L1- Basics of Programming (Flowcharts and Pseudocodes)

→ What is Programming?

"Set of Instr" given to machine to perform tasks.

→ what is Algorithm?

Defination: The combination of sequence of finite steps to solve a problem.

Ex: Namkeen Chawal, Maggi, Pasta

→ How to approach a problem?

(Thought process)

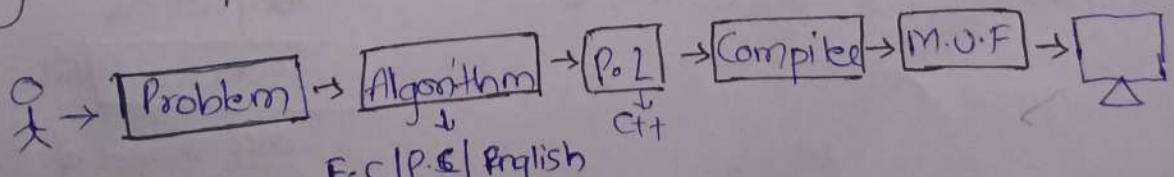
① Lets Undeestand the problem.

② Analyze problem → given values / relate formula

③ Create a approach for Algorithm

④ Flowchart

→ Using a computer to solve a problem



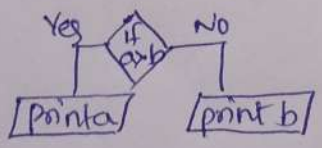
=> Flowchart and its Components:

Def: Diagramatic representation of your Algorithm.

(or)

Flowcharts are the diagrams used to represent Soln for the given problem.

Components:

Components	Representations	Name of shape
Start/End	Start End	Terminator
Input/output	Read Name Print "Hi"	Parallelogram
Process	name = "Asif" Sum = a+b	Rectangle
Decision		Diamond
Arrows	↑, ↓, ←, →	They act as Connectors b/w diff shapes of diagram/ flow of Execution

→ Pseudo Code:

↓

Nakli code denote karta hai desi basha.

Ex: ①

1. Start
2. Read First Name
3. Read Middle Name
4. Read Last Name.
5. FullName = F.N + M.N + L.N
6. print FullName
7. End.

② Sum of 2 NO

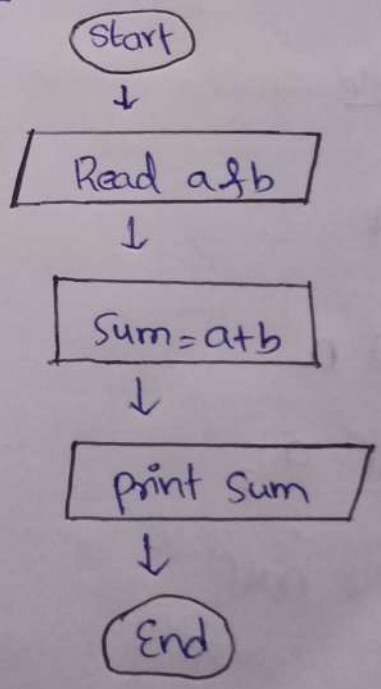
1. Start.
2. Read the value of a & b
3. Sum = a+b
4. print Sum
5. End.

Q) Design Flowchart - Print sum of a and b

Pseudo code:

1. Start
2. Input a & b
3. Sum = a+b
4. print Sum
5. End.

Flowchart:

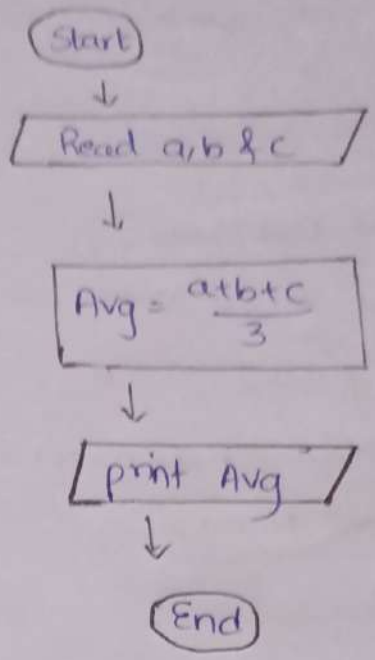


Q) Design Flowchart - Print Average of a, b and c

Pseudocode

1. Start
2. Read a, b & c
3. Avg = $\frac{a+b+c}{3}$
4. print Avg
5. End.

Flowchart:

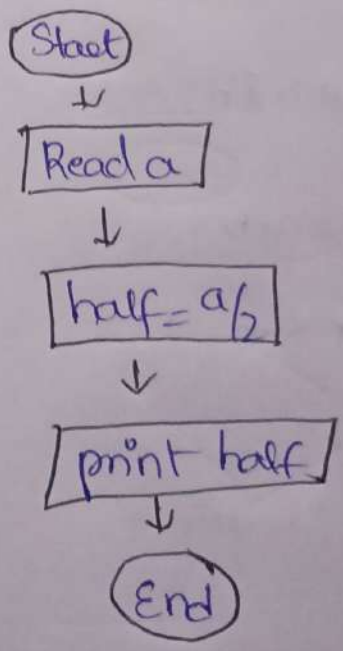


Q) Design Flowchart - Print half of a.

Pseudocode

1. Start
2. Read a
3. half = a/2
4. print half
5. End

Flowchart



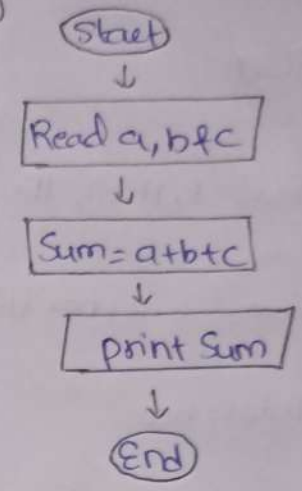
Q) Design Flowchart - Take Input and add 3 numbers

Pseudocode:

1. Start
2. Read a, b & c
3. Add or Sum = a+b+c
4. print Sum
5. End

Flowchart:

1.

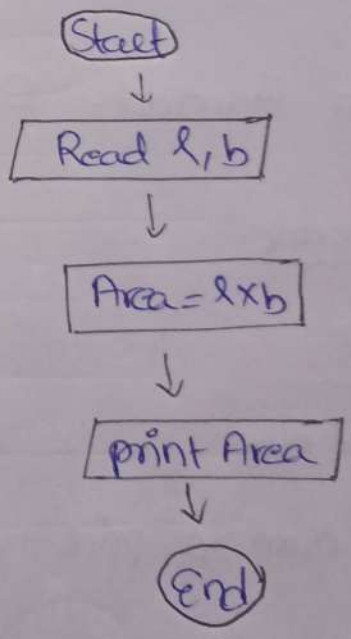


Q) Design Flowchart - Area of Rectangle

Pseudocode

1. Start
2. Read length (l) and breadth (b)
3. Area = l x b
4. Print Area
5. End

Flowchart:



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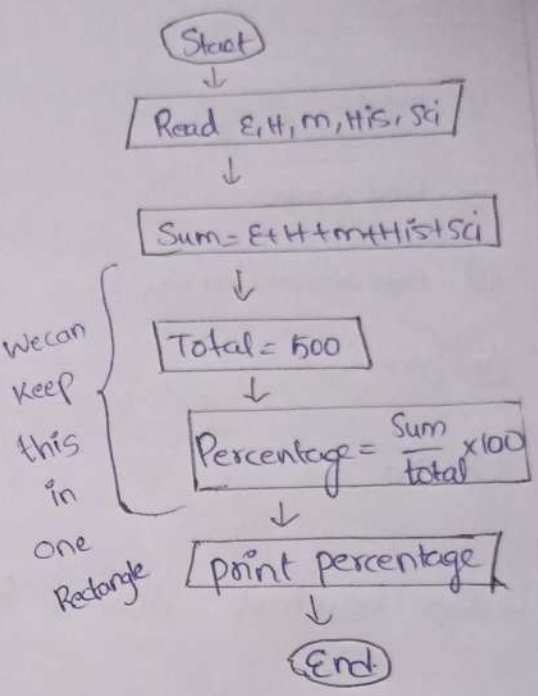
Q) Design Flowchart - Calculate Percentage

Pseudocode

1. Start
2. Read E, H, M, His, Sci
3. Sum = E+H+M+His+Sci
4. Total = 500
5. Percentage = $\frac{Sum}{total} \times 100$
6. print Peccentage
7. End

Flowchart

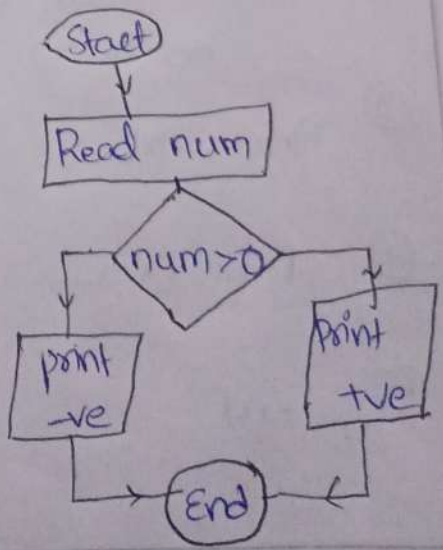


Q) Design Flowchart - Given Number +ve (positive) / -ve

Pseudocode.

1. Start
2. Read num
3. If num > 0, print +ve
4. else, print -ve | if num < 0, print -ve
5. End

Flowchart:



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Q) Design Flowchart — age ≥ 18 — license
age < 18 — no license.

Pseudocode

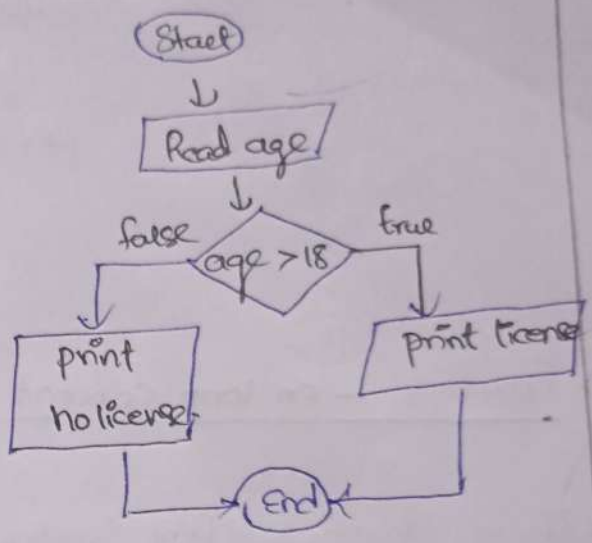
① Start

② Read age

③ if age ≥ 18
print license
else
print no license

④ End

Flowchart:



Q) Design Flowchart - check positive, negative or zero

Pseudocode

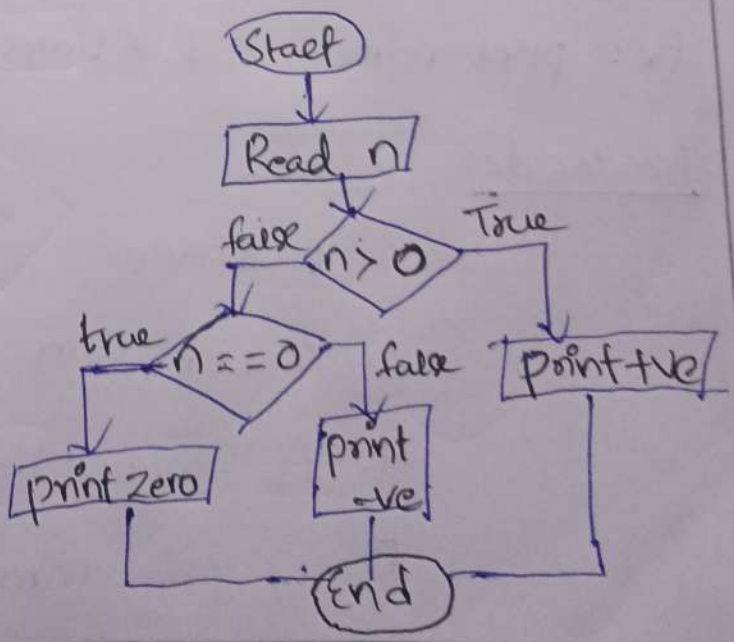
① Start

② Read n

③ If n > 0
print +ve
else if (num == 0)
print zero
else print -ve

④ end

Flowchart:



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→ Homework

Q) Design Flowchart A_1 A_2 A_3 A_4 A_5 marks

↓

Calculate percentage

↓

print grade → A >90%
B 80-90%
C 70-80
fail <70

→ Flowcharts – on loop Concept

Q) Design Flowcharts - Print Counting from 1 to N

Before moving the Questions solution let's have Example based on looping example

Ex: print name - Asif 5 times

Pseudocode:

