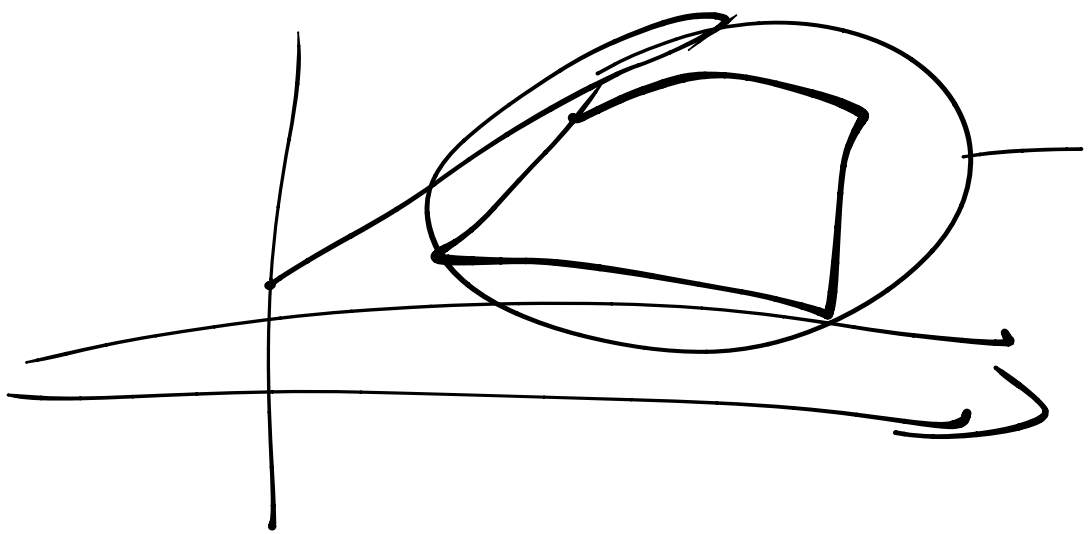
SIMPLESSO



POLOS

REGIONS

MAX → MIN (CAMBIO SEGNO)

max $3x_1 + x_2 + 3x_3$

→ min $-3x_1 - x_2 - 3x_3$

D. A VINCOLI

...

→ AGGIUNGIAMO SLACK

3 DISEQUAZIONI

→ x_4, x_5, x_6 PER RENDERLE

UN DISUG. DELLE UG.

a. A $2x_1 + x_2 + x_3 \leq 2$

→ $2x_1 + x_2 + x_3 + x_4 = 2$

$x_1 + 2x_2 + 3x_3 \ldots + x_5 = 5$

$2x_1 + 2x_2 + x_3 + x_6 = 6$

D. $\rightarrow x_1 \ldots x_6 \geq 0$

$x_1 \in \mathbb{Z}_+ \rightarrow$ integers positifs

$$\min \; -3x_1 - x_2 - 3x_3$$

$-z$ → F.O

	x_1	x_2	x_3	x_4	x_5	x_6
$-z$	-3	-1	-3	0	0	0

↑ COSTRAINT

COSTRAINT | F.O | OUTPUT

	x_1	x_2	x_3	x_4	x_5	x_6	z	b
$-z$	-3	-1	-3	0	0	0	-1	0
x_4							0	2
x_5							0	5
x_6							0	6

$B = \{x_4, x_5, x_6\}$

≥ 0

(ALLE VARIABILI ≥ 0)

AMMISSIBILE

$\forall \bar{B}_i \geq 0 \vee$ x_4

x_5 $\Rightarrow$ 1

x_6 1

1

MATRICE IDENTITÀ SUL TABLEAU

$\rightarrow$ È OTTIMA? NO

$\rightarrow x_1, x_2, x_B < 0$

BLAND → ANTICICLO

$B = \{x_4, x_5, x_6\}$

x_1, x_2, x_3

$x_1 \rightarrow$ INDICE PIÙ BASSO

BLAND → CALCOLO

x_4, x_5, x_6

↑ USCE

x_1, x_3, x_6

↑ USCITA

$\min \frac{\bar{B}_i}{x_i}$ → BLAND

(x_1, x_2, x_3)

