Problem Solving Through programming in C

Course Code: ONL1001

Topic : Flowchart

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School - SCOPE

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Flowchart

A graphical representation of an algorithm, often used in the design phase of programming to work out the logical flow of a program.

- Visual way to represent the information flow
- Make our logic more clear
- Help during writing of program
- Make testing and debugging easy

Flowchart Symbols

Symbol	Symbol Name	Purpose
	Start/Stop	Used at the beginning and end of the algorithm to show start and end of the program.
	Process	Indicates processes like mathematical operations.
	Input/ Output	Used for denoting program inputs and outputs.
	Decision	Stands for decision statements in a program, where answer is usually Yes or No.
	Arrow	Shows relationships between different shapes.
	On-page Connector	Connects two or more parts of a flowchart, which are on the same page.
	Off-page Connector	Connects two parts of a flowchart which are spread over different pages.

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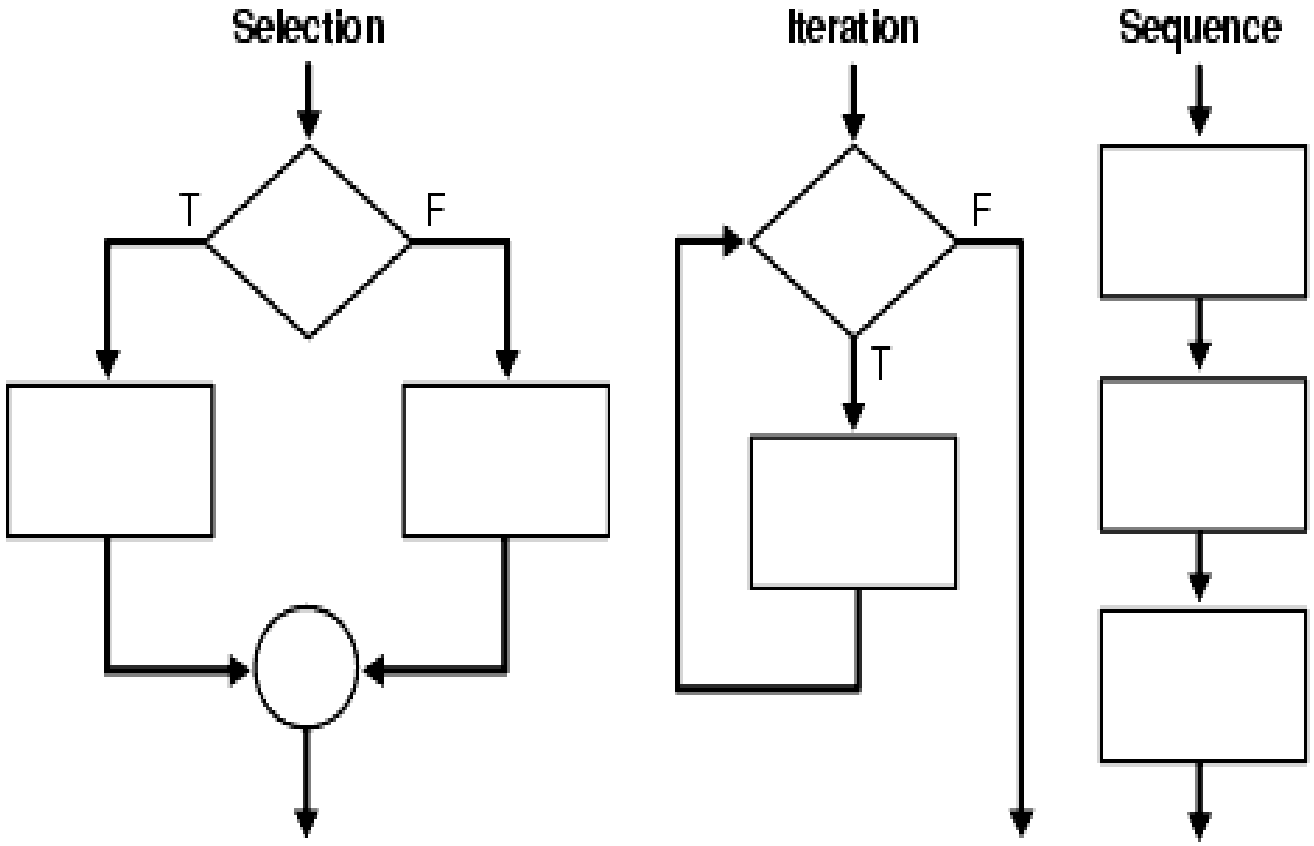
Flowchart or program constructs

