Games w/o Dice or Cards

Combinatorial Game Theory

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Ordering Games

$G < 0$	R wins
$G = 0$	2nd wins
$G > 0$	Left wins
$G \parallel 0$	1st wins

fuzzy

$G < H$

H is better for L
(even if part of a bigger game)
than G

$0 < H - G$

$$G = H$$

G and H have the same outcome — even if part of a bigger game

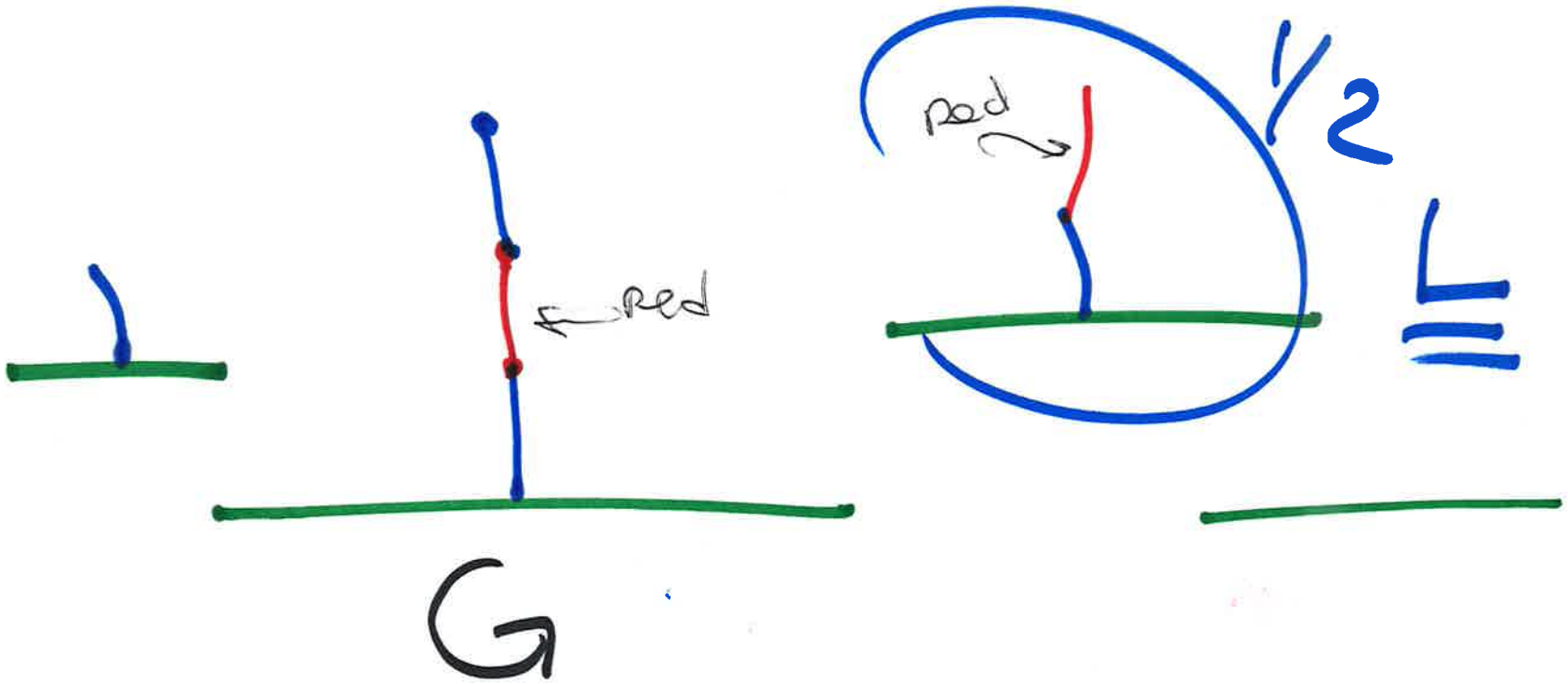
$$H - G = 0$$

$G \leq H$

$G < H$ OR $G = H$

H is at least as good for L as G.

