Introduction to Programming and Flowchart

How to solve a programming problem?

→ Given the problem,

① understand the problem → Add 2 num

② check the given values → 2 variable. Data types

③ Figure out an approach → a+b = ans

④ code

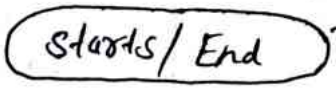
```
int ans = a+b;
cout << ans << endl;
```

Pseudocode: A very simple and high level form of computer language that is used in program design.

A flowchart is a diagramatic representation of an approach. This draws out all the steps of our approach in order.

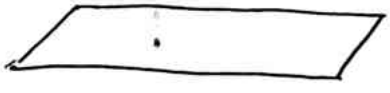
Components:

① Terminator: Specifies the start and end of a program



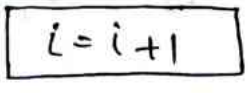
→ Terminator

② Parallelogram: For taking input or showing output.

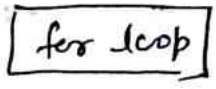


Input/Output

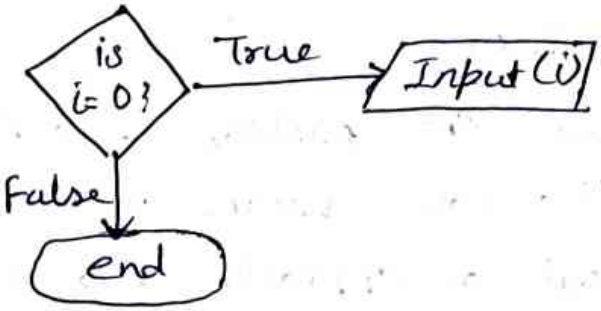
③ Process: Operations and process. ke liye.



or



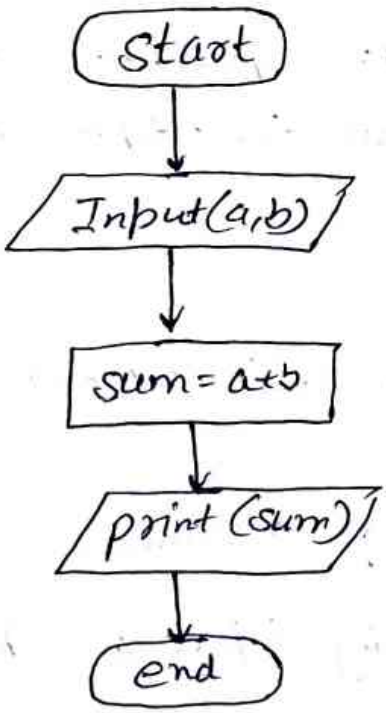
④ Decision Making: (Diamond shape)



⑤ Circle: Connectors (To be covered when we discuss function/methods)

⑥ Arrow: To show the flow of code

Example Flowchart for adding two numbers



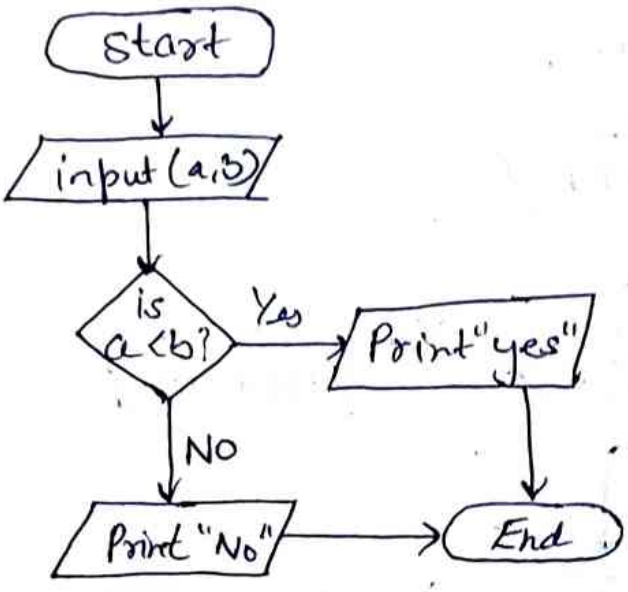
Pseudocode for adding 2 num

① → input 2 num a and b
→ Let sum = a+b
→ Print out sum

② → Read a and read b
→ sum variable is a+b
→ sum

- Both pseudocodes are OK. No pseudocode is wrong as long as the logic is same/similar

