

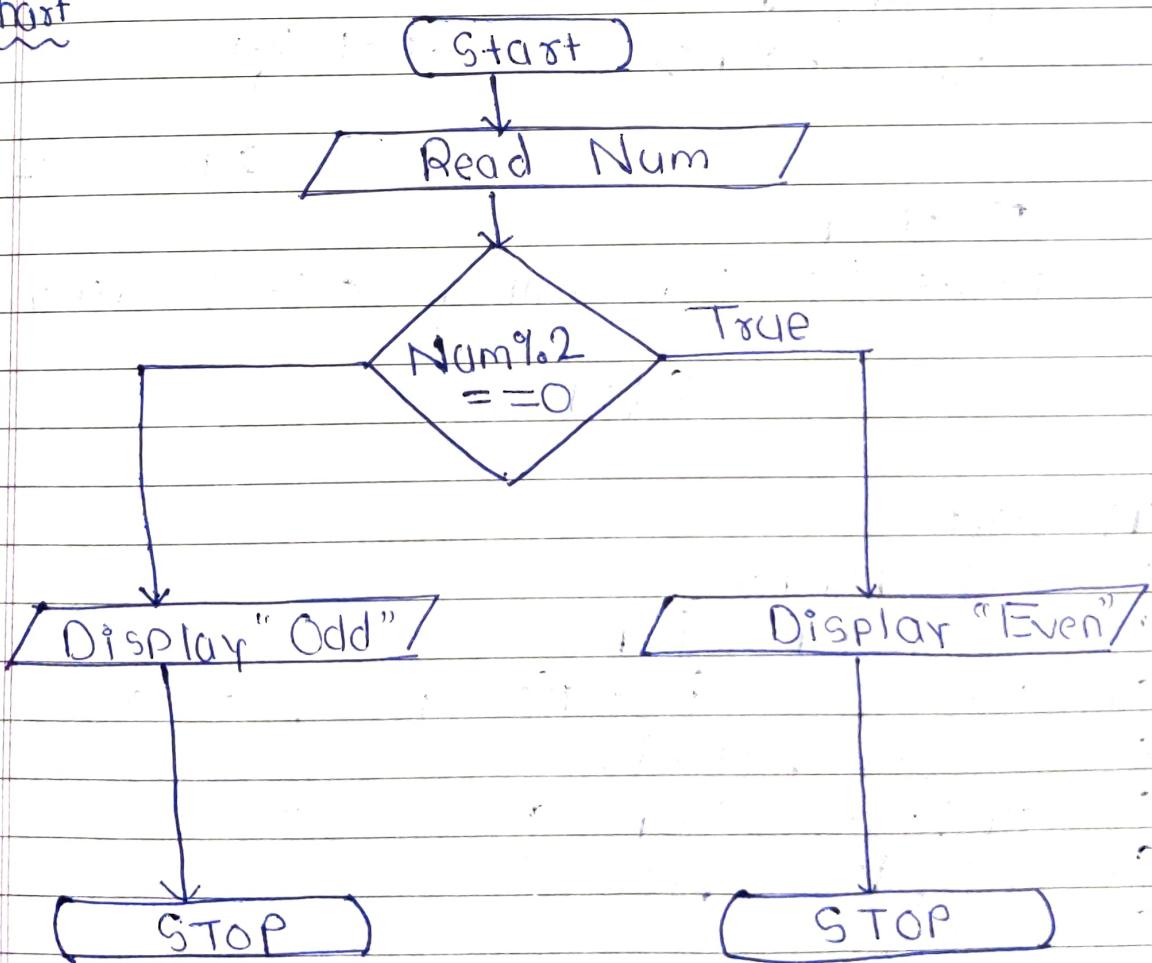
1. Check if the given no. is Even or odd.

→

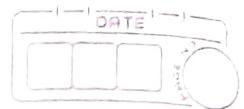
Algorithm

1. Start
2. Read Num
3. If Num divisible by 2 go to S4. else S5
4. Display "Even" and STOP
5. Display "Odd" and STOP.

Flowchart



For loop [Exact no of Iteration]



Q. Write a Java prog. to find the Factorial of a given number.



Defⁿ

$$5! = 1 * 2 * 3 * 4 * 5 = 120$$

logic



$$1 * 2 = 2$$

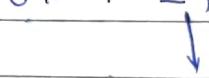


$$2 * 3 = 6$$

→ Storing fact 6

Multiplying with next no.

$$6 * 4 = 24$$



$$24 * 5 = 120$$

$$\text{Fact} = 1$$

Result $\neq 0 \therefore$ it will get 0 if 0 used

Algorithm

$$0! = 1$$

S1: Start

S2: Read number

S3: Set fact=1, i=1

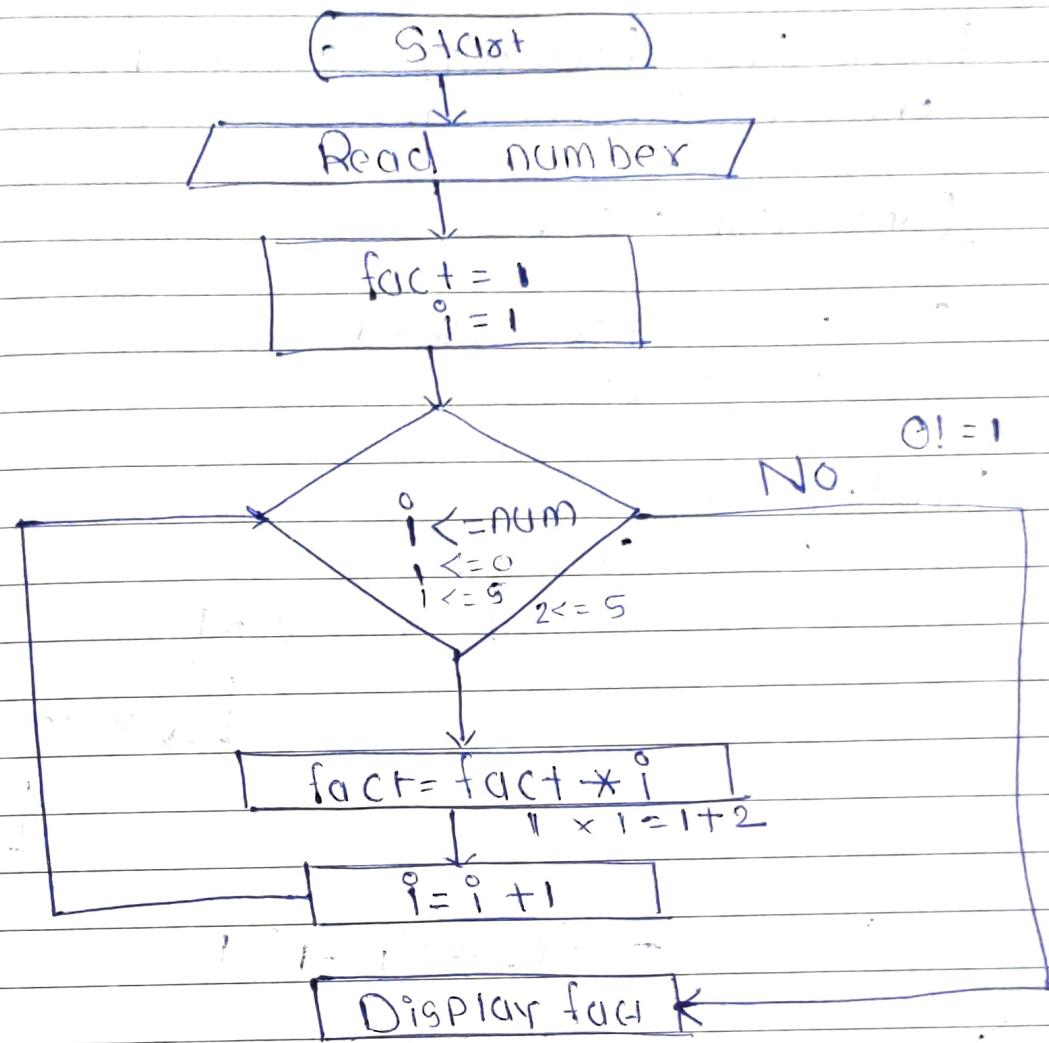
S4: Check cond $i \leq \text{no}$ if false go to S7

S5: fact = fact * i;

S6: update i = i + 1 go to S4

S7: Display fact

S8: Stop



Code

```
for (i=1 ; i<=num ; i++)
```

```
    fact = fact * i
```

}

```
Cout << " factorial of " << num << " is " << fact
```

fact = 1	i = 1
fact = 1 * 1 = 1	i = 2
fact = 1 * 2 = 2	i = 3
fact = 2 * 3 = 6	i = 4
fact = 6 * 4 = 24	i = 5
fact = 24 * 5 = 120	i = 6

