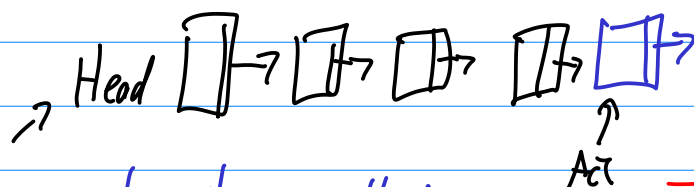# Time Complexity Function $O(n)$

Función : Indica el # de pasos para completar un algoritmo en función del ==TAMAÑO== de la entrada.
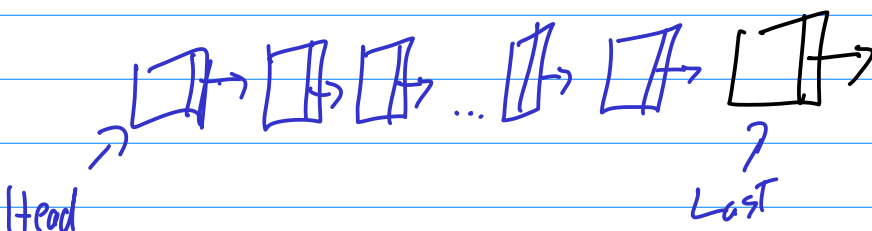
Lista
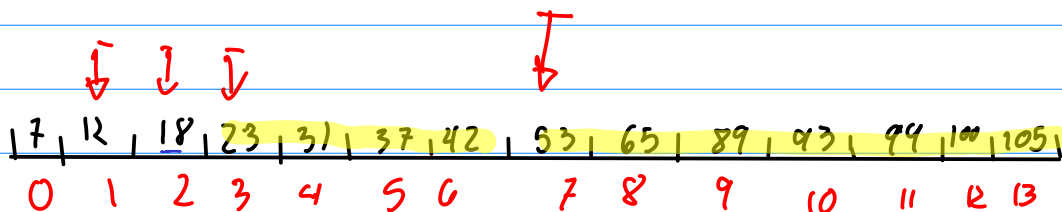- Insertar al final

Head ▢→▢→▢→▢→▢→

$O(n)$
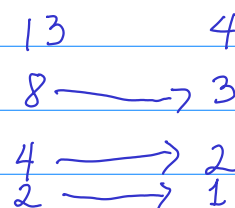
Act

si sólo tengo Head

▢→▢→▢→ ... ▢→▢→▢→

Head   Last

$O(1)$

7	12	18	23	31	37	42	53	65	89	93	99	100	105
0	1	2	3	4	5	6	7	8	9	10	11	12	13

(18)

0	7	13
0	3	7
0	1	3
1	2	3

$$n = \log(n)$$

13   4
8 ——→ 3
4 ——→ 2
2 ——→ 1

$$a R b \wedge b R c \Rightarrow a R c$$

$$\sqrt[2]{n} \qquad \vee \qquad a^n$$

$$a^n = \left(a^{n/2}\right)^2$$

$$a^6 = \left(a^3\right)^2$$

$$a^7 = a \cdot \left(a^3\right)^2$$

$$f(a,n) \begin{cases} 1 & si \quad n=0 \\ \left[f(a, n/2)\right]^2 & si \quad n(2)=0 \\ a \cdot \left[f(a, \frac{n-1}{2})\right]^2 & si \quad n(2)=1 \end{cases}$$

$$2^{10} = \left(2^5 \,_{32}\right)^2$$
1024

$$\hookrightarrow 2 \cdot \left(2^{\frac{1}{2}}\,_4\right)^2$$

$$\hookrightarrow \left(2^{\frac{2}{2}}\right)^2$$

$$\hookrightarrow 2 \cdot \left(2^{\frac{0}{1}}\right)^2$$

```
for (int i=0; i<n; i++)
  r *= a;
```

$$0,0000\,1 \qquad \downarrow \qquad \frac{1}{\sqrt{0000}}$$

$$\rightarrow \left(r - 0,00001\right)^2 < n < \left(r + 0,00001\right)^2 \ \leftarrow$$

$$r \overset{\sim}{\approx} \sqrt{n}$$

0	$\downarrow$	n
0	1	2
1	3/2	2
1	1,25	1,5
1,25	1,375	1,5