$T(n) = 9T(n-1)-14T(n-2),\ T(0) = 10,\ T(1) = 15$

1) $T(n) = a_1 T(n-1) + a_2 T(n-2) + \dots + a_k T(n-k)$

$T(n) = r^n$

$$\frac{r^n}{r^{n-2}} = \frac{9r^{n-1}}{r^{n-2}} - \frac{14r^{n-2}}{r^{n-2}} =$$

$$r^{(n-(n-2))} = 9r^{(n-1)-(n-2))} - 14r^{(n-2)-(n-2)}$$

$$r^2 = 9r - 14 = r^2 - 9r + 14 = 0$$

$$\frac{-b \pm \sqrt{b^2-4ac}}{2a} \qquad \frac{9 \pm \sqrt{81-4\times 14}}{2} = \frac{9 \pm \sqrt{81-56}}{2} = \frac{9 \pm \sqrt{25}}{2}$$

ax^2+bx+c

$$\frac{9 \pm 5}{2} \begin{cases} 7 \\ 2 \end{cases}$$

$T(0) = 10$

$T(1) = 15$

$$\boxed{T(n) = A\,7^n + B\,2^n}$$

$$T(n) = -7^n + 11\times 2^n$$

$\times 2$

$10 = A + B$

$15 = 7A + 2B$

$5 = -5A$

$A = -1$

$B = 11$

$T(2) = 9T(1) - 14T(0)$

$= 9 \times 15 - 14 \times 10$

$= 135 - 140 = -5$

$-7^2 + 11 \times 2^2 =$

$-49 + 44 = -5$ ✓

$T(3) = 9T(2) - 14T(1)$

$= 9(-5) - 14(15)$

$= -45 - 140 - 70$

$= -255$

$-7^3 + 11 \times 2^3$

$-343 + 88$

-255

$$T(n) = -T(n-1) + 42T(n-2)$$

$$T(0) = 20$$

$$T(1) = 10$$

$T(n) = r^n$ $\qquad$ $r^n = -r^{n-1} + 42r^{n-2}$

$$\frac{r^n}{r^{n-2}} = \frac{-r^{n-1}}{r^{n-2}} + \frac{42r^{n-2}}{r^{n-2}} = r^2 = -r + 42$$

$$\boxed{r^2 + r - 42 = 0}$$

$$-\frac{1 \pm \sqrt{1-4(-42)}}{2} = -\frac{1 \pm \sqrt{1+168}}{2} = -\frac{1 \pm \sqrt{169}}{2} = \frac{-1 \pm 13}{2}$$