3. Find the Factorial of a number using Recursion.

Defⁿ Funⁿ call itself

$$5! = 5 \times 4 \times 3 \times 2 \times 1 \\ = 5 \times 4!$$

$$\text{Fun}^n = 5!$$

$$= 5 \times 4!$$

$$\quad\quad\quad\downarrow \rightarrow 4 \times 3!$$

$$\quad\quad\quad\downarrow \rightarrow 3 \times 2!$$

$$\quad\quad\quad\downarrow \rightarrow 2 \times 1$$

$$\rightarrow n * (n-1)!$$

advantage: Complex code in limited code

dis → infinite loop if goes into absent terminating cond

Algorithm S1: Start

S2: Read Num

S3: Fact=1, i=1

S4: Check Cond i < num

 then goto S5 else S7

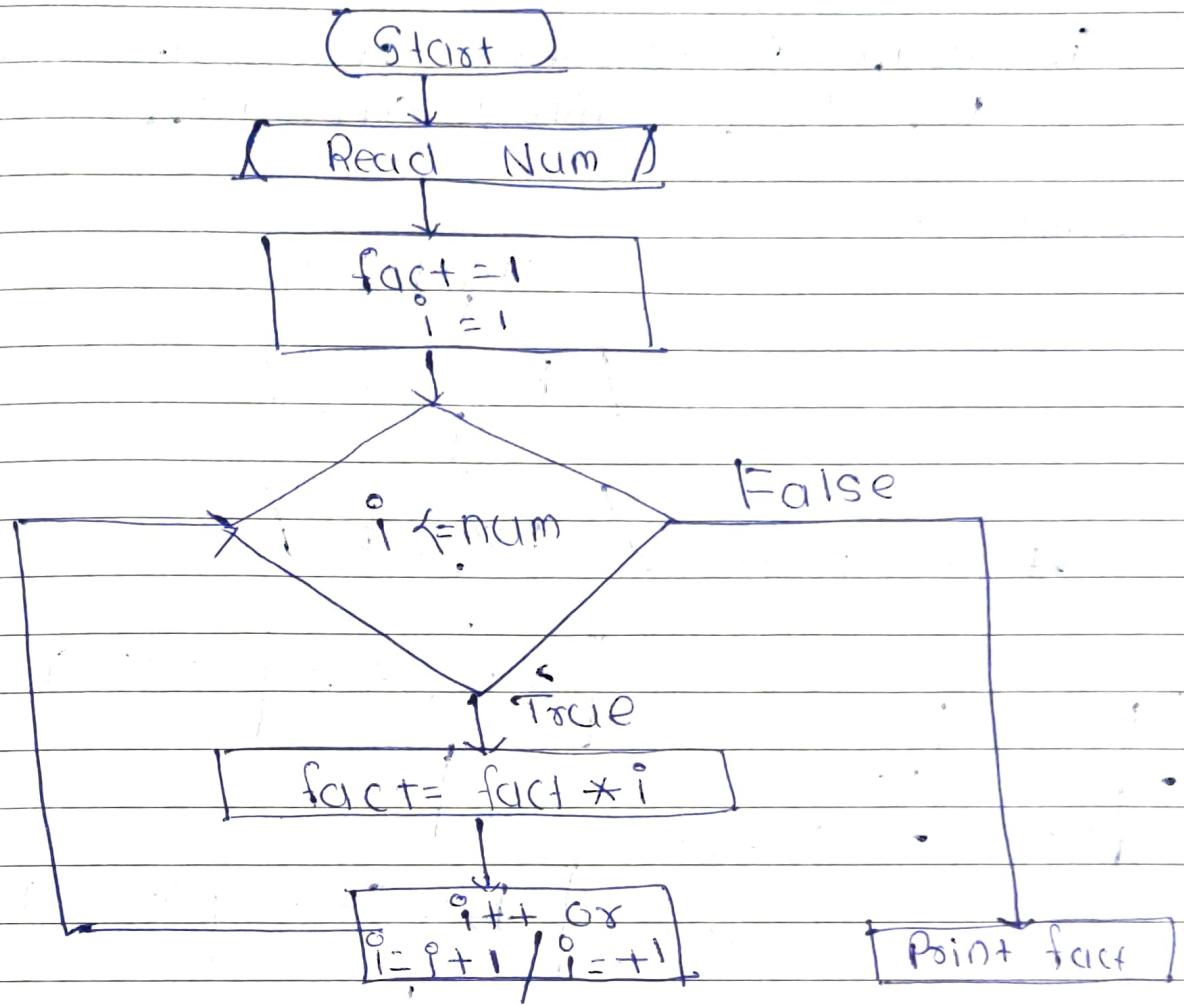
S5: fact = fact * i

S6: i = i + 1 repeat S4 to S6

S7: Print fact



Flow
chart



num = 5

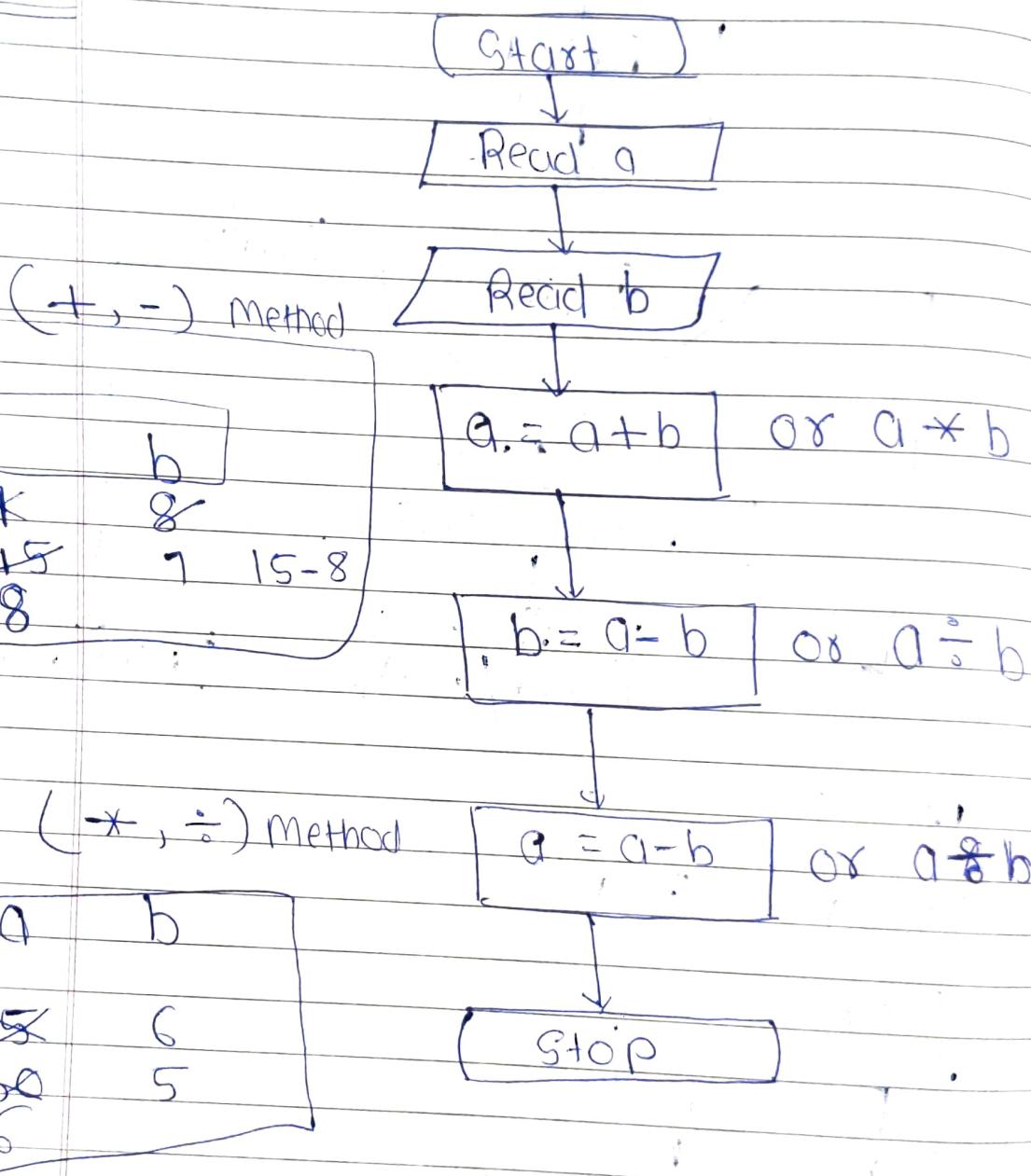
Fact = 1 i = 1

$5 < 1$

F	i	
1	1	$2 < 5$
2	2	$3 < 5$
6	3	$4 < 5$
24	4	$5 < 5$
120	5	$6 < 5$ X

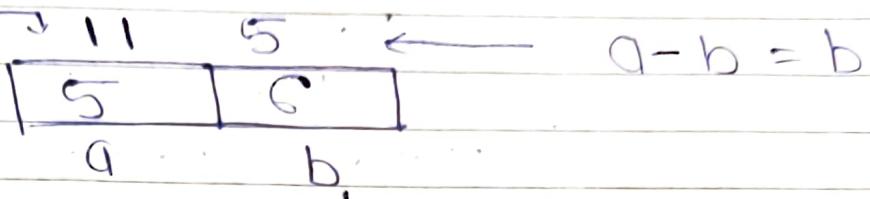
4. Swap 2 numbers without using the third variable approach.

