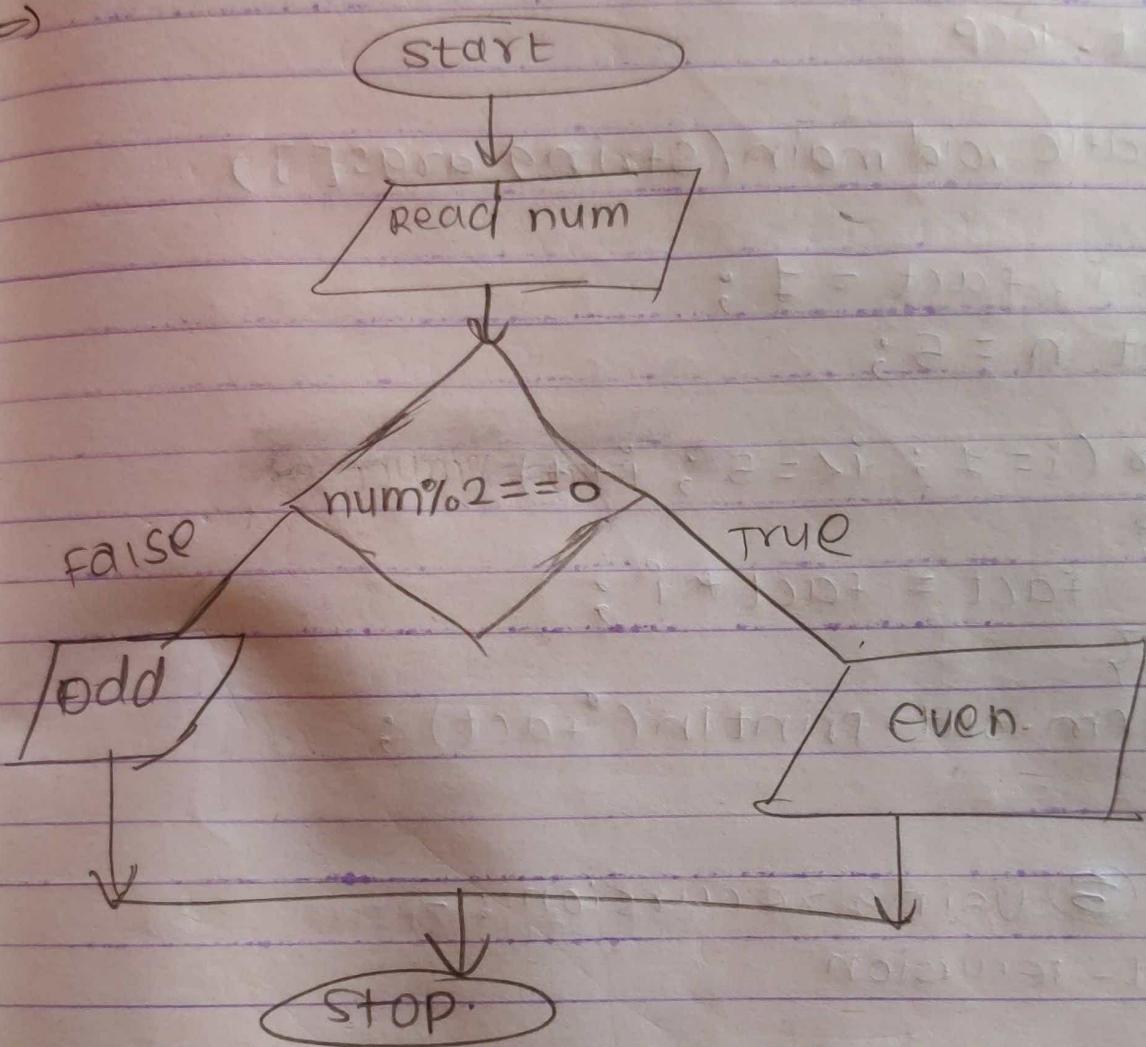


Assignment - 1

① check if the given number is even or odd ?



② write a java program to find the factorial of a given number ?

