

RECREO con la sucesión de FIBONACCI

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UIS

Círculos Matemáticos UIS

3 de octubre de 2025

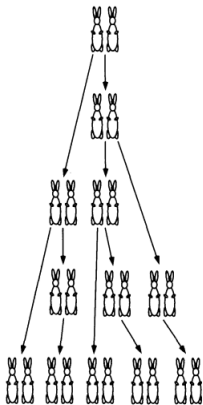


FIGURE 4.22 *A pair of rabbits and their progeny.*

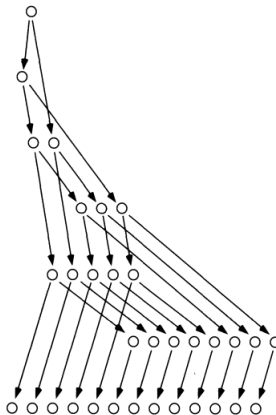
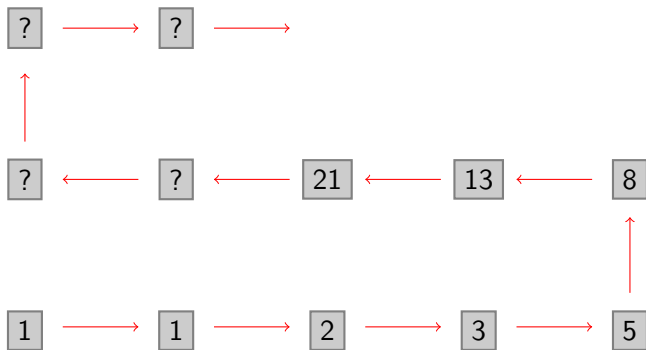
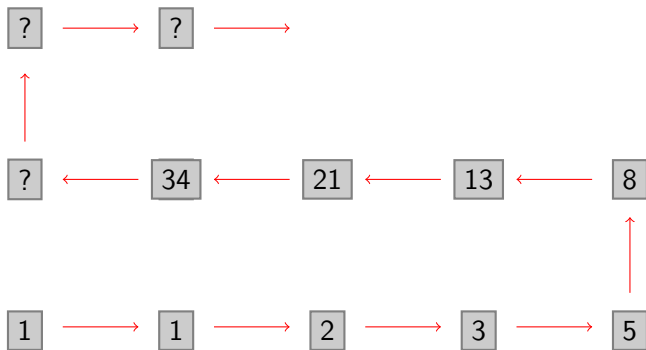
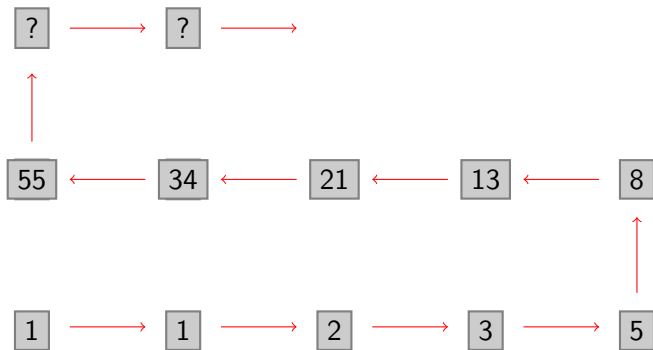
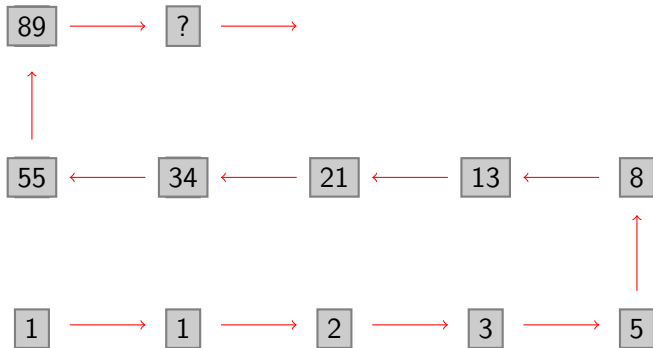


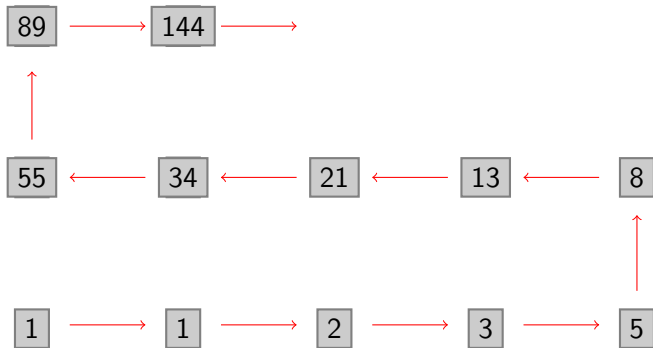
FIGURE 4.23 *Forming the Fibonacci numbers.*