Flowchart



Algorithm

$$c \leftarrow a - b$$



✓ method 1 $\rightarrow (+ -)$
or

method 2 $\rightarrow (\times \div)$

$$5 + 6 = 11$$

$$a = a + b -$$

$$a = \frac{a}{b} \quad 6 \\ b \quad 30 \quad 5$$

5	6
---	---

$$b = a \div b \\ = 30 \div 6$$

$$a = c \times b$$

5. How to check whether the given no is positive or negative in Java?

→
Logic

$i > 0$

positive no

x

Negative no

Algorithm

S1: Start

S2: Take no i.e. i

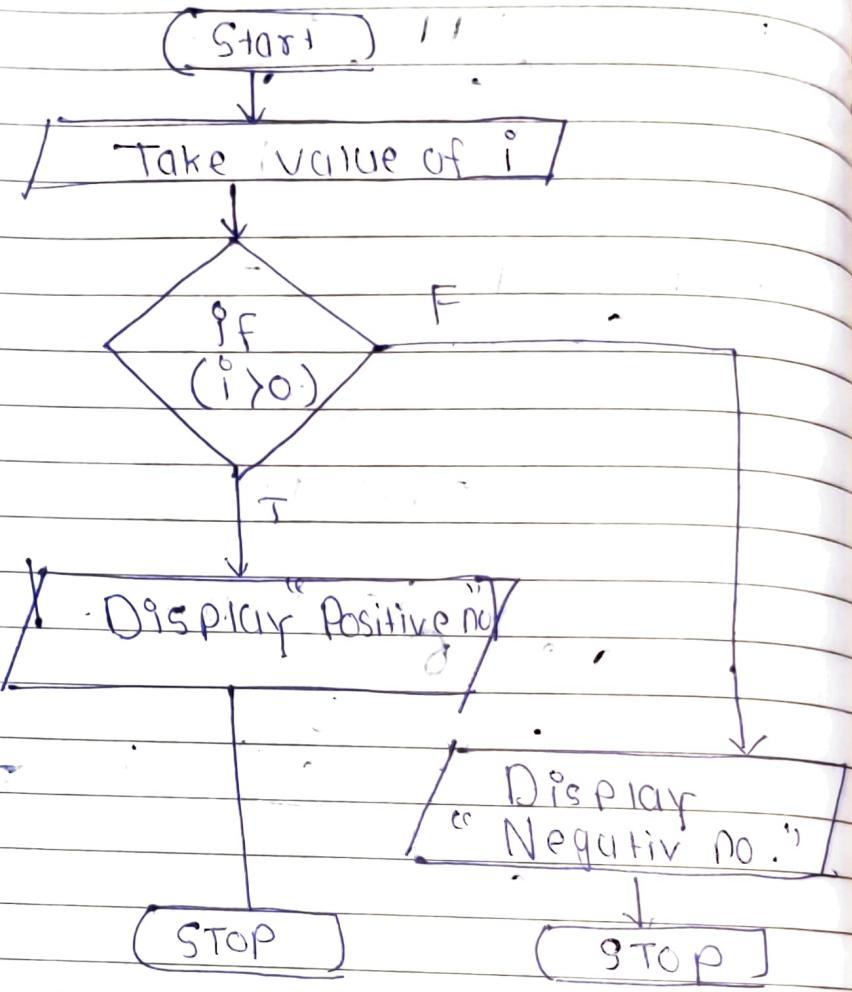
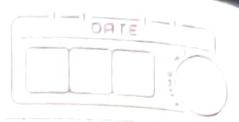
S3: if ($i > 0$)

then display "Positive no"
otherwise go to S5

S4: Stop

S5: Display "Negative no"

S6: Stop



Q. Write a Java prog to find whether a given no. is Leap year or NOT.

Algorithm S1 Start

2. Recd Year

3. ~~Solve if~~

$$\text{Year} \% 4 == 0$$

$$\text{Year} \% 100 == 0$$

: OR

$$\text{Year} \% 400 == 0$$

5.04

2000) 2016

200

1600

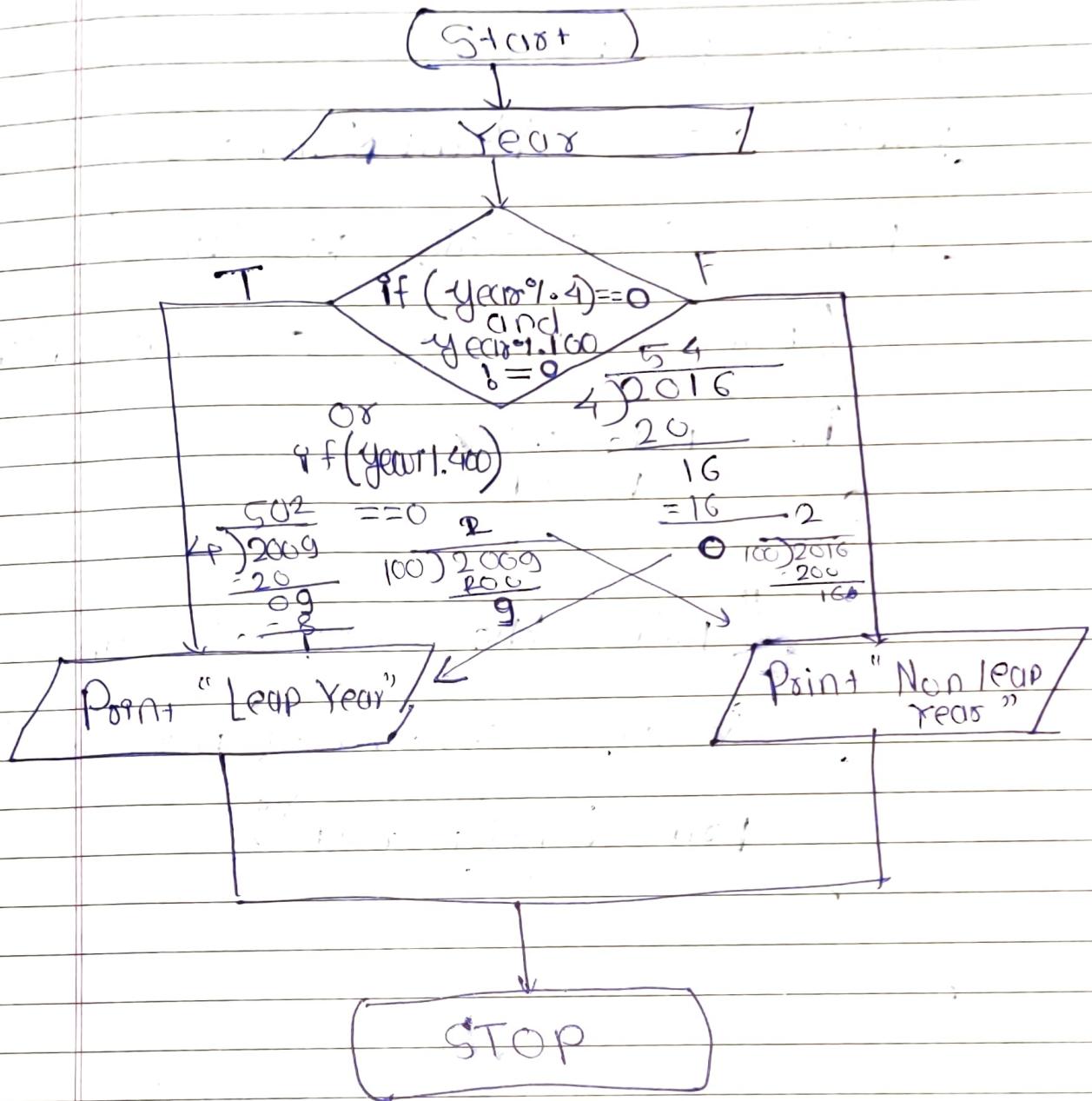
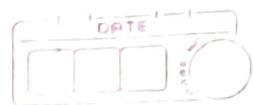
1600
~~xx~~

then goto S4 or else goto S5

4. Display "Even Yes".

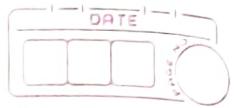
5. Display "Non-Leap" Year.