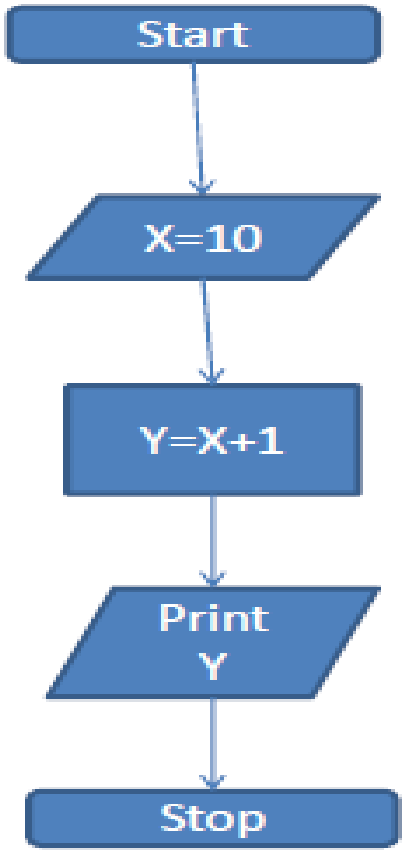
- Sequence: The order of execution, this typically refers to the order in which the code will execute. Normally code executes line by line, so line 1 then 2 then 3 and so on.
- Selection: Selection, like branching, is a method of controlling the execution sequence, you can create large control blocks, using **if statements** testing a condition, or **switch statements** evaluating a variable to control and change the execution of the program depending on this environment and changing variables.
- Iteration (Repetition): Iteration is typically used to refer to collections and arrays of variables and data. Repeating set of instruction. Counting from 1 to 10, you are iterating over the first 10 numbers. for, while, do-while loops will be implemented for iteration.

