Day 05:- FOR loop in C++ Advance.

Loop Advance: (Problems)

Means loop ko hum log int, char, bool kisi b data-type sy kr skty hain.

let say, I have;

$$n = 10$$

10, 9, 8, 7, 6, 5, 4, 3, 2, 1

① i=10   for (i=10; i>1; i=i-1
② i>1   {
③ Print i   { cout << i;
④ i--   }

NOTE

→ Number jis mai hum agy ko jaty hain os mai condition kuch essy lgti hai, i<100.

→ Number jis mai hum pichy ko aty hain os mai condition kuch essy lgti hai. i>1.

▷① Power of a Number:-
$$n = 5, \quad Pow = 4 \qquad \qquad :: 5^4$$

Is mei hum 'n' ko fix krlaingy and Power sy '1' less wahan tak hum loop chalaingy.

jesy;

$$n \times 8 \qquad * \quad num = n$$

→ 5^4

$n = 5; \quad Pow = 4$

→ ab meny pehly step mai '1' 5 ko fix kerna hai.

like this, and '1' variable k andl hold kerna hai.

✓ num = 5

✓ num = num × 5

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

dekho: n=5	1 < 4 ✓	num × 5 = 25
num 5	2 < 4 ✓	25 × 5 = 125
num = num × n	3 < 4 ✓	125 × 5 = 625

num = 625

② Sum of 'n' natural Numbers :-

Way 01 : Guddo Bhaiya

Sum = 0

✓ Sum = Sum + i

for (i=1; i ≤ n; i++)
{
  Sum = Sum + i
}

cout << Sum;

$\overset{i=0}{0+1=1}$
1+2=3
3+3=6
6+4=10
10+5=15
15+6=21

sum=0

sum = sum+i;

1)   1+2 = ③
2)   3+3 = 6
③   6+4 = 10
④   10+5 = 15
⑤   15+6 = 21
⑥

sum
No. starts from 0.

Way 2 : Babblo Baiya Sum = 0

• No. of terms (Last term + First term)

n * (n+1) / 2

last term (b) $6 * (6+1)/2$

n=6

$n * (n+1)$ / 2

$6 * 7/2$

$6 × 7$ / 2 → 42/2 = 21

No. of terms (6)

Let say n = 6

$\frac{n}{6} * (6+6)/2 = 13$

$\frac{6}{6} * (6+1)/2 =$

$\frac{6}{2}$
3

1
2
3
4
5
6

③ Factorial of a number n:-

let say $n = 5$

factorial ko mai agr 'o' rkhongi
two wo next jis numbee say b
'x' hoga result 'O' hi ayga.
two iska matlb hum factorial
ko 'I' sy start krskty hain.

Factorial $= n$

$$\boxed{n = 5}$$

$$1 \times 2 \times 3 \times 4 \times 5 \quad = 120$$

$i = 1$ $i \leqslant 5$

factorial $= 1$

④ Prime Numbere

Prime Numbee wo number hota
hai jo '1' sy divide ho ya khudsy
divede ho, lekin dono numbee diff
hony chahye.

             1 or n(means khudsy)

→ (A number pichy tk
     divide krna
     hai) ←   different.

Example: $\boxed{n = 10}$ $2 - n-1$ $\boxed{2-4}$
                                     $2 - 10-1$

Ab 2 sy lek $n-1$ tk
agr koi b number isko divide krkta
hai two mai kahogi k ye P

Prime Number.

Example: $n = 7$

Ab 2 ko lena hai and 6 tk divide kerna hai '7 sy.

$$2, 3, 4, 5, 6 \quad (\text{1 number pichy tk lena hai}).$$

$$\left(\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7} \right) \quad ('7' \text{ is called a P.N,}$$

$$\frac{7}{2}, \frac{7}{3}, \frac{7}{4}, \frac{7}{5}, \frac{7}{6}$$

kuk ye (2-6) k darmayan kisi b number sy divide nhi hoa).