6. STOP



1. Write a Java program to print 1 to 10 without using loop.

Using Recursion



Package pointnumbers;

```
public class PointNumbers
{
    public static void printNum (int num)
    {
        // num is less than or equal to 100
        if (num <= 100)
            10 <= 10.
        {
            // print the value of num
            System.out.print (num + " ");
            printNum (num + 1);
        }
    }
}
```

```
public static void main (String [ ] args)
{
    int n = 1;
    printNum (n)
}
```

8. Write a Java Prog. to print the digits of a given no.

- →

```
import java.util.Scanner;  
class Digits
```

{

```
public static void main(String args)
```

{

```
int n; count = 0;
```

```
System.out.print("Enter a no.");
```

```
Scanner s = new Scanner(System.in);
```

```
n = s.nextInt();
```

{

```
while (n > 0)
```

```
n = n / 10;
```

```
count++;
```

}

```
System.out.print("No. of digits"  
+ count);
```

}

```
int n, count = 0;
```

```
input n;
```

```
while (n > 0)
```

{

$n \div n / 10$; $123 / 10 = 12$ $12 / 10 = 1$ $1 / 10 = 0$

Count++; // * 3

}

S.O.P (Count)

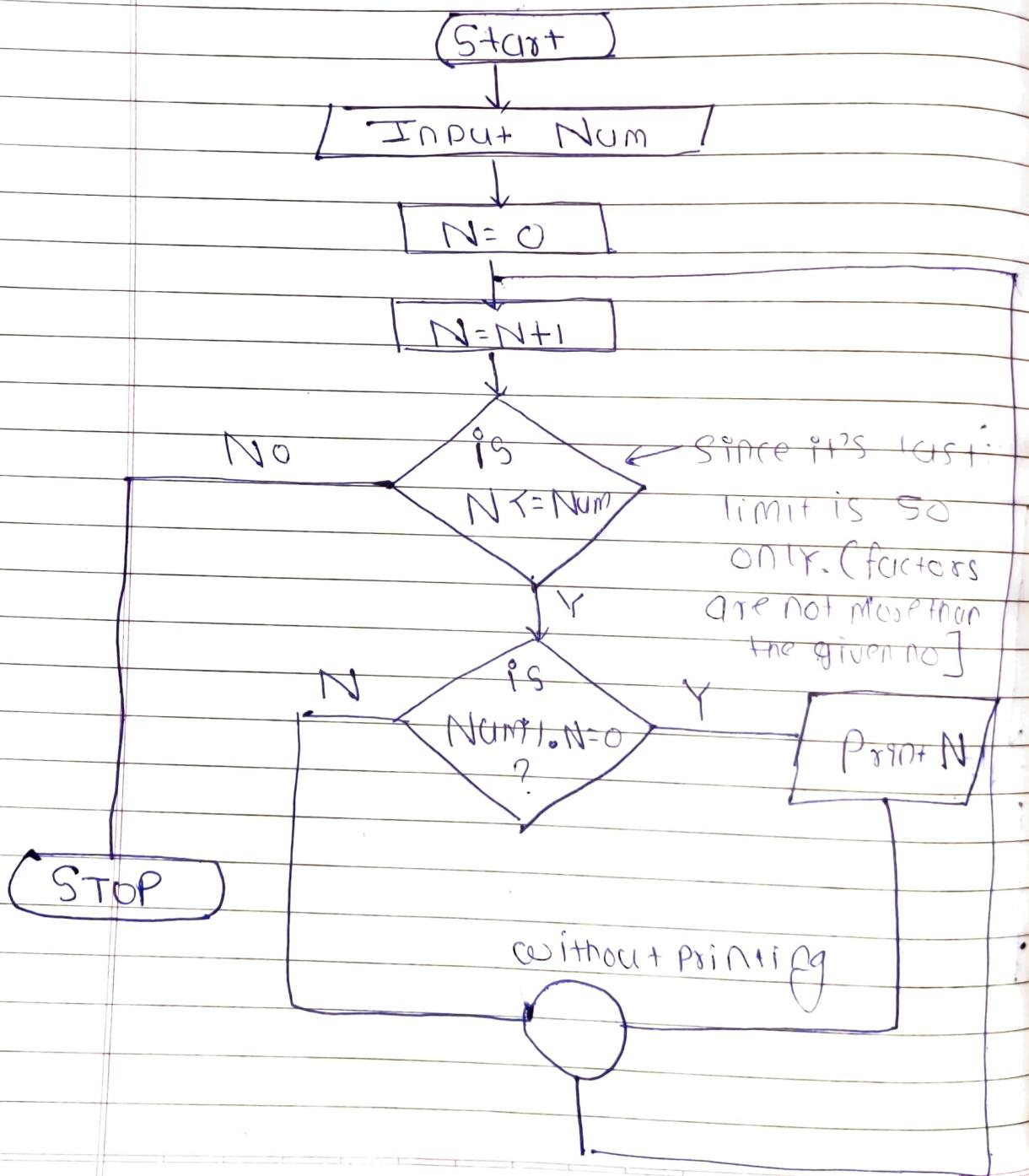
// n = 123 (3 digits)
123 % 10 12 % 10 1 % 10

✓

9. Write a Java prog to print all the factors of the Given No.

→ Factors of 50 are.

1, 2, 5, 10, 25, 50



10. Write a java prog. to find the sum of the digits of given no.

Ex. $342 = 3 + 4 + 2 = 9$

$$342 \div 10 = \boxed{2}$$

$$\begin{array}{r} 342 \\ \hline 10 \\ \quad 34 \\ \quad + \\ \hline \end{array} = 34$$

$$34 \div 10 = \boxed{4}$$

$$\begin{array}{r} 34 \\ \hline 10 \\ \quad 3 \\ \quad + \\ \hline \end{array} = 3$$

$$\begin{array}{r} 3 \\ \hline 10 \\ \quad 3 \\ \quad + \\ \hline \end{array} = \boxed{3}$$

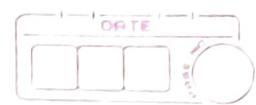
Algorithm:

- S1. START
- S2. Accept No. i.e num
- S3. Sum=0
- S4. rem = num % 10
Sum = Sum + rem
num = num / 10