↑ PIVOT

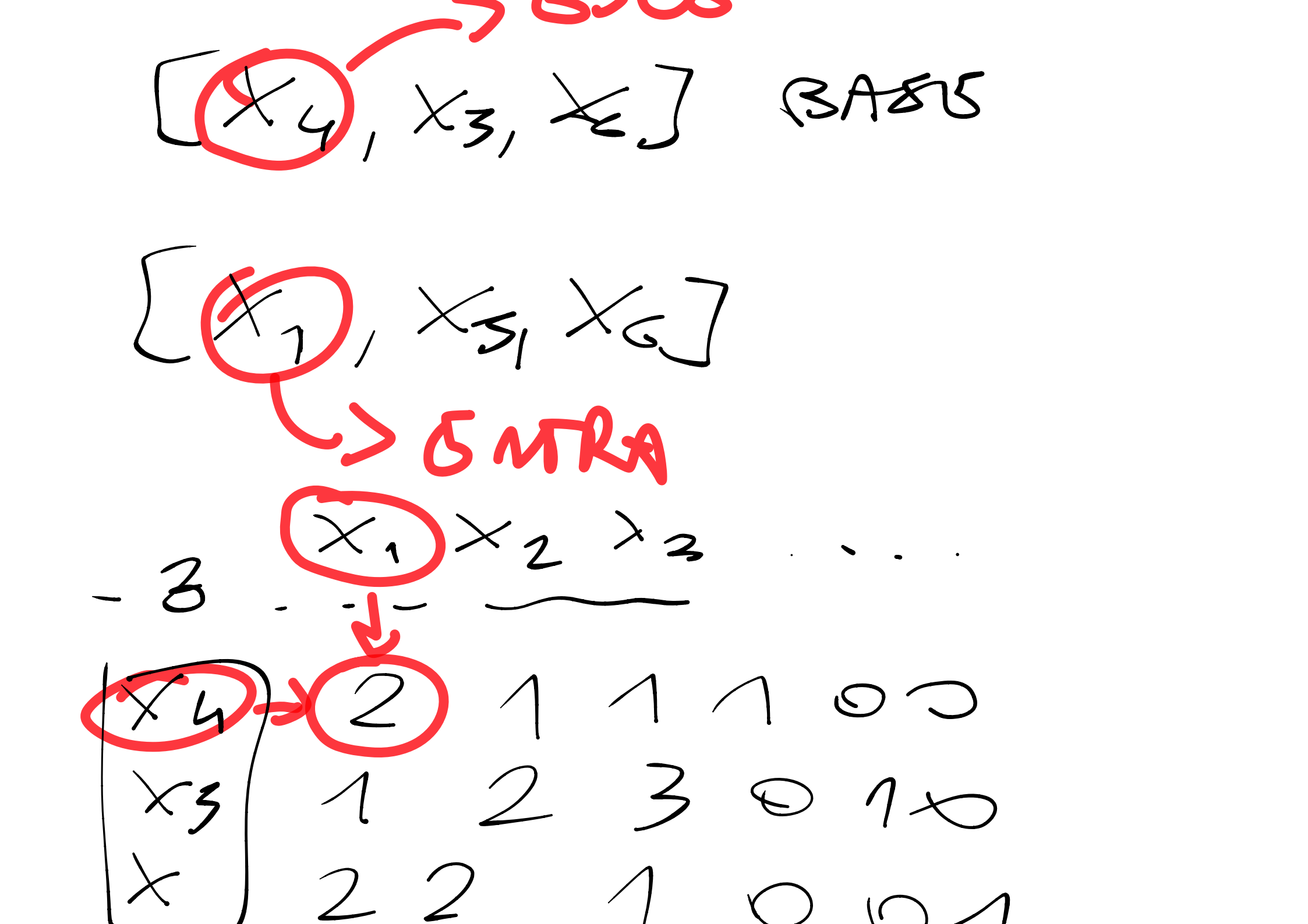
QUELLA NEGATIVA CON INDICE MINORE!

$\frac{\bar{B}}{x_4}, \frac{\bar{B}}{x_5}, \frac{\bar{B}}{x_6}$

$= \frac{2}{2}, \frac{5}{1}, \frac{6}{2}$

$= 1, 5, 3$

1 → MINORE!