$6 \qquad -7$

$$T(n) = A6^n + B(-7)^n$$

$T(0) = 20$ $\quad 20 = A + B$ $\times 7$

$T(1) = 10$ $\quad 10 = 6A - 7B$

$$150 = 13A \qquad A = \frac{150}{13}$$

$$\frac{260}{13} = \frac{150}{13} + B \qquad \frac{110}{13} = B$$

$$T(n) = \frac{150}{13} 6^n + \frac{110}{13}(-7)^n$$

$$20 = \frac{150}{13} + \frac{110}{13} = \boxed{20 = \frac{260}{13}}$$

$$10 = \frac{150}{13} \times 6 - \frac{110}{13} \times 7$$

$$10 = \frac{900}{13} - \frac{770}{13} = \frac{130}{13} = 10$$

$$T(2) = -T(1) + 42\,T(0)$$

$$T(2) = -10 + 42 \times 20 = 830$$

$$830 = \frac{150}{13} \times 36 + \frac{110}{13} \times 49$$

$$830 = \frac{5400 + 5390}{13} = \frac{10790}{13}$$

$T(n) = 4T(n-1) - T(n-2) + 6T(n-3)$ $(r-2)(r+3)(r+1)$

$T(0) = 10$ $T(2) = 20$

$T(1) = 15$

$r^3 - 4r^2 + r + 6 = 0$

$T(n) = A2^n + B3^n + C(-1)^n$

$10 = A + B + C$

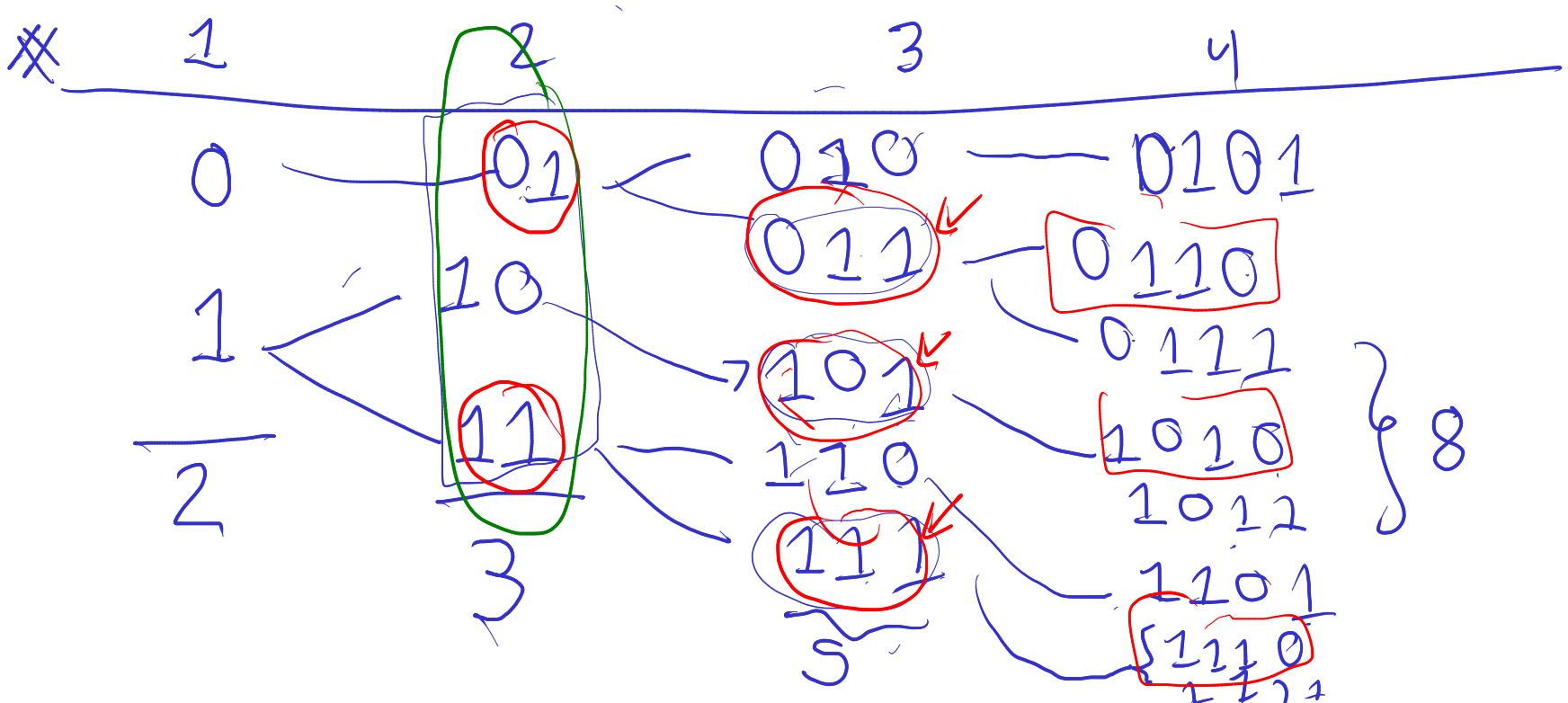
$15 = 2A + 3B - C$

$20 = 4A + 9B + C$

[13.33333333 -3.75 0.41666667]

$$T(n) = 13,\overline{333}\,2^n + 3,75 \times 3^n + 0,4\overline{1666}\,(-1)^n$$

Encuentre la RR que permita contar las cadenas de bits que no pueden tener dos ceros consecutivos