S5: if (num > 0)
then goto S4
Otherwise goto S6

S6: Display Sum i.e sum

S7: STOP



$$243 \cdot 1.10 = 3$$

$$\therefore 0 + 3 = 3$$

$$243 \cdot 1.10 = 24$$

$$241 \cdot 1.10 = 4$$

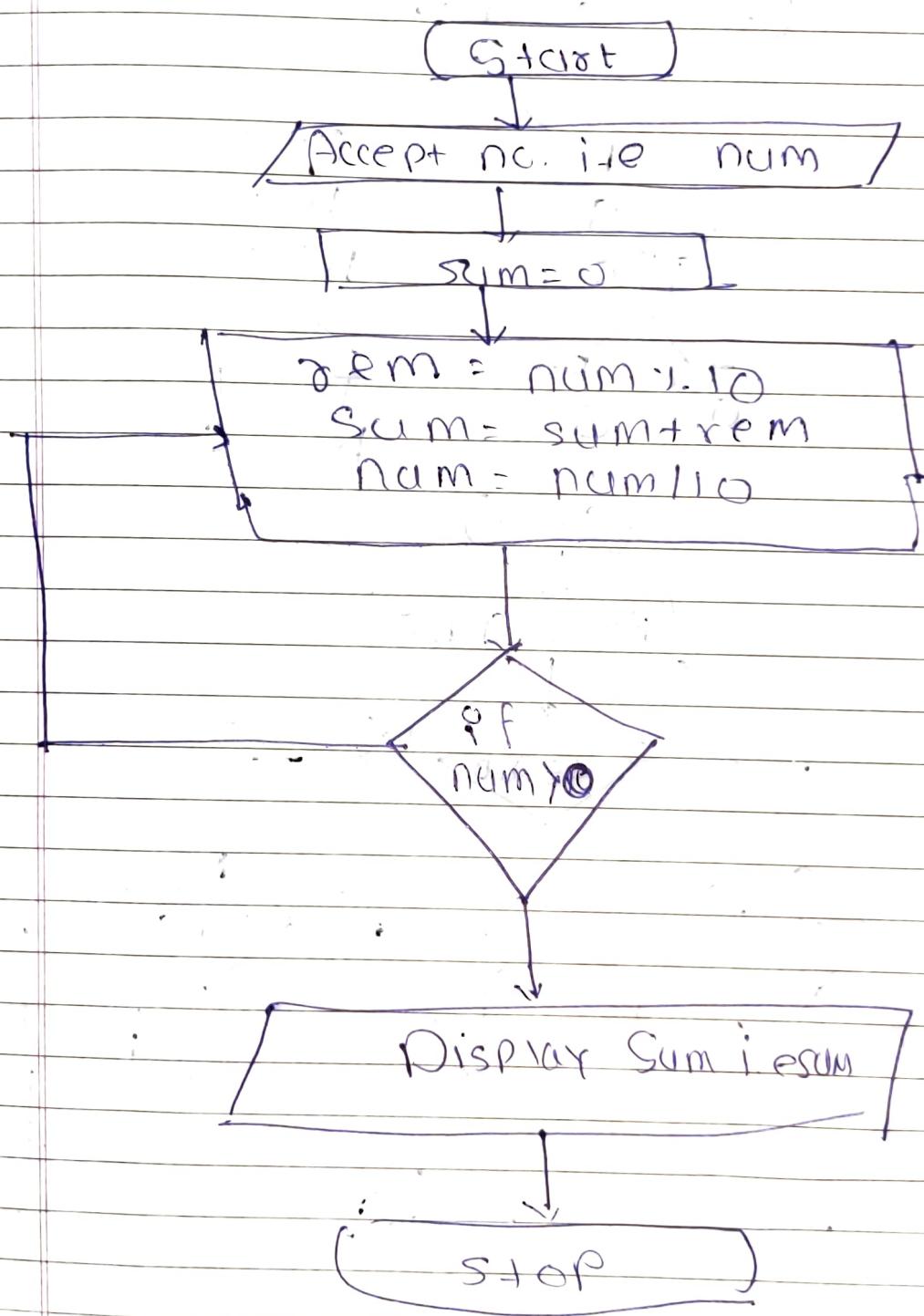
$$3 + 4 = 7$$

$$\frac{24}{10} = 2$$

$$2 \cdot 1.10 = 2$$

$$7 + 2 = 9$$

$$\frac{2}{10} = 0$$



Q1 Write a Java Prog. to find the smallest of 3 numbers (a, b, c).

a, b, c
~~a~~ ~~b~~

Logic $\rightarrow a \leq b$

True

False

$\checkmark a$

$\checkmark b$

$a \leq c$

$b \leq c$

True False

c

True False

b

c

(S + C & T)

Read [a, b, c]

a \leftarrow Yes

57

No \rightarrow b

IS a \leq b

Yes
IS a \leq c

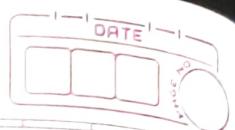
No

a is greater

c is greater

b is greater

Stop



12. How to add two numbers without using the arithmetic operators in Java? [for positive no only]

$$x = 3, y = 4$$

Algorithm

S1. $x++;$, $y--;$

S2. repeat S1 until y becomes 0

1. $x = 4, y = 3$

2. $x = 5, y = 2$

3. $x = 6, y = 1$

4. $x = 7, y = 0$ Stop

Final result.

{while($y \neq 0$)}

$x++;$
 $y--;$
}

Code.

13. Write a Java prog to Reverse a given no.

- - To reverse the no. we need to find the 10% of a no.
- then the rem need to added to the sum which is multiplied by 10
- Repeat this until no. is greater than zero
- Suppor 123, Sum=0

$$1 \times 100 \quad 2 \times 10 \quad 3$$

$$10\% \text{ of } 123 = 3 \text{ (remainder)}$$

$$\text{Sum} + \text{Sum} * 10 + 3 = 3$$

now in 123 we extracted 3 next is to extract 2 how is this possible

$$\begin{array}{r} 123 \\ \times 10 \\ \hline 1230 \end{array}$$



- Now again repeat the same until no. is greater than 0. Why 10 because how we tally no. system.
- Units, tens, hundreds, thousands, ten thousand, million ..
- $10 * 0$ $10 * 1$ $10 * 10$ $10 * 10 * 10$ $10 * 10 * 10 * 10$

Algorithm

S1: Start
S2: Read a number num
S3: Set sum=0, dup=num
S4: While num>0 true continue else goto S8
S5: Set rem = num%10
S6: Set sum = sum*10 + rem
S7: Set num = num/10 goto S4
S8: Print sum value i.e. reverse no.
S9: Stop

while(num>0)

{
 rem = num%10;

 sum = sum * 10 + rem;

 num = num/10;

}
 printf ("reverse of %d is %d",
 dup, sum);



num dup

num > 0

rem

sum

123

123

123>0

123%10=3

$3 * 10 + 3$ (3)

$123 // 10 = 12$

12>0

$12 // 10 = 1$

$3 * 10 + 2$ (32)

$12 // 10 = 1$

1>0

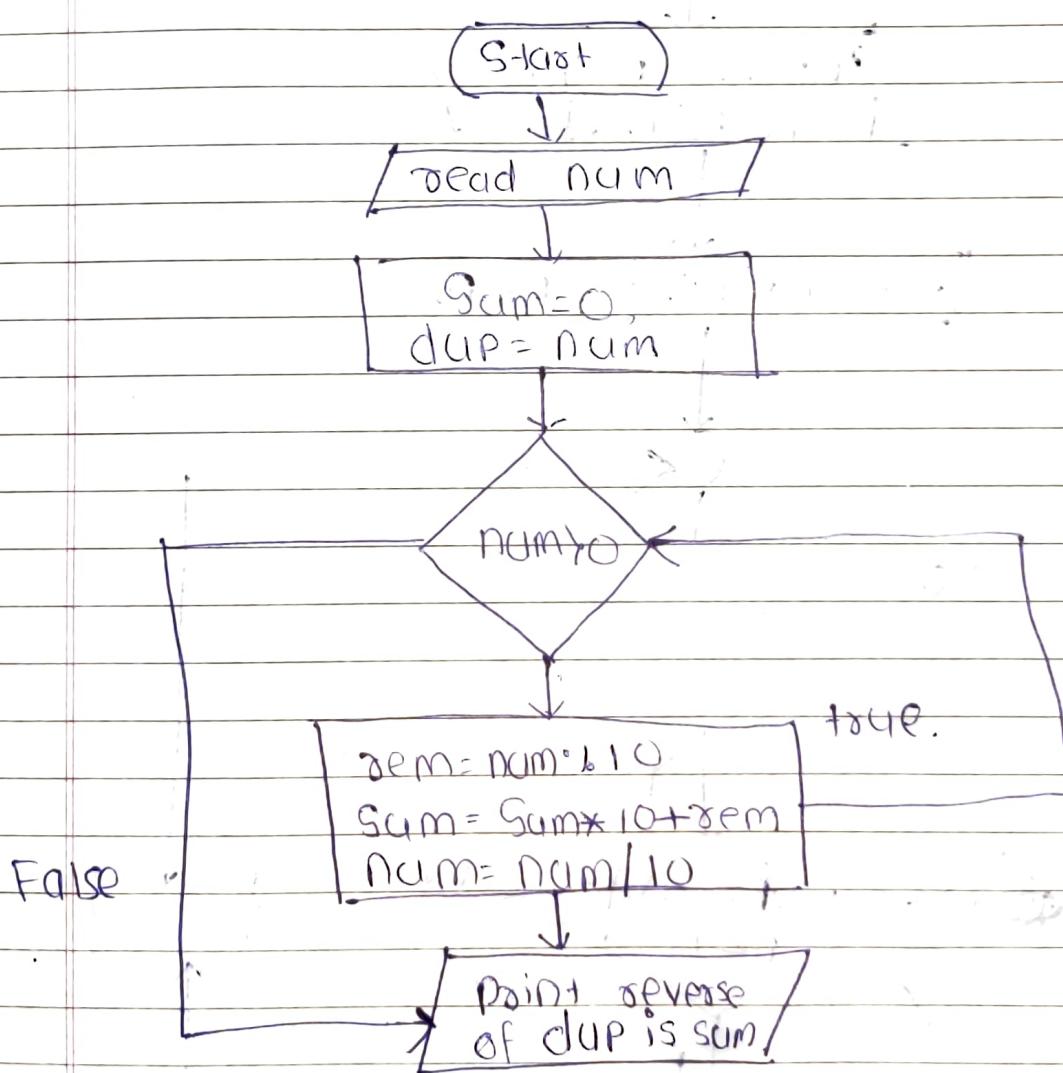
$1 // 10 = 1$

$32 * 10 + 1$ (321)

