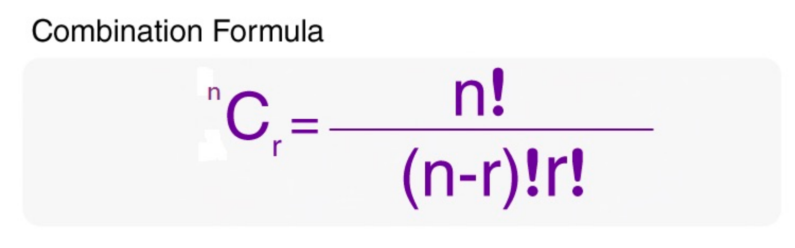
1 Apr 2023

^nC_r :


Combination Formula

$$^nC_r = \frac{n!}{(n-r)!r!}$$

$$^nC_r : {}^5C_2 = \frac{5!}{(5-2)! \times 2!}$$

$$= \frac{5!}{3! \times 2!}$$

$$= \frac{5 \times 4 \times \cancel{3!}}{\cancel{3!} \times 2!}$$

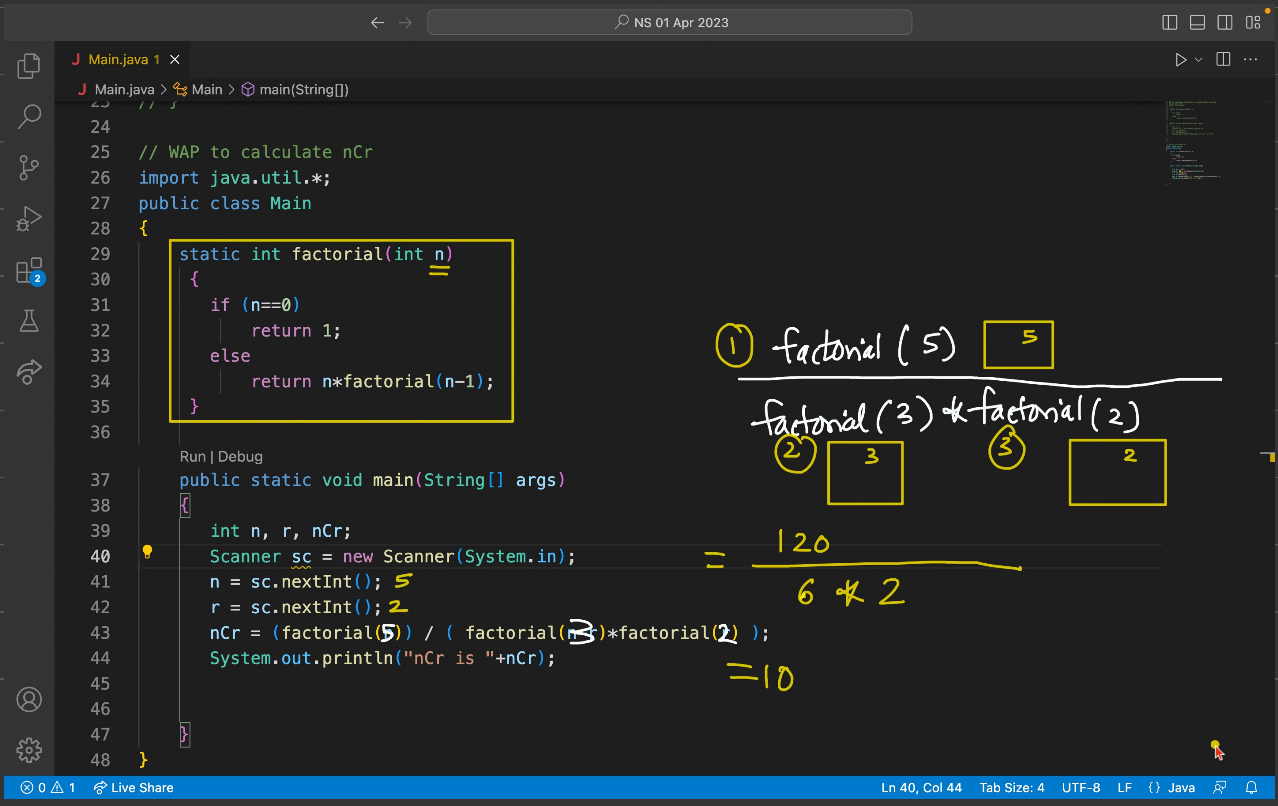
$$= \frac{5 \times \cancel{4}^{2}}{\cancel{2} \times 1}$$

$$= 10$$

$$\therefore \boxed{^5C_2 = 10}$$

Pgm: Enter n } Scanner
Enter r

int nCr;
nCr=(factorial(n))/
(factorial(n-r) * factorial (r))


