Factorial

$$n! = \underbrace{n \times (n-1) \times (n-2) \times \cdots \times 3 \times 2 \times 1}_{\text{Result.}} = 1 \times 2 \times 3 \cdots \times (n-1) \times n$$

Result.

$n = 5$ Result = 1 $(i = 2, 3, 4, 5)$ for i in range(2,6)

i=2 Result ← Result × i (Result = 2)

i=3 Result ← Result × i (Result = 2 × 3 = 6)

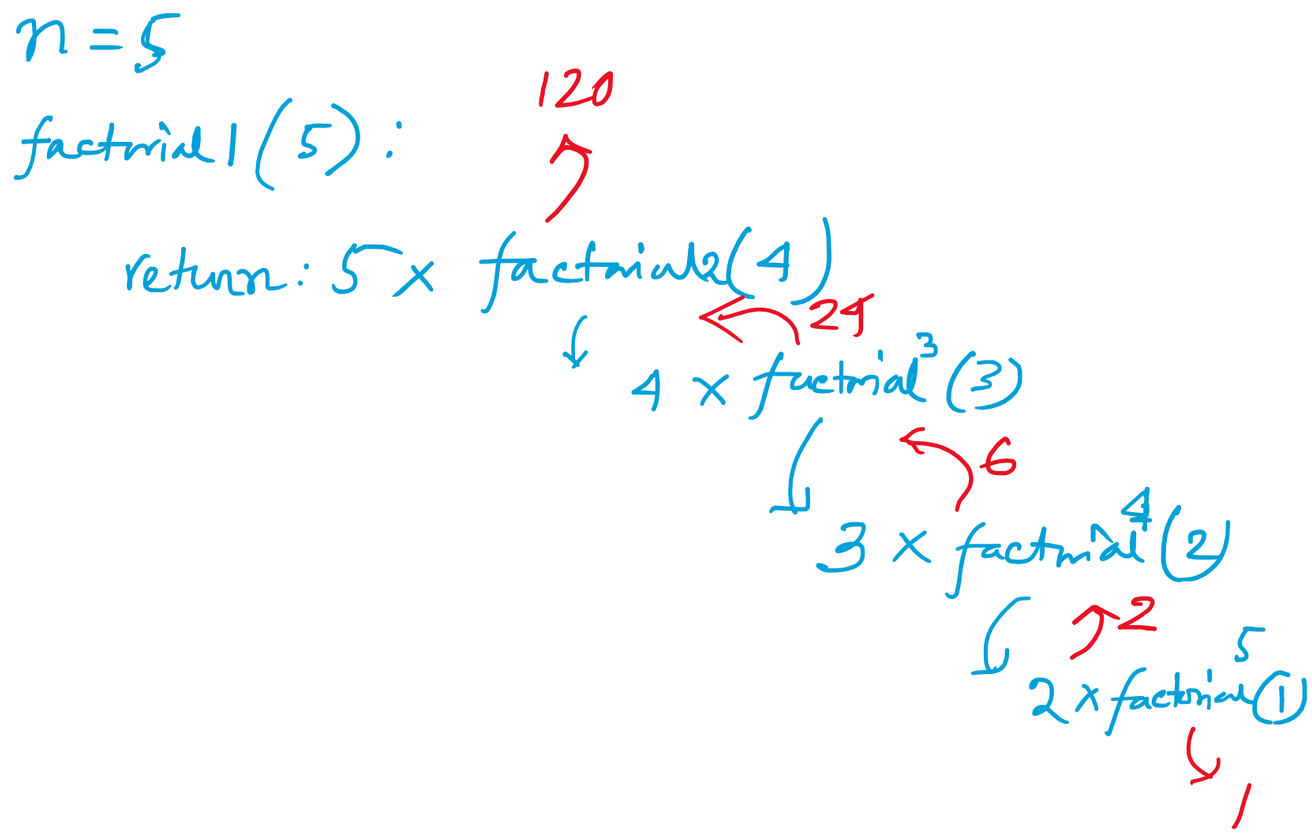
i=4 Result ← Result × i (Result = 6 × 4 = 24)

