Example 14:

Write an Algorithm to evaluate the following equation and draw its flow chart:

$$e^x = 1 + X + \frac{X^2}{2!} + \frac{X^3}{3!} + \frac{X^4}{4!} + \dots\dots\dots\dots\dots.. \frac{X^N}{N!}$$

Solution:

1- Start.

2- Read the value of N and X.

3- Let the initial value of the factorial (F) equals to one (F=1).

4- Let the initial value of the summation (S) equals to one (S=1).

5- Let the initial value of the counter equals to zero (I=0).

6- Increase the value of the counter by one (I=I+1).

7-F=F*I

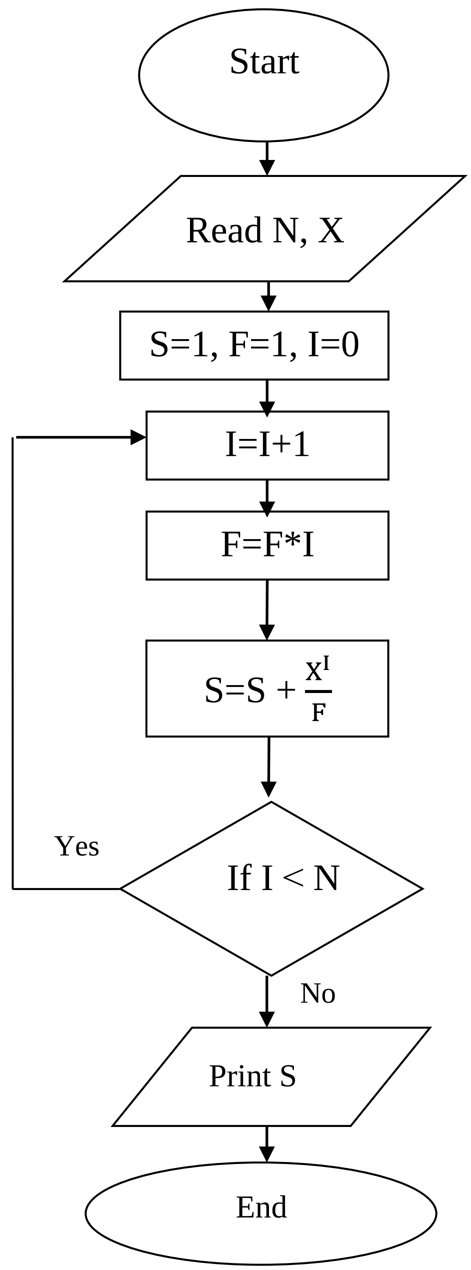
8- S=S + $\frac{X^I}{F}$

9- If I< N, then go to step 6

10- Print S.

11- End

The flowchart of example 14 is shown below:



Example 15: Write an Algorithm to evaluate the following equation:

$$\boldsymbol{Sin(X) = X - \frac{X^3}{3!} + \frac{X^5}{5!} - \frac{X^7}{7!} + \frac{X^9}{9!} \ldots\ldots\ldots\ldots\ldots.. N\ Terms}$$

Solution:

The equation is $\mathrm{Sin(X)} = \sum_{\mathrm{I}=1}^{\mathrm{N}} (-1)^{(\mathrm{I}-1)} \frac{\mathrm{X}^{(2\mathrm{I}-1)}}{(2\mathrm{I}-1)!}$

1-Start.

2- Read the value of X and N.

3-Let the initial value of the summation equals to zero(S=0).

4-Let the initial value of the counter equals to zero(I=0).

5-Increase the value of the counter by one (I=I+1).

6-Let the initial value of the counter of the Factorial equals to zero(IF=0).

7- Let the initial value of the factorial (F) equals to one (F=1).

8- Increase the value of the counter of the Factorial by one (IF=IF+1).

9-F=F*IF.

10- If the value of (IF) is less than (2*I-1) Return to step 8.

11- $S = S + (-1)^{(\mathrm{I}-1)} * \frac{\mathrm{X}^{(2\mathrm{I}-1)}}{\mathrm{F}}$.

12- If the value of (I) is less than (N) Return to step 5.

13- Print S.

14- End.

The flowchart of example 15 is: