

Fac(int n) ←

smaller input
use

int x = fac(n) ←
x * n

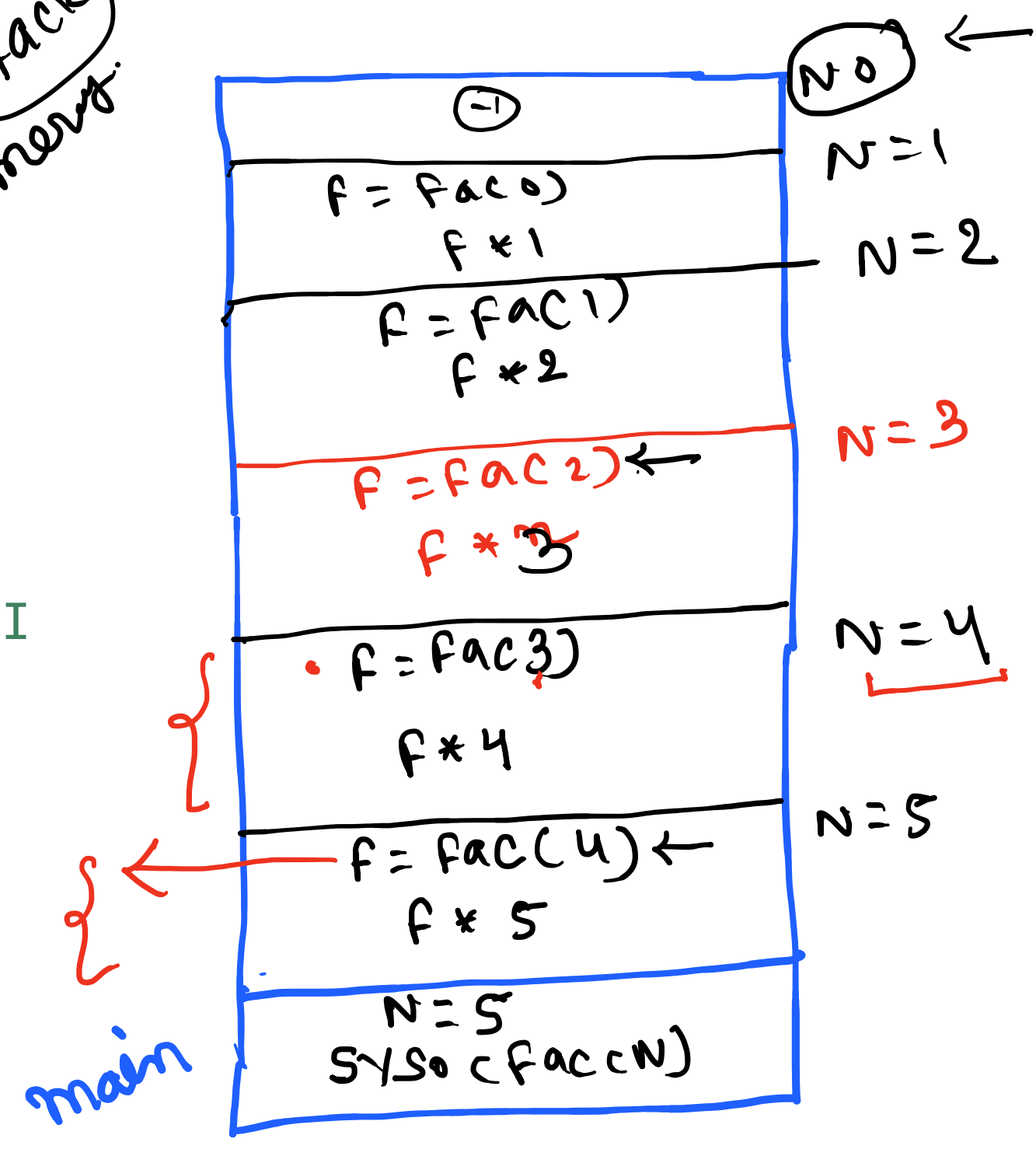
5! = 4! * 5 = 120
4! = 3! * 4
3! = 2! * 3
2! = 1! * 2
1! = 0! * 1

as n=1

```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int n = 5;
    System.out.println(Fac(n));
}

public static int Fac(int n) {
    // SP 2nd Steps of PMI
    return f * n;
}
```