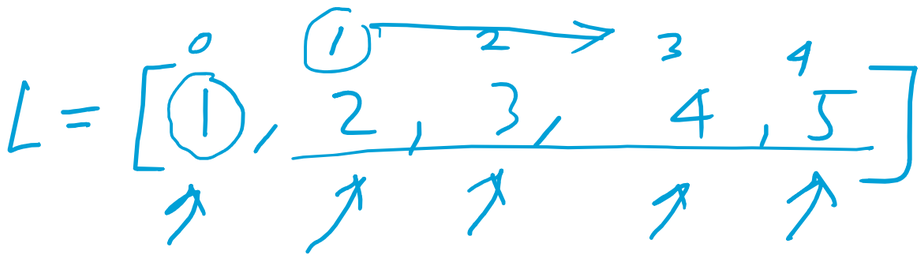
i=5 Result ← Result × i (Result = 24 × 5 = 120)

Return Result

```
factorial(n):
    if n==1:
        return 1
    else:
        return n * factorial(n-1)
```

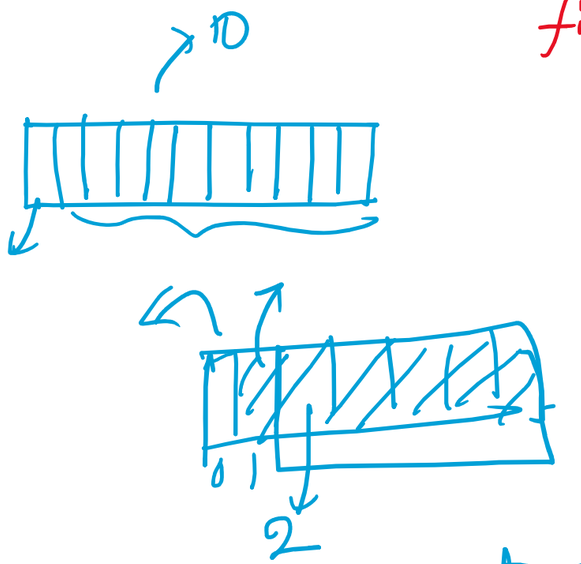
Find a number.