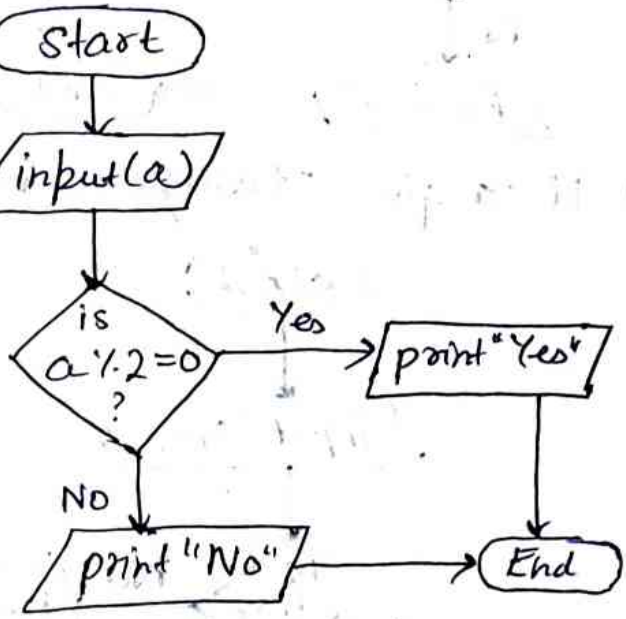
Example: Determine if a<b



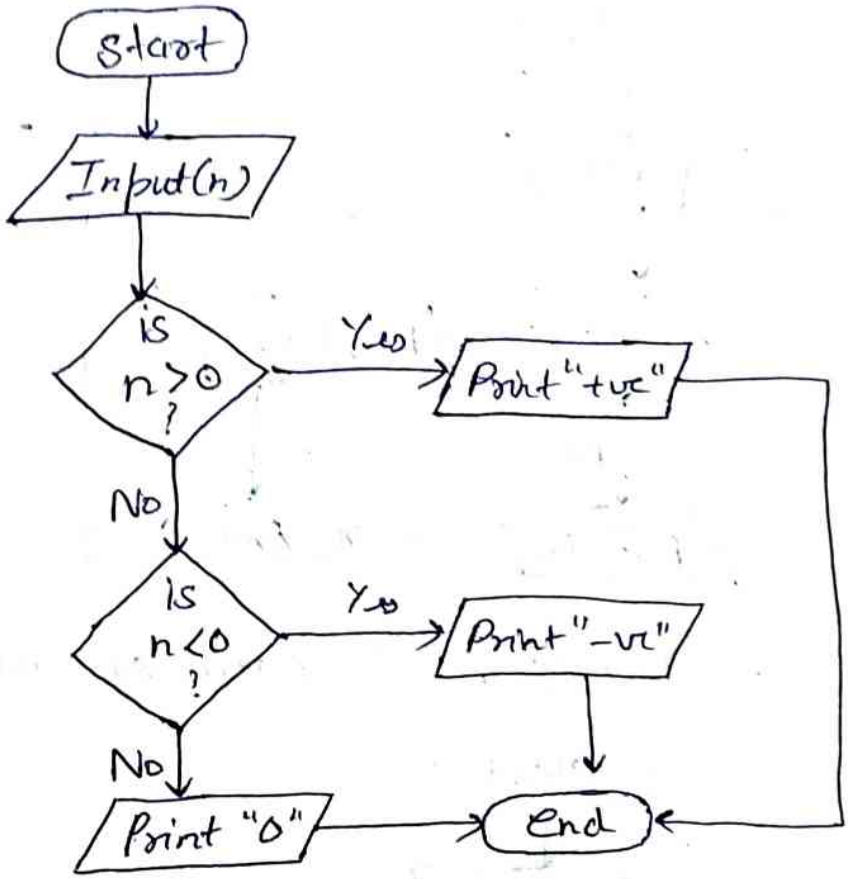
PSEUDOCODE

→ Read a and b
if a < b
then print Yes
else
print No

Example: Check if n is even or odd

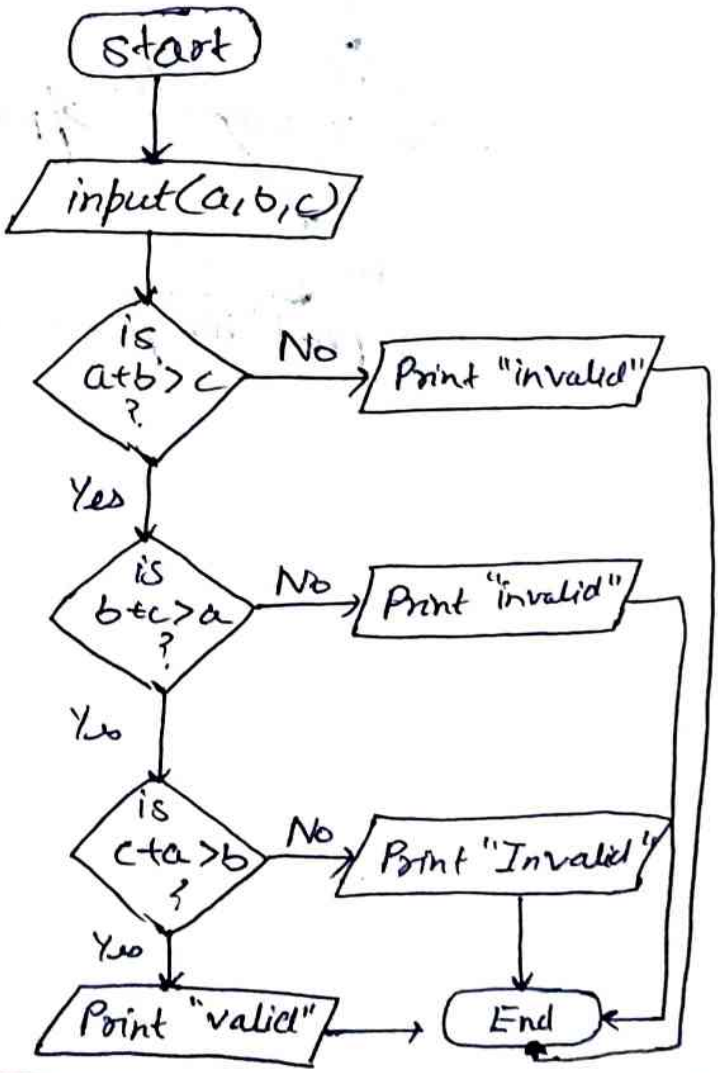


Example : Is n positive, negative or zero