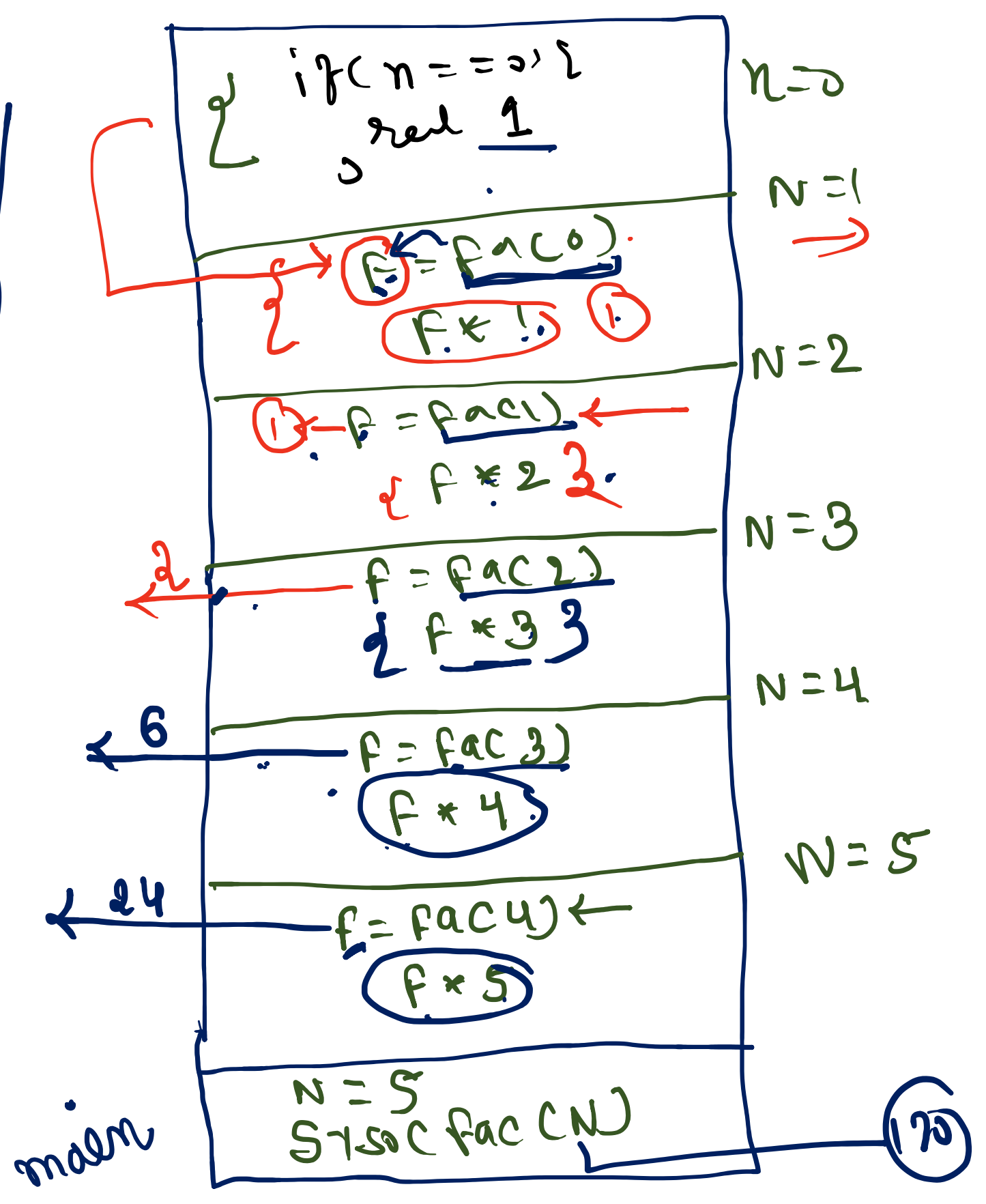
Stack
main



```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int n = 5;
    System.out.println(Fac(n));
}

public static int Fac(int n) {
    if (n == 0) {
        return 1;
    }
    int f = Fac(n - 1); // SP 2nd Steps of PMI
    return f * n;
}
```

