$$T(n) = \begin{cases} 1 & , \text{if } n = 1 \\ T(n-1) + \log n & , \text{if } n > 1 \end{cases}$$

$$T(n-1) = T(n-1-1) + \log(n-1)$$

$$T(n-1) = T(n-2) + \log(n-1) \quad - \quad \textcircled{1}$$

$$T(n-2) = T(n-3) + \log(n-2) \quad - \quad \textcircled{2}$$

$$T(n) = T(n-2) + \log(n-1) + \log n$$

$$T(n) = T(n-3) + \log(n-2) + \log(n-1) + \log n$$

$$= T(n-4) + \log(n-3) + \log(n-2) + \log(n-1) + \log n$$

$$\vdots$$

$$= T(n-k) + \log(n-(k-1)) + \log(n-(k-2)) + \log(n-(k-3)) + \cdots \log n$$

$$T(1) = 1$$

$$n - k = 1$$
$$k = n - 1$$

$$= T(1) + \log(n - (n-1-1)) + \log(n - (n-1-2)) + \log(n-1 \ldots$$

$$\log m + \log n$$

$$\log(n) - (n-1-3) + \dots \log n$$

$$= T(1) + \log 2 + \log 3 + \log 4 + \dots + \log n$$

$$= 1 + \log 2 + \log 3 + \log 4 + \dots + \log n$$

$$= 1 + \log(2 \times 3 \times 4 \times \dots \times n)$$

$$= \boxed{1 +} \log(n!)$$

$$= \log(n!)$$

$$= \log(n^n)$$

$$= n \log n$$

$$\log a^b$$
$$\Downarrow$$
$$b \log a$$

$$n! = n \times (n-1) \times (n-2) \times (n-3) \times \dots 3, 2, 1$$

$$\Rightarrow n^n$$

$$2 \cdot 2 \cdot 2 \cdot \dots 2 \cdot 2 \cdot 2$$

$$25$$

Sorting Algorithm

→ to arrange things in particular order.

order
↳ asc   ↳ based on
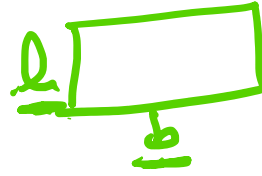↳ desc   properties of elem.

① Array of rectangle coordinates

(1) Array of Rectangle Customers

    ① based on length
    ② based on b
    ③ Perimeter.
    ④ area.

② Array of Strings:- ⟵ length
                lexicographical

Q) Sorting Algorithms:-