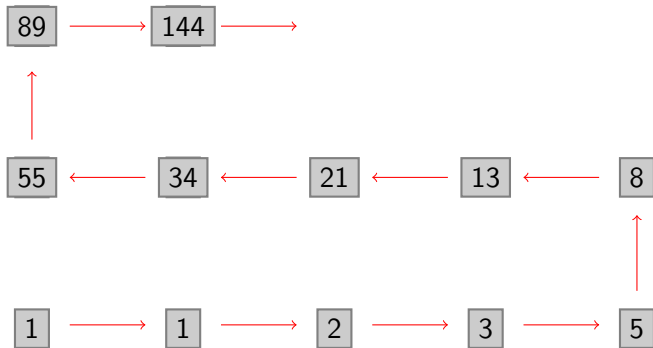




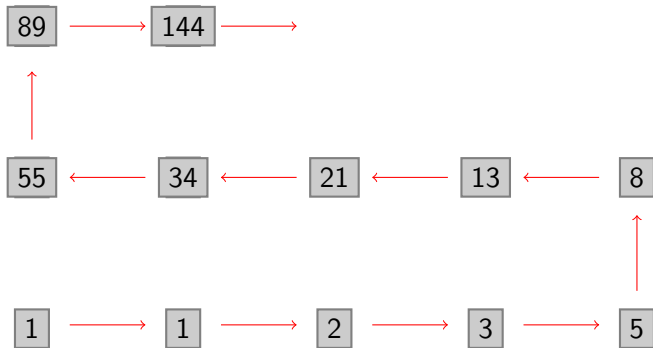


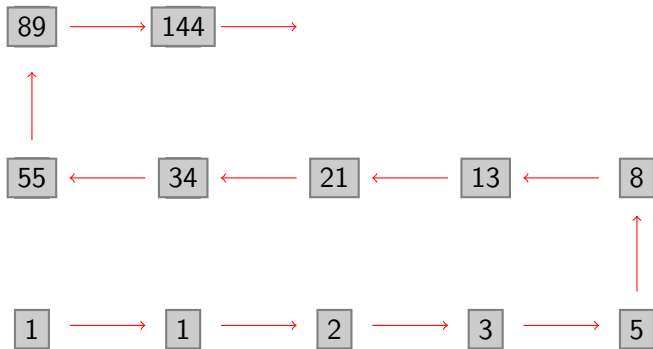


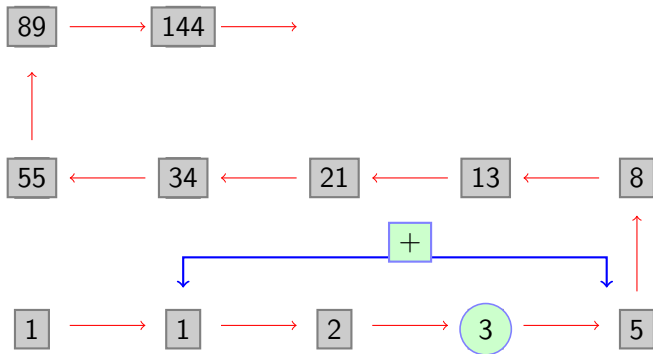
$$F_0 = 0; F_1 = 1$$

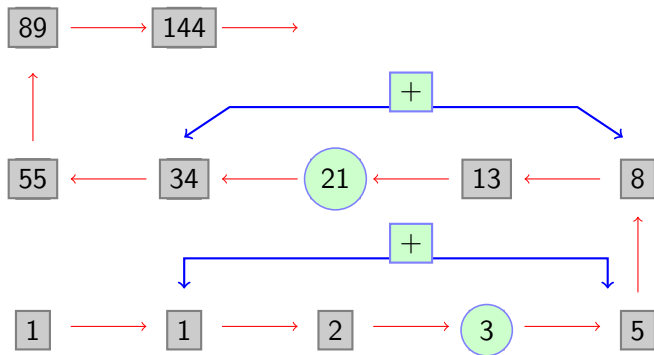


$$F_0 = 0; F_1 = 1 \quad F_{n+1} = F_n + F_{n-1}$$

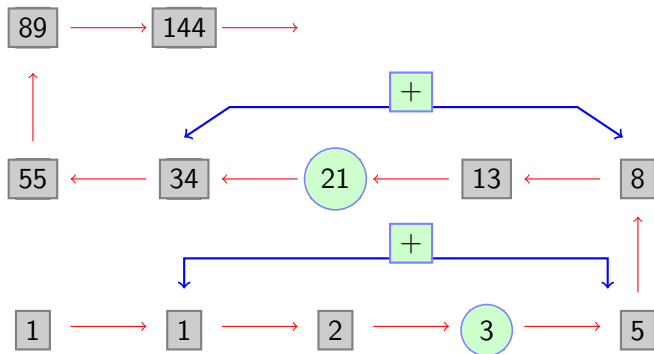




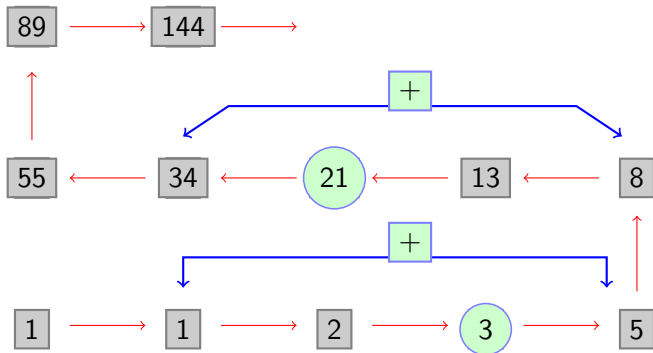




$$F_{n-1} + F_{n+2} =$$



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



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

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

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

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

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

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

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