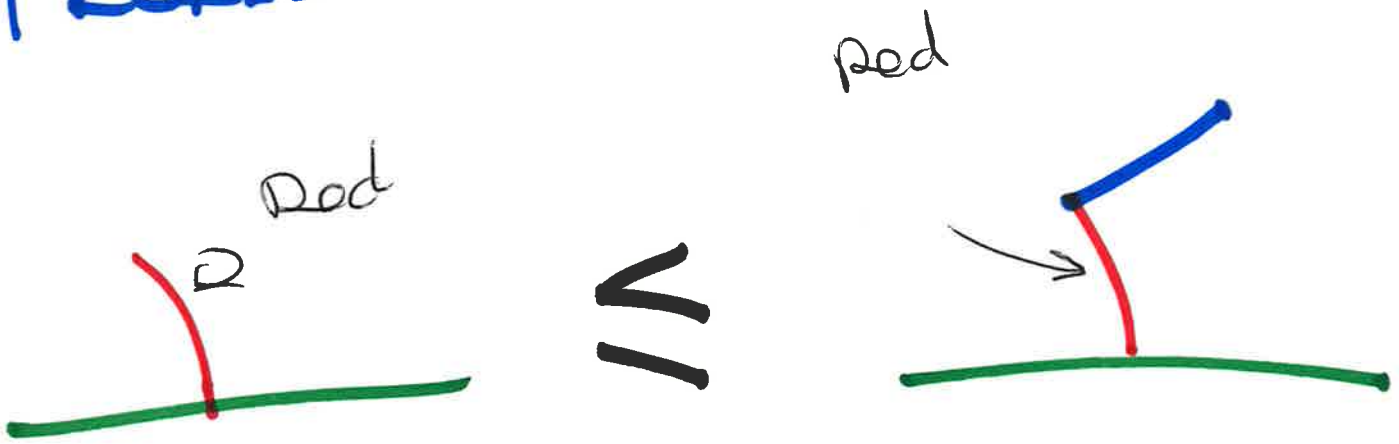
L wins H - G going 2nd



{ Left moves | Right moves }

$\{0 \mid 1\}$ $\frac{1}{2}$ $\{0 \mid \frac{1}{2}\}$ $0 < \frac{1}{2}$

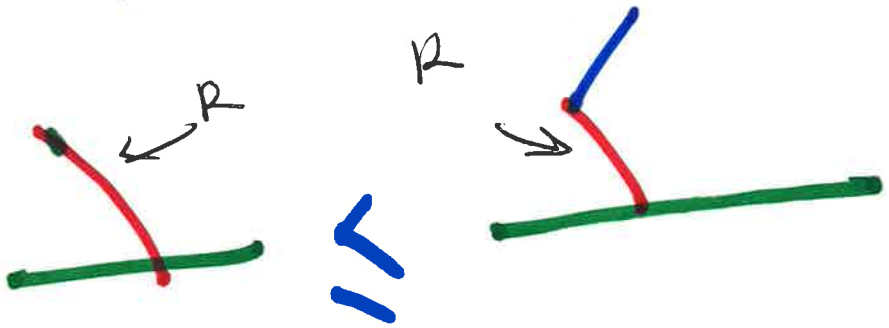
PROBLEM



$G \leq H$

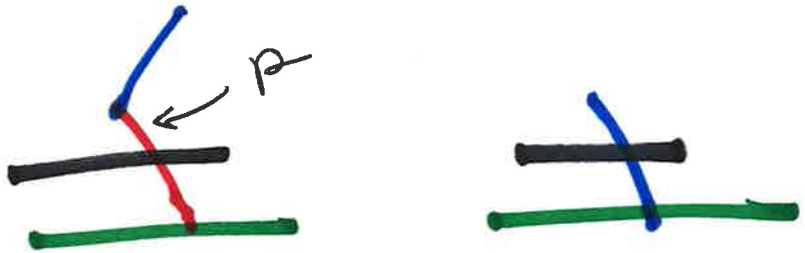
$H - G$ win 2^{nd}