Example: Check if a given triangle is valid

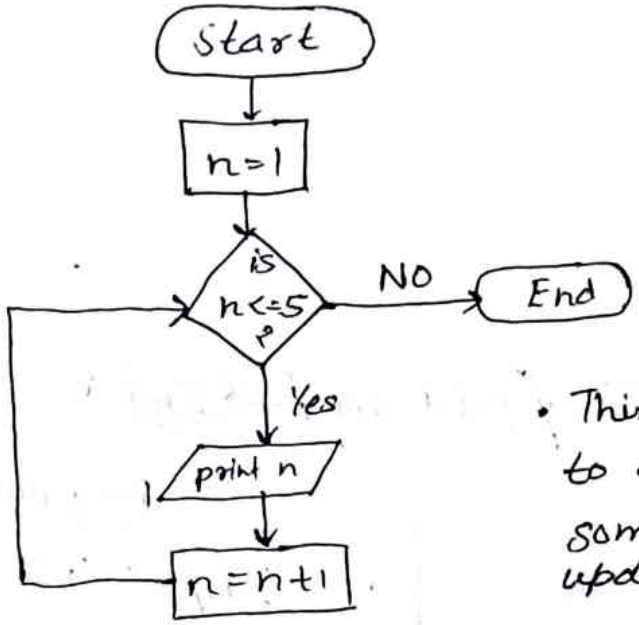
Hint-
a+b>c
b+c>a
c+a>b



Loops

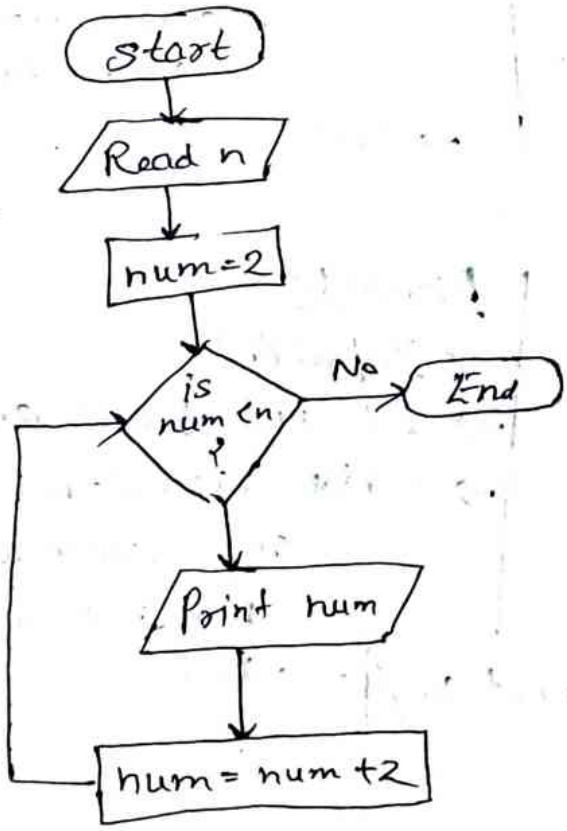
Let variable n=1

Now make n go from 1 to 5



- This whose we use loops to continuously perform some action while updating some value.