Program constructs



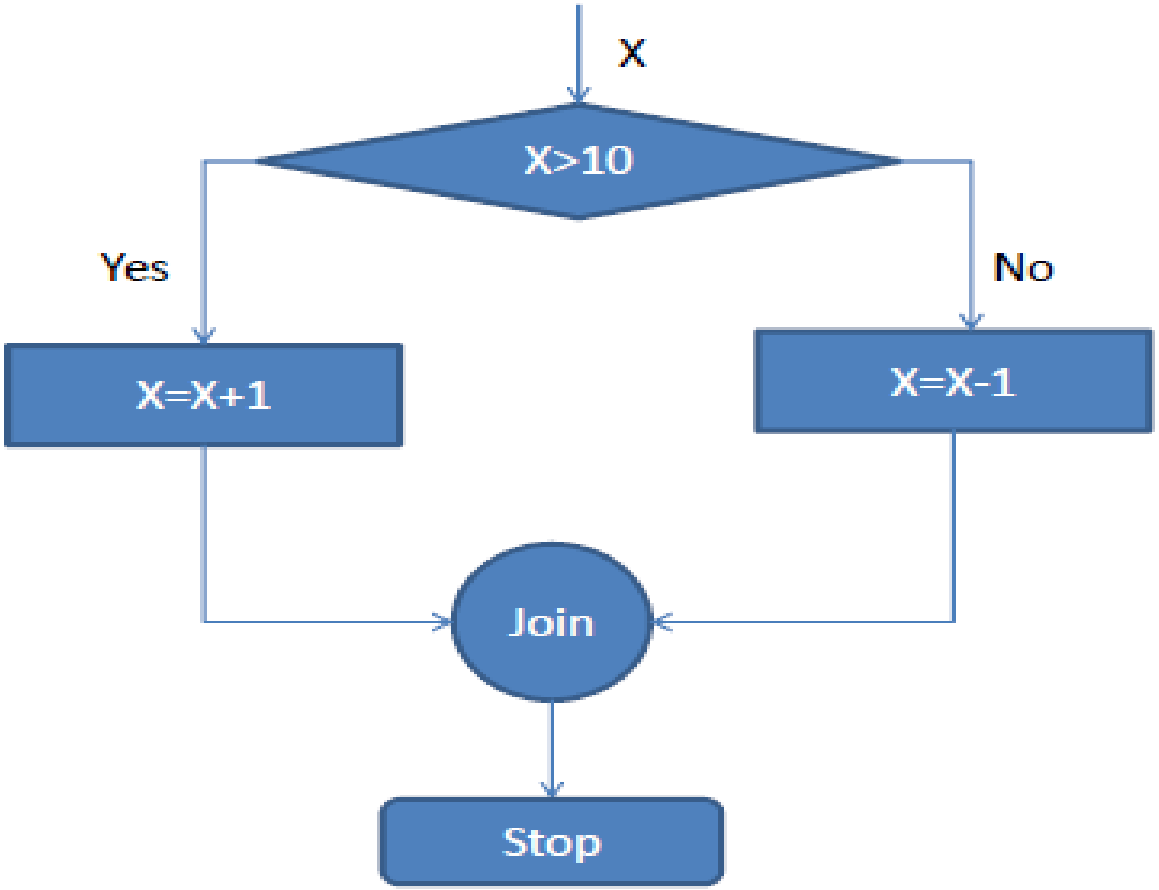
Flowchart

Sequence



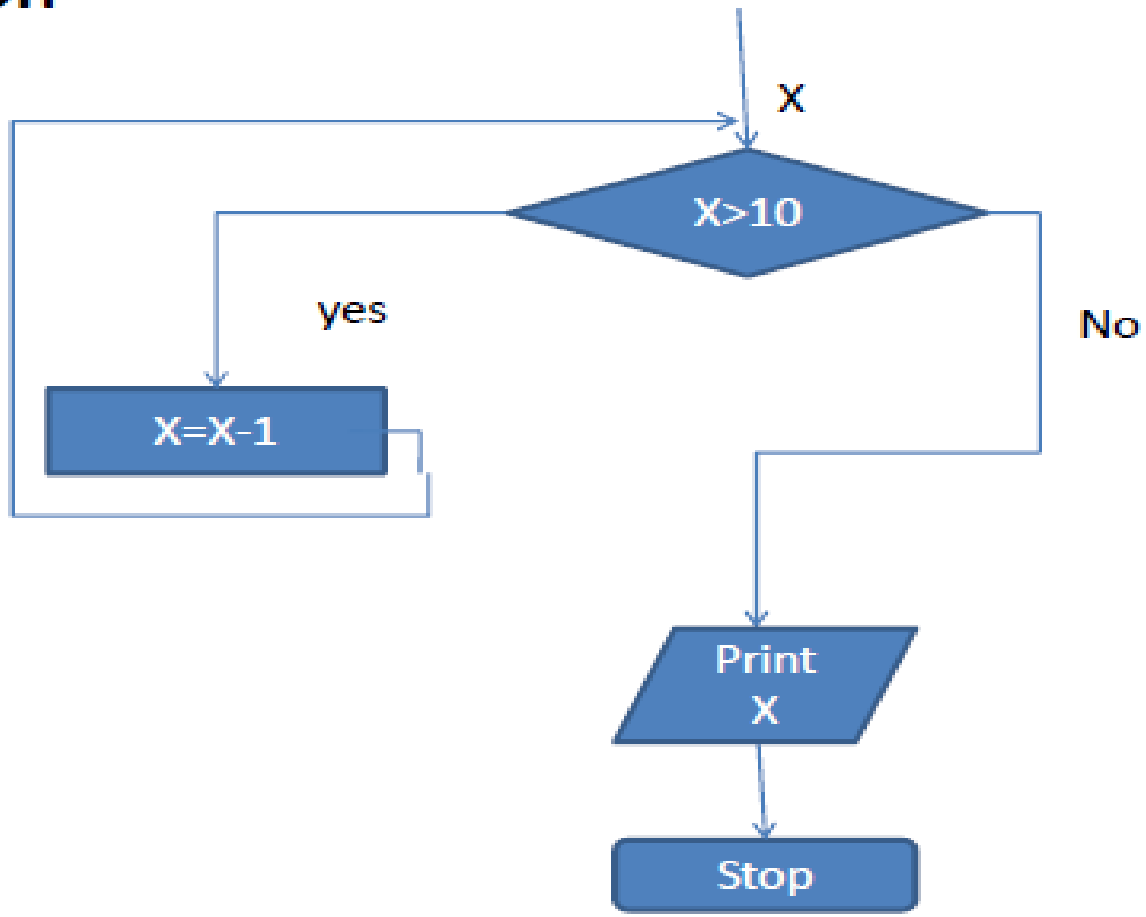
Flowchart (cont..)

