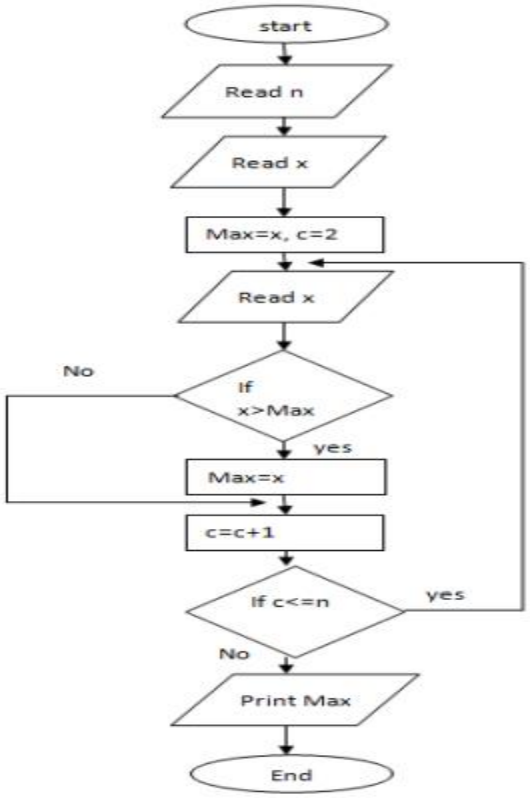
Example (3): Design an algorithm and the corresponding flowchart which asks the user for a number N and prints the sum of the numbers 1 to N?

Step 1: Start
Step 2: Read N
Step 3: i=1, sum=0
Step 4: sum=sum +i
Step 5: i=i+1
Step 6: If i <= N then goto step 4
Step 7: Print sum
Step 8: End



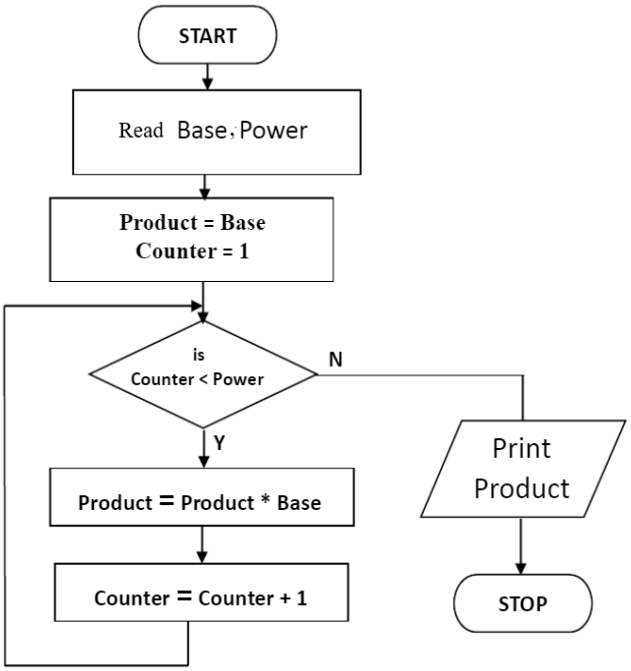
Example (4):Write algorithm and the corresponding flowchart to read n numbers and print the largest number of them.

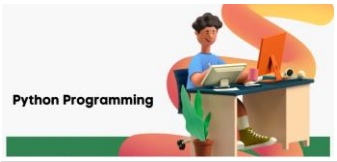
Step 1: Start
Step 2: Read n, x
Step 3: Max=x, c=2
Step 4: Read x
Step 5: If x > Max then Max=x
Step 6: c=c+1
Step 7: If c <= n then go to 4
Step 8: Print Max
Step 9: End



Example (5): Write an algorithm and the corresponding flowchart to find X^Y i.e. power(X, Y).

Step 1: Start
Step 2: Read x, y
Step 3: C=1, z=X
Step 4: z=z*x
Step 5: C=C+1
Step 6: if C < y then go to 4
Step 7: print z
Step 8: End



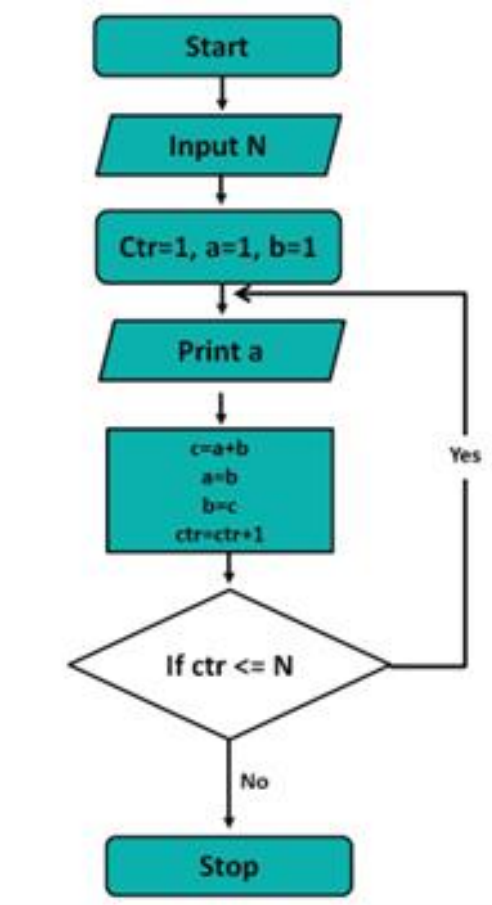


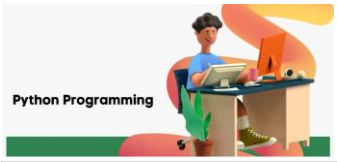
Example (6): Write an algorithm with number n as input which calculates following formula:

$$S = ½ + ¼ + \ldots + 1/n$$

Step 1: Start
Step 2: Read n
Step 3: i =2 , S = 0
Step 4: S= S + (1/i)
Step 5: i=i+ 2
Step 6: If I less than or equal to n then go to step 4
Step 7: print S
Step 8: End

Example (7): Draw a Flowchart to generate Fibonacci series as 1,1,2,3,5,8,… where number N as input of terms :





WORK SHEET (2)

Homework Write an algorithm for print odd numbers between 5 to 20.

Homework Draw Flowchart for the calculate average from 5 exam scores.

Homework Write an algorithm and corresponding flowchart to read number and check if it's prime or not prime.

Homework Write an algorithm to find factorial X!

Hint: x! = x * x-1 * x-2 * x-3 * ... * 2 * 1

Homework Write an algorithm and the corresponding flowchart for finding the sum of the numbers 4, 16, 64, 256, 1024, …, n

Homework Write an algorithm and the corresponding flowchart for reading N numbers and get the summation of negative, the summation of positive numbers and the number in each group.