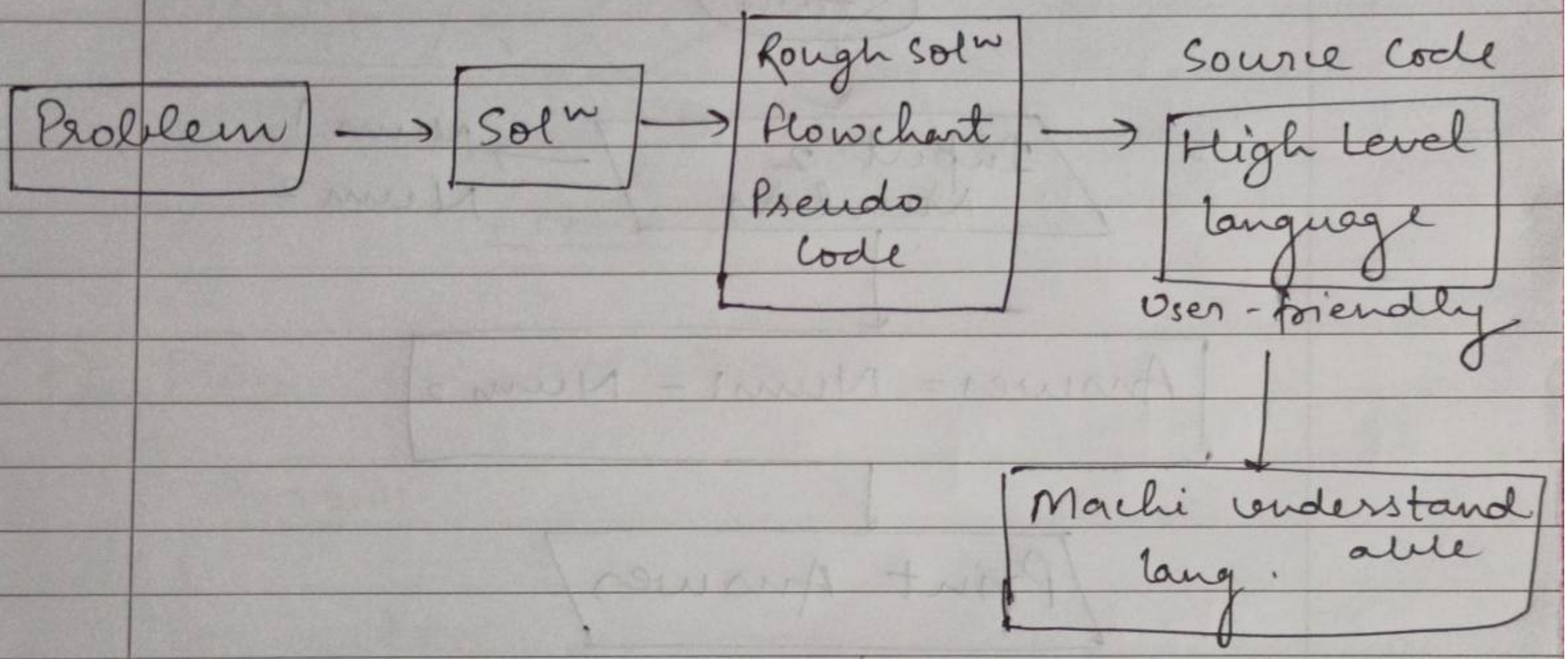
Lec 1 Date ⇒ 27/01/23 __/__/____

Data Structures and Algorithms

* Thought process to solve a problem
  - Understand the problem.
  - Check input values.
  - Approach
  - Rough Work
  - Source code Implementation



Using computer to solve a problem

- check 13 is prime or not -

13 → 13/2
13/3
13/4
13/5
13/6

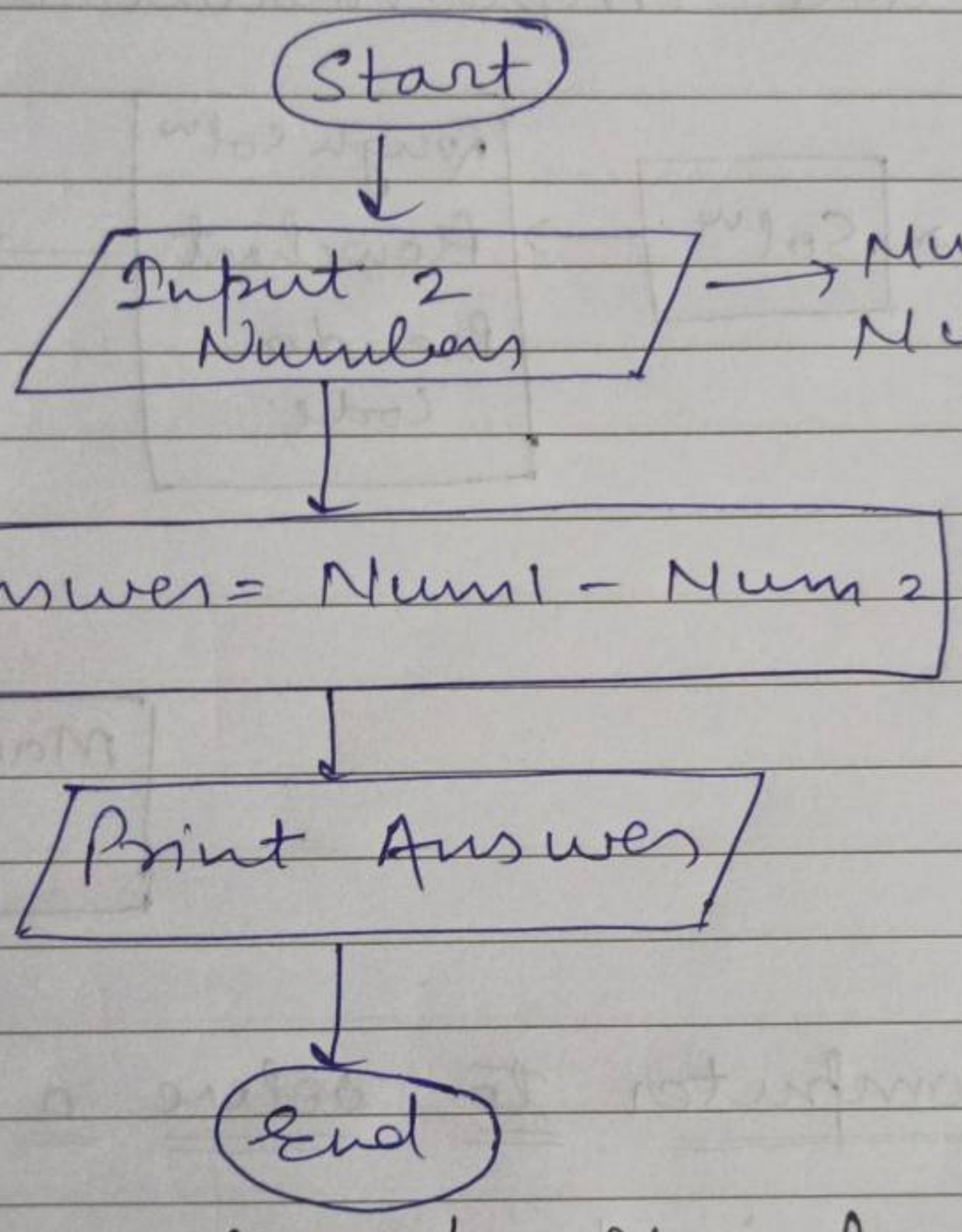
} checking prime or not

Flowchart

A graphical representation of an algorithm

It is usually used by a programmes to solve a problem

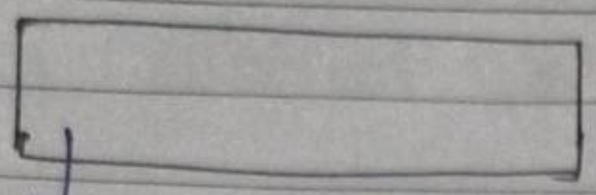
eg: Sub 2 nos



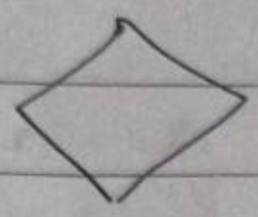
Components of flowchart

1) ⬭ → Terminator
↳ Used for start/end

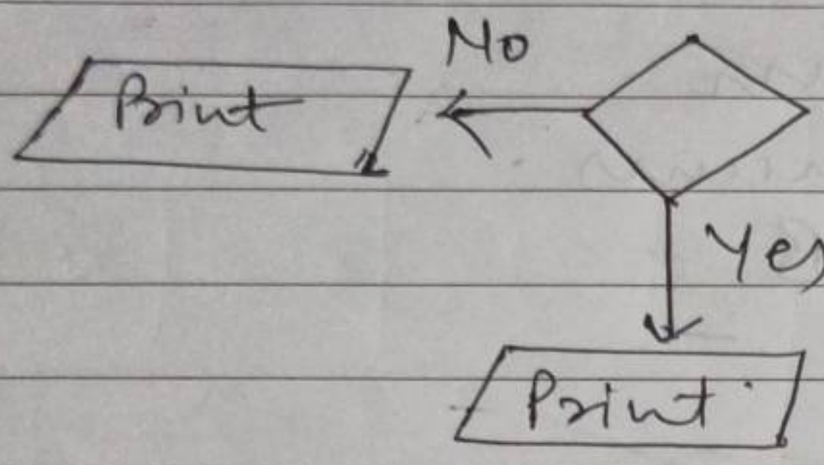
2) ▱ → Used for denoting Input / Output

3)  Process Block or Operation.

Calculation or initialisation.

4)  Conditional Block or Decision Making Block

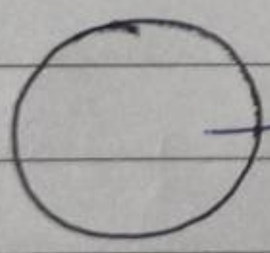
It has 2 blocks



5) Flow or direction

↑ Arrows

6) Connector

 Denotes a function

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Pseudo Code

Nakli code jo ki only humans smj sakte hain.

* Detailed description of a algorithm

eg: Sum of 2 numbers:

→ Start Program
→ Enter two nums.
→ Add A and B
→ Print Result
→ End

eg: Diff of 2 numbers.

→ Start
→ Read A, B
→ Diff. A and B
→ Print Diff.
→ End.

eg: Product of 2 numbers.

→ Start
→ Read A, B
→ Product = A * B
→ Print Product
→ End.

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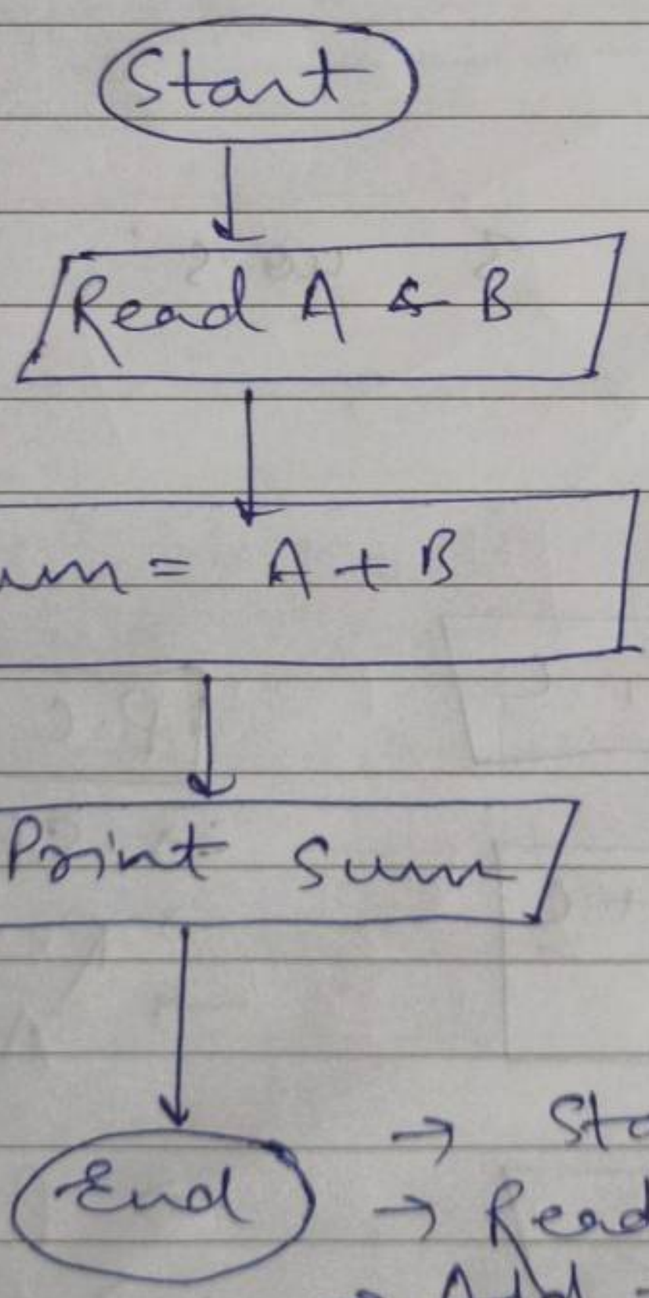
eg: Print average of 2 no.

→ Start
→ Read A and B
→ Avg = $\frac{A+B}{2}$
→ Print Avg
→ End.

Practice

1) Add 2 no.s by taking inputs

Flowchart



Pseudocode:

→ Start
→ Read A, B
→ Add = A + B
→ Print Add
→ End

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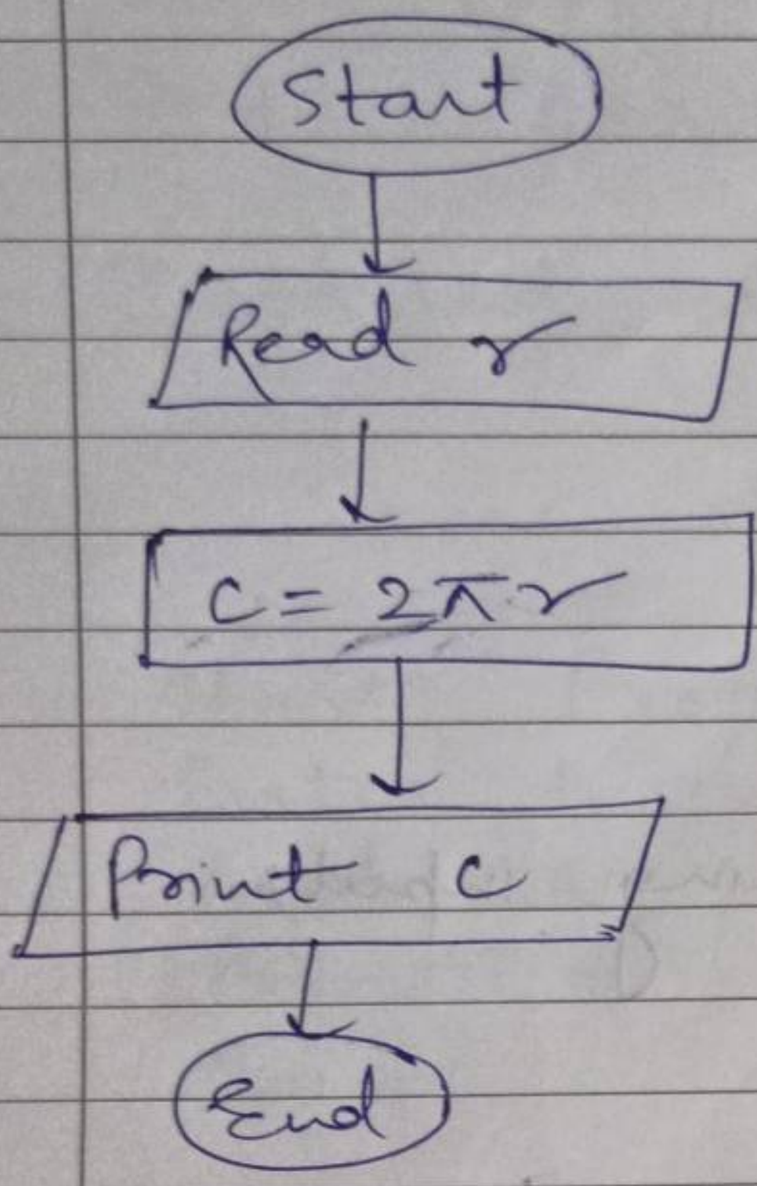
2) Circumference of a circle -

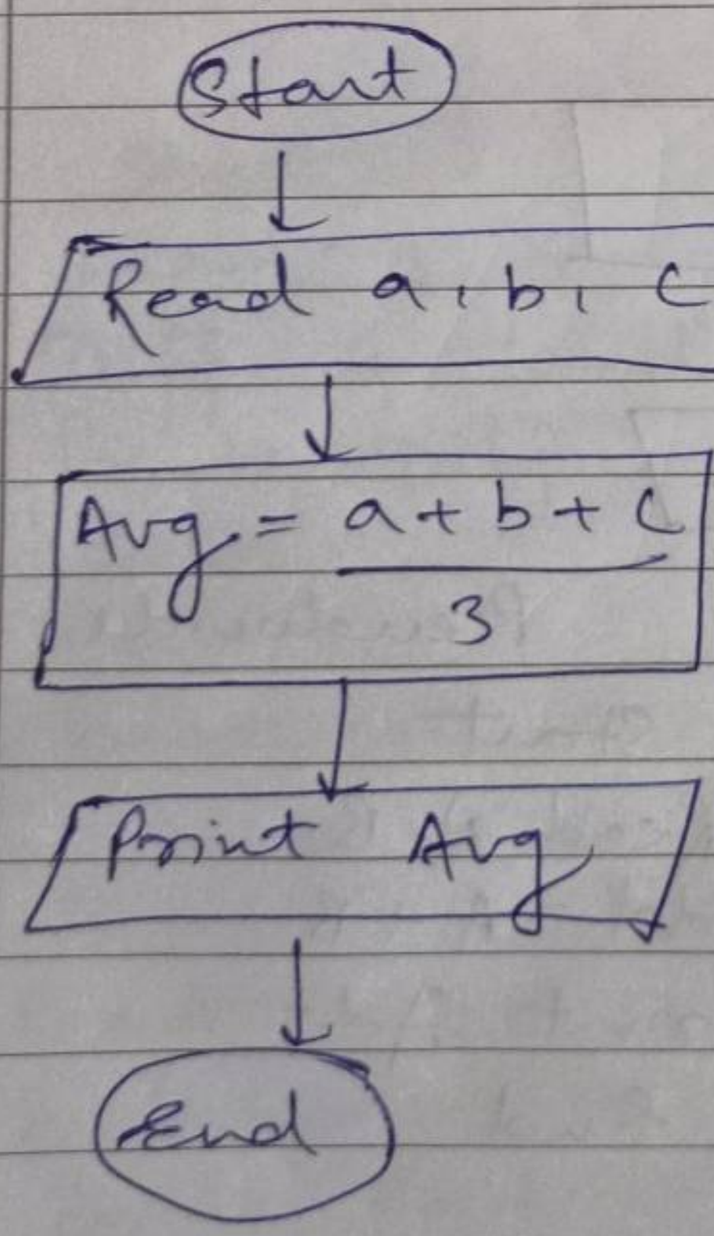
$C = 2\pi r$



P.C

→ Start
→ Read r
→ C = 2πr
→ Print C
→ End.

3) Avg. of 3 no.s



P.C

⇒ Start
→ Read a, b, c
→ Avg = $\frac{a+b+c}{3}$
→ Print Avg
→ End.

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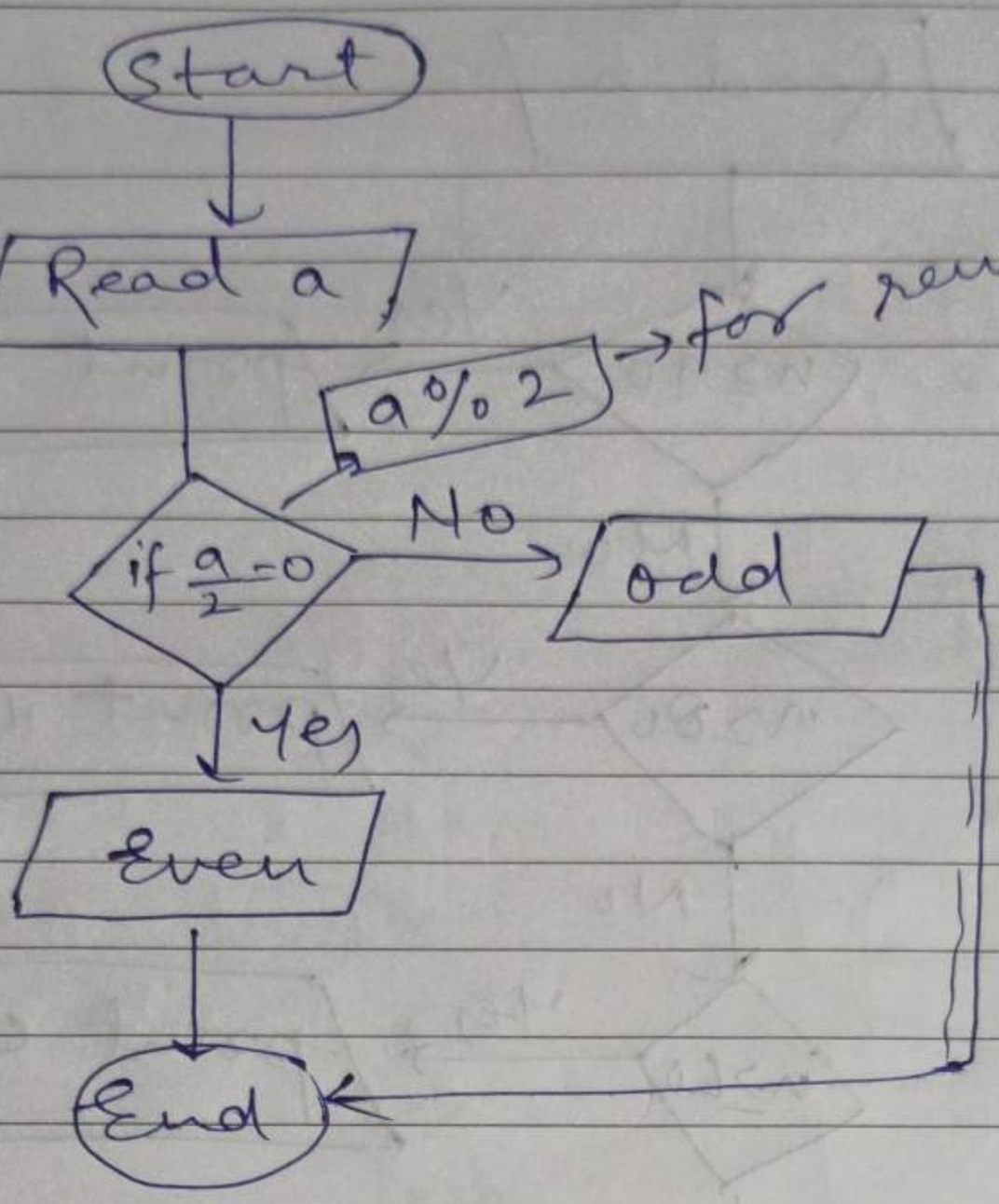
4) check a no. is odd or even →



P.C

→ Start
→ Read a
→ if a%2=0, then print "even".
→ else print "odd"
→ end.

5) Student & Grade flowchart.

P.C

>= 90 A
>= 80 B
>= 60 C
>= 40 D
< 40 fail.