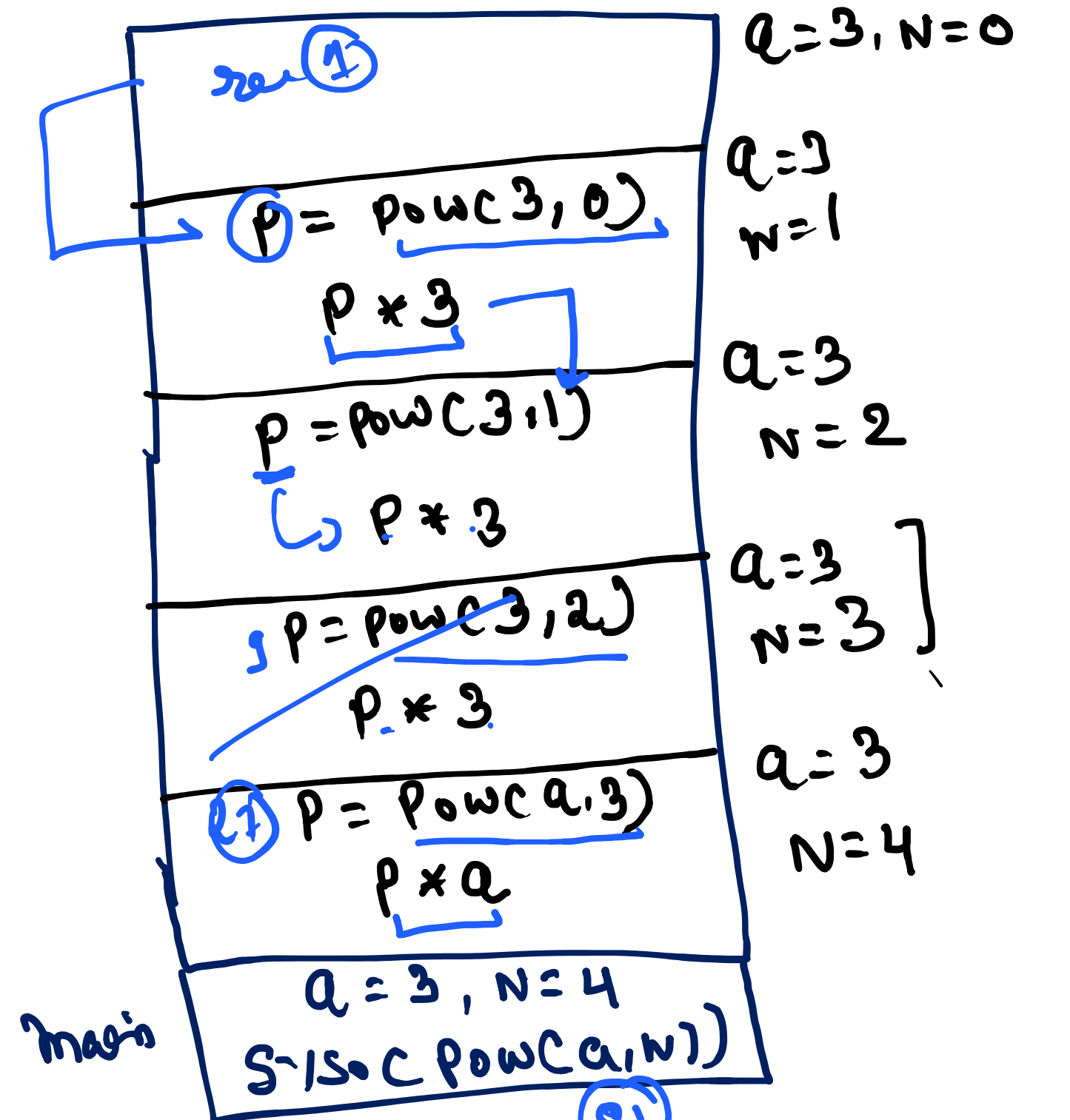
down call



```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int a = 3;
    int n = 4;
    System.out.println(pow(a, n));
}

public static int pow(int a, int n) {
    if (n == 0) {
        return 1;
    }
    int p = pow(a, n - 1); // a^n-1
    return p * a;
}
```