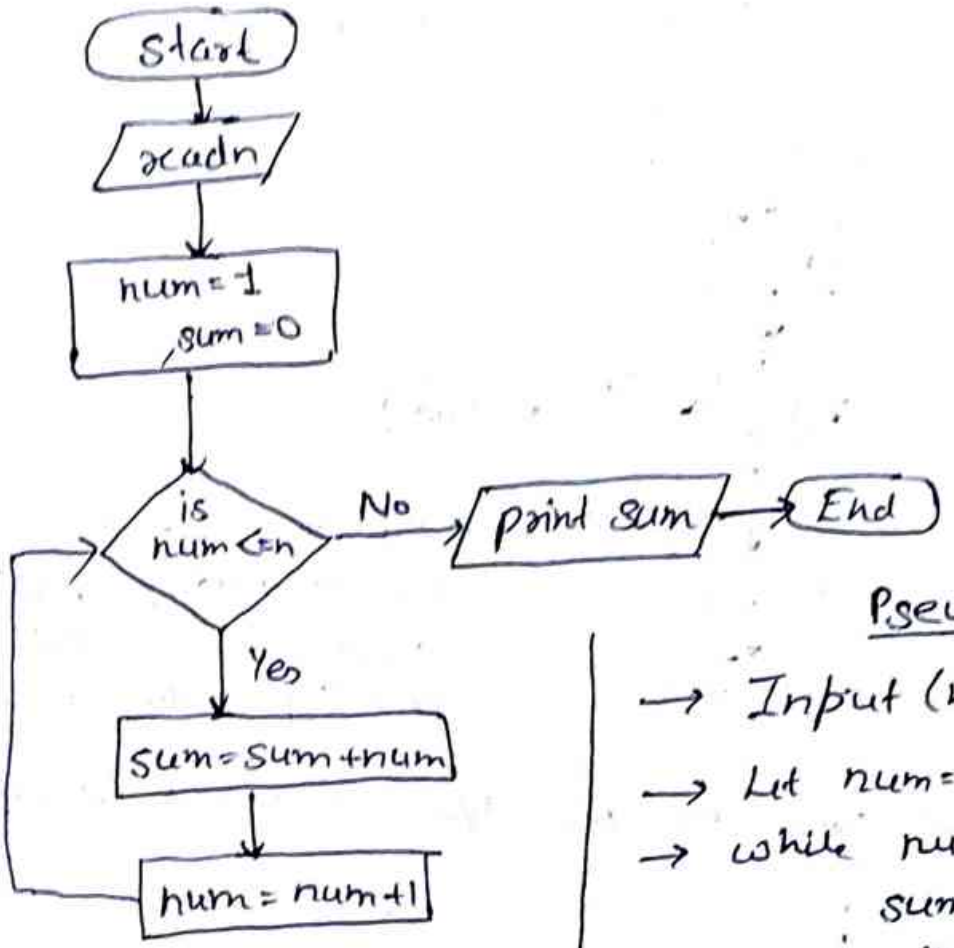
Example : Print even number b/w 1 and n. (exclusive)



Pseudocode

→ Input (n)
→ Let num = 2
→ while num < n,
    print num
    num = num+2
→ End.