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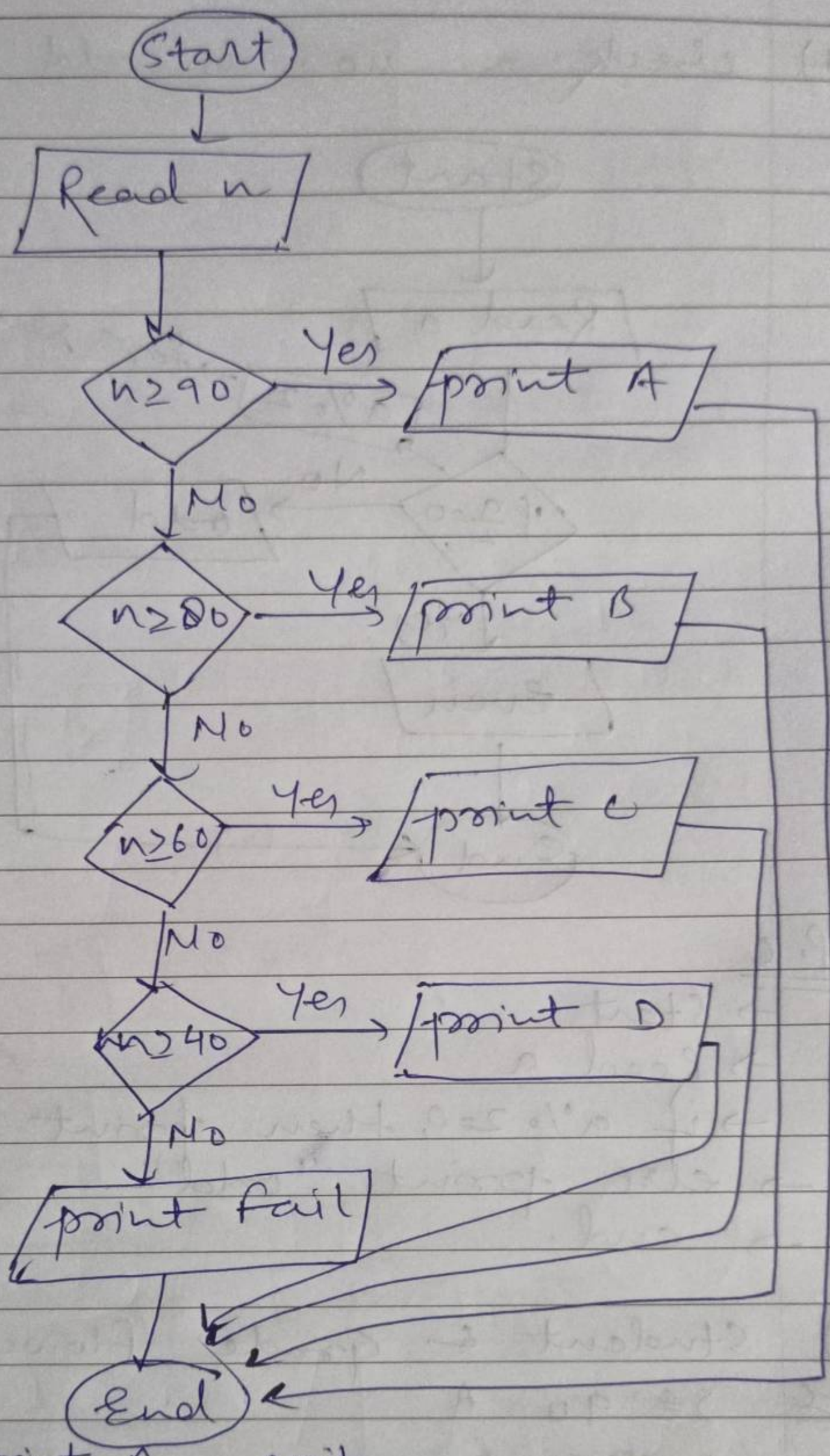
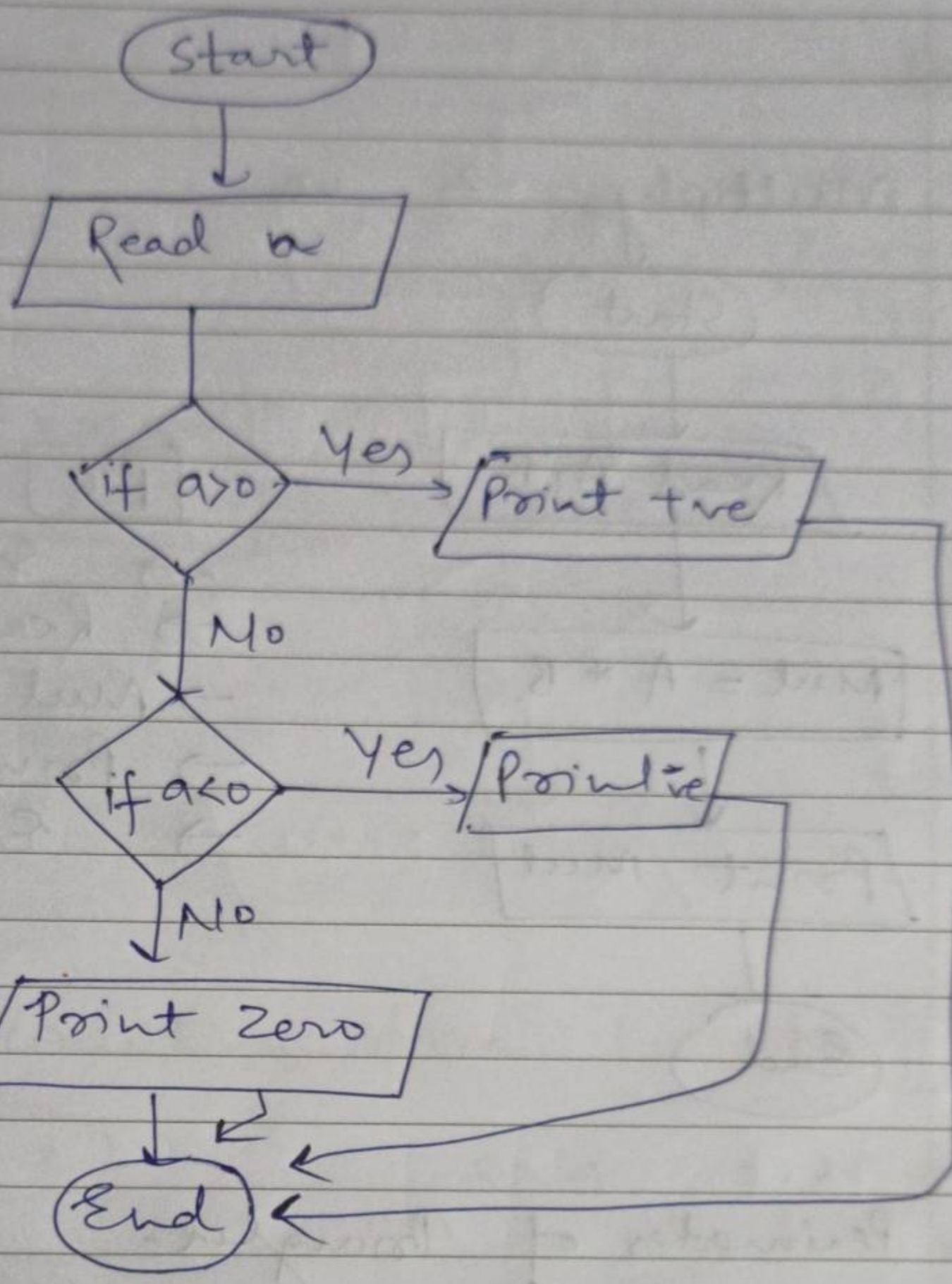


P.C → Start
→ Read n
→ if n>=90, Print A exit
→ if n≥80, Print B exit
→ if n≥60, Print C exit
→ if n≥40, Print D exit
else
print fail
End

6) check no. is +ve, -ve, 0.