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

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



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

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

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

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

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



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

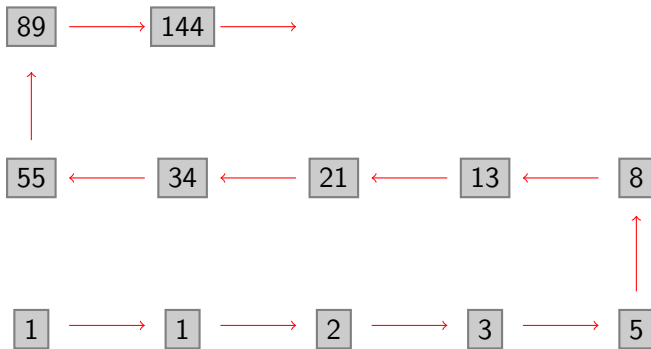
$$F_{n-1} + F_{n+2} = 2F_{n+1}$$

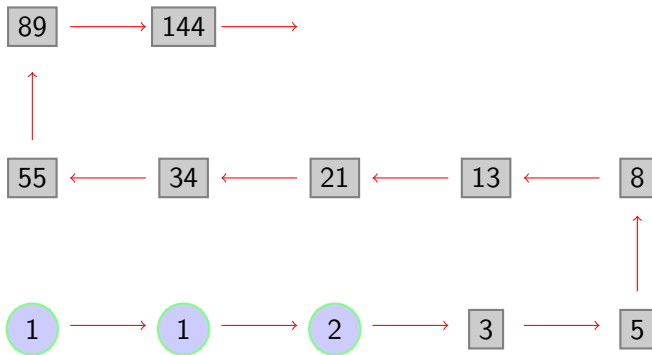
$$F_{n+1} = F_n + F_{n-1}$$

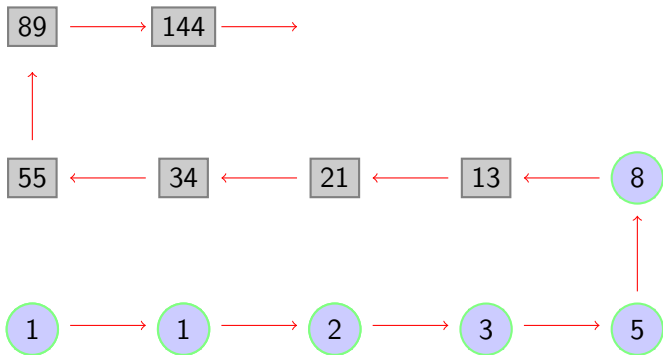
$$F_{n+2} = F_{n+1} + F_n$$

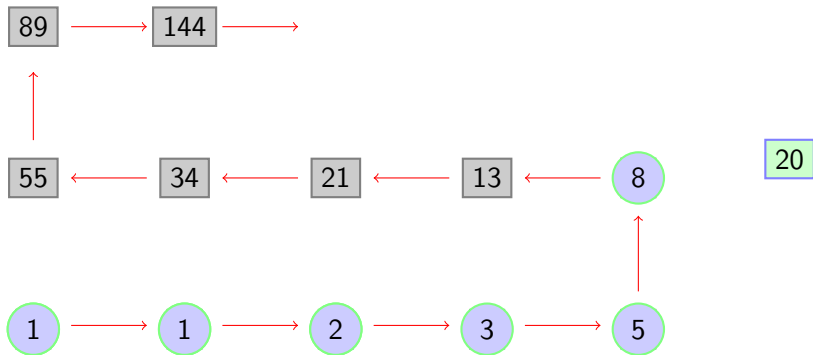
$$F_n = F_{n+1} - F_{n-1}$$

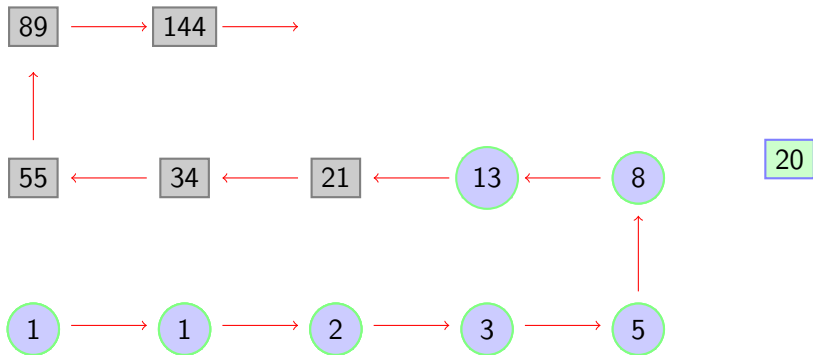
$$F_{n+2} = F_{n+1} + F_{n+1} - F_{n-1}$$