Agregar 1

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

agregar 1

Agregar 0

$+ T(n-2)$

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

$T(1) = 2$

$T(2) = 3$

$T(3) = 5$

$T(4) = 8$

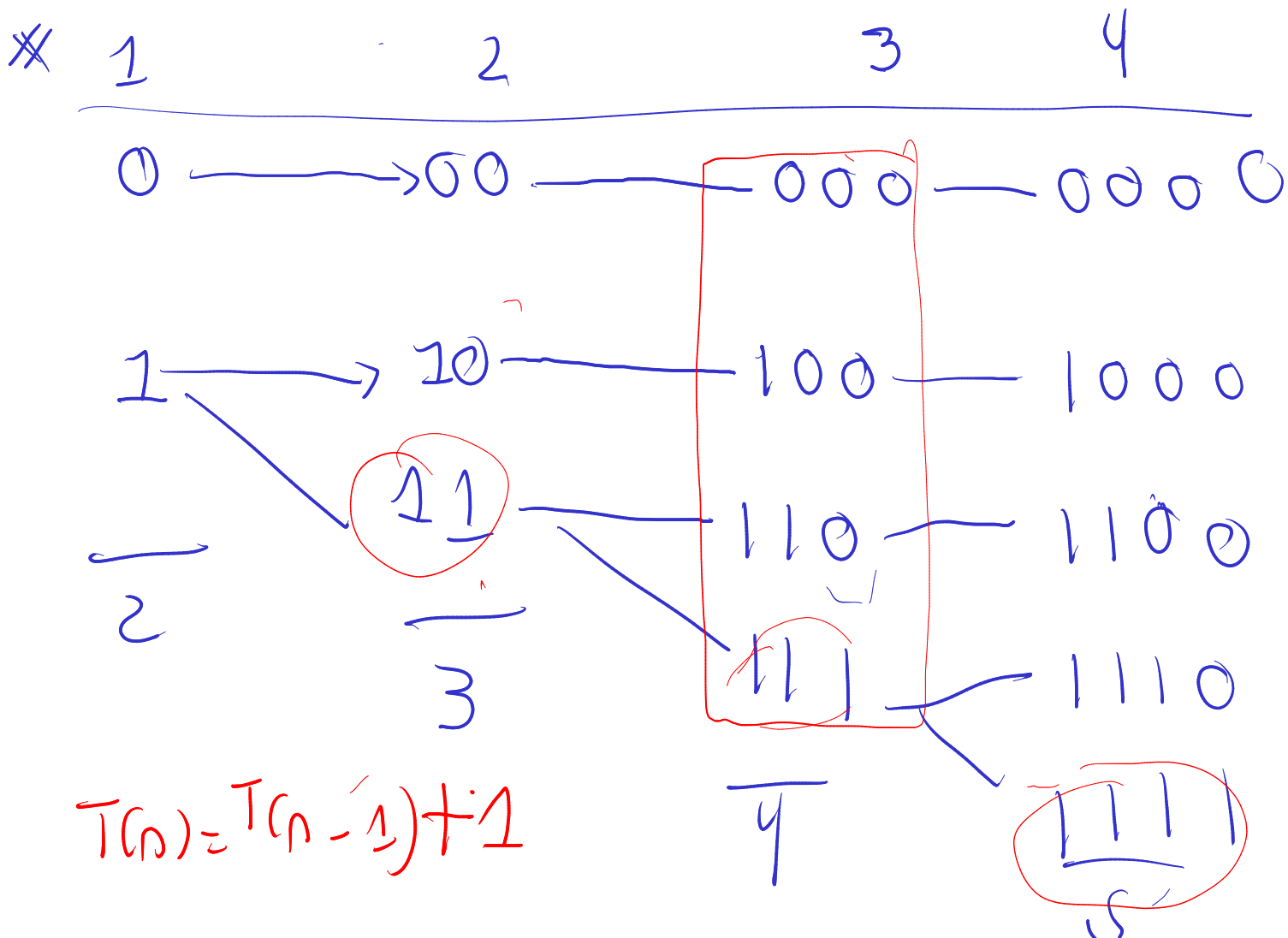
$$r^2 - r - 1 = 0 \qquad \frac{1 \pm \sqrt{1+4}}{2} = \frac{1 \pm \sqrt{5}}{2}$$

$$T(n) = A\left(\frac{1+\sqrt{5}}{2}\right)^n + B\left(\frac{1-\sqrt{5}}{2}\right)^n$$