BASE
BASE
ENTRA

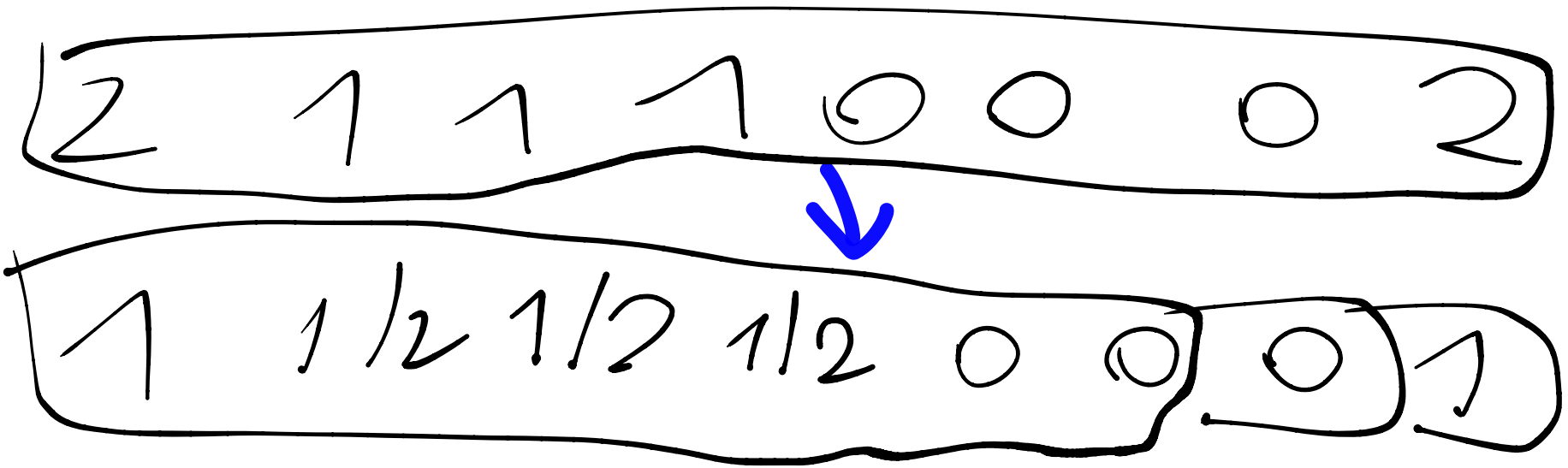
↑ BASE (2) → PIVOT

- 8 -

		x_1	x_2	x_3	x_4	x_5	x_6	
x_4	1	1/2	1/2	1/2	0	0		$\leftarrow R_1 = R_1/2$
x_5	0	3/2	1/2	-1/2	1	0		$\leftarrow R_2 = R_2 - 1$
x_6	0	1	0	-1	0	1		$R_3 = R_3 - 2R_1$