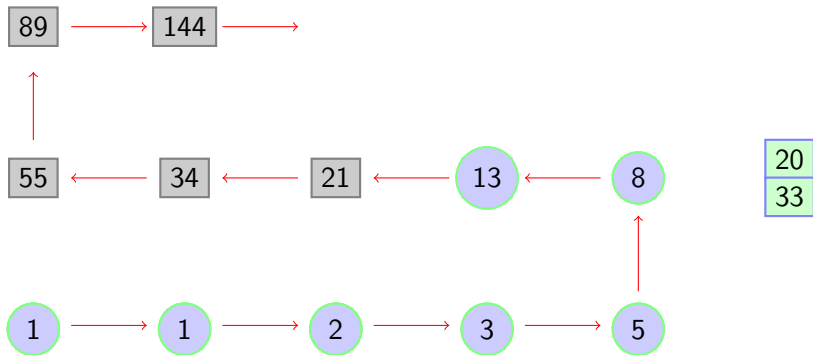


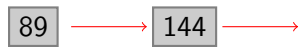


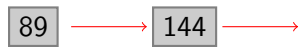






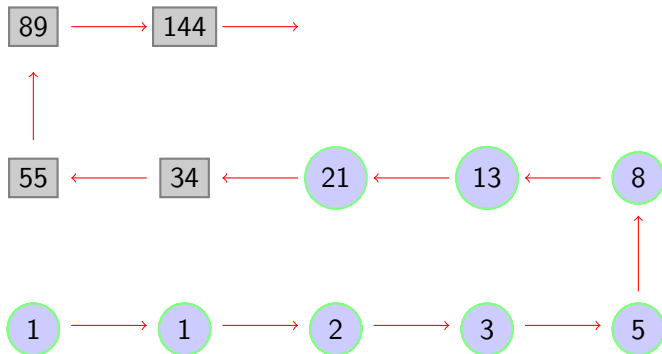






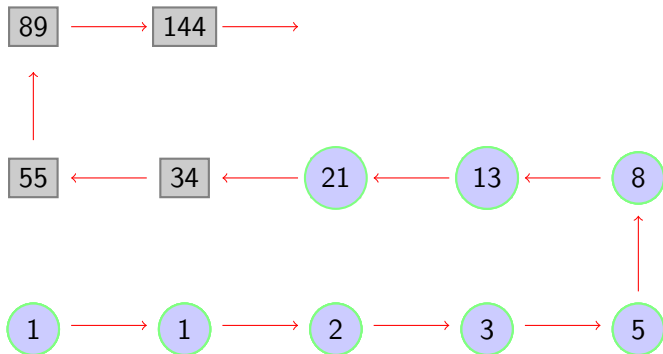
20
33
53

$$F_0 + F_1 + F_2 \dots + F_k =$$



20
33
53

$$F_0 + F_1 + F_2 \dots + F_k = F_{k+1}$$



20
33
53

89 → 144 →

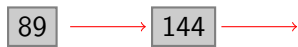


55 ← 34 ← 21 ← 13 ← 8

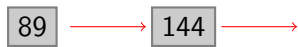


1 → 1 → 2 → 3 → 5

12

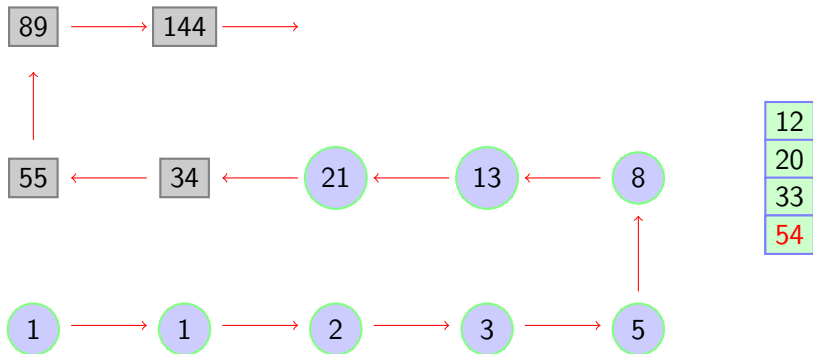


12
20
33
53

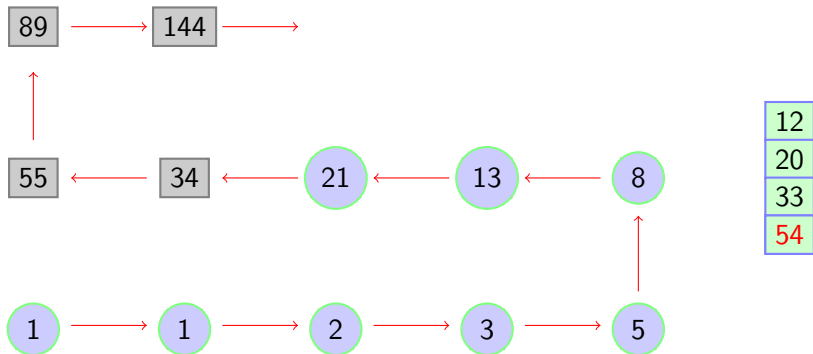


12
20
33
54

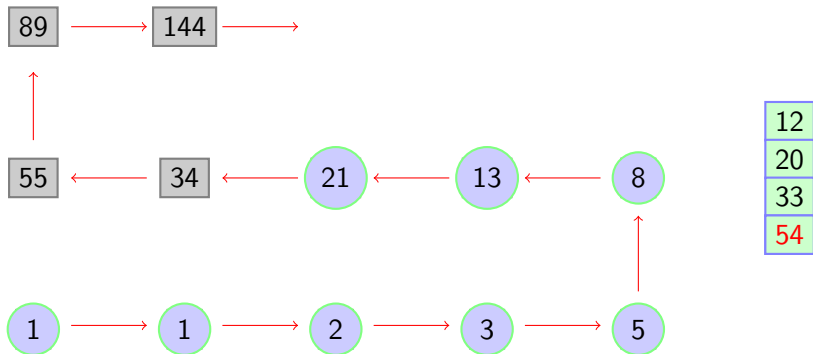
$$F_0 + F_1 + F_2 \dots + F_k =$$

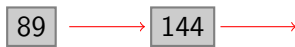


$$F_0 + F_1 + F_2 \dots + F_k = F_{k+2} - 1$$



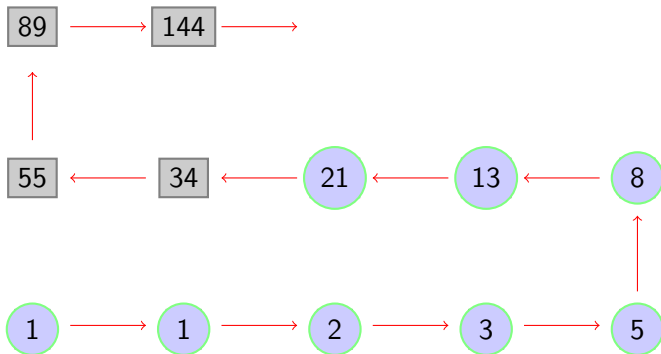
$$F_0 + F_1 + F_2 \dots + F_k = F_{k+2} - 1$$





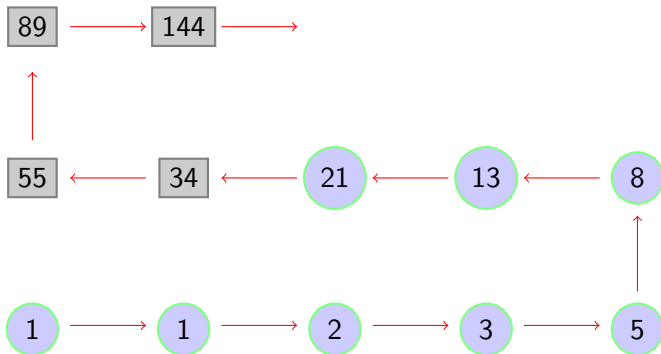
12
20
33
54

$$F_0 + F_1 + F_2 \dots + F_k =$$



12
20
33
54

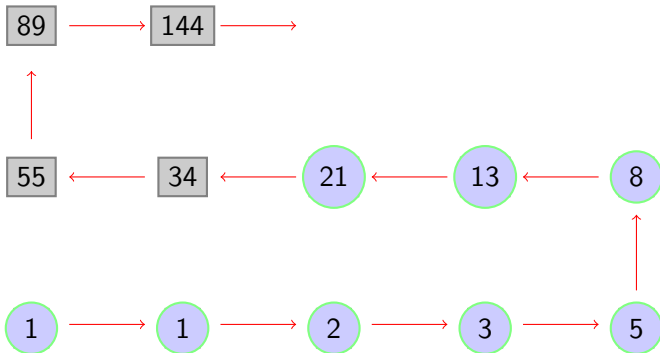
$$F_0 + F_1 + F_2 \dots + F_k = F_{k+2} - 1$$



12
20
33
54

$$F_0 + F_1 + F_2 \dots + F_k = F_{k+2} - 1$$

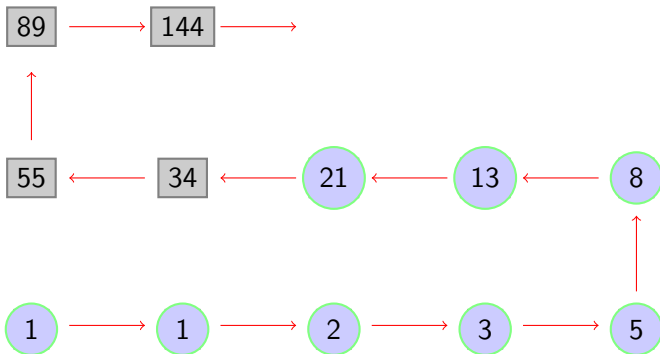
$$F_0 + F_1 + F_2 \dots + F_k + F_{k+1} =$$