down call



N = 5

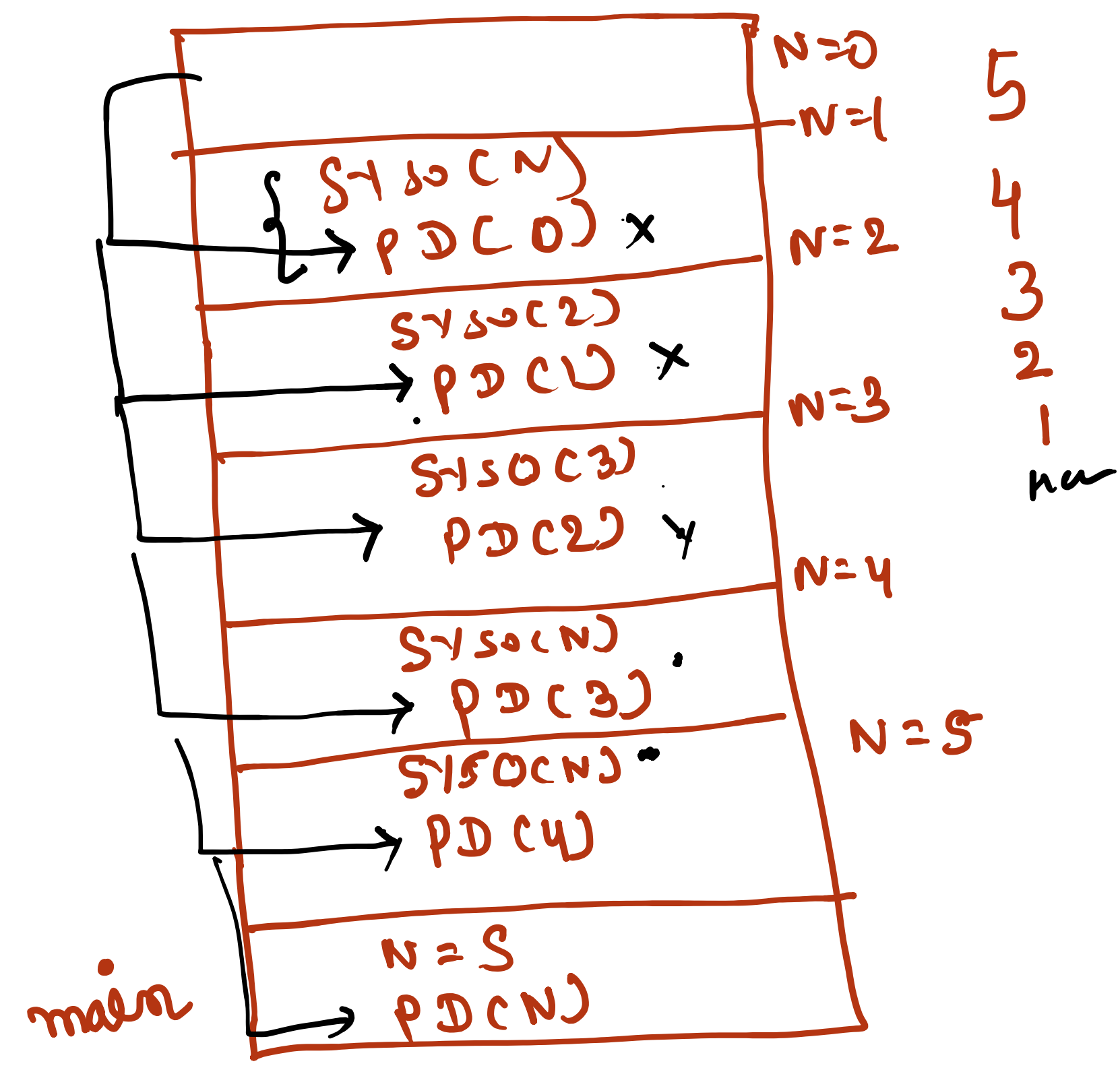
5
4
3
2
1

for (i = N; i > 0; i--)
sys.c(i)

```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int n = 5;
    PD(n);
}

public static void PD(int n) {
    // TODO Auto-generated method stub
    if (n == 0) {
        return;
    }
    System.out.println(n); // 5
    PD(n - 1);
}
```