IDENTITÀ → 2 → 1

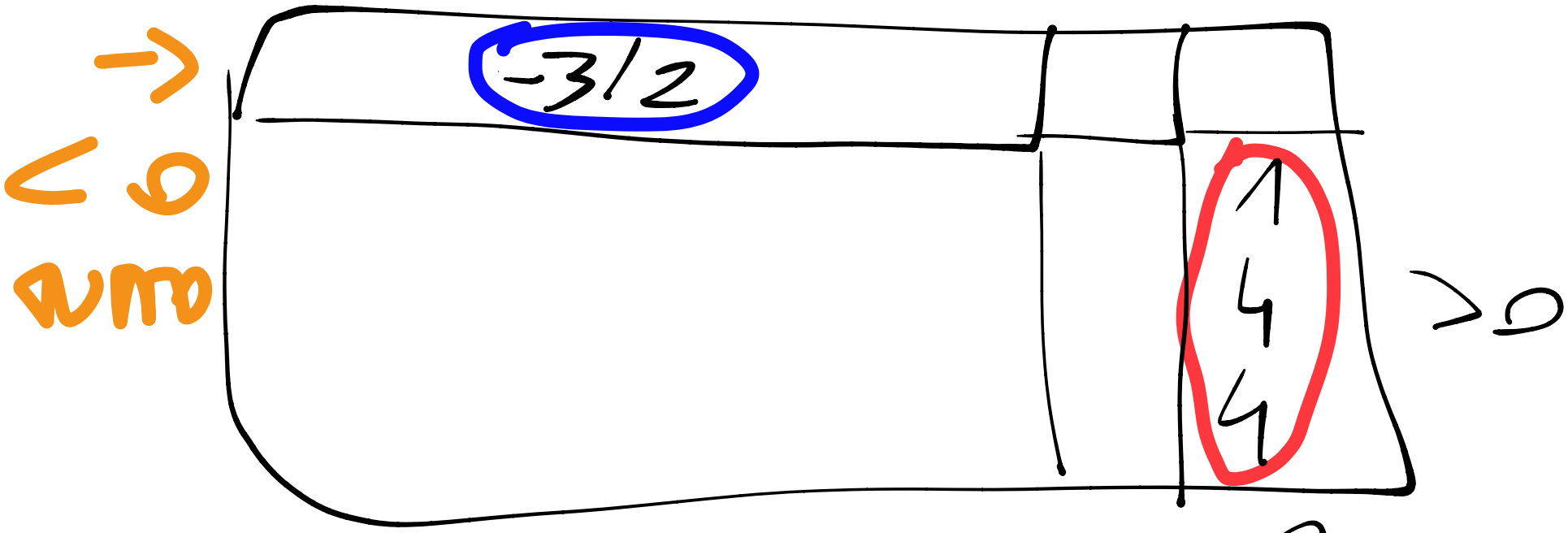
2 5



$R_2 \Rightarrow R_2 - R_1$

$5 - 1 = 4$

ARRIVO ALLA FINE



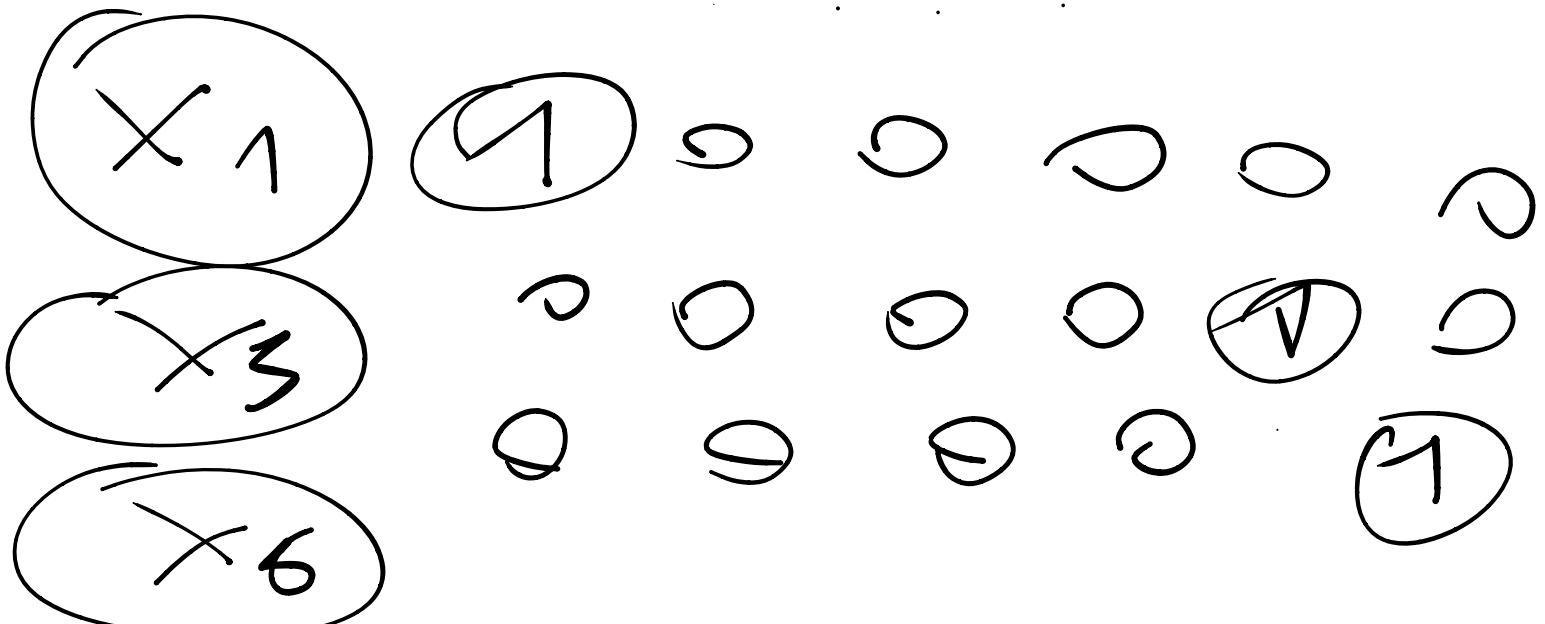
→ AMMISSIBILE? → SI

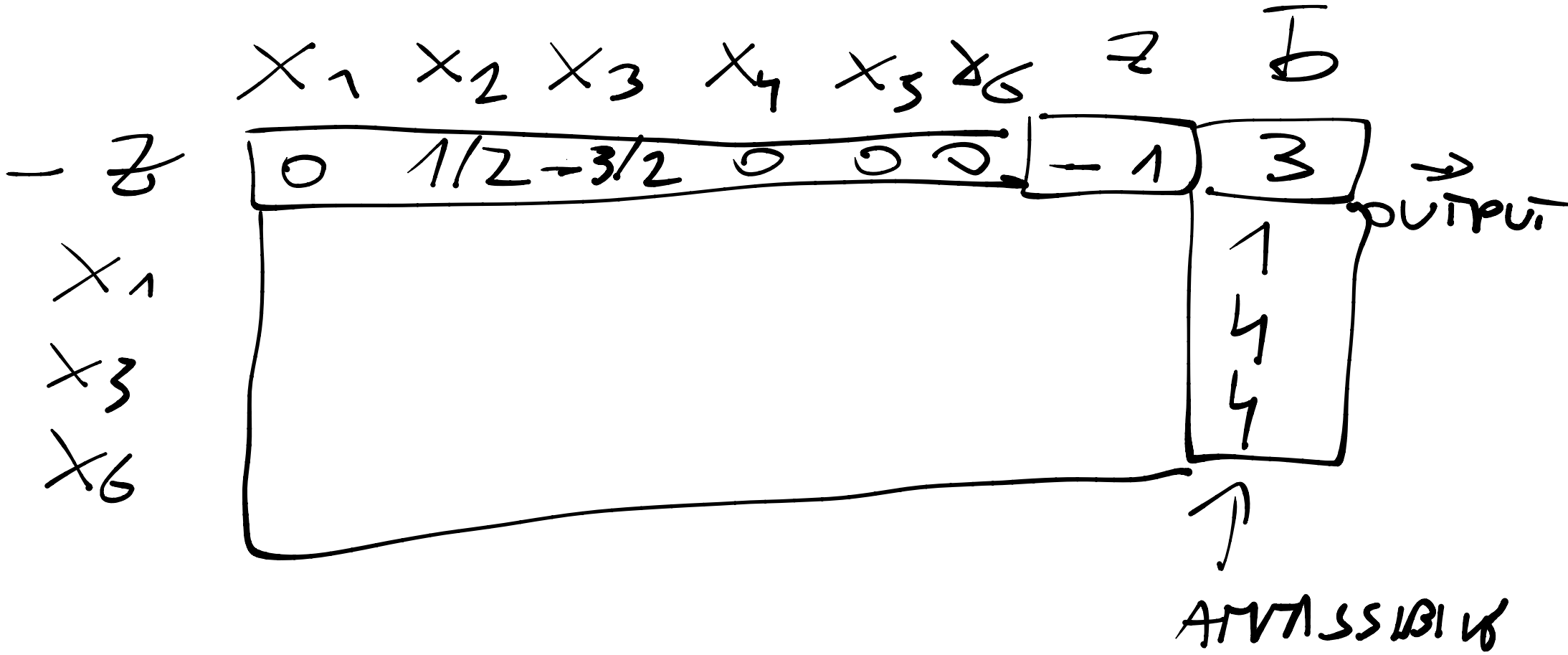
→ OTTIMO? → NO →

→ ILLIMITATA? → NO

[ENTRA ?
  SSC6 ?] → BLANCO