⇒ i) by using loop :-

class Fact - loop

{

public static void main(String args[])

{

int i, fact = 1;

int n = 5;

for (i=1; i<=5; i++)

{

fact = fact * i;

}

System.out.println(fact);

}

{

③ Using recursion :-

class Fact - recursion

{

static int factorial(int n)

{

if (n==1)

return 1;

else

return n * factorial(n-1);

}

public static void main(String args[])

{

int fact = 1;

int number = 5;

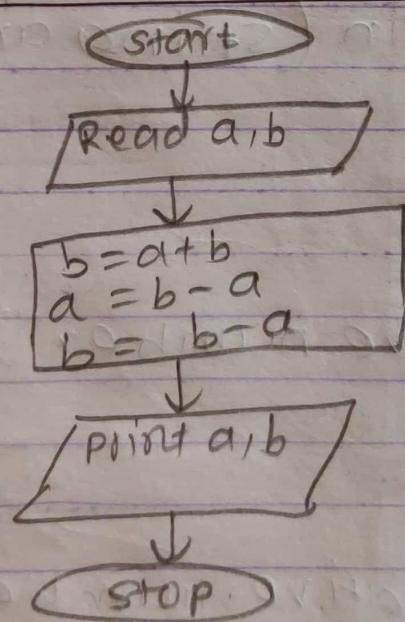
fact = factorial(number);

System.out.println(fact);

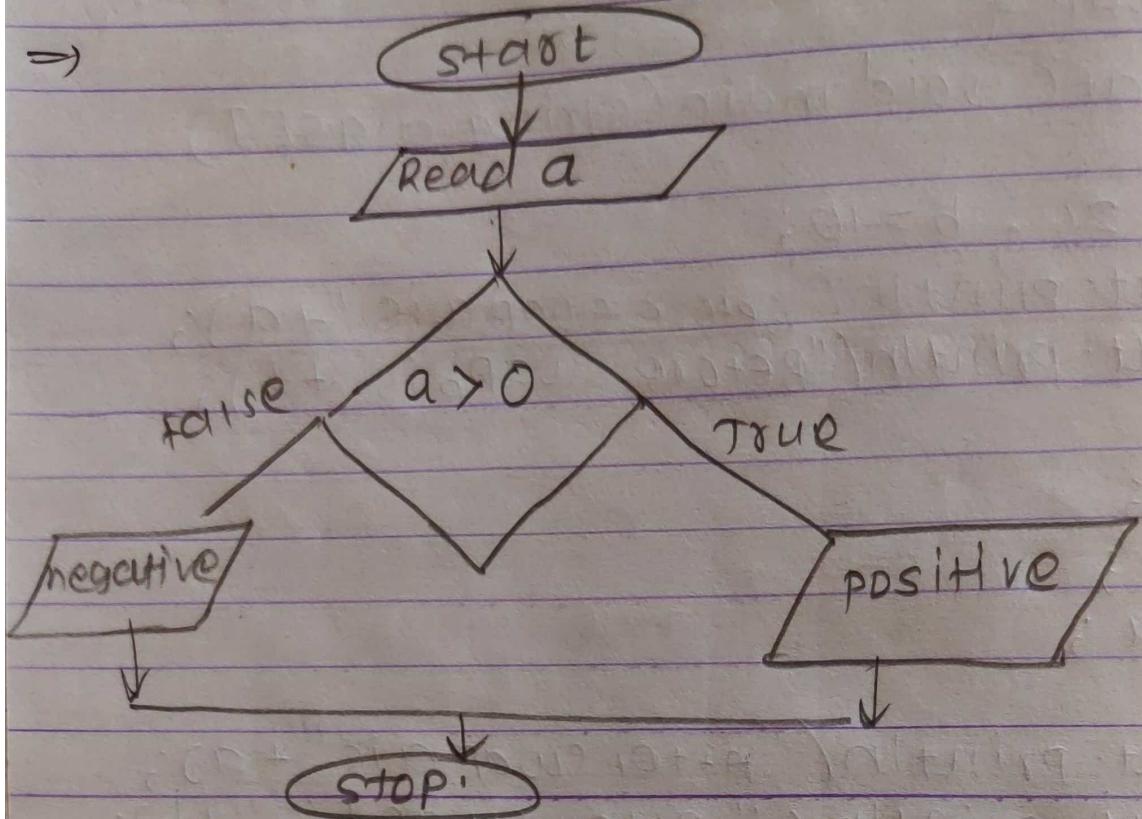
}

④ swap two numbers without using the third variable approach.

```
→ class swap {  
    public static void main(String args[])  
{  
        int a = 20, b = 10;  
        System.out.println("Before swap a is "+a);  
        System.out.println("Before swap b is "+b);  
  
        b = a + b;  
        a = b - a;  
        b = b - a;  
  
        System.out.println("After swap a is "+a);  
        System.out.println("After swap b is "+b);  
    }  
}
```