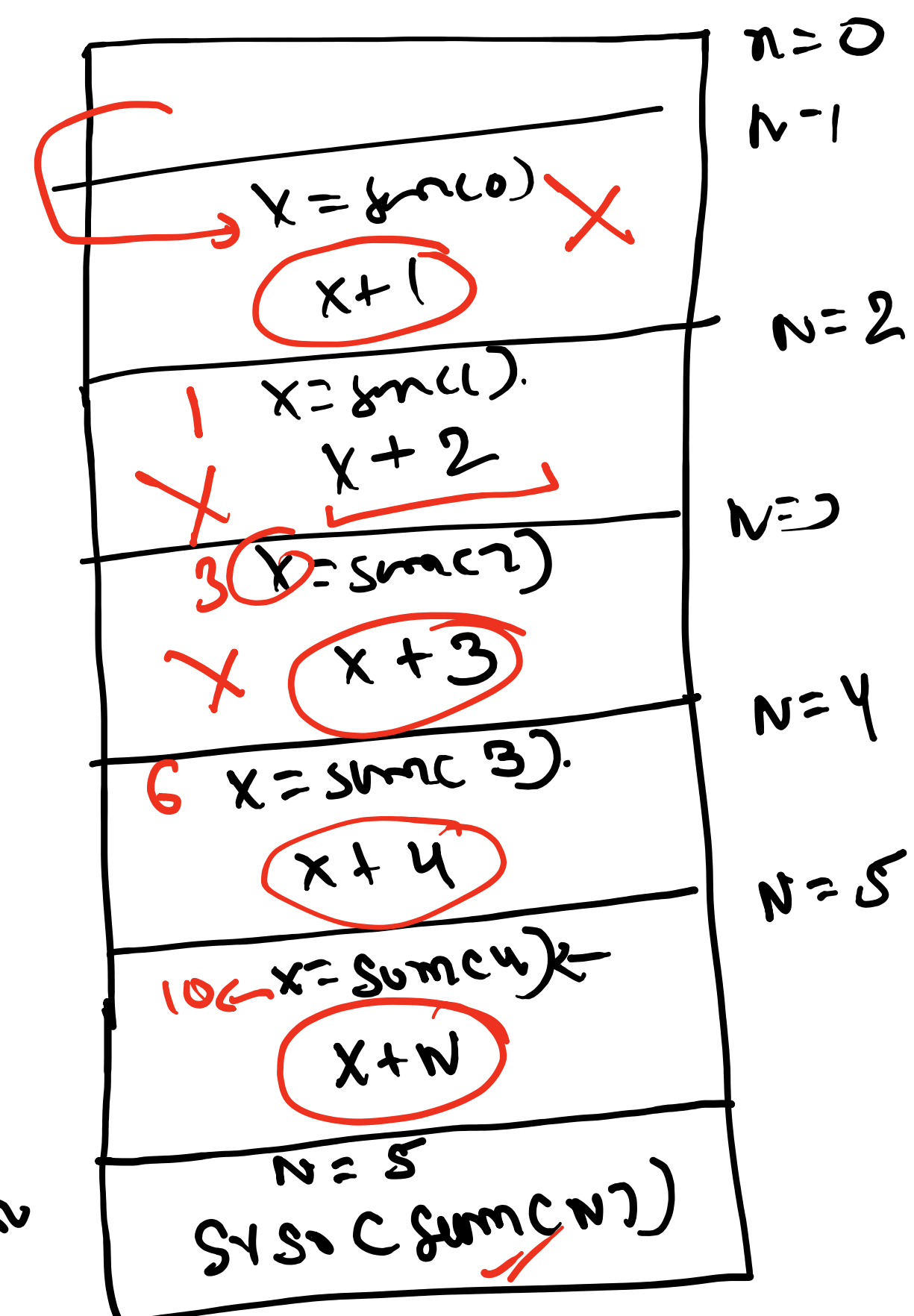
sys.c



```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int n = 5;
    System.out.println(Sum(n));
}

public static int Sum(int n) {
    if (n == 0) {
        return 0;
    }
    int x = Sum(n - 1);
    return x + n;
}
```

