

factorial

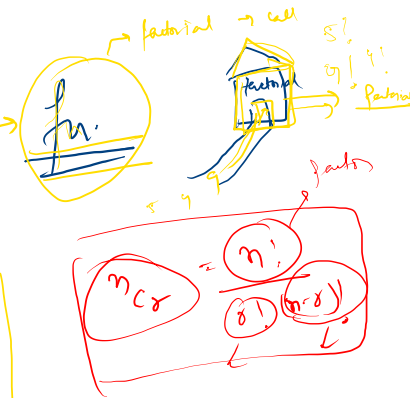
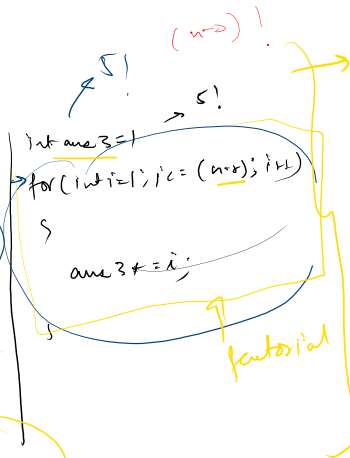
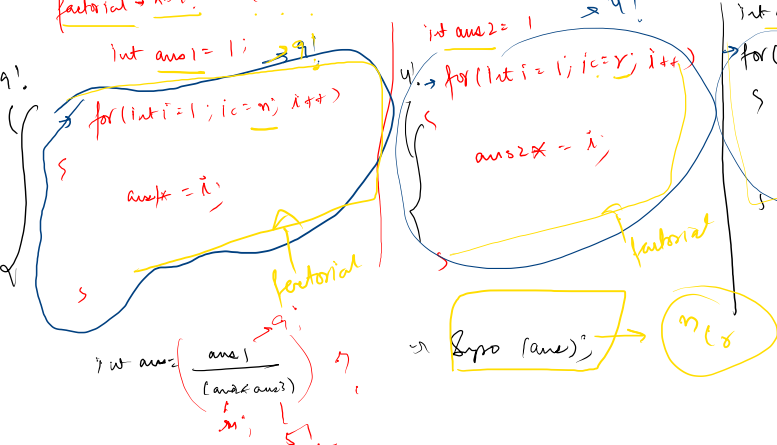
$$n=9, r=4$$

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

$$9C4 = \frac{9!}{4!5!}$$

Program -

$$\text{factorial} = n! = 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$



Syntax of function

public static

return type

(int)
(boolean)
(void)
(double)
(string)

what type value the particular fn give

functional name

write this datatype

((int x))

factorial → integer

Logic / Printing

public static int factorial(int x) {

Java **Recursion** **Parameter**

```

public static int factorial(int x, int y){
    int ans=1;
    for(int i=1; i<=x; i++){
        ans*=i;
    }
    return ans;
}

public static void main(String[] args) {
    /* Enter your code here. Read input from STDIN. Print output to
    *OUT. Your class should be named Solution. */
    int n=9;
    int r=4;

    User input
    int ans1=factorial(n);
    int ans2=factorial(r);
    int ans3=factorial(n-r);

    ans = 24
    arguments: 9, 4, 5
    int ans1=1;
    for(int i=1; i<=n; i++){
        ans1*=i;
    }

    int ans2=1;
    for(int i=1; i<=r; i++){
        ans2*=i;
    }

    int ans3=1;
    for(int i=1; i<=(n-r); i++){
        ans3*=i;
    }

    int ans=ans1/(ans2*ans3);
}

```

Handwritten notes:

- Factorial(9):**
 - $9! = 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 362880$
 - $ans = 1 \times 2 = 2$
 - $ans = 2 \times 3 = 6$
 - $ans = 6 \times 4 = 24$
 - $ans = 24 \times 5 = 120$
 - $ans = 120 \times 6 = 720$
 - $ans = 720 \times 7 = 5040$
 - $ans = 5040 \times 8 = 40320$
 - $ans = 40320 \times 9 = 362880$
- Factorial(4):**
 - $4! = 4 \times 3 \times 2 \times 1 = 24$
- Factorial(5):**
 - $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$
- Final Calculation:**
 - $ans = \frac{362880}{24 \times 120} = 120$

Handwritten notes:

- $9! = 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 362880$
- $ans = 1 \times 1 = 1$
- $i = 2, ans = 2$
- $i = 3, ans = 6$
- $i = 4, ans = 24$
- $ans = 24 \times 5 = 120$
- $ans = 120 \times 6 = 720$
- $ans = 720 \times 7 = 5040$
- $ans = 5040 \times 8 = 40320$
- $ans = 40320 \times 9 = 362880$

RAM

Handwritten notes:

- Factorial(9):**
 - $9! = 362880$
- Factorial(4):**
 - $4! = 24$
- Factorial(5):**
 - $5! = 120$
- Final Calculation:**
 - $ans = \frac{362880}{24 \times 120} = 120$