⑤ How to check whether the given number is positive or negative in java?



class Sample

```
{ public static void main (String args[])
{
    int a=10;
    if(a>0)
    {
        println (" positive number");
    }
    else
    {
        println ("negative number");
    }
}
```

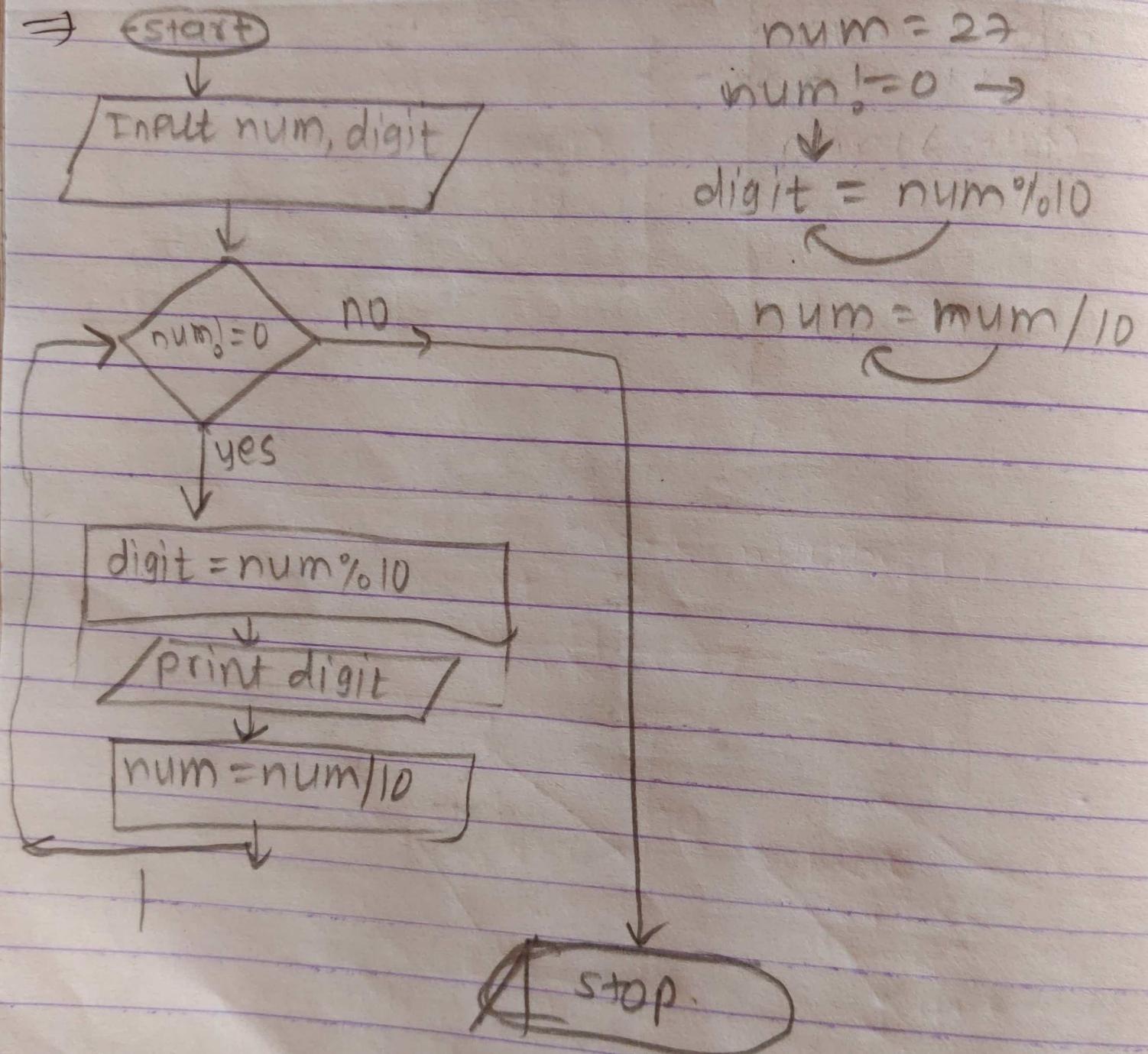
⑥ write a java program to find whether a given no. is leap year or not?