$1 // 10 = 0$

0>0 false

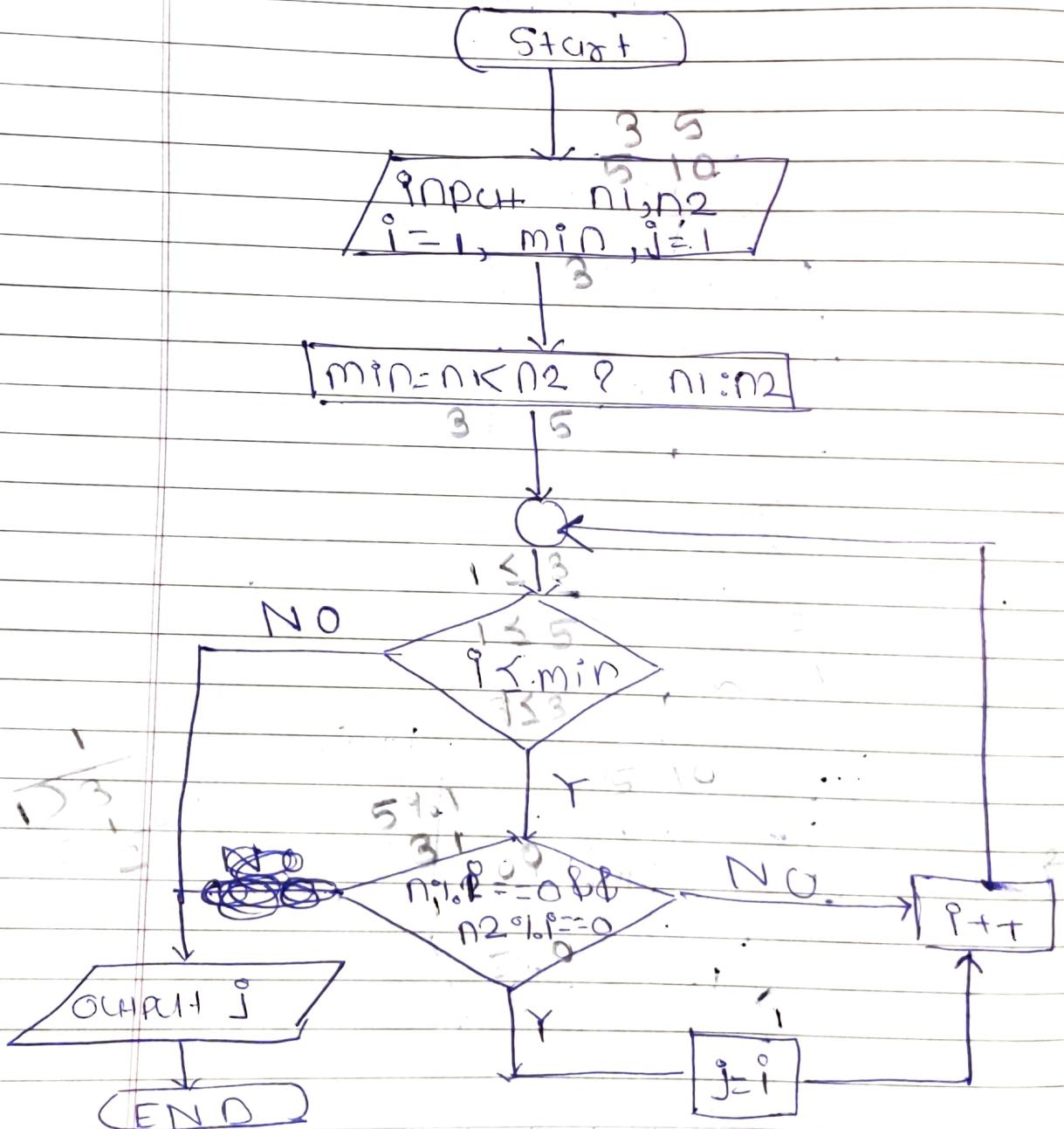
Come out of while.



Q. Write a java prog. to find the GCD of two given numbers.

HCF
min value, $a = 5, b = 10$

~~RG41A1~~ \downarrow $\min = 5, i = 1$
~~5 | 5, 10~~ \leftarrow $i <= \min$ \downarrow $\text{for}(i=1, i \leq 5)$
~~1 2~~





15. Write a java prog. to find LCM of 2 given numbers.

Least common multiple

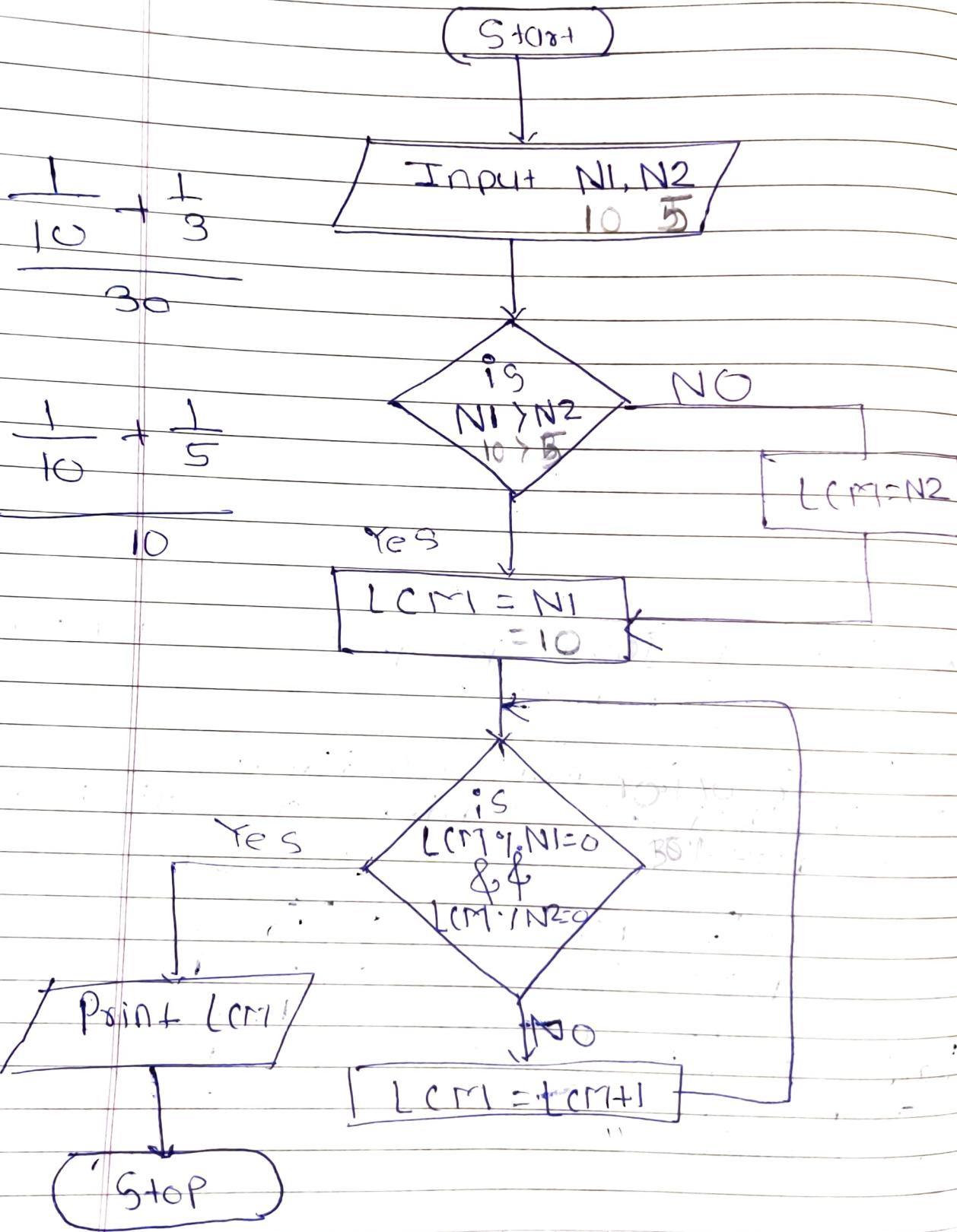
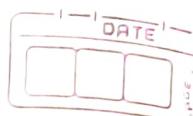
→ min that no. which can divide 2 nos

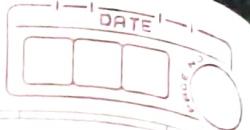
Larger

3	3	10	5	10	5
10	1	10	2	2	1
Larger no only		10 × 3		10	
Ans 1st		30		10	

(LCM of 10 & 3)

1st step → GCD & LCM





17.