NS 01 Apr 2023
Main.java 1
Main.java > Main > main(String[])
⊗ 0 ⚠ 1 Live Share
Ln 40, Col 44 Tab Size: 4 UTF-8 LF {} Java

```
    // }

// WAP to calculate nCr
import java.util.*;
public class Main
{
    static int factorial(int n)
    {
        if (n==0)
            return 1;
        else
            return n*factorial(n-1);
    }

    Run | Debug
    public static void main(String[] args)
    {
        int n, r, nCr;
        Scanner sc = new Scanner(System.in);
        n = sc.nextInt(); 5
        r = sc.nextInt(); 2
        nCr = (factorial(5)) / ( factorial(3)*factorial(2) );
        System.out.println("nCr is "+nCr);



    }
}
```

① factorial (5) [5]

factorial(3) * factorial(2)
② [3] ③ [2]

$$= \frac{120}{6 * 2}$$

$$= 10$$

Fibonacci Series:

0 1 1 2 3 5 8 13 21

```
class Main
{ psvm(—||—)
  {
    int n1=0,n2=1,n3,i;
    Sop(n1+" "+n2);

    for(i=2; i<10; i++)
    {
      n3= n1+n2, Sop(" "+n3);
      n1= n2;
      n2=n3;
    }
  }
}
```

n1 n2

~~n1~~ ~~n2~~ ~~n3~~ n3

o/p: 0 1 1 2 3 5 13 21 34

i = ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~7~~ ~~8~~ ~~9~~ 10

n1 = ~~0~~ ~~1~~ ~~1~~ ~~2~~ ~~3~~ ~~5~~ ~~8~~ ~~13~~ 21

n2 = ~~1~~ ~~1~~ ~~2~~ ~~3~~ ~~5~~ ~~8~~ ~~13~~ ~~21~~ 34

n3 = ~~1~~ ~~2~~ ~~3~~ ~~5~~ ~~8~~ ~~13~~ ~~21~~ 34

Fibonacci Series using Recursion:

0	1	1	2	3	5	8	13	21
f(1)	f(2)	f(3)	f(4)	f(5)	f(6)	f(7)	f(8)	