P.C

Start
Read a
if a>0 , print +ve
if a<0 , print -ve
else
print zero
end

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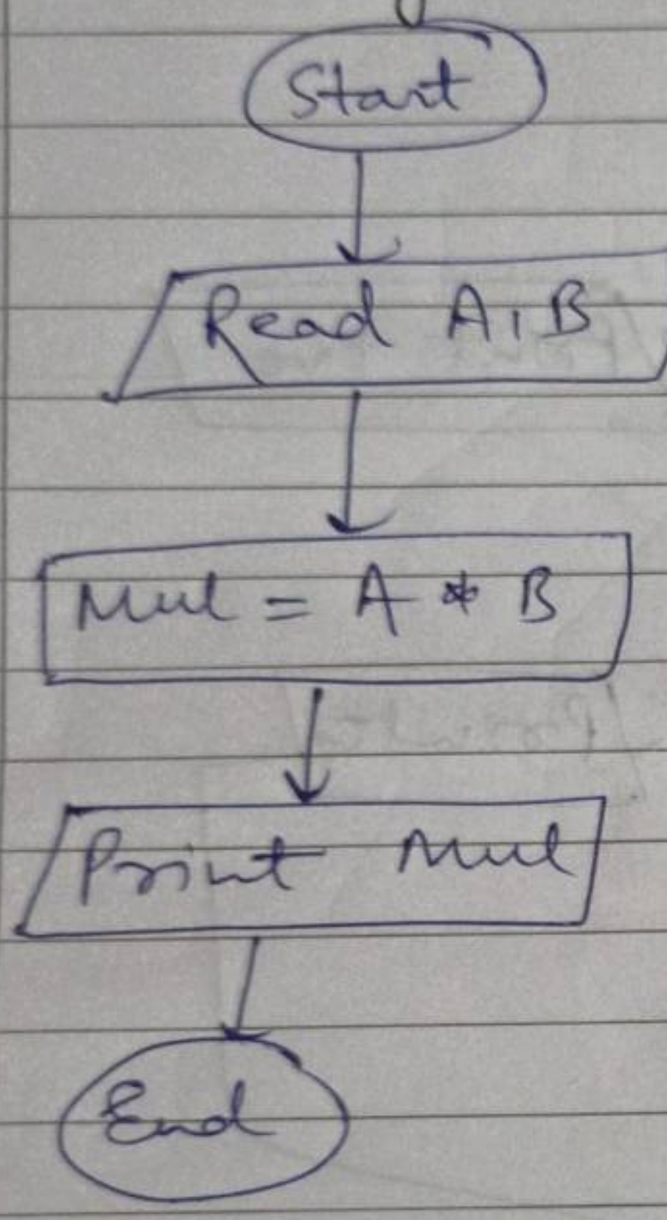
7) Print

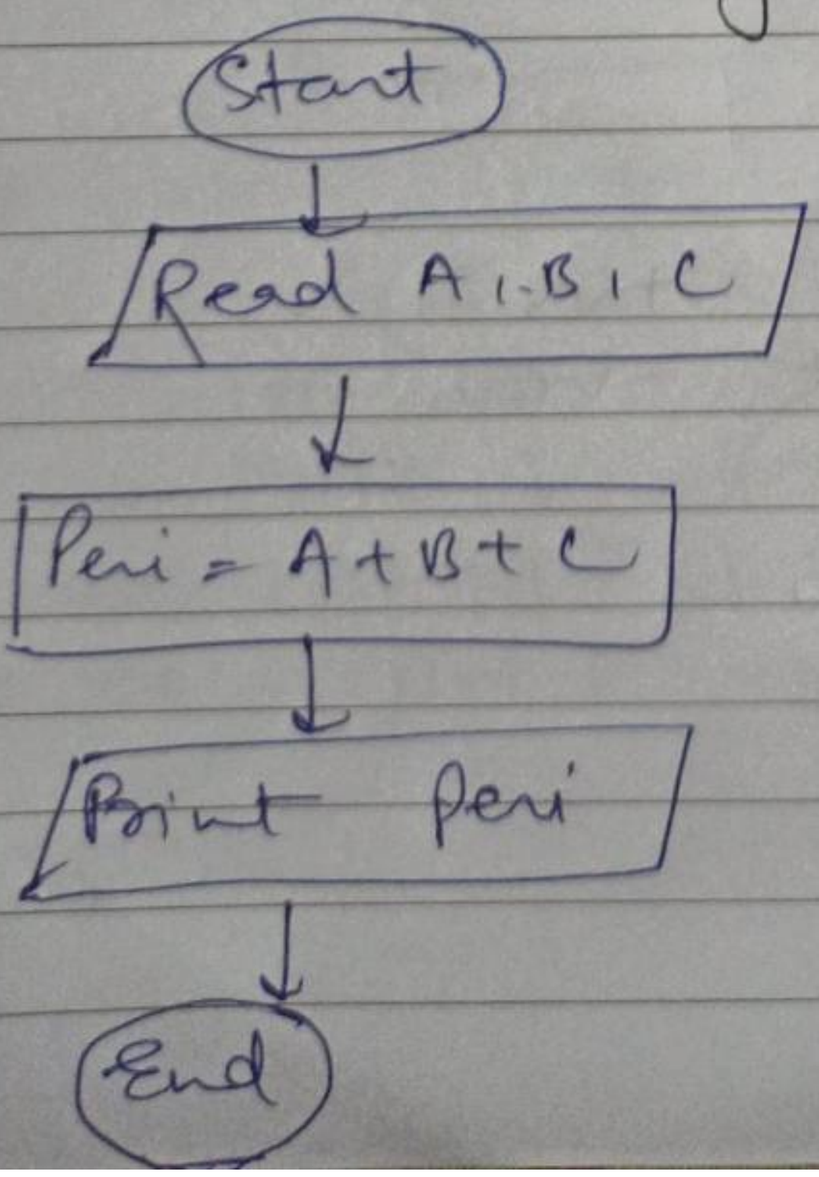
H.W

1) Multiply 2 no.