⇒ algorithm :-

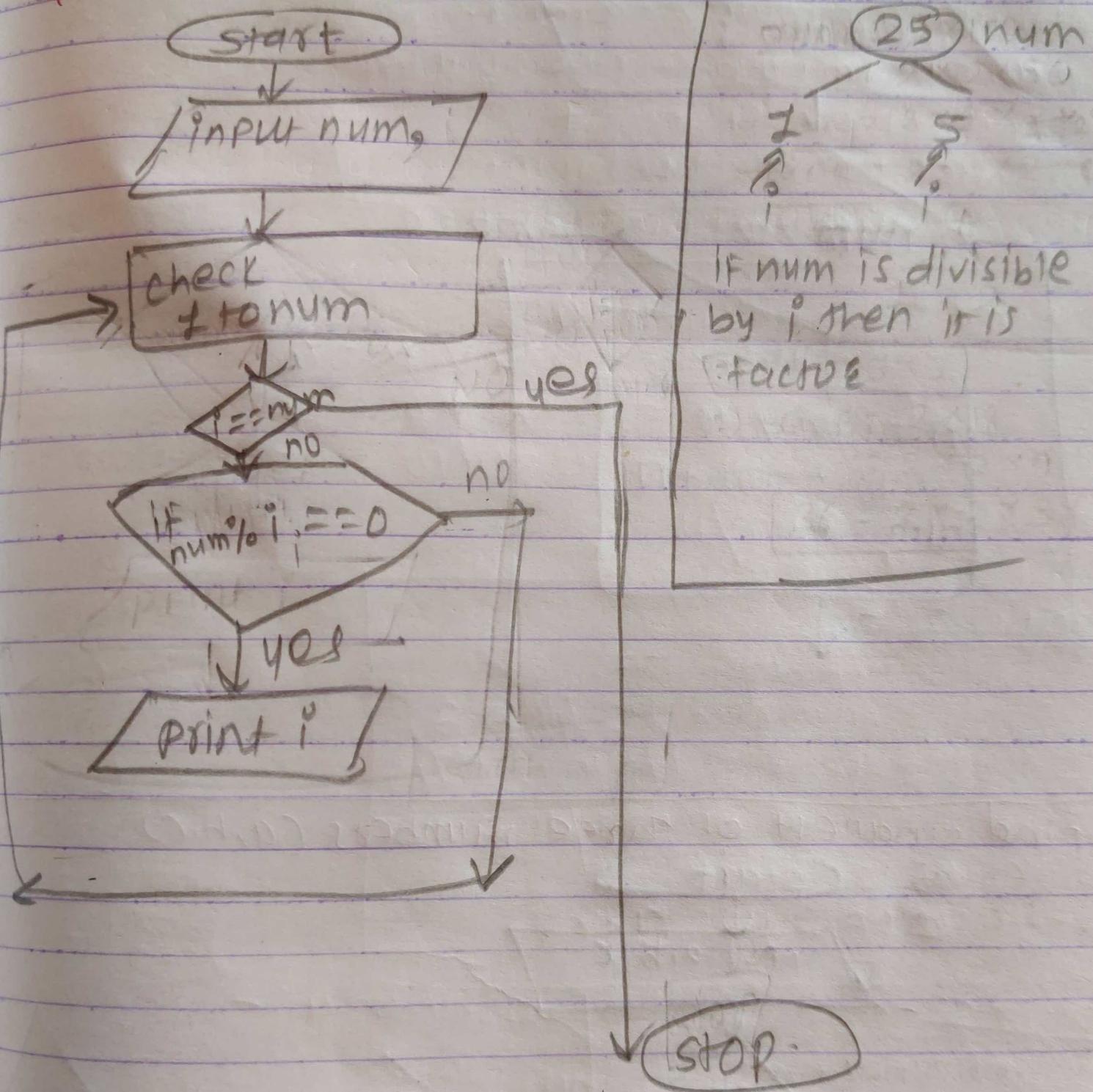
A year is leap year if -

1. it is divisible by 100
2. if it is divisible by 100 then it should be divisible by 400.
3. except this, all other years divisible by 4 are leap years.