12
20
33
54

$$F_0 + F_1 + F_2 \dots + F_k = F_{k+2} - 1$$

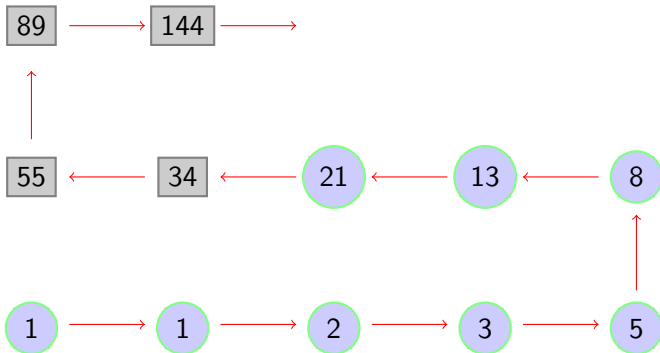
$$F_0 + F_1 + F_2 \dots + F_k + F_{k+1} = F_{k+1} + F_{k+2} - 1 =$$



12
20
33
54

$$F_0 + F_1 + F_2 \dots + F_k = F_{k+2} - 1$$

$$F_0 + F_1 + F_2 \dots + F_k + F_{k+1} = F_{k+1} + F_{k+2} - 1 = F_{k+3} - 1$$



12
20
33
54

89 → 144 →



55 ← 34 ← 21 ← 13 ← 8



1 → 1 → 2 → 3 → 5

3

89 → 144 →



55



34



21



13



8

1



1



2



3



5



3
8

89 → 144 →



55



34



21



13



8

1



1



2



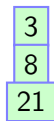
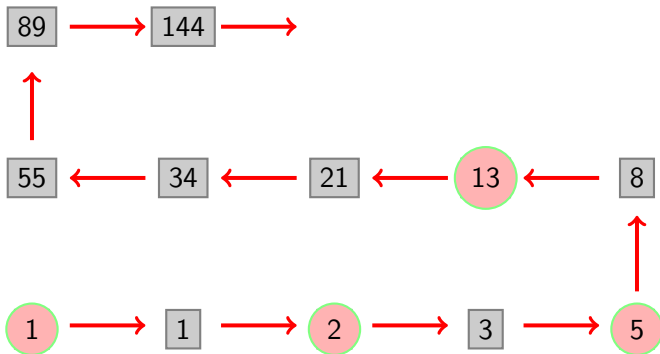
3



5



3
8



89 → 144 →



55



34



21



13



8



1



1



2



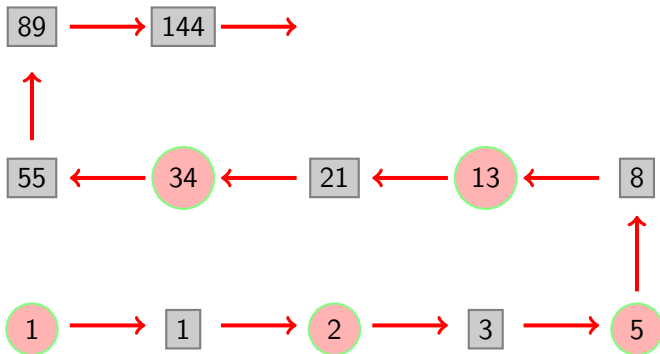
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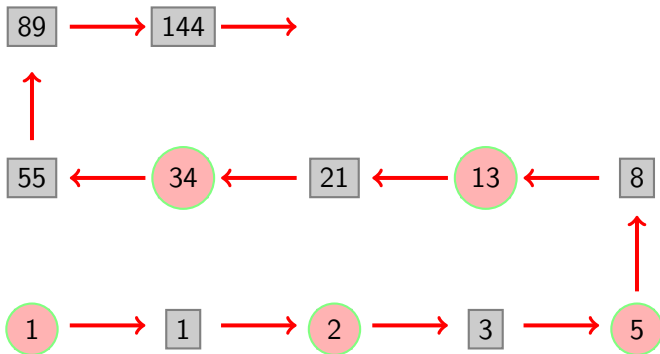
5

3
8
21
55

$$F_1 + F_3 + F_5 \dots + F_{2k+1} =$$

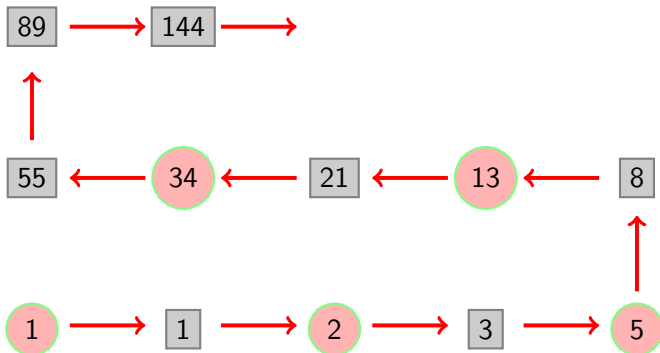


$$F_1 + F_3 + F_5 \dots + F_{2k+1} = F_{2k+2}$$



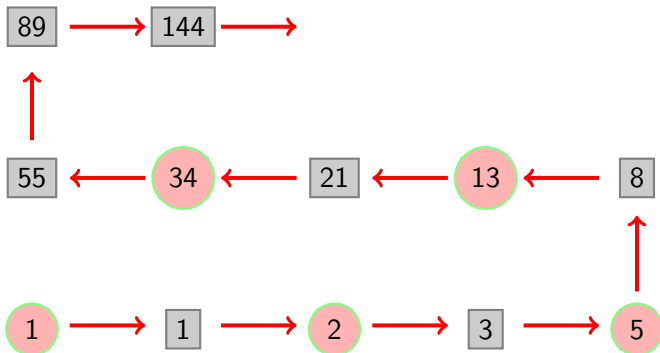
$$F_1 + F_3 + F_5 \dots + F_{2k+1} = F_{2k+2}$$