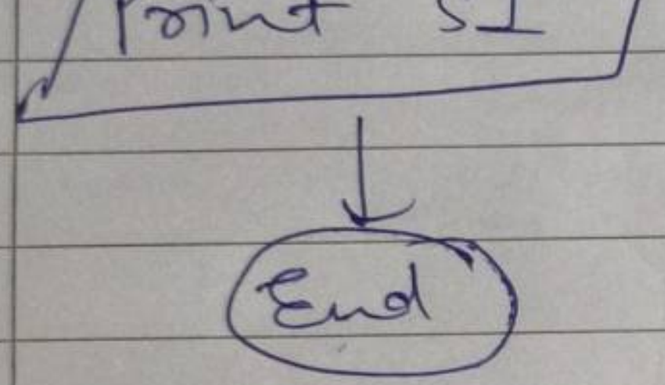
PC
→ Start
→ Read A,B
→ Mul = A * B
→ Print Mul
→ End

2) Perimeter of Triangle



PC
→ Start
→ Readd A,B,C
→ Peri = A+B+C
→ Print Peri
→ End

3) Find S.I -



PC

→ Start
→ Read P, r, t
→ S.I = $\frac{P \times r \times t}{100}$
→ Print SI
→ End

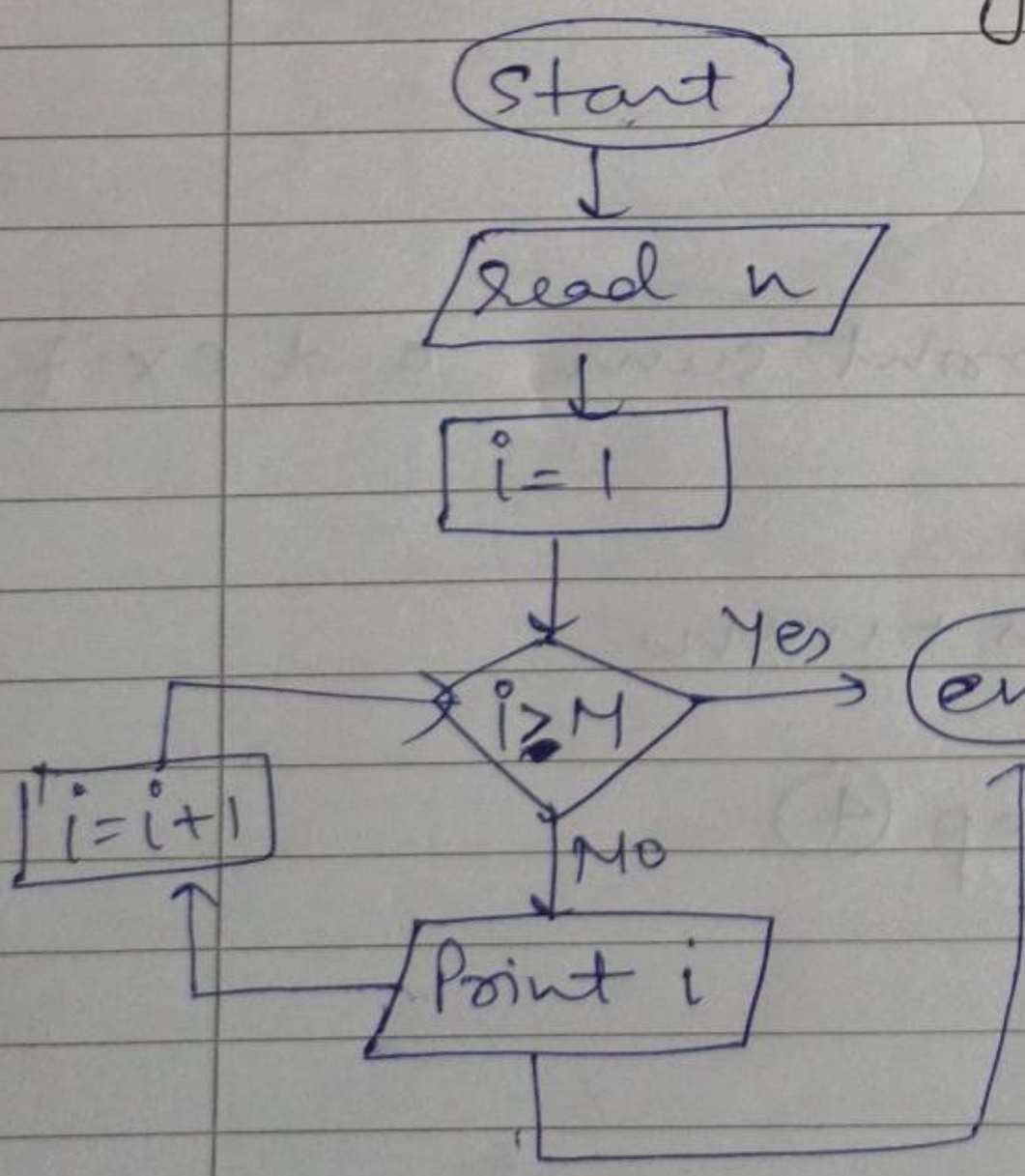
7) Print counting from 1 to N

n=5

op ⇒ 1, 2, 3, 4, 5

↓ Start at 1

↓ end at 5



PC

① → Start
② → Read n
③ → i=1
④ → if i>n, then exit
⑤ else
print i
i=i+1
goto step 4