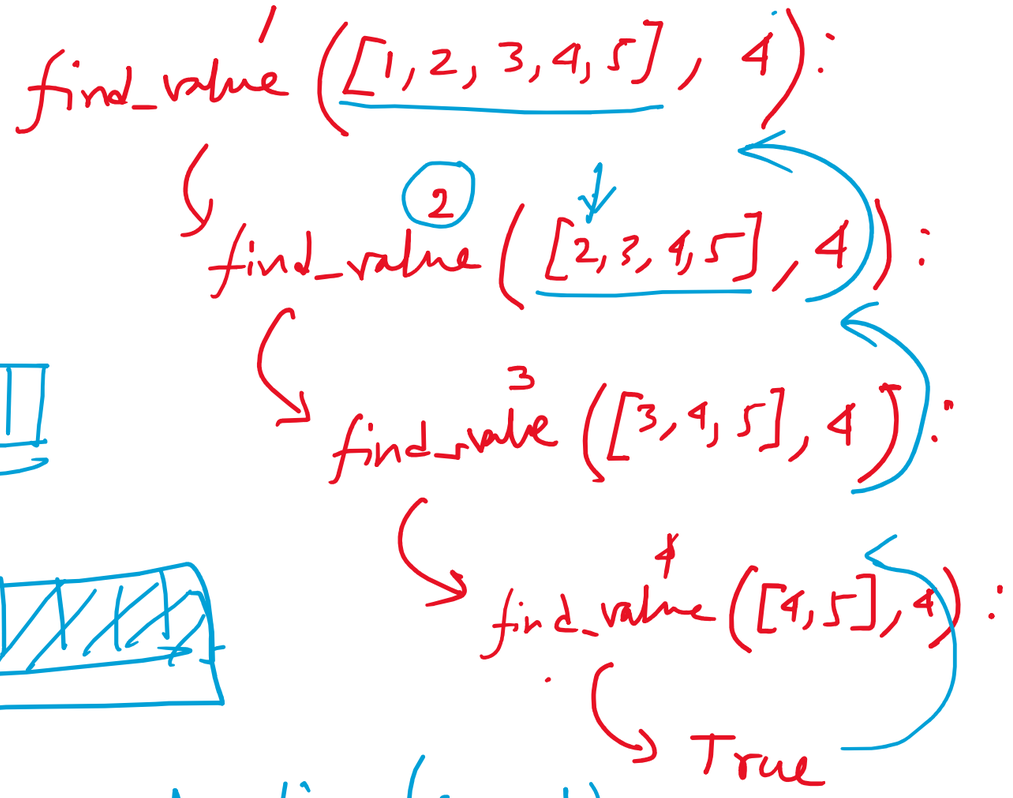
$L[1:]$

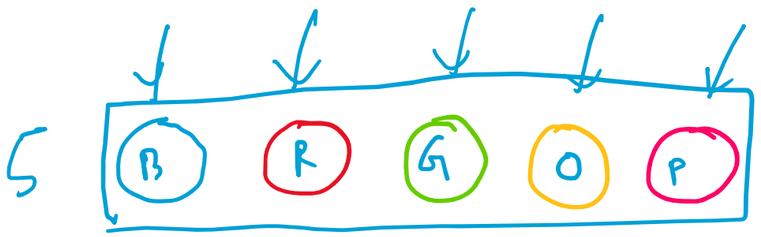
```
find_value(L, n):
    if len(L) == 0:
        return False
    if L[0] == n:
        return True
    else:
        return find_value(L[1:], n)
```



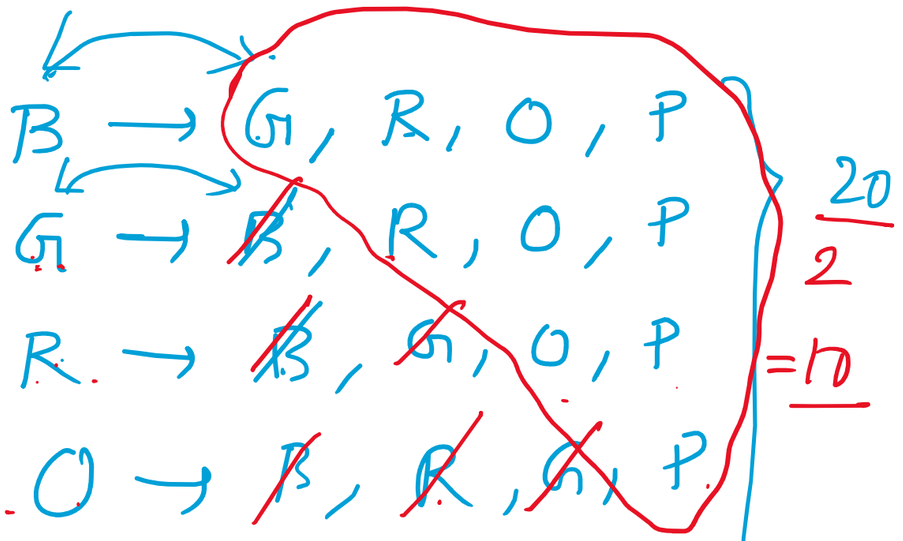
eat_slice(bread)

eat_slice(bread[1:])





R, G, O, P
P, G, O, R
P, O, G, R
} All are same (order doesn't matter).



4

$^{10}C_7 = {}^{10}C_3$

^nC_r

$^5C_4 = {}^5C_1$

$^5C_3 = {}^5C_2$

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

$$^5C_3 = \frac{5!}{2! \times 3!} = \frac{120}{2 \times 6} = 10$$

$^nC_r = {}^nC_{n-r}$

$^5C_2 = \frac{5!}{3! \times 2!}$

Binomial Coefficient

^nC_r → Binomial coefficient

$$(1+x)^n = 1 + {}^nC_1 x + {}^nC_2 x^2 + \cdots + {}^nC_r x^r + \cdots + {}^nC_n x^n$$

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

Fibonacci Series:-

the n^{th} term of Fibonacci series is sum of previous two terms.

$$F_0 = 0, \quad F_1 = 1$$

$$F_n = F_{n-1} + F_{n-2}$$

1) → 0 F_0
2) → 1 F_1
3) → 1 F_2
4) → 2 F_3
5) → 3 F_4
6) → 5 F_5
7) → 8
8) → 13
9) → 21
10) → 34

55