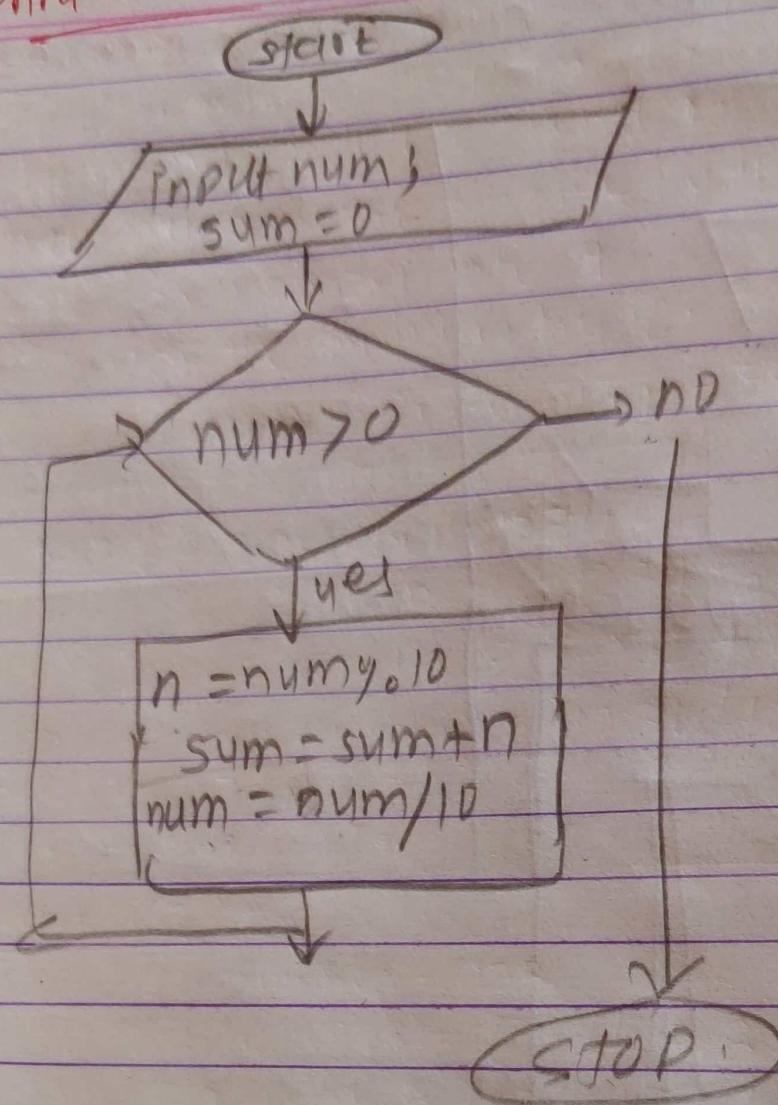
Q) write a java program to print the digits of a given no. ?