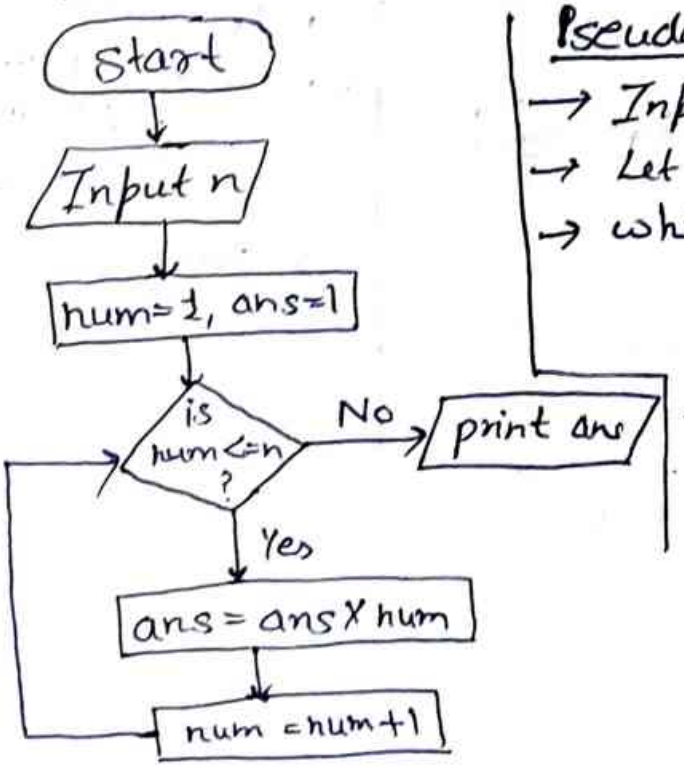
Example : Find sum from 1 to n



Pseudocode

→ Input (n)
→ Let num = 1 and sum = 0
→ while num <= n
    sum = sum + num
    num = num + 1
→ End

Example : Find n!

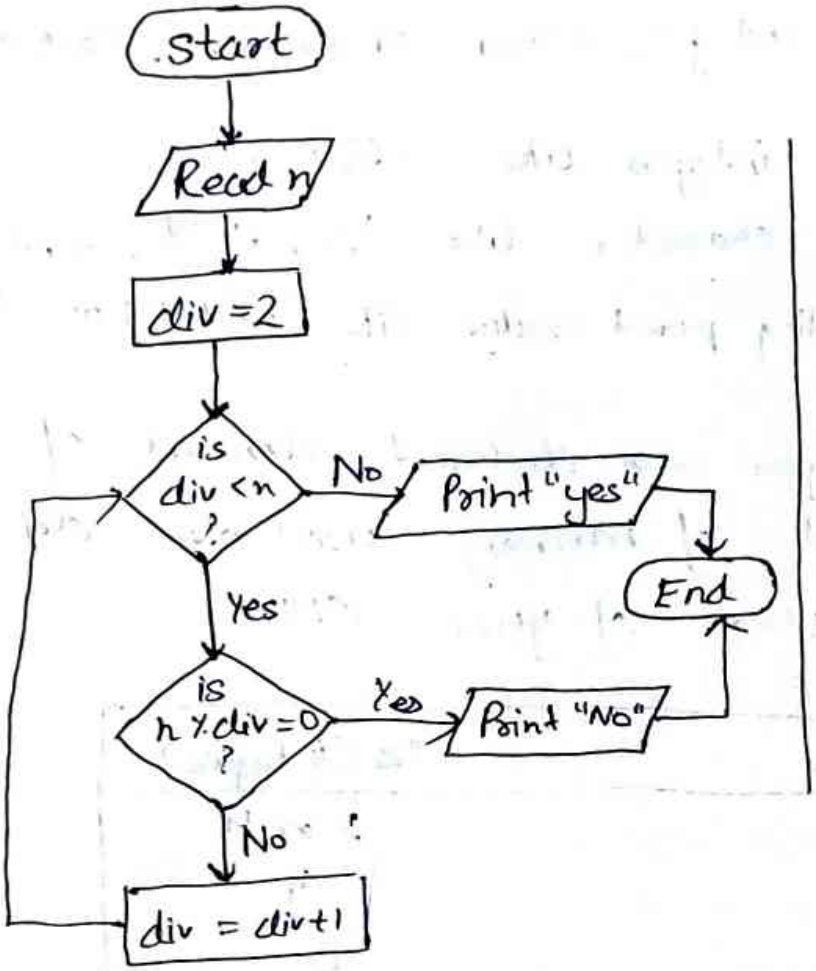


Pseudode

→ Input (n)
→ Let num = 1 and ans = 1
→ while num <= n,
    ans = ans X num
    num = num + 1
→ End.

Example: Check if n is prime

Hint: → n % (any number from 2 to n-1) ≠ 0



Pseudocode

→ input (n)
→ Let div = 2
→ while div < 2,
  • if n % div = 0
    print "No"
    exist
  else
    div = div + 1
→ Print "Yes"

What is a Programming Language?

- A programming language is a way to communicate with a computer. It is a formal language which consists of sets of string that produce various kinds of machine output

Eg: C, C++, Java, Python, R, GO, etc

⇒ Source code (C++) → Compiler → Binary/Machine code → Comp. executes

- A computer essentially only understands binary codes of 0s and 1s. A compiler process the statements of a programming language into Machine code (Binary)