1. Start
2. Read name
3. limit = 5, count = 0
4. if count < limit
5. print name
   count = count + 1
   else go to step 6
5. go to step 4
6. End

Alternate

pseudocode:

1. Start
2. Read name
3. limit=5
4. If limit is not=0
   print name
   limit= limit-1
   else
   end
5. Go to step (4)
6. End

DryRun: Name: Asif limit: 5

limit = ~~5~~ 4 ~~3~~ ~~2~~ ~~1~~ 0

① 5!=0 → Asif → limit=5-1 =4

② 4!=0 → Asif → limit=4-1 =3

⋮

Asif
Asif
Asif
Asif
Asif

⑤ 1!=0 → Asif → limit =1-1=0

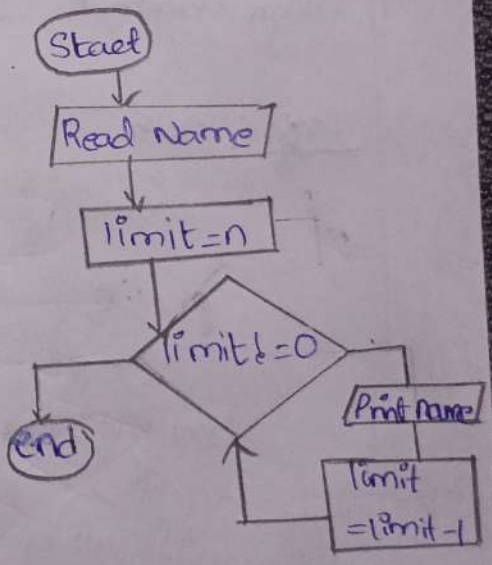
0!=0 failed

Q) Printing Name ntimes

Pseudocode:

1. Start
2. Read name
3. limit = n
4. if limit !=0
   print name
   limit=limit-1
   else
   end
5. Goto step (4)
6. End

FC:



Q) Printing name 4 times

Name = Ayaan

limit = 4 3 2 1 0

1. Start
2. Read Name
3. limit = 4
4. if limit != 0
   print Name
   limit = limit - 1
   else
   end
5. go to step (4)
6. End

Q) Design Flowchart - Print Counting from 1 to N

Logic: n = 5

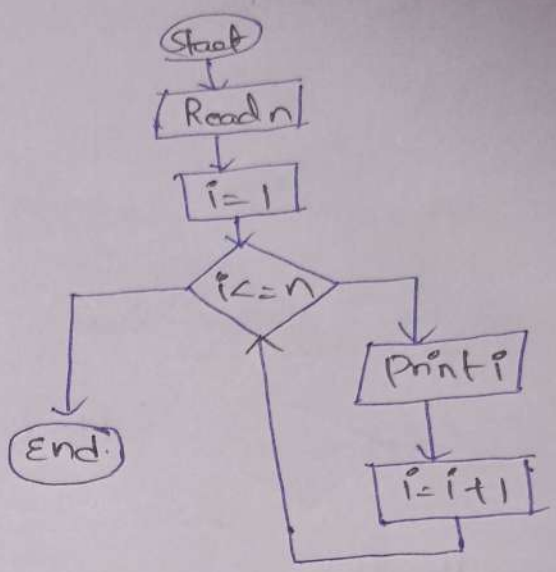
count = 1 count = 2

1 <= 5	2 <= 5	3 <= 5	4 <= 5	5 <= 5
↓	↓	↓	↓	↓
print 1	print 2	print 3	print 4	print 5
↓	↓	↓	↓	↓
count++	count++	count++	count++	count++