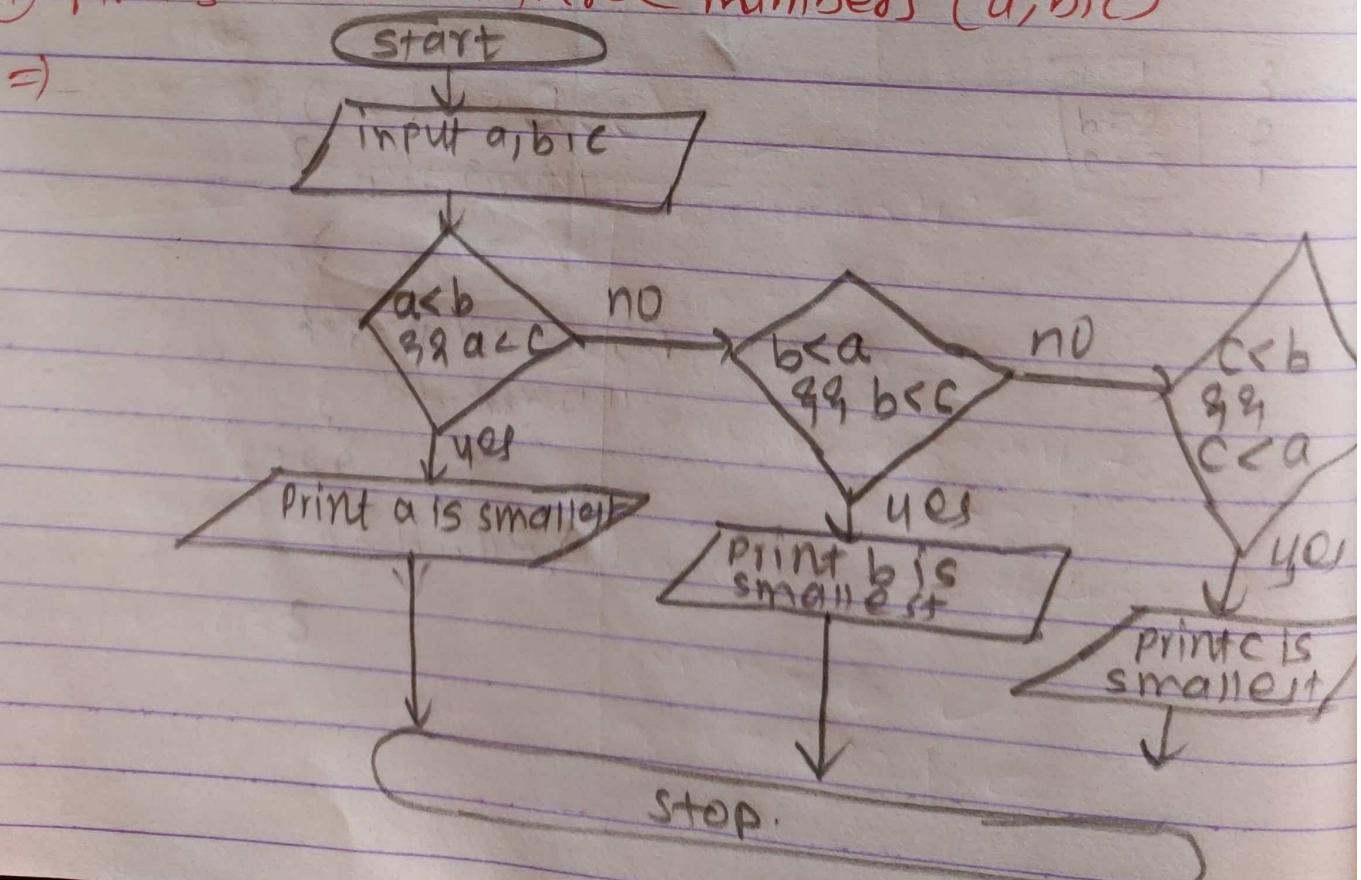
⑨ write a java program to print all the factors of a given no.



(10) Print sum of digits of given number.



(11) Find smallest of three numbers (a, b, c)



⑫ How to add two numbers without using the arithmetic operators in Java?

8421

→ By iteration method :-

class Add

{ static int add(int x, int y)

{ while(y != 0)

bitwise
AND

int carry = x & y;

x = x ^ y; ← XOR

y = carry << 1;

↑ left shift

return x;

}

psvm(string[] args)

{

sop(add(4, 5));

 ↳ ↳

NOW, x = 4, y = 8

while(y != 0) → true

carry → 4 & 8

0001

8 1.000

carry = 0000 = 0

x = x ^ y 2 0001

= 1 ^ 8 7 1 000

x = 1001 = 9

while(y != 0) → true

{ int carry = 0 & 5

0100

3 0101

carry = 0100 = 4

x = x ^ y → 4 ^ 5

0100

1 0101

5 = 00100000 = 0

similar = 0

dissimilar = 1

y = carry << 1

y = 0 & 5 << 1

= 0100

↓

y = 1 000 = 8

x << n

x * 2^n

y * 2^n

= 8

y = carry << 1

⇒ 0 << 1

carry = 0000

↓

y = 0000 = 0

x << n

x * 2^n

0 * 2^n

= 0

while(y != 0) → false

→ carry is AND of two bits

→ sum of two bits is A XOR B

→ shifts carry to 1 bit to calculate sum.