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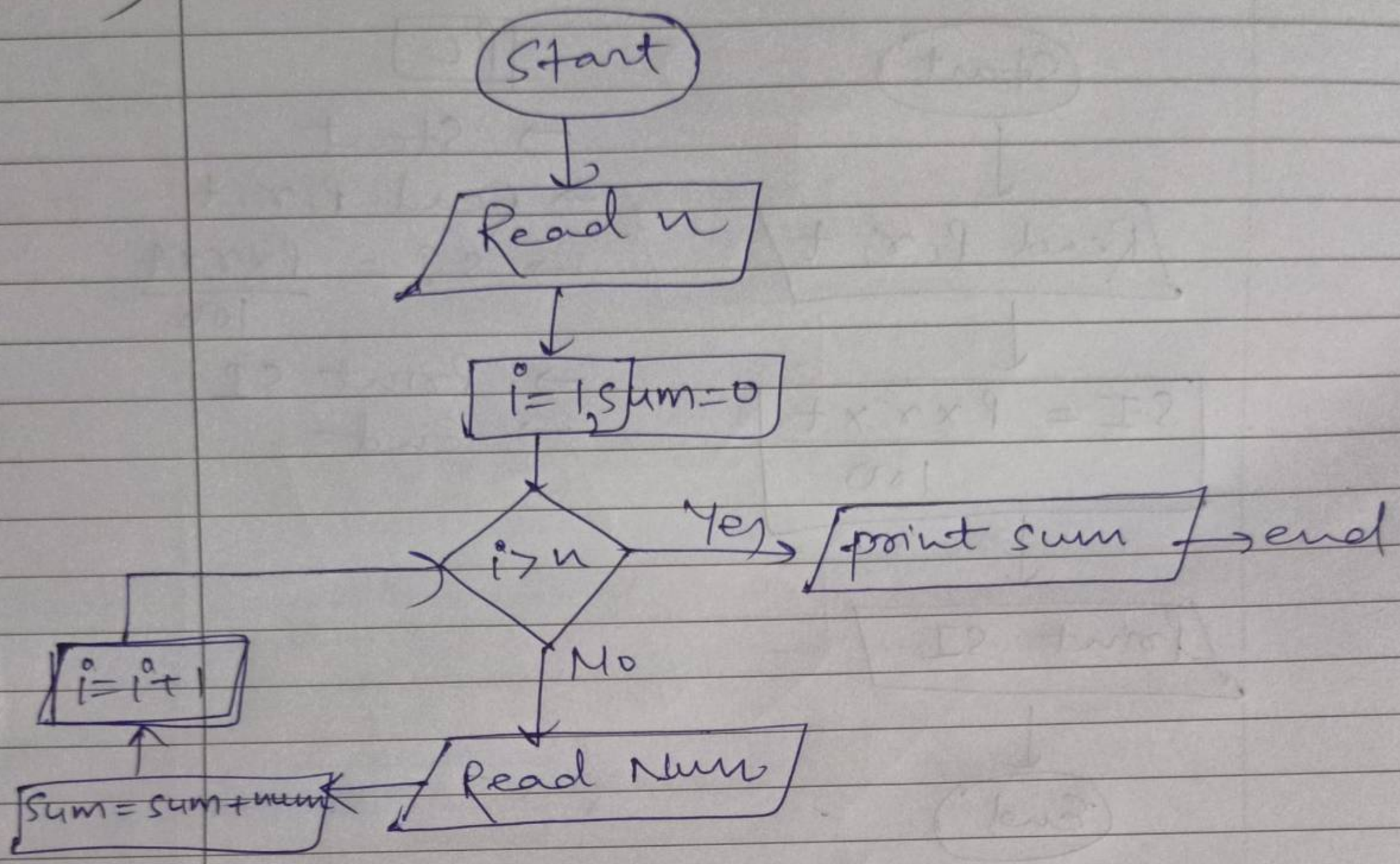
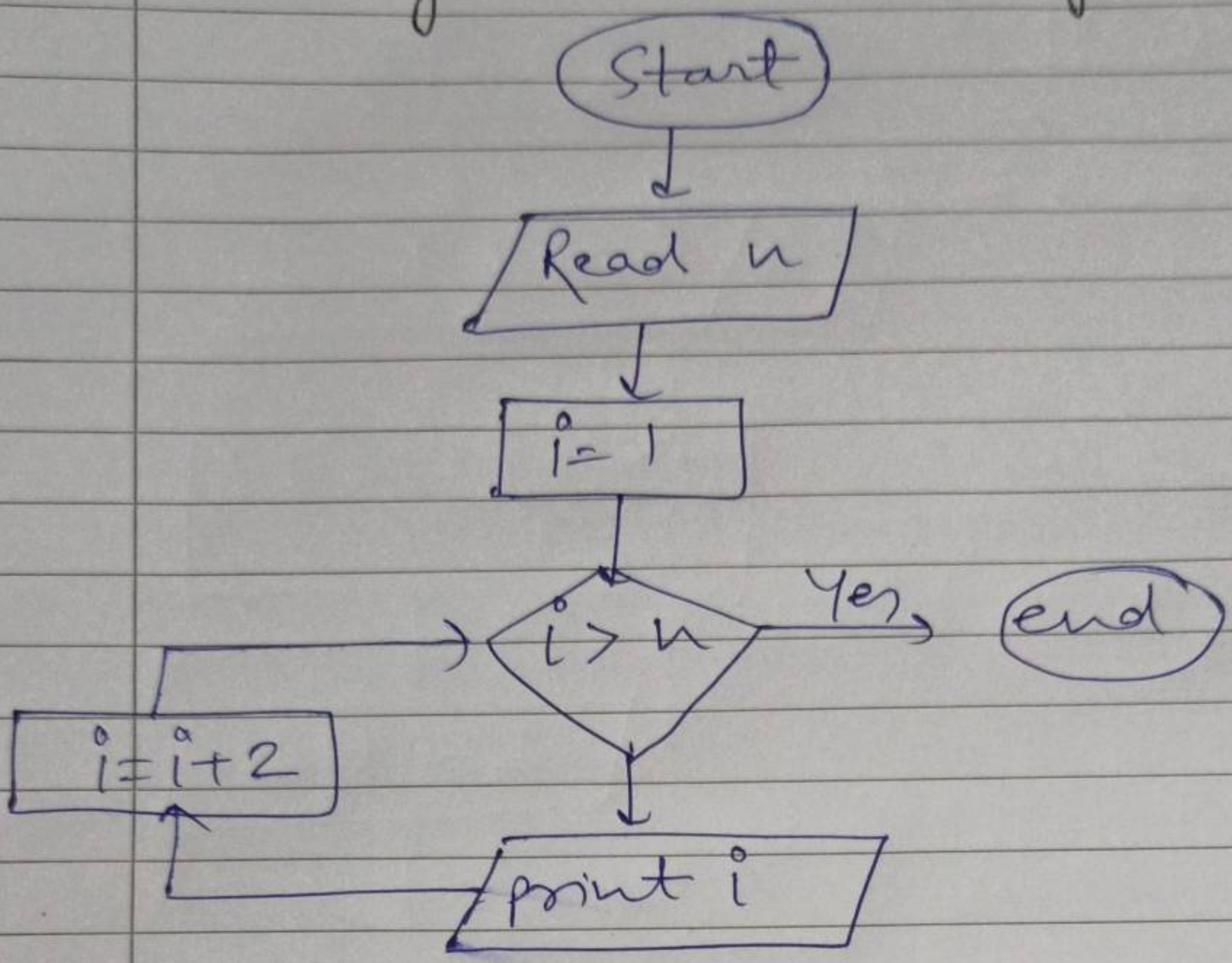
8) Add N no.s from user



P.C

① → Start
② → Read n
③ → i=1, sum=0
④ → if i>n, then print sum and exit.
⑤ → else
→ Read Num
→ sum = sum + num
i = i + 1
goto step ④

9) Printing 1 to N but only odd numbers.



P.C

① → start
② → Read n
③ → i = 1
④ → if i > n, then exit
⑤ → else
→ print i
→ i = i+2
goto step 4