$$F_1 + F_3 + F_5 \dots + F_{2k+1} + F_{2k+3} =$$



$$F_1 + F_3 + F_5 \dots + F_{2k+1} = F_{2k+2}$$

$$F_1 + F_3 + F_5 \dots + F_{2k+1} + F_{2k+3} = F_{2k+2} + F_{2k+3} =$$



$$F_1 + F_3 + F_5 \dots + F_{2k+1} = F_{2k+2}$$

$$F_1 + F_3 + F_5 \dots + F_{2k+1} + F_{2k+3} = F_{2k+2} + F_{2k+3} = F_{2k+4}$$

89 → 144 →

↑

55 ← 34 ← 21 ← 13 ← 8

1 → 1 → 2 → 3 → 5

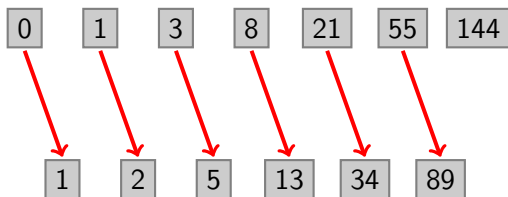
↑

3
8
21
55

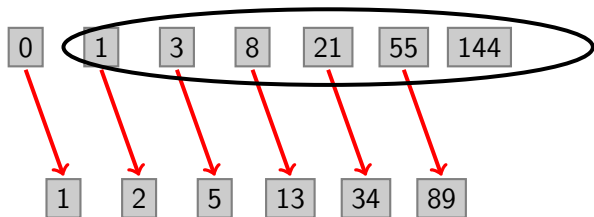
0	1	3	8	21	55	144
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1	2	5	13	34	89
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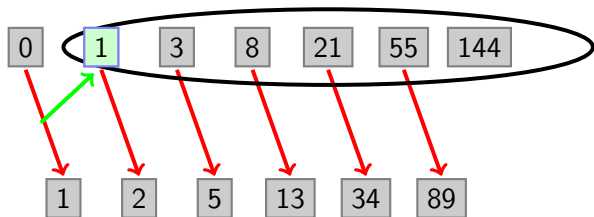
$$F_0 + F_1 \dots + F_k = F_{k+2} - 1$$



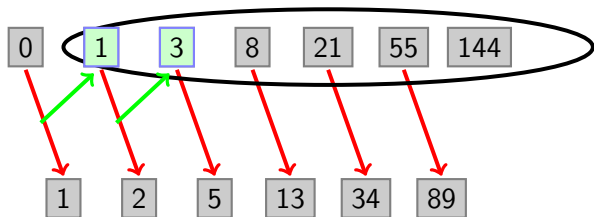
$$F_0 + F_1 \dots + F_k = F_{k+2} - 1$$



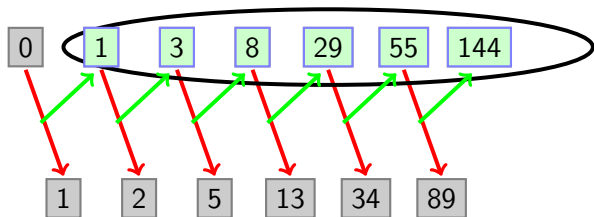
$$F_0 + F_1 \dots + F_k = F_{k+2} - 1$$



$$F_0 + F_1 \dots + F_k = F_{k+2} - 1$$



$$F_0 + F_1 \dots + F_k = F_{k+2} - 1$$



$$f_{n+1} = f_n * 2 - f_{n-2}$$

$$f_{n+1} = f_n * 2 - f_{n-2}$$

$$f_0 + f_1 + f_2 + \cdots + f_n = f_{n+2} - 1$$

$$f_{n+1} = f_n * 2 - f_{n-2} \qquad f_0 + f_1 + f_2 + \cdots + f_n = f_{n+2} - 1$$

$$f_1 + f_3 + f_5 + \cdots + f_{2n-1} = f_{2n}$$

$$f_0 + f_2 + f_4 + \cdots + f_{2n} = f_{2n+1} - 1$$

$$f_{n+1} = f_n * 2 - f_{n-2} \qquad f_0 + f_1 + f_2 + \cdots + f_n = f_{n+2} - 1$$

$$f_1 + f_3 + f_5 + \cdots + f_{2n-1} = f_{2n}$$

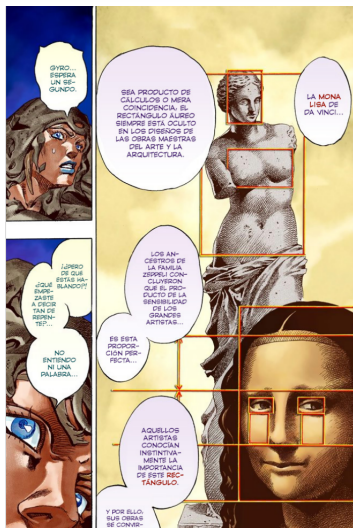
$$f_0 + f_2 + f_4 + \cdots + f_{2n} = f_{2n+1} - 1$$

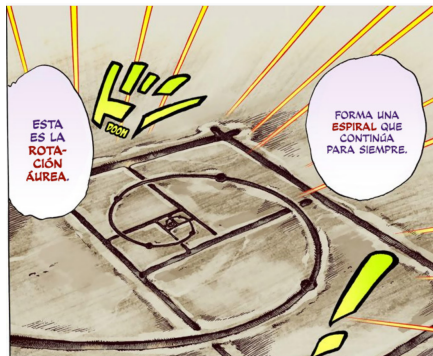
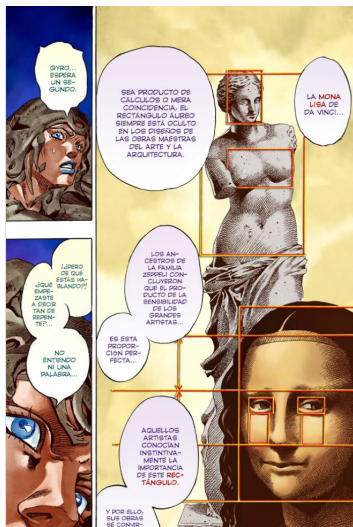
$$f_{n+1}^2 + f_n^2 = f_{2n+1}$$

$$f_{n+2}^2 - f_{n+1}^2 = f_n f_{n+3}$$

$$f_{n+2}^2 - f_n^2 = f_{2n+2}$$

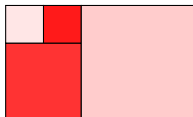
$$f_{n+2}^3 + f_{n+1}^3 - f_n^3 = f_{3n+3}$$