Check whether the given no. is a Palindrome

Palindrome

$$\left\{ \begin{array}{l} 121 \stackrel{\sim}{=} 121 \text{ Palindrome} \\ \text{Same} \\ 352 \neq 253 \text{ No.} \end{array} \right.$$

Reverse^{no}
X

$$175 \cdot 1 \cdot 10 = 5$$

$$\frac{175}{10} = 17$$

$$17 \cdot 1 \cdot 10 = 7$$

$$\frac{17}{10} = 1$$

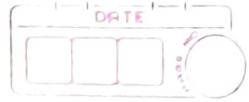
$$1 \cdot 1 \cdot 10 = 1$$

$$423 \cdot 1 \cdot 10 = 3$$

$$\text{Sum} = 0 \times 10 + 3$$

$$= 3$$

$$\frac{423}{10} = 42$$



$$42 \cdot 10 = 2$$

$$\begin{aligned} \text{Sum} &= 3 \times 10 + 2 \\ &= 32 \end{aligned}$$

$$\frac{42}{10} = 4$$

$$4 \cdot 10 = 4$$

$$\begin{aligned} \text{Sum} &= 32 \times 10 + 4 \\ &= 324 \end{aligned}$$

$$\frac{4}{10} = 0$$

Reverse no

$$\frac{512}{10}$$

$$\frac{51}{10}$$

$$\frac{5}{10}$$

$\text{temp} = \text{num}$

temp value getting changing that's why

Algorithm

S1. START

S2. Accept no. i.e num

S3. Sum = 0

S4. temp = num : for comparison

S5. temp = num // 10

Sum = sum * 10 + rem

num = num / 10

S6. If (num > 0) then

 goto S4

S7. If (temp == sum.)

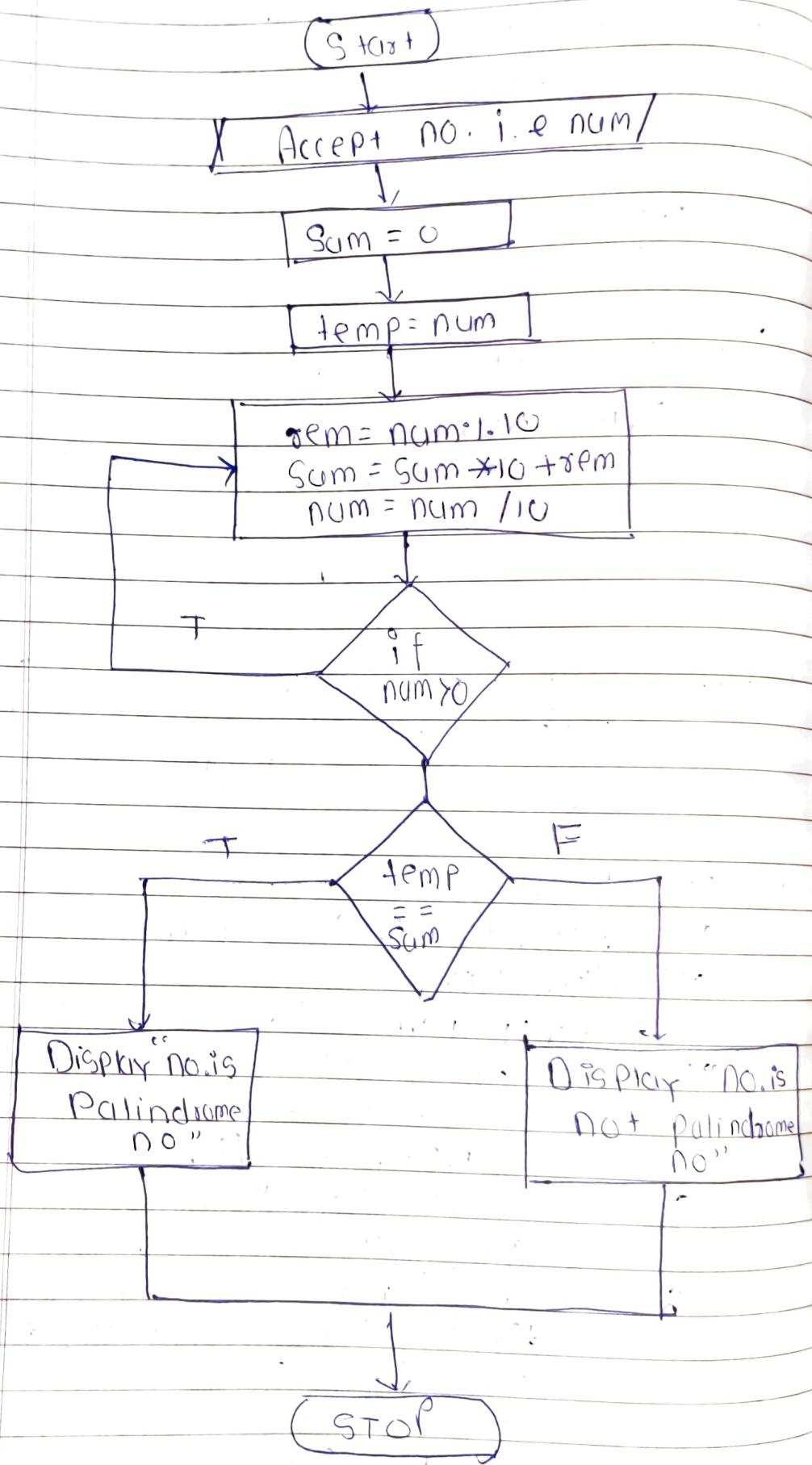
 display "no. is palindrome"

 otherwise goto S9

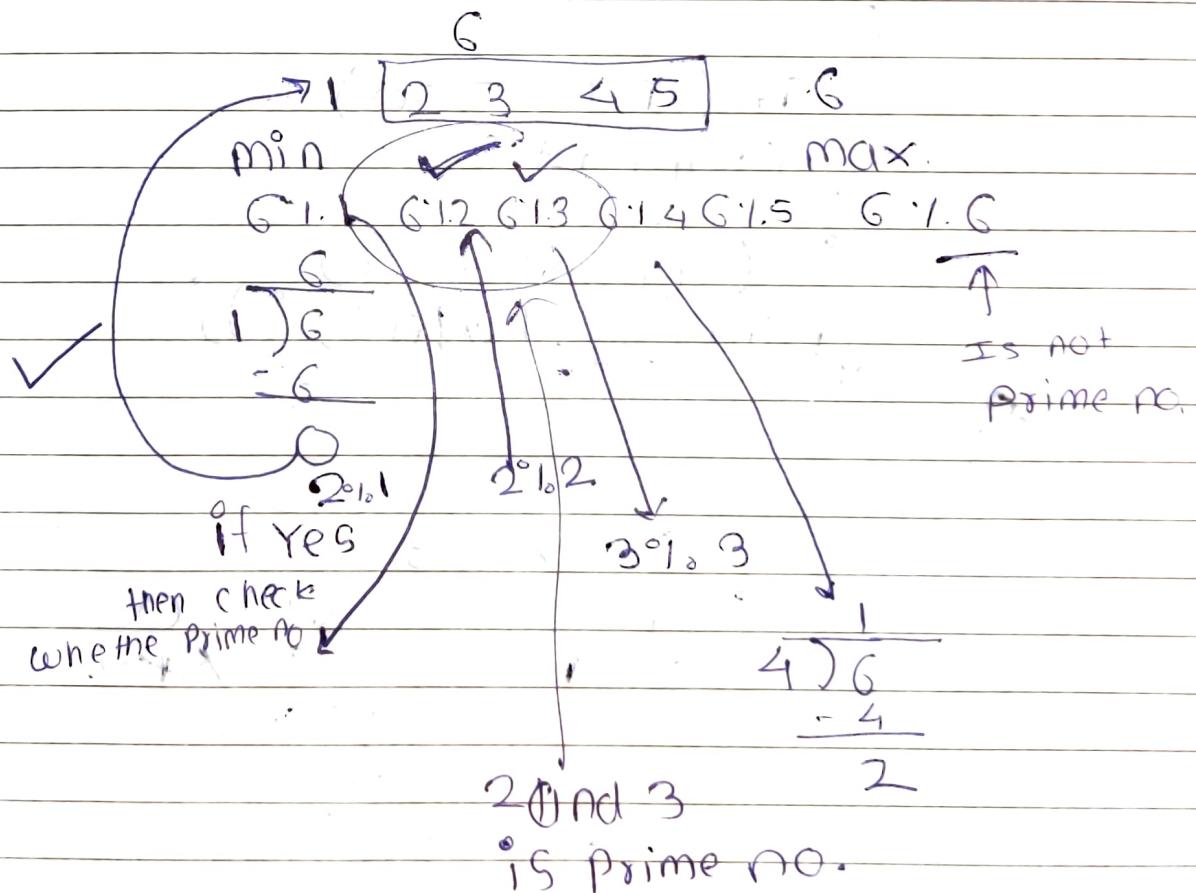
S8. STOP

S9. display "no. is not palindrome"

S10. STOP



18 Write a Java Program to print all the Prime Factors of the Given Number.



#include <stdio.h>
main()
{

int n, i, j, count = 0;

printf("enter n");
scanf("%d", &n);

for (i=1, i<=n, i++)

{ if (n%2, i == 0)

count = 0;

for (j=1, j<=i, j++)

{ if (i%j == 0)

count++;

if (count == 2)

printf("%d\n", i);