BASE → MAYOR DISPONIBILIDAD





BLAND $\Rightarrow$ $x_i < 0$

DI INDICE

MINIMO

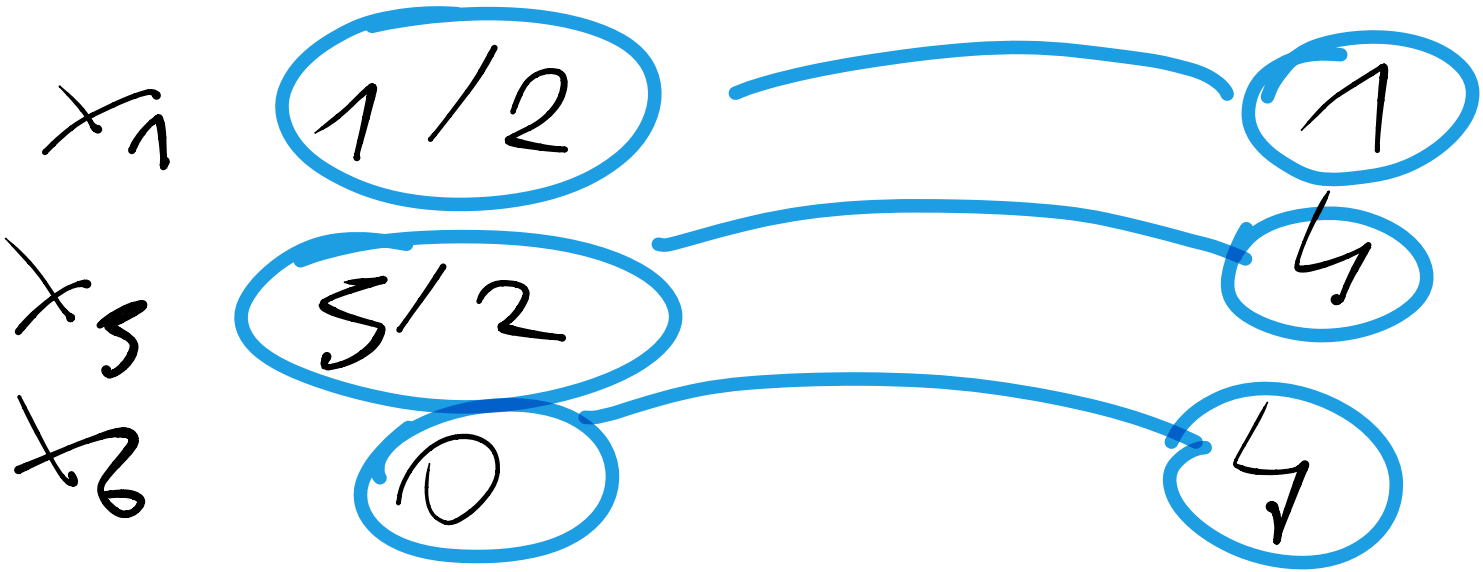
$x_3 = -3/2$ $\Rightarrow$ ENTRA

$[x_1, x_5, x_0]$

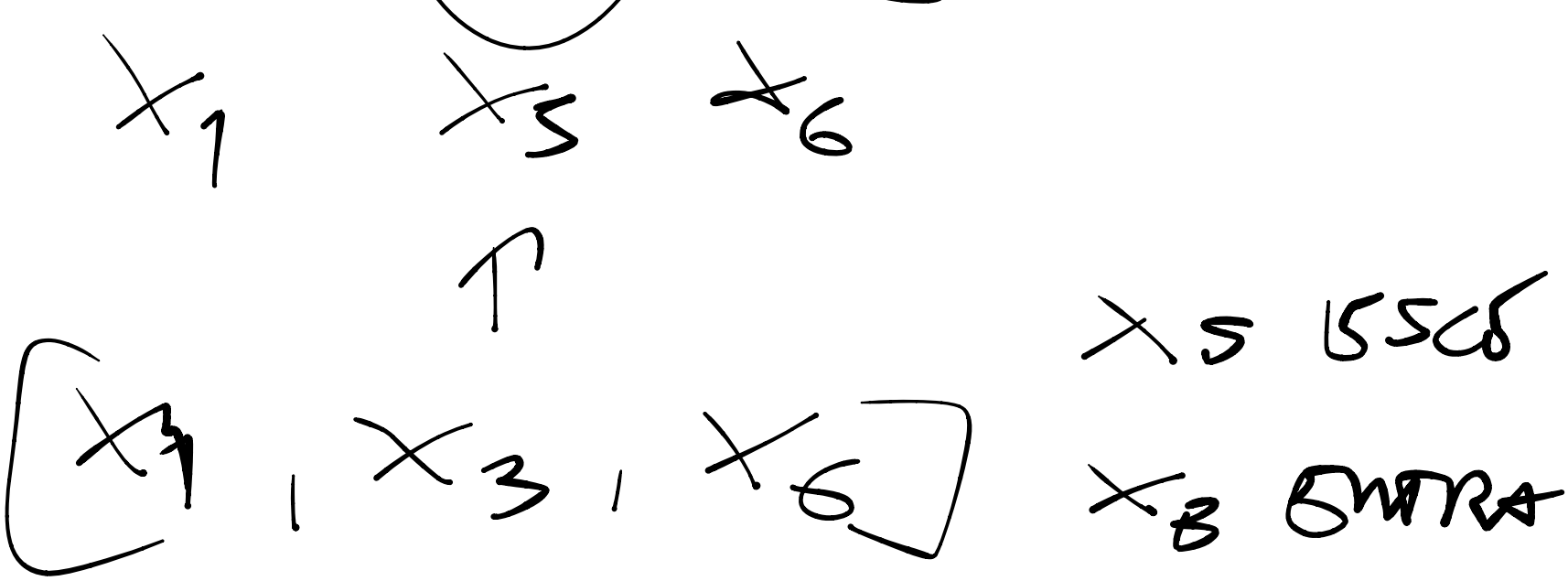
↑ DOVE SIAMO QUI?

$-3/2$

5



$\left[\frac{1}{1/2}, \frac{4}{3/1}, \frac{4}{0}\right]$



TABLEAU