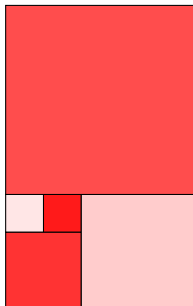


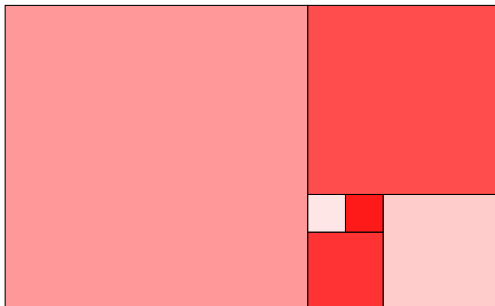


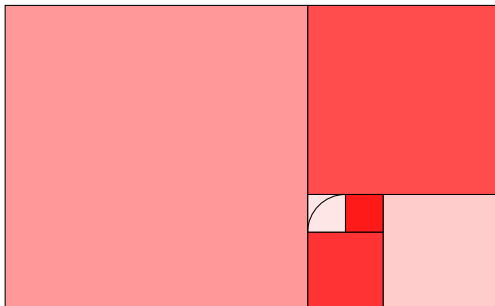


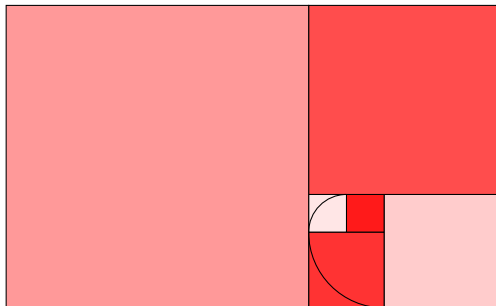






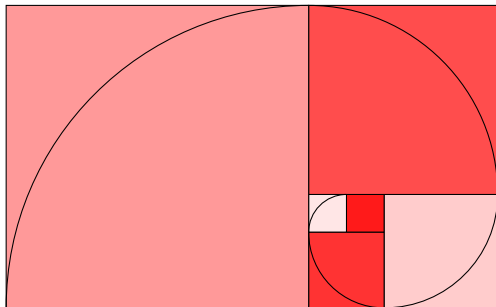




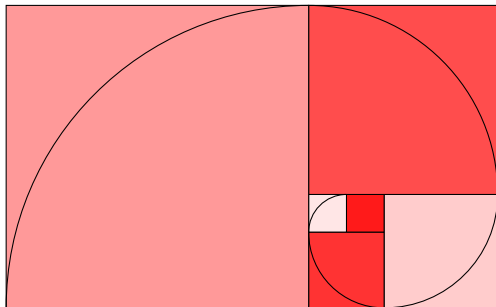






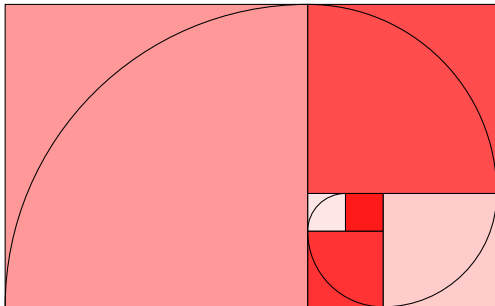


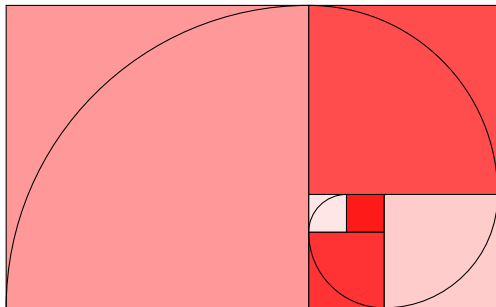
$$F_{n+1} = F_n + F_{n-1}$$



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

$$\frac{F_{n+1}}{F_{n-1}} = \frac{F_n}{F_{n-1}} + \frac{F_{n-1}}{F_{n-1}}$$

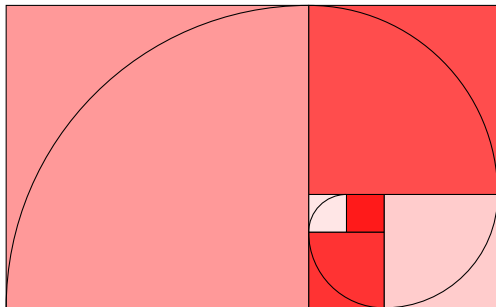




$$F_{n+1} = F_n + F_{n-1}$$

$$\frac{F_{n+1}}{F_{n-1}} = \frac{F_n}{F_{n-1}} + \frac{F_{n-1}}{F_{n-1}}$$

$$\frac{F_{n+1}}{F_n} \frac{F_n}{F_{n-1}} = \frac{F_n}{F_{n-1}} + 1$$



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

$$\frac{F_{n+1}}{F_{n-1}} = \frac{F_n}{F_{n-1}} + \frac{F_{n-1}}{F_{n-1}}$$

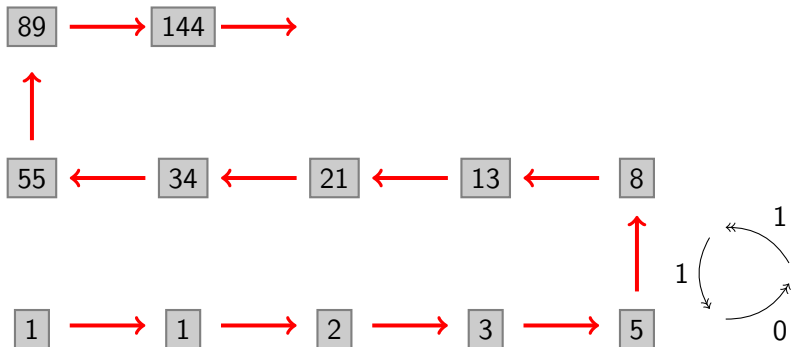
$$\frac{F_{n+1}}{F_n} \frac{F_n}{F_{n-1}} = \frac{F_n}{F_{n-1}} + 1$$

$$\phi * \phi = \phi + 1$$

$$x^2 = x + 1$$

Hay muchísimo de esta histórica e interesante sucesión,
recomendamos: [Fibonacci-Saenz de Cabezón](#)
También [Lenismath](#)

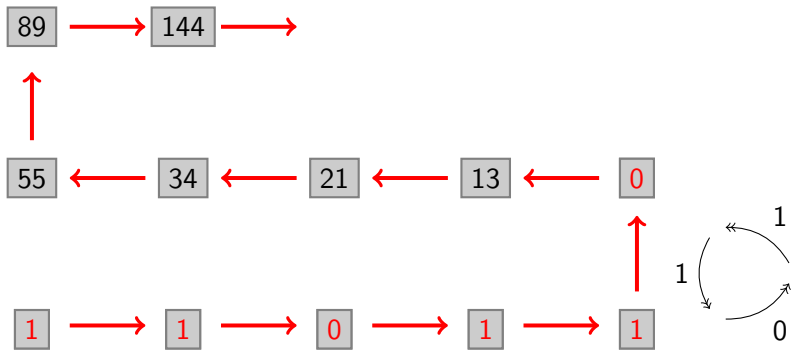
Pares e impares



Answered Questions

How many primes are there?

