

ANÁLISIS DE ALGORITMOS

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TALLER FIBONACCI

- Codificar el algoritmo Fibonacci
- Identificar las recurrencias:

$$f(n) = f(n-1) + f(n-2)$$

$$f(0) = 0$$

$$f(1) = 1$$

- Demostrar:

Prueba de escritorio

i	llamada a fibonacci	Respuesta	Salida
i=0	$f(0)$	0	0
1	$f(1)$	1	1
2	$f(2) = f(1) + f(0)$ $1 + 0$	1	1
3	$f(3) = f(2) + f(1)$ $1 + 1$	2	2
4	$f(4) = f(3) + f(2)$ $2 + 1$	3	3
5	$f(5) = f(4) + f(3)$ $3 + 2$	5	5
6	$f(6) = f(5) + f(4)$ $5 + 3$	8	8

7	$f(7) = f(6) + f(2)$ 8 + 5	13	13
8	$f(8) = f(7) + f(1)$ 13 + 8	21	21
9	$f(9) = f(8) + f(2)$ 21 + 13	34	34
10	$f(10) = f(9) + f(3)$ 34 + 21	55	55

• Formula general:

$$f(n) = \frac{1}{\sqrt{5}} (f^n - \gamma^n)$$

Donde:

$$f = \frac{1 + \sqrt{5}}{2}$$

$$= 1,6180$$

$$\gamma = \frac{1 - \sqrt{5}}{2}$$

$$= -0,6180$$

n	f(n)	Valor
0	$\frac{1}{\sqrt{5}} (f^0 - \gamma^0) = 0$	0
1	$\frac{1}{\sqrt{5}} (f^1 - \gamma^1) = 1$	1
2	$\frac{1}{\sqrt{5}} (f^2 - \gamma^2) = 2$	2
3	$\frac{1}{\sqrt{5}} (f^3 - \gamma^3) = 3$	3
4	$\frac{1}{\sqrt{5}} (f^4 - \gamma^4) = 4$	4
5	$\frac{1}{\sqrt{5}} (f^5 - \gamma^5) = 5$	5
6	$\frac{1}{\sqrt{5}} (f^6 - \gamma^6) = 8$	8
7	$\frac{1}{\sqrt{5}} (f^7 - \gamma^7) = 13$	13
8	$\frac{1}{\sqrt{5}} (f^8 - \gamma^8) = 21$	21
9	$\frac{1}{\sqrt{5}} (f^9 - \gamma^9) = 34$	34
10	$\frac{1}{\sqrt{5}} (f^{10} - \gamma^{10}) = 55$	55