① $f(n) = f(n-1) + f(n-2)$

$f(3) = f(2) + f(1)$

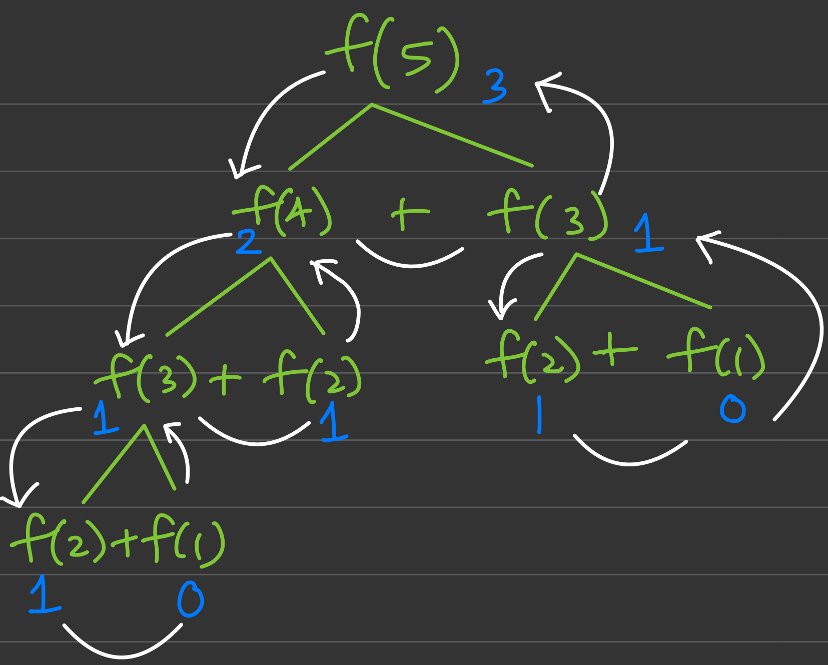
$f(4) = f(3) + f(2)$

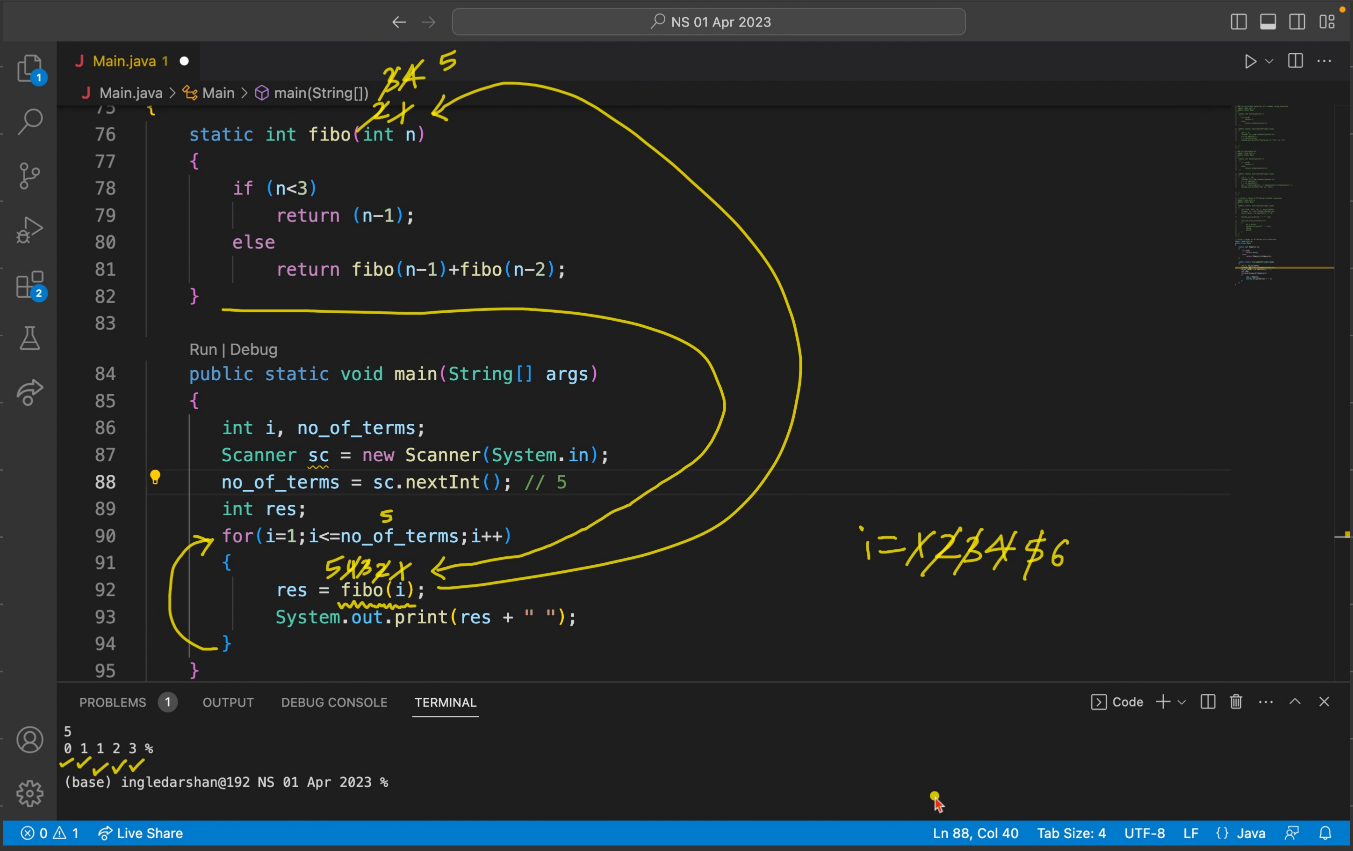
Repeat ① till $n \leq 3$

If $n < 3$, then $f(n) = (n-1)$

eg: If $n = 2$, then $f(2) = 1$

If $n = 1$, then $f(1) = 0$





~~3~~ ~~4~~ 5

2 ~~1~~

```
    static int fibo(int n)
    {
        if (n<3)
            return (n-1);
        else
            return fibo(n-1)+fibo(n-2);
    }

    Run | Debug
    public static void main(String[] args)
    {
        int i, no_of_terms;
        Scanner sc = new Scanner(System.in);
        no_of_terms = sc.nextInt(); // 5
        int res;
        for(i=1;i<=no_of_terms;i++)
        {
            res = fibo(i);
            System.out.print(res + " ");
        }
    }
```