Selection



Flowchart (cont..)

Repetition



Exchanging/Swapping the values of two variables

Two different methods:

i) Using a temporary variable

ii) Without using a temporary variable

```
Enter the value of x and y
4
5
Before Swapping
x = 4
y = 5
After Swapping
x = 5
y = 4
```

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Exchanging the values of two variables

Using temporary variable

Suppose x and y are the two variables.

x=4 and y=5

Take temporary variable say T

T=x

x=y

y=T

- After swapping the values of x=5 and y=4

Exchanging the values of two variables

Without using temporary variable

Suppose x and y are the two variables.

x=4 and y=5

x = x + y

y = x-y

x = x-y

After swapping the values of x and y will be 5 and 4

Flowchart/Alogoirthm for exchanging values of two variables

Algorithm

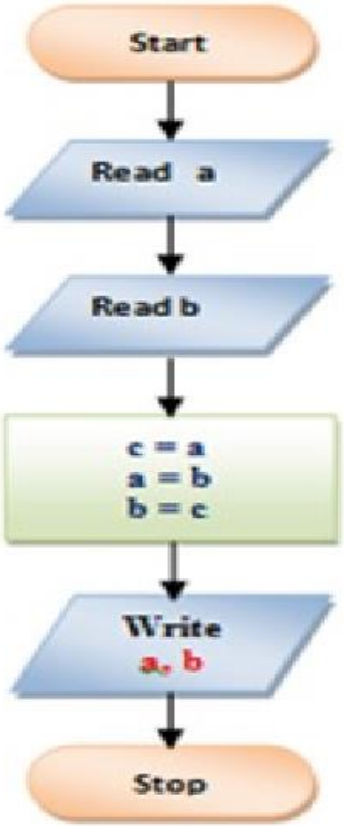
1. Start
2. Read two values into two variables a, b
3. Declare third variable, c

   c = a

   a = b

   b = c
4. Print or display a, b
5. Stop

Flowchart



Algorithm of Counting

Algorithm to Print "*Hello World*" 10 times

Step1: Start

Step2: Initialize count = 0 (PROCESS)

Step3: Print Hello World (I/O)