↓

COSM RIDOTTI

TUTTI POSITIVI

x_1 $1/5$

x_3 $8/5$

x_6 4

$Z = (x_1, x_2, x_3, x_4, x_5, x_6)$

FUORI BASE

$= 0$

$= (1/5, 0, 8/5, 0, 0, 4)$

$-z = 27/5 = -27/5$

VINCOLI

$\rightarrow$ SATURI $(x_2 = 0)$

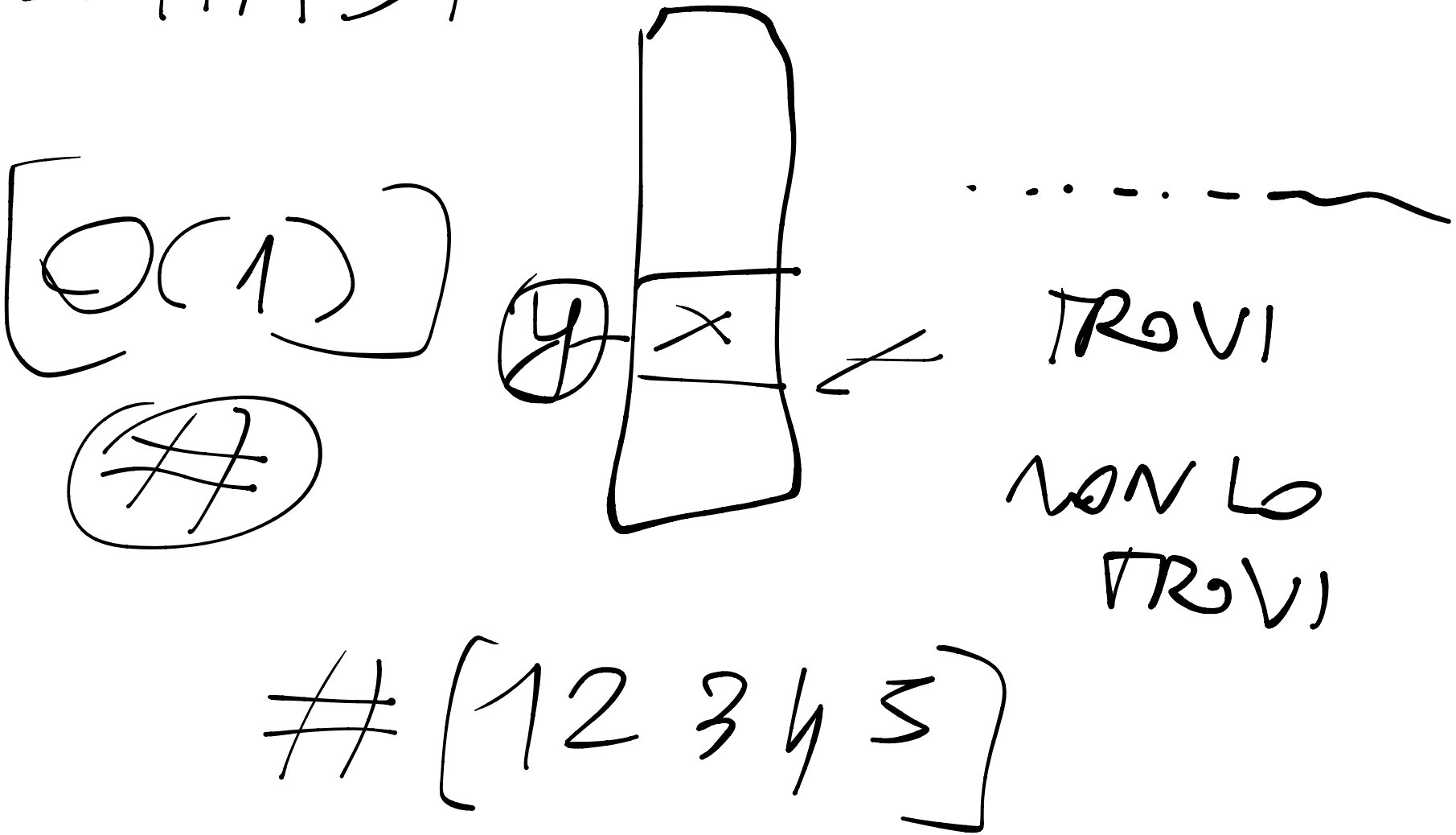
$\rightarrow$ LASCIA $\left(\frac{1}{5} = x_1\right.$