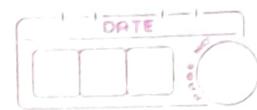
6 → 2, 3

$$6 \% 1 == 0 \\ C = 1$$

$$6 \% 2 == 0 \\ C = 1 + 2$$

$$X C = 2$$

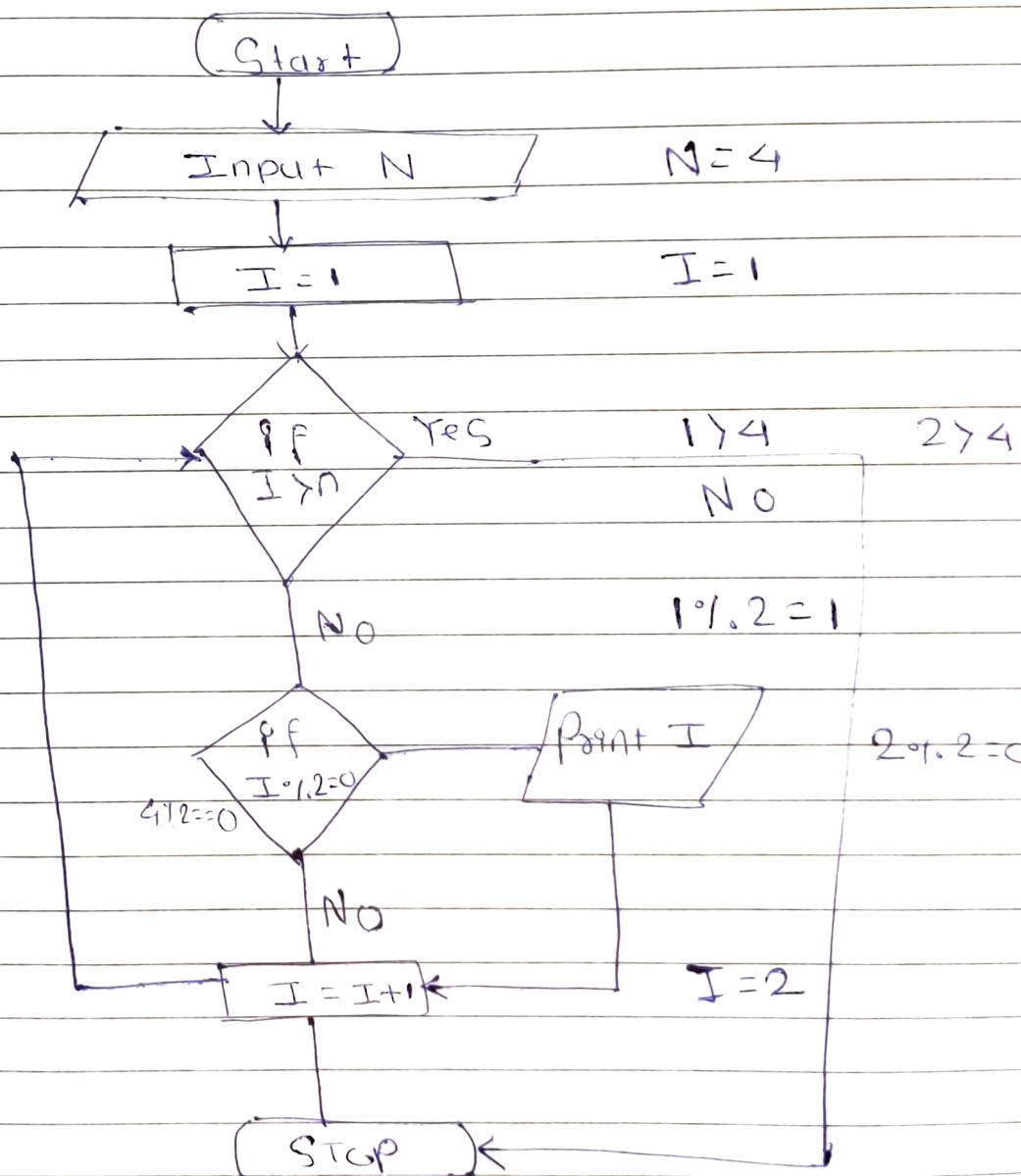
2
3



19. To Print the following Series
Even number Series.

2 4 6 8 10 12 14 16 ...

$$\begin{array}{|c|} \hline 100 \% 2 = 0 \\ \hline 8 \% 2 = 0 \\ \hline \end{array} \quad \text{logic}$$



$N = 4$

$I = 1$	$1 > 4$ X	$I = 2$	$2 > 4$ X	$I = 3$	$3 > 4$ X
	$1 \% 2 = 0$		$2 \% 2 = 0$		$3 \% 2 = 0$

$I = 4$	$4 > 4$ X	$I = 5$	$5 > 4$ QP
	$4 \% 2 = 0$		$5 \% 2 = 1$

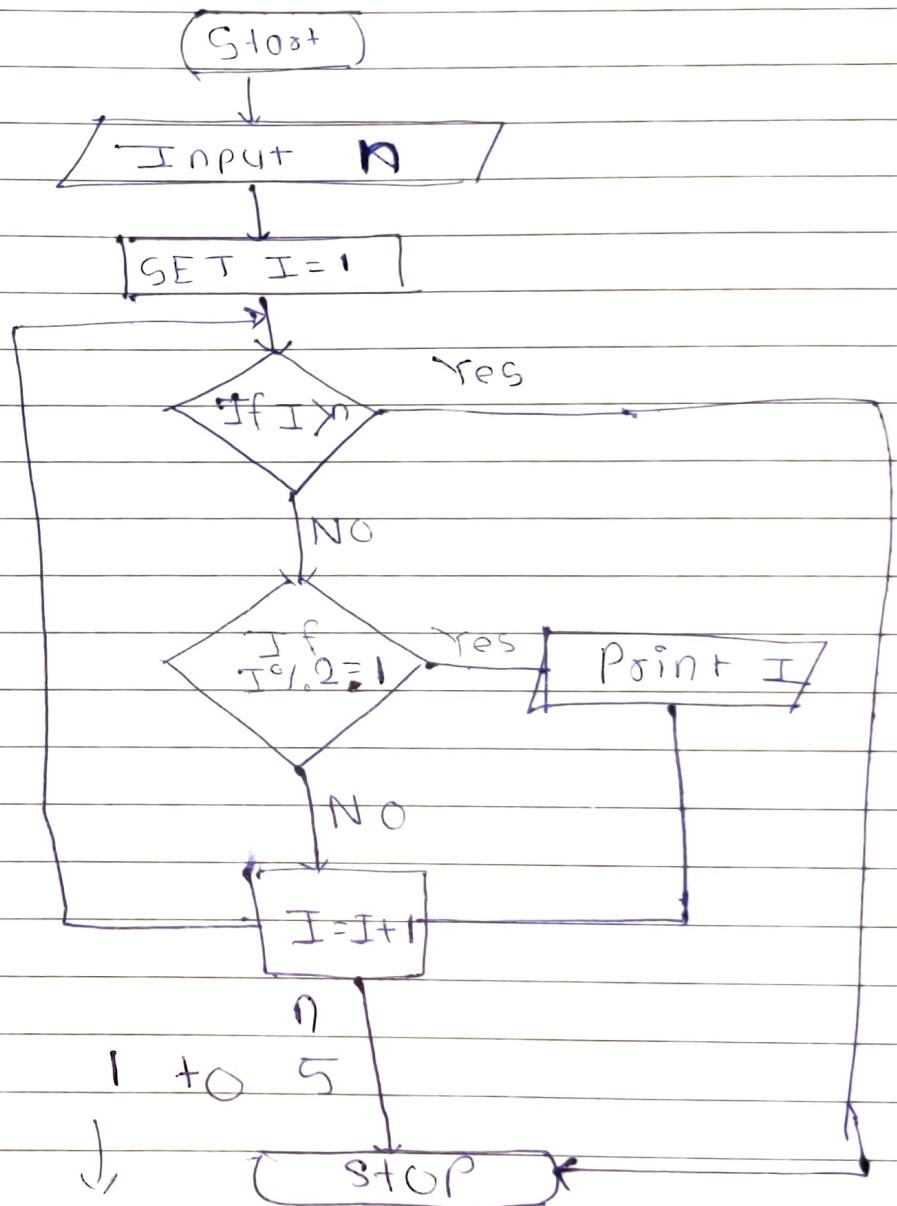


20. To Print the following series Odd Number Series 1 3 5 ~~7~~ 9 11 13 ...

→

$$3 \mid 2 = 1$$

$$153 \mid 2 = 1$$



O/P

$$I=1 \quad 1 \times 5$$

$$1 \mid 2 = 1, \quad \boxed{11}$$

$$I=2 \quad 2 \times 5$$

$$2 \mid 2 = 0$$

$$I=3$$

O/P

$$\boxed{3}$$

$$I=4$$

$$I=5$$

$$5 \mid 2 = 1$$

$$\boxed{5}$$