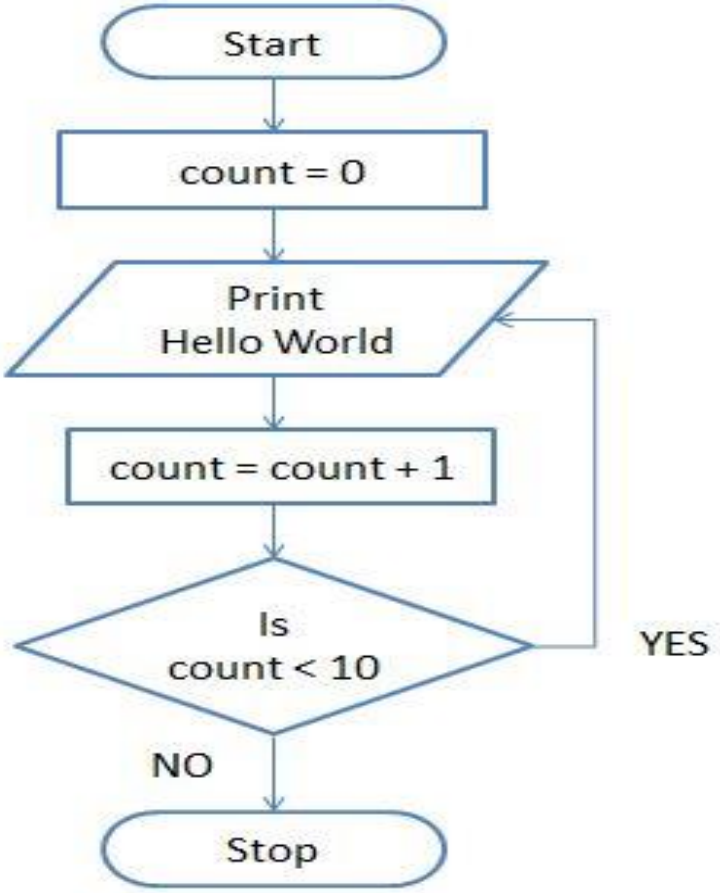
Step4: Increment count by 1 (PROCESS)

Step5: if count < 10 go to step 3 (DECISION)

Step6: Stop

Flow chart of Counting

Flowchart to Print "*Hello World*" 10 times



Factorial computation

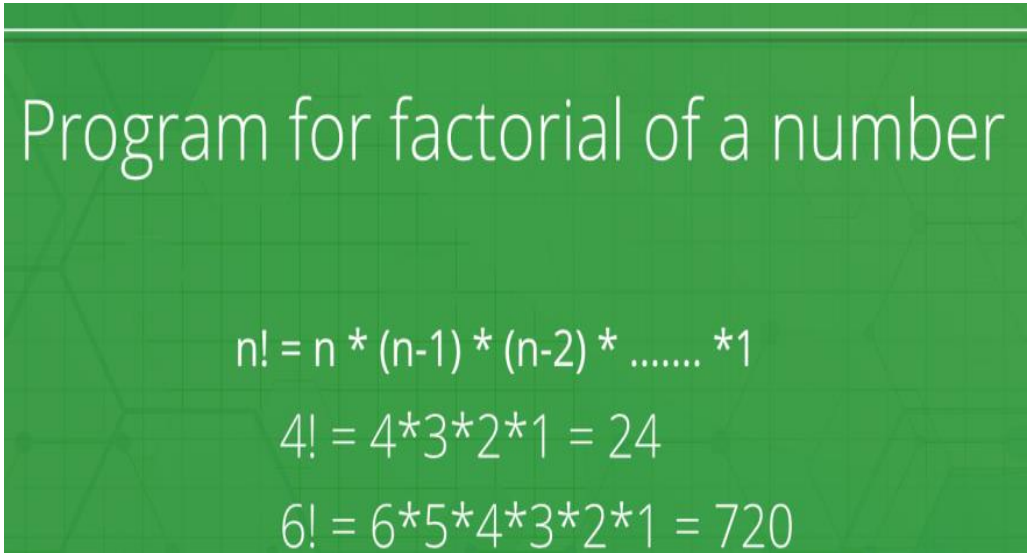
Algorithm to calculate the factorial of a number

step 1. Start
step 2. Read the number n
step 3. Initialize i=1, fact=1
step 4. Check is i <= N if TRUE then continue

ELSE Goto step 7

step 5. fact=fact*i
step 6. i=i+1 Goto step 4

step 7. Print fact
step 8. Stop



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