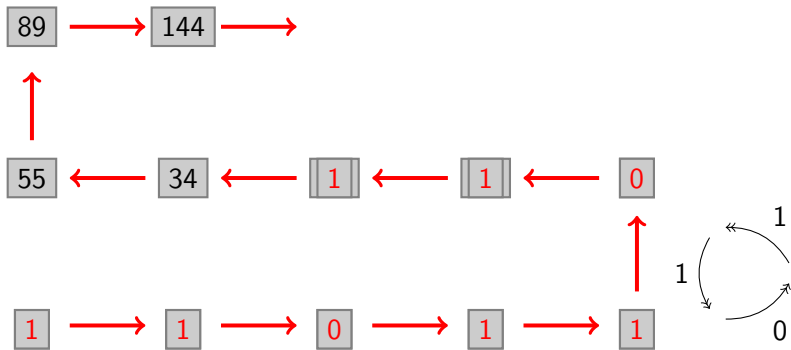
Pares e impares



Answered Questions

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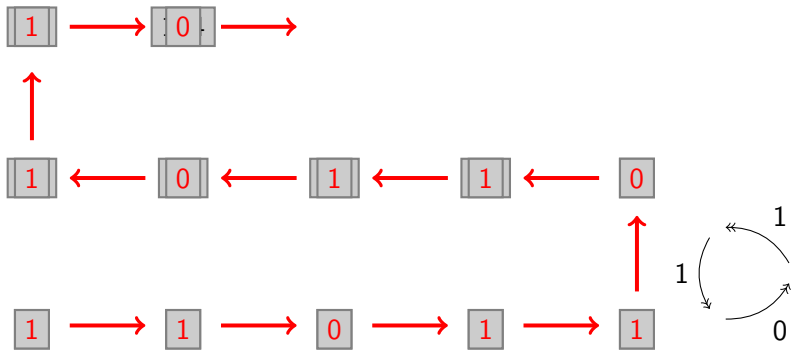
Pares e impares



Answered Questions

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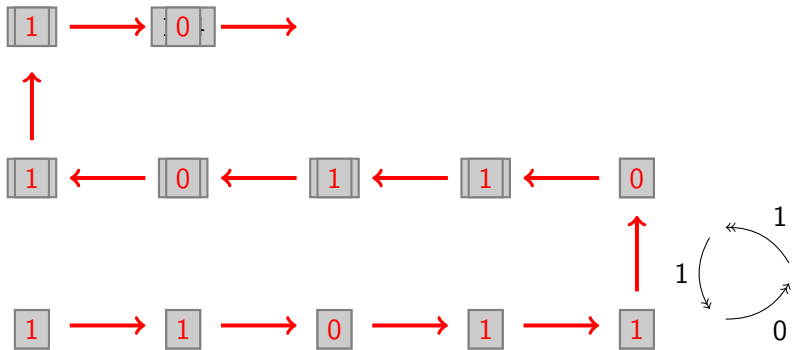
Pares e impares



Answered Questions

How many primes are there?

Pares e impares



Answered Questions

How many primes are there?

El 6-ficiclo $\overline{0,1}_4$

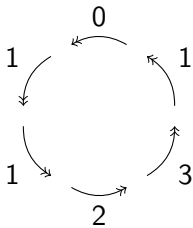


Figura: El 6-ficiclo $\overline{0,1}_4$

Operaciones en $\mathbb{Z}_4$

+	0	1	2	3
0	0	1	2	3
1	1	2	3	0
2	2	3	0	1
3	3	0	1	2

·	0	1	2	3
0	0	0	0	0
1	0	1	2	3
2	0	2	0	2
3	0	3	2	1

El 6-ficiclo $\overline{0,1}_4$

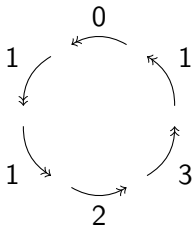
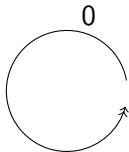
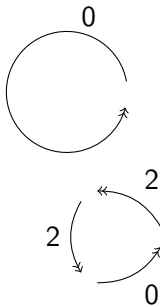


Figura: El 6-ficiclo $\overline{0,1}_4$

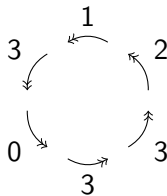
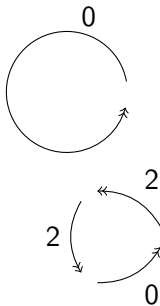
Los ciclos en $(\mathbb{Z}_4, +)$



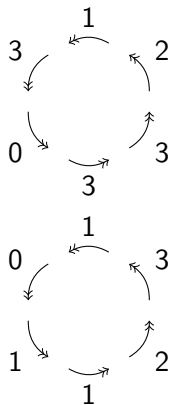
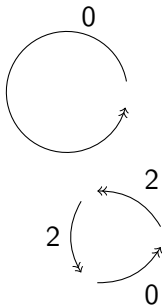
Los ciclos en $(\mathbb{Z}_4, +)$



Los ciclos en $(\mathbb{Z}_4, +)$



Los fícclos en $(\mathbb{Z}_4, +)$



Suma en $\mathbb{Z}_6$

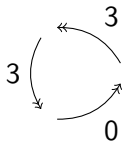
+	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1	2	3	4	5	0
2	2	3	4	5	0	1
3	3	4	5	0	1	2
4	4	5	0	1	2	3
5	5	0	1	2	3	4

Los ciclos en $(\mathbb{Z}_6, +)$

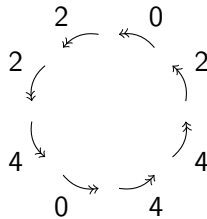
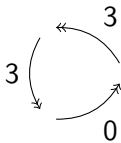
0



Los fícclos en $(\mathbb{Z}_6, +)$



Los ciclos en $(\mathbb{Z}_6, +)$



El otro fícciclo de $(\mathbb{Z}_6, +)$