$> 0 \rightarrow$ LASCIA

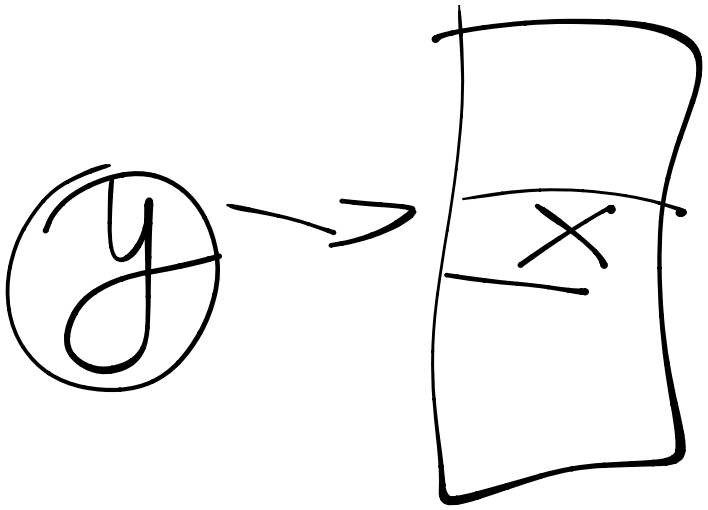
END RO

ALGO

- HASH



y su x → collisione



x rompe

collisioni

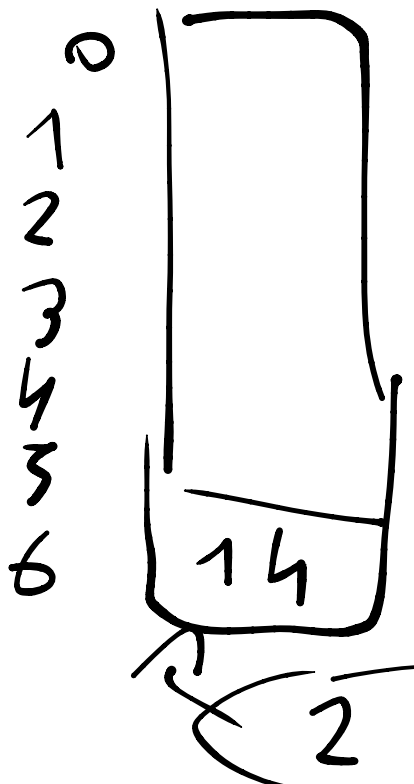
tramocco

linked

doppio hash

$h(k) = k \bmod m$ (m) = 8 → num.

[14, 10, 22, 18, 14] (k) = key



14 mod 8 (k, m)

$h(k) = k \bmod m$

22 mod 8

↓

Creo LISTA dove c'è una collisione!

DOPPIO HASH

↓

$h_1(k) = k \bmod m$

$h_2(k) = 1 + k \bmod (m-2)$

$K = [12, 3, 22, 14, 38]$

$h(12, 0)$

$\updownarrow$ $i = 1$ 56 collisions

$h(k, i)$

$h(12, 0) = (h_1(k) + 0 * h_2(k)) \bmod m$

$((12 \bmod 8) + 0 * (h_2)) \bmod 8$

$4 \mod 3 = 4$

...

$h(14, 0) \rightarrow$ COLUSIONE

↓

$h(14, 1) \rightarrow (h_1(K) + \boxed{1 \cdot h_2(K)}) \mod (m)$

$1 = 1$

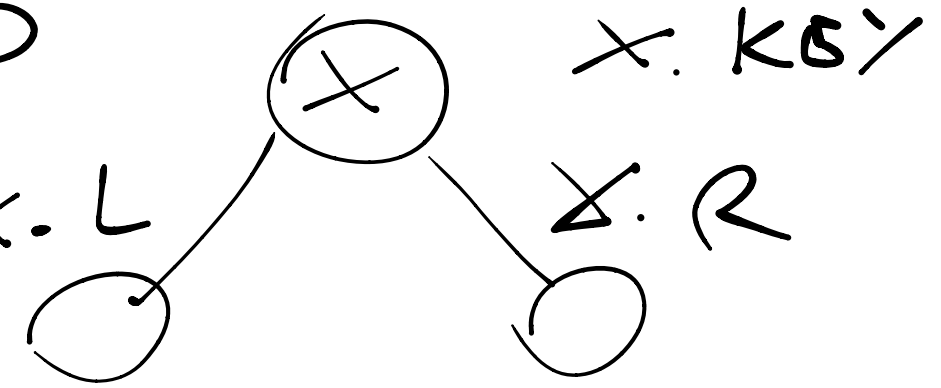
$R(14,1) = ((14 \bmod 8), +1\ (1 + 14 \bmod 6))$