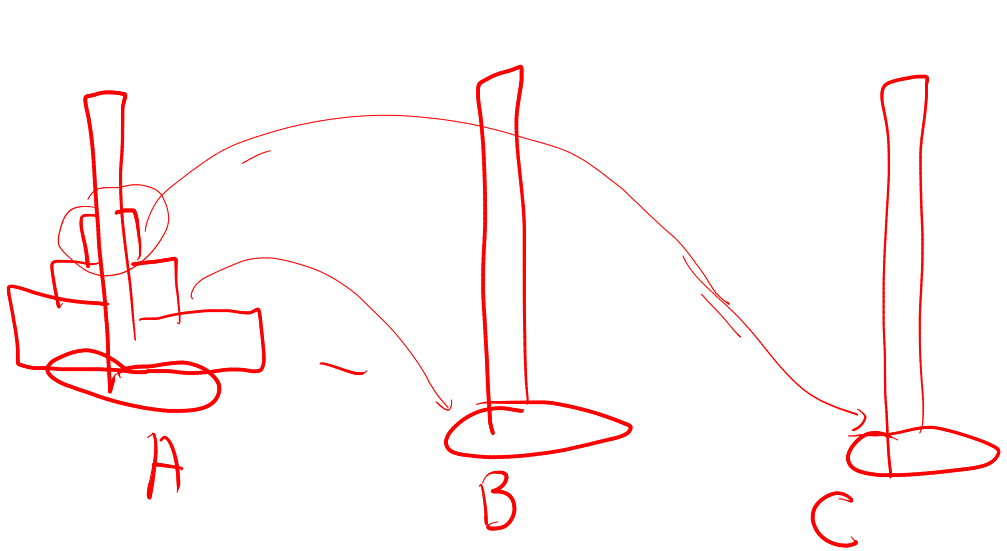
Cadenas binarias que no puedan 01

agregar 0

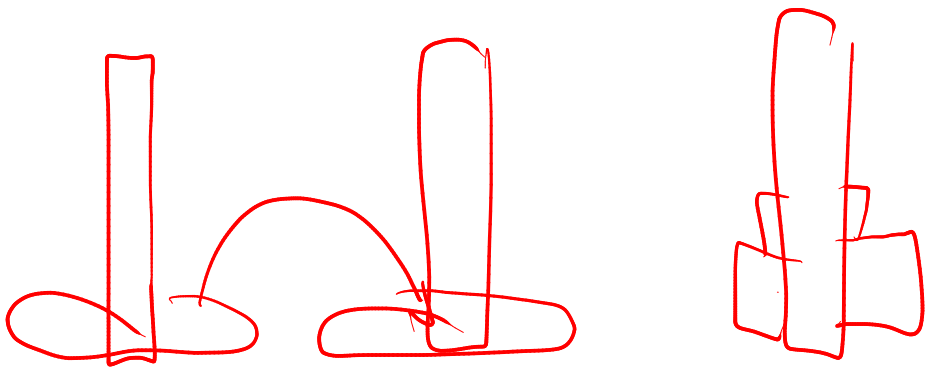
Todos



Torres de Hanoi



3)