Condition:

$$n < 2$$

↓ Not Prime Number.

Means (0, 1, -1, -2, etc all are not P.Ns.)

Code:

```
if (n < 2)
{   cout << "Not prime Number";
    return 0;  ──→  [means exit krjao]
}                   Program ko
                    nichy jany
else                ki need nhi hai
{ for (i=2; i<n; i++)
  { if (n % i == 0)
        cout << "Not PN".
        return 0;  ──→ end my program
  }
  else
      cout << "Prime Number";
```
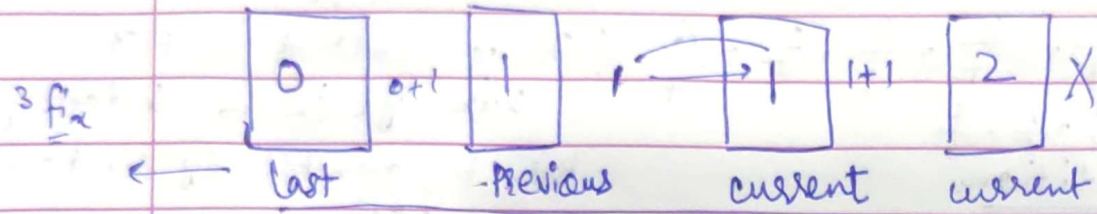
⑤ **Fibonnancie Seriess**

Fibonnancie Series start from 'o'.

(and next no, pichley 2 nors ka sum hota hai)

$$0 \underbrace{1}_{0+1} | \underbrace{2}_{1+0} \quad 3 \quad 5$$

3 fix

0 | 0+1 | 1 | → 1 | 1+1 | 2 | X

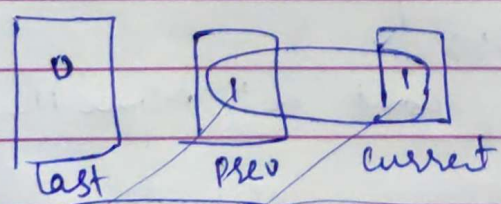last   Previous   current   current

(ab kea mai hae '1' current

variable klye itny new variables banayegy.

So, mai '3' ko fix krkti hon, and then baki ko oska acc krongi.
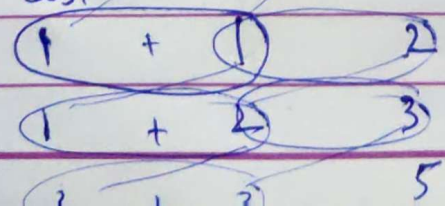
Let say;

.9 have :

fibonanid = 0   1   1   2   3   5   8   13   21

n = 1   2   ③   ④   5   6   7   8   9

↓   ↓   ↓   ↓

Last   pseo current   current
     Last prev

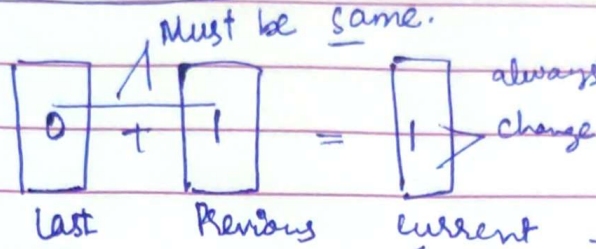Last two nos ko utha k pehli 2 positions pr and so on. rkhdena hai."

0 | 1 | 1

last   prev   current

1 + 1 = 2
1 + 2 = 3
    5

• Logic Explanations

→ Ab mai jab b '2' nos
ko add kr rhi how
3rd no. arahai hai.
ob kea mai 4th lelye
5th kl"lye and so on.
lelye new variables
banaos bo, meny
fir keye
hai.

Code Perspective:-

Patterns

Must be same.

Last   Previous   current   → Last + Previous = current

(last k
andl psev
aya hai)

(previous k and current
aya hai)

Last = Previous

Psev = current

→ 0 , 1 ye 2no starting numbers
hamesha hi same rahaingy.