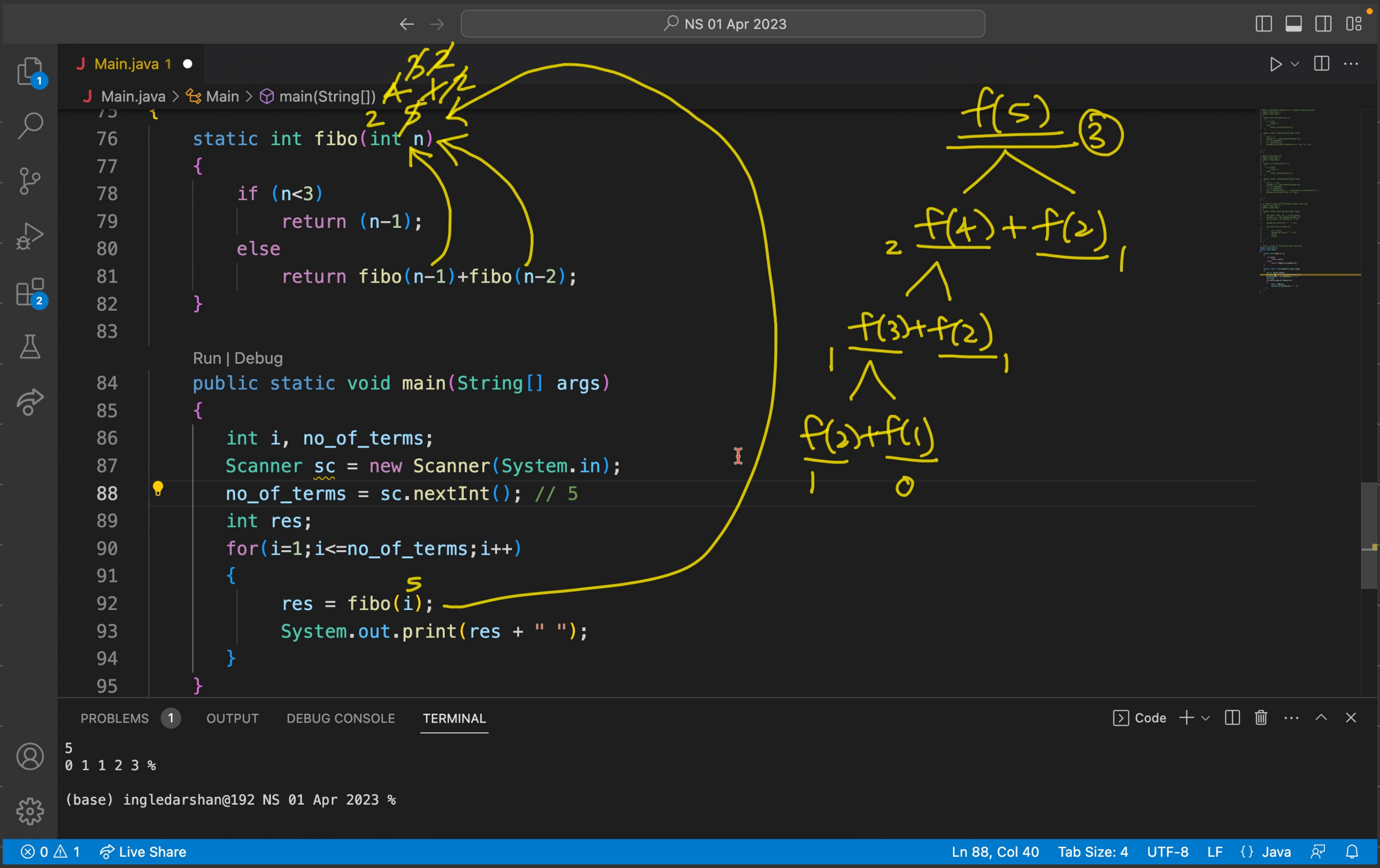
5

5 ~~4~~ ~~3~~ ~~2~~ ~~1~~

i = ~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ 6

```
5
0 1 1 2 3 %
(base) ingledarshan@192 NS 01 Apr 2023 %
```

✓✓✓✓✓



```java
{
    static int fibo(int n)
    {
        if (n<3)
            return (n-1);
        else
            return fibo(n-1)+fibo(n-2);
    }

    Run | Debug
    public static void main(String[] args)
    {
       int i, no_of_terms;
       Scanner sc = new Scanner(System.in);
       no_of_terms = sc.nextInt(); // 5
       int res;
       for(i=1;i<=no_of_terms;i++)
       {
            res = fibo(i);
            System.out.print(res + " ");
       }
    }
```

```
5
0 1 1 2 3 %

(base) ingledarshan@192 NS 01 Apr 2023 %
```

H/W: Java Program to Find the Sum of Natural Numbers using Recursion [easy]

https://www.programiz.com/java-programming/examples/sum-natural-numbers-recursion

https://www.youtube.com/watch?v=Cv_lgVhYbFs&ab_channel=ProgrammingForBeginners