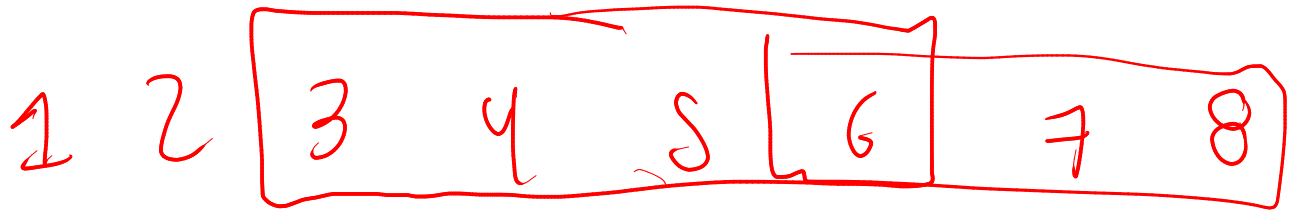
$T(n) = 2\,T(n-1) + 1$

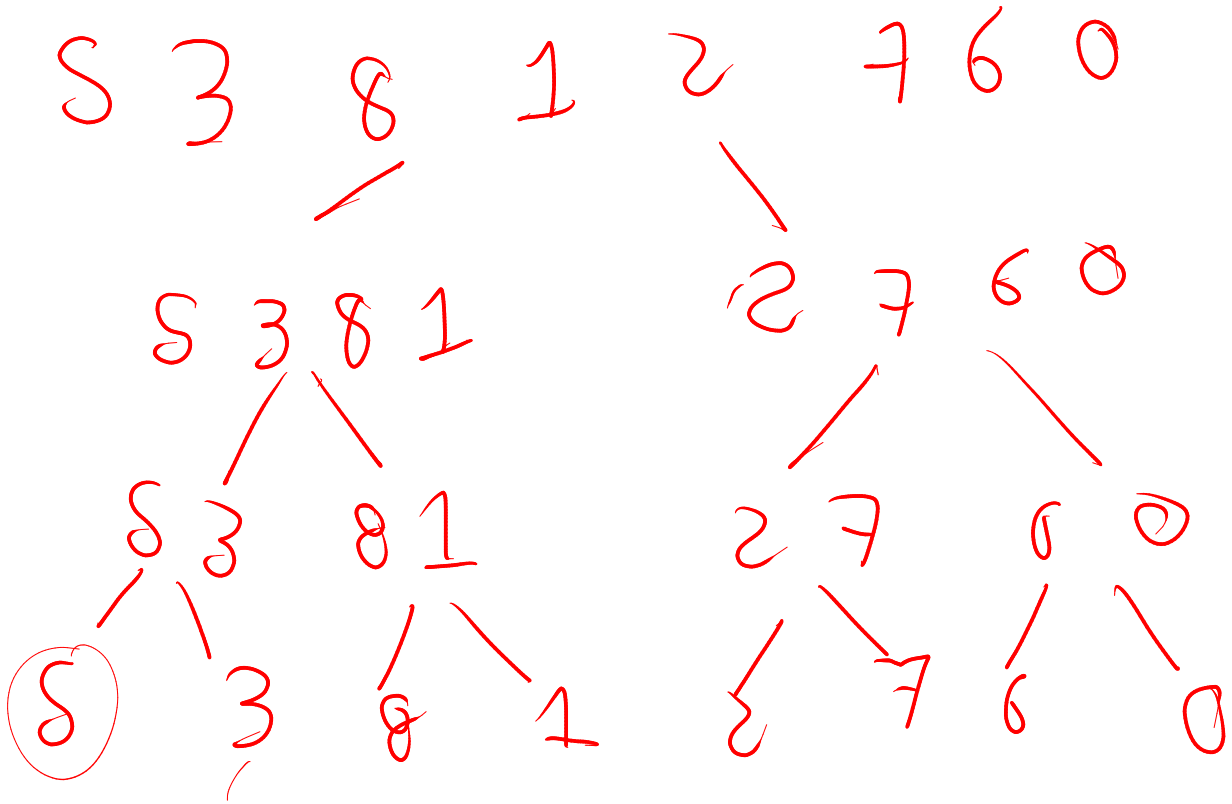
Disco grande