$g^r \bmod 8 = 1$

⇒ DA SAPERE:

f. di DOPPIO HASH

ALBERO



ARRICCHIMENTO $\Rightarrow$ λ

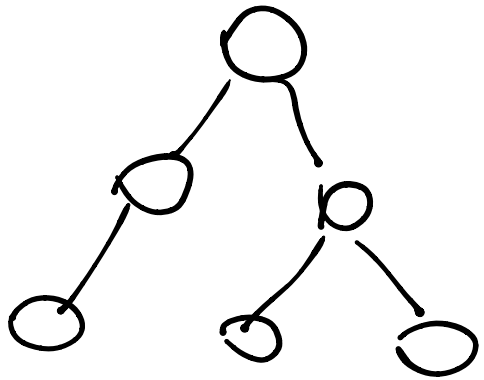
$- \lambda.\,SIBS$

$- \lambda.\,CHILDREN$

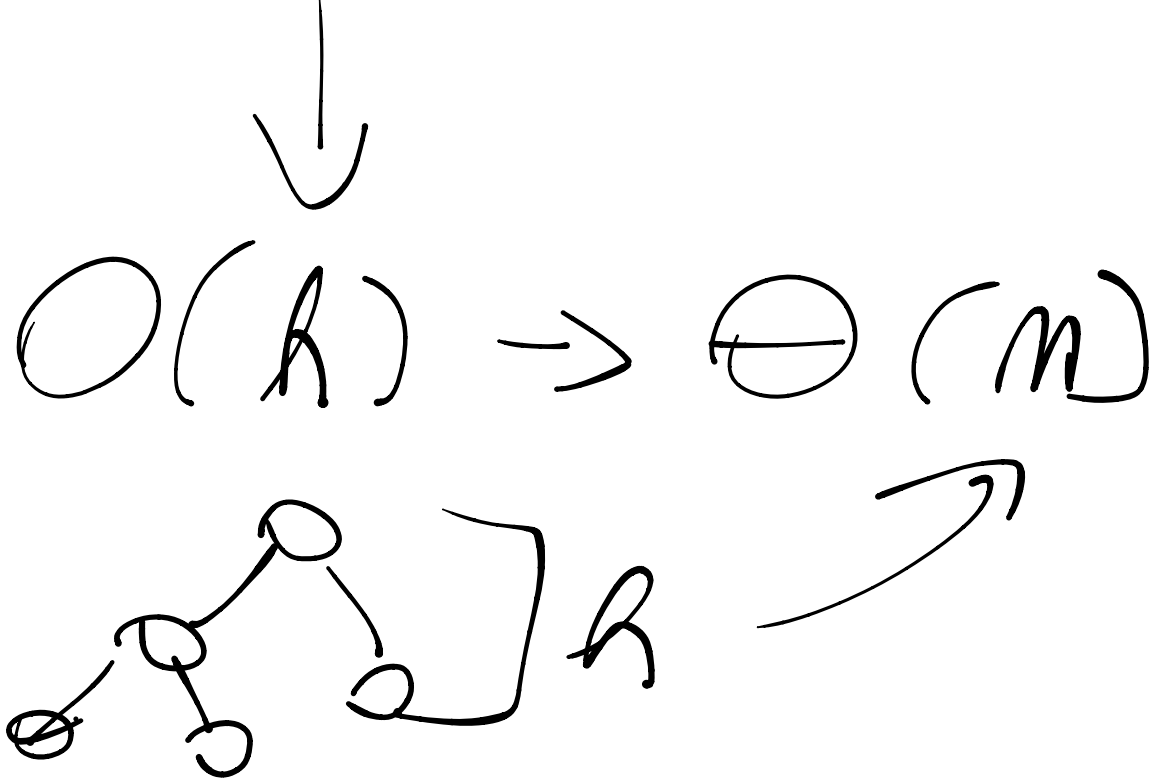
$[\,LEVEL\,(T) \Rightarrow \#\,NODI$

$\lambda.\,KEY \leq$

$NODO\ LIVELLO$



```
[LOWER(T)]-X = T.ROOT
IF(X == NIL) RETURN -1
LEFT = LOWER(X.LEFT, L+1)
RIGHT = LOWER(X.RIGHT,
                L+1)
IF(X.KEY >= L)
    RETURN LEFT+RIGHT+1
ELSE
    RETURN LEFT + RIGHT
```


O(k) → ⊖(n)
k