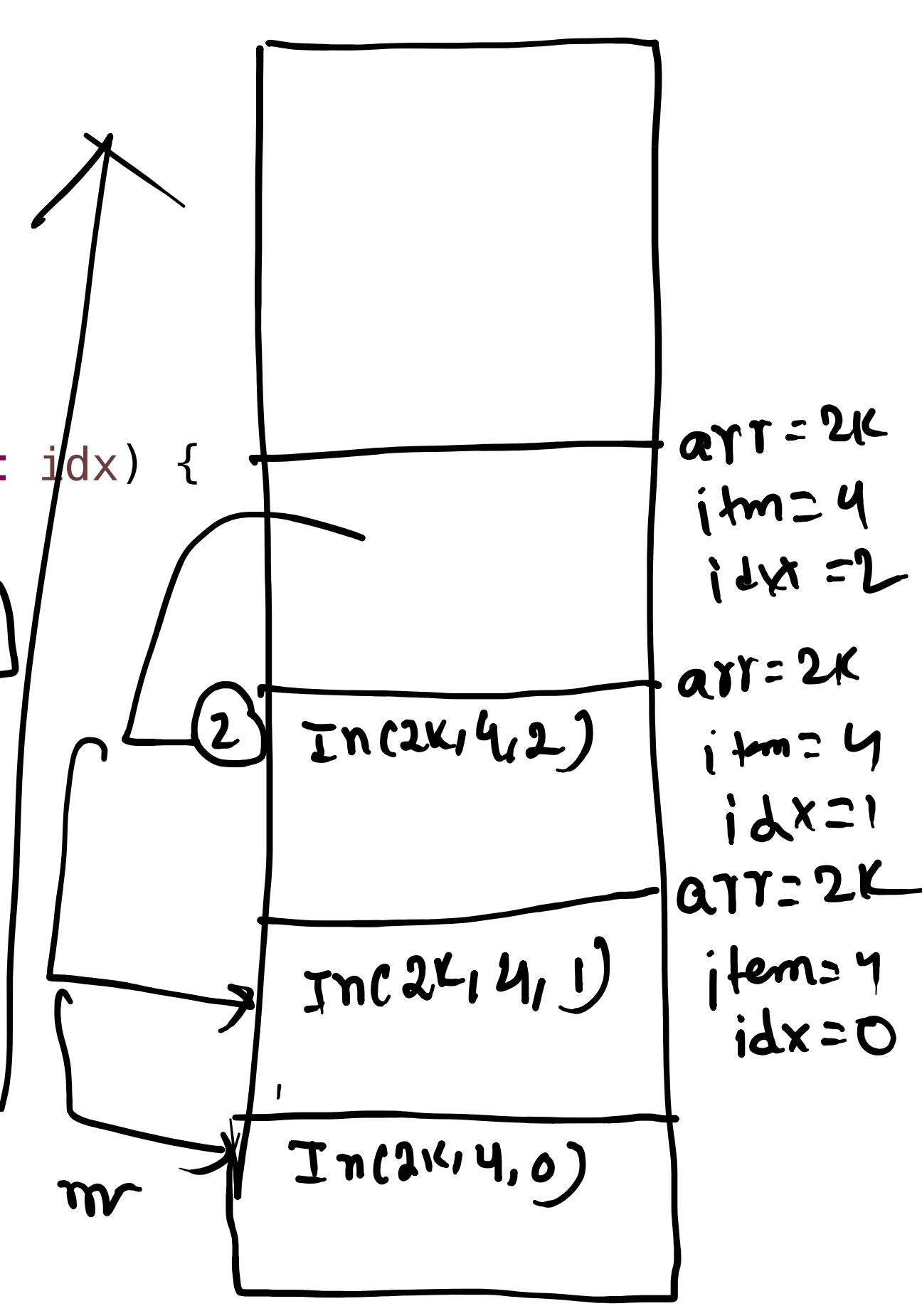
main



```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int[] arr = { 2, 3, 4, 5, 4 };
    int item = 4;
    System.out.println(Index(arr, item, 0));
}

public static int Index(int[] arr, int item, int idx) {
    if (idx == arr.length) {
        return -1;
    }
    if (arr[idx] == item) {
        return idx;
    }
    return Index(arr, item, idx + 1);
}
```

2k



tail Head

```
public static void main(String[] args) {
    // TODO Auto-generated method stub
    int n = 5;
    System.out.println(Fac(n, 1));
}

public static int Fac(int n, int ans) {
    if (n == 0) {
        return ans;
    }
    return Fac(n - 1, ans * n);
}
```

main