(13) write a java program to reverse a given number?

⇒ steps ⇒

- I) Find remainder of given no. by using module % operator.
 - II) multiply variable reverse by 10 & Add remainder into it
 - III) Divide the number by 10.
- Repeat until number == 0

Iteration 1 :- number = 1234

$$\text{remainder} = 1234 \% 10 = 4$$

$$\text{reverse} = 0 * 10 + 4 = 4$$

$$\text{number} = 1234 / 10 = 123$$

$$\text{number} = 123$$

$$\text{reverse} = 4$$

Iteration 2 :-

$$\text{number} = 123$$

$$\text{remainder} = 123 \% 10 = 3$$

$$\text{reverse} = 4 * 10 + 3 = 43$$

$$\text{number} = 123 / 10 = 12$$

$$\text{number} = 12$$

$$\text{reverse} = 43$$

Iteration 3 :-

$$\text{number} = 12$$

$$\text{remainder} = 12 \% 10 = 2$$

$$\begin{aligned}\text{reverse} &= 43 * 10 + 2 \\ &= 432\end{aligned}$$

$$\text{number} = 12 / 10 = 1$$

$$\text{num} = 1$$

$$\text{reverse} = 432$$

Iteration 4 :-

$$\text{num} = 1$$

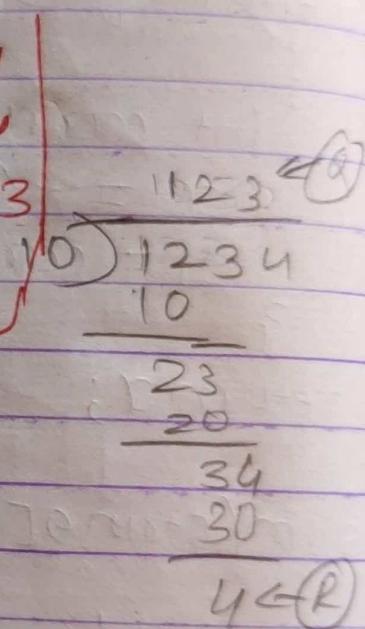
$$\text{remainder} = 1 \% 10 = 1$$

$$\begin{aligned}\text{reverse} &= 432 * 10 + 1 \\ &= 4321\end{aligned}$$

$$\text{number} = 1 / 10 = 0$$

$$\text{num} = 0$$

$$\text{rev} = 4321$$



Q) write java program to find GCD of two numbers?

=>

GCF(12, 8)

12 = 1, 2, 3, 4, 6, 12

8 = 1, 2, 4, 8

common = 1, 2, 4

GCF = 4

Q main() {

 int a, b, gcd = 1;

 for (int i = 1; i <= a && i <= b; i++)

 {

 if (a % i == 0 && b % i == 0)

 gcd = i;

 }

}

a = 12 , b = 8 , gcd = 1

12 % 1 = 0 , 8 % 1 = 0 , = 1

12 % 2 = 0 , 8 % 2 = 0 = 2

12 % 3 = 0 , 8 % 3 = 2 → 2

12 % 4 = 0 , 8 % 4 = 0 = 4

12 % 5 = 2 , 8 % 5 = 3 → 4

12 % 6 = 0 , 8 % 6 = 2 → 4

12 % 7 = 5

12 % 8 = 4

12 % 9 = 3

12 % 10 = 2

12 % 11 = 1

12 % 12 = 0

12 % 13 = False

Q) Check whether the given number is a palindrome or not?

⇒ palindrome number -

a number that is same after reverse eg. 151, 545, 121 etc.

Algorithm -

- Get the number to check for palindrome
 - temp = number
 - Reverse ~~temp~~ number . temp
 - compare ~~temp~~ with reversed ~~number~~ temp.
- if num == temp
then it is Palindrome.