Pseudocode

1. Start
2. Read n
3. i=1
4. if i<=n
   print i
   i=i+1
   else
   end
5. Goto Step(4)
6. Exit

Flowchart

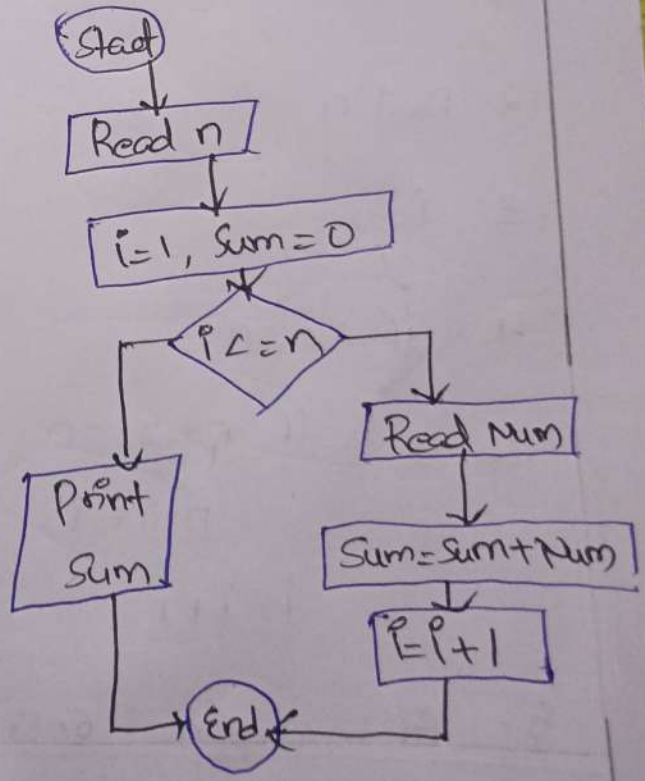


Q) Design Flowchart - Add N numbers from 0 see.

Pseudocode:

1. Start
2. Read n
3. i=1, Sum=0
4. if i<=n
   Read num
   Sum=Sum+1, i=i+1
   else
   Print num
   end
5. Go to step (4)
6. End

Flowchart:



Logic:

n=10

i=1

1<=10

1%2==0

↓

odd

i=i+1

2<=10

2%2==0

↓

Even

i=i+1

3<=10

|

3%2==0

|

odd

i=i+1

10<=10

|

10%2==0

|

Even

i=i+1

11<=10 ✗

End

Pseudo code:

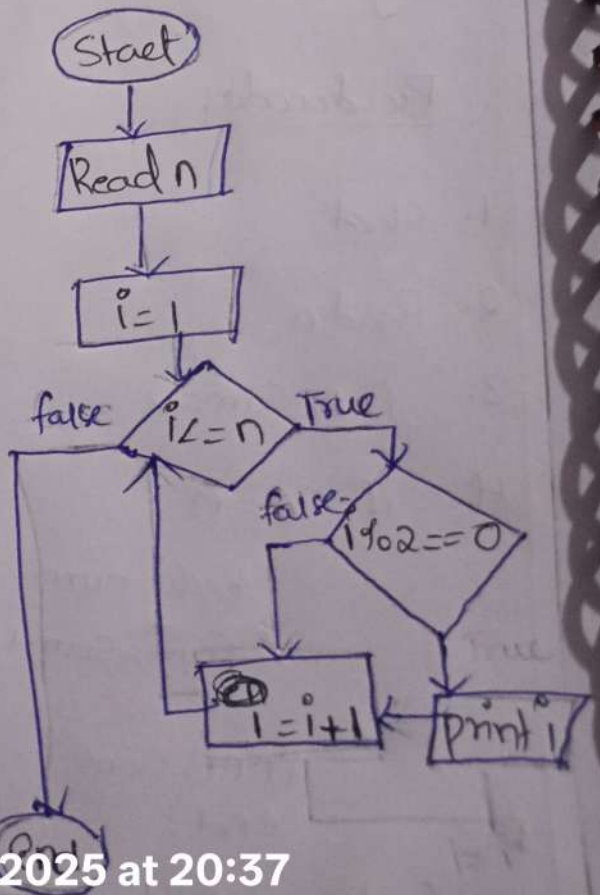
1. Start
2. Read n
3. i=1
4. if i<=n

   if i%2==0

   print i

   i=i+1
5. Go to step 4

Flowchart:



Dry Run:

i=1, n=7

1<=7
└ 1%2==0 ✓
↙
i=1+1=2

2<=7
└ 2%2==0
└ print 2
i=2+1=3

...

7<=7
└ 7%2==0
└ i=i+1
=7+1
=8

8<=7 ✗

→ Assignment:

Design Flowchart for below

① Multiply 2 Number after taking Input
② perimeter of Δle
③ Find simple Interest
④ Find compound Interest
⑤ print Counting from N to 1
⑥ Find Factorial of a Number
⑦ Check if a Number is prime or Not
⑧ Chek valid Δle or Not
⑨ Print Max of 2 Number.