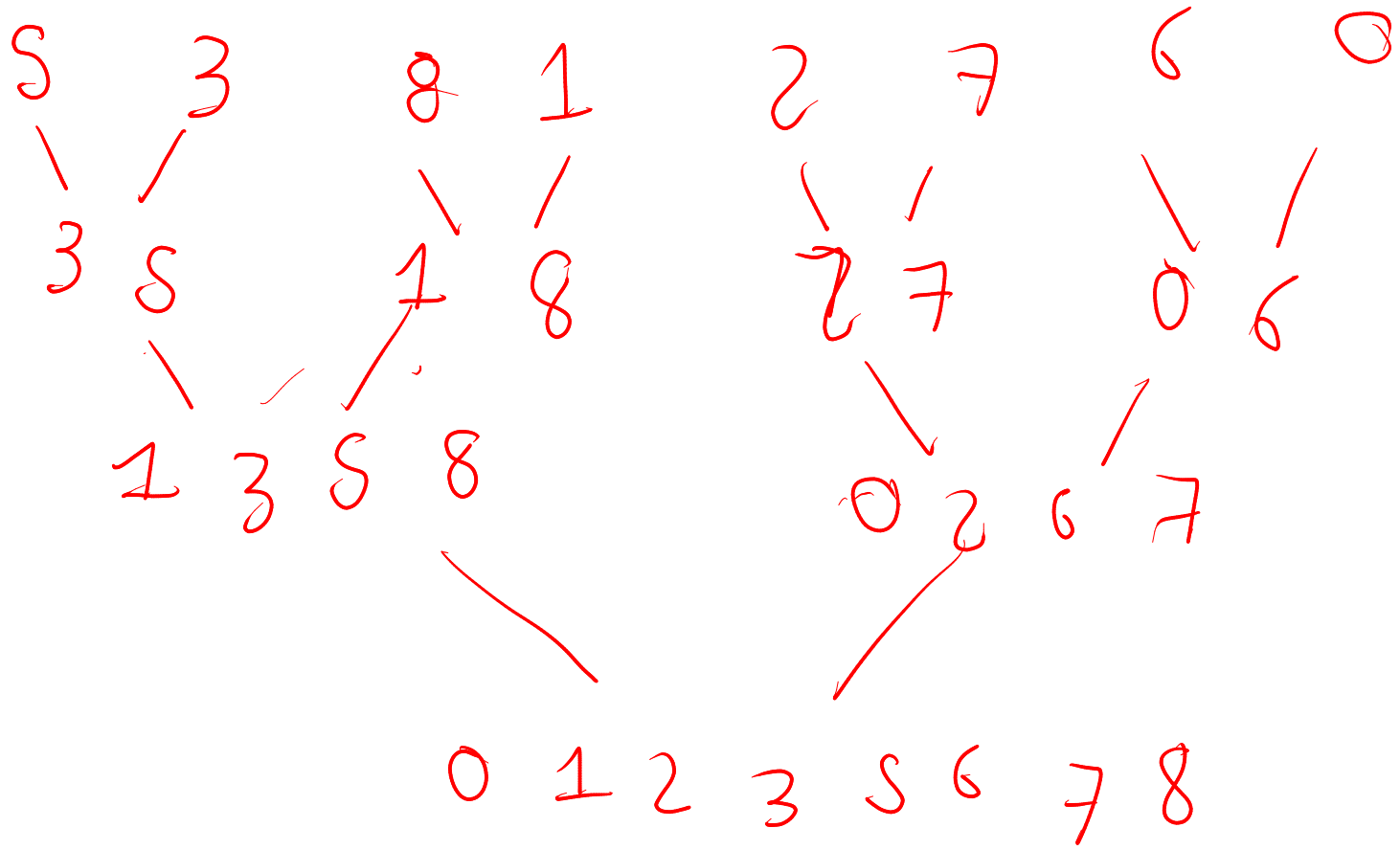
Mover n-1 discos desde el origen
hasta hasta el auxiliar y luego moverlos
de nuevo hasta el destino