18) Print all the prime factors of the given number.

$$\begin{aligned} 48 &= 2 \times 24 \\ &= 2 \times 2 \times 12 \\ &= 2 \times 2 \times 2 \times 6 \\ &= 2 \times 2 \times 2 \times 3 \\ 48 &= 2 \times 2 \times 2 \times 3 \end{aligned}$$

```
main()
{
    int num, temp, i = 2;
    num = 48;
    temp = num;
    cout("prime factor are");
}
```

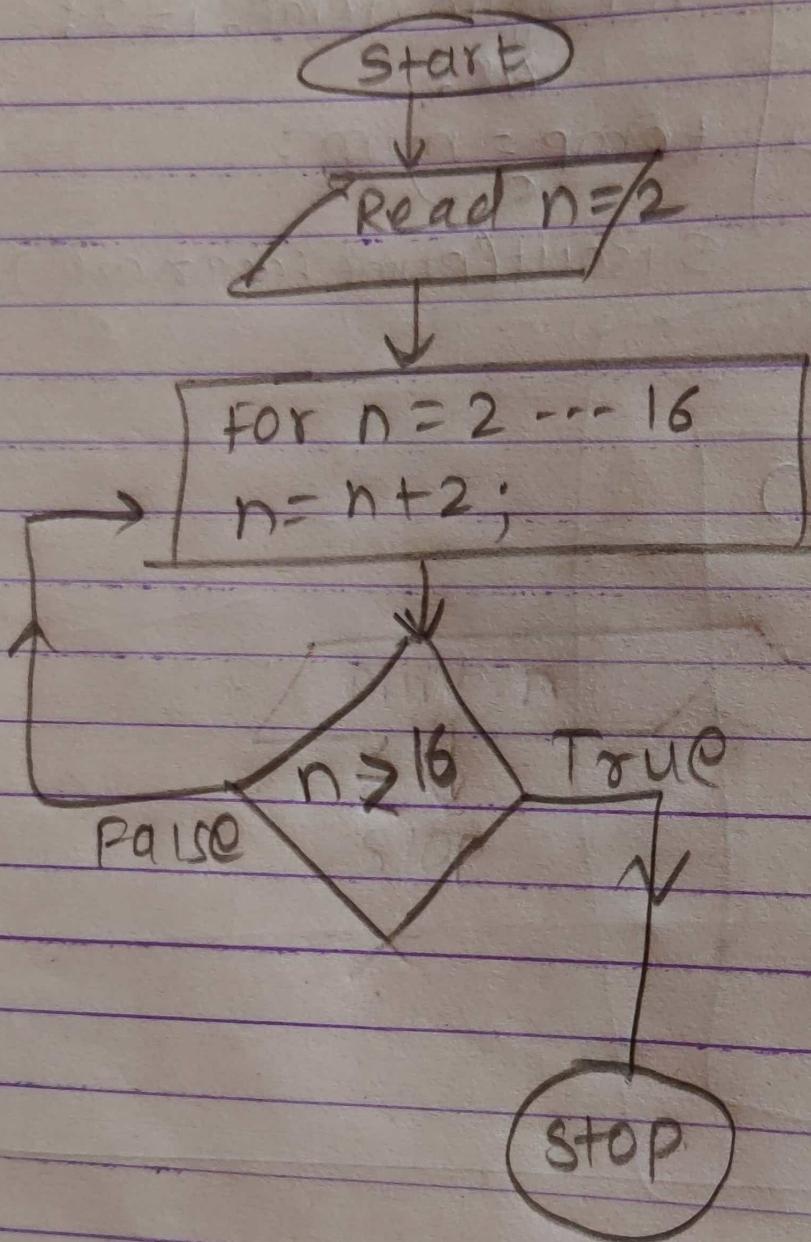
while (temp > 1)

```
{ if (temp % i == 0)
    {
        cout(i);
        temp = temp / i;
    }
}
```

else

```
{ i++;
}
```

Q9) TO print the FOLLOWING even no. series.
2, 4, 6, 8, 10, 12 --- 16.



⑩ To print odd series

1, 3, 5, 7 ... 13.