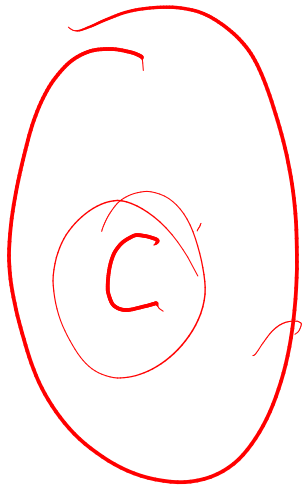
$T(1) = 1$

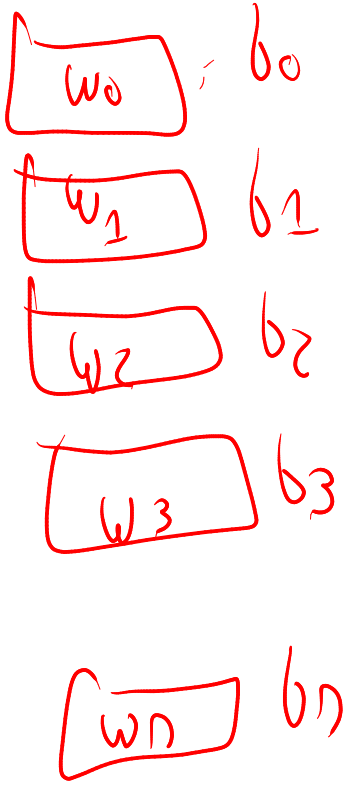
n	T(n)
1	1
2	3
3	7
4	15
5	31


1 2 3 4 5 6 7 8


5 3 8 1 2 7 6 0
5 3 8 1
2 7 6 0
5 3
8 1
2 7
6 0
5
3
8
1
2
7
6
0

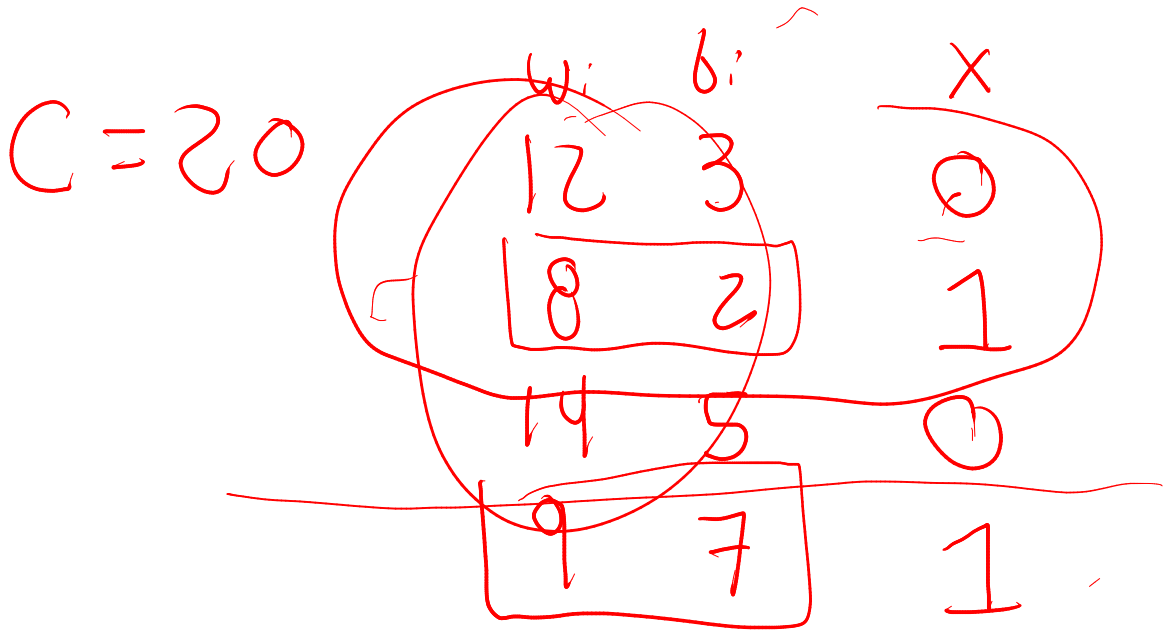

5 3 8 1 2 7 6 0
3 5 1 8 2 7 0 6
1 3 5 8 0 2 6 7
0 1 2 3 5 6 7 8

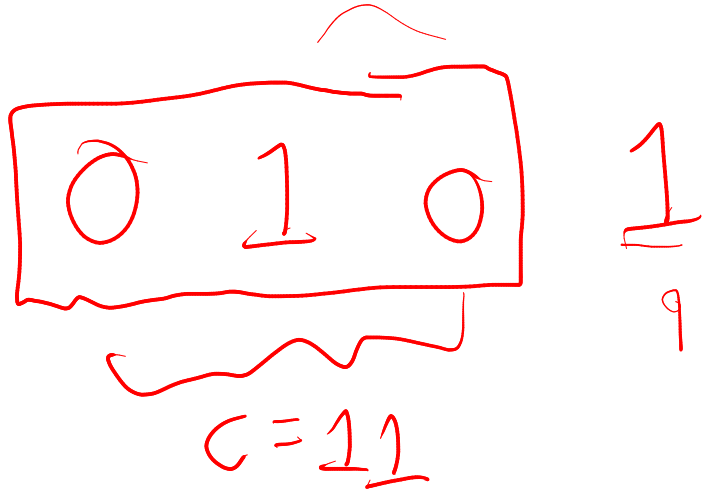




$$\max\left(\sum_{i=0}^{n} b_i\right)$$

$$\sum_{i=0}^{n} w_i \leq C$$





0 1 0 → 0 1

C = 11

C = 11

$5! = 5 \times \boxed{4 \times 3 \times 2 \times 1}$

$5! = 5 \times 4!$

$4! = 4 \times \boxed{3 \times 2 \times 1}$

$4! = 4 \times 3!$

$n! = n \times (n-1)!$