PROBLEM solution



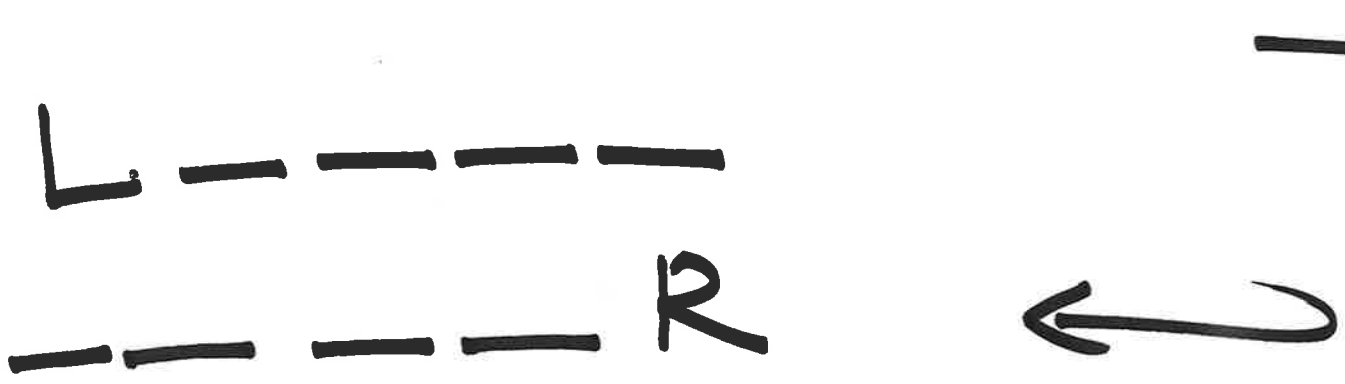
$G \leq H$

$H - G \geq 0$



$H \qquad -G$

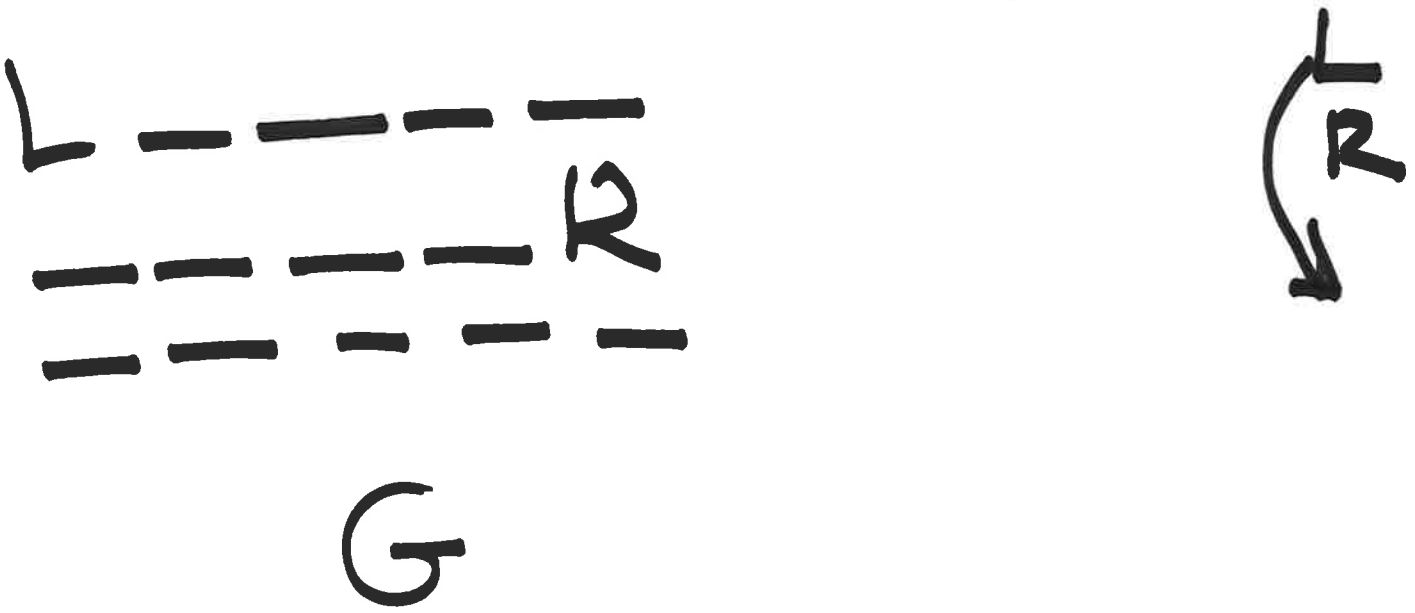
Ski Jumps / w.o. Jumps



=0

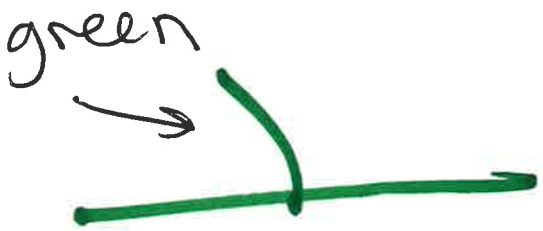
1st Lose
2nd win

Ski Jumps w/ Jumps



$0 < G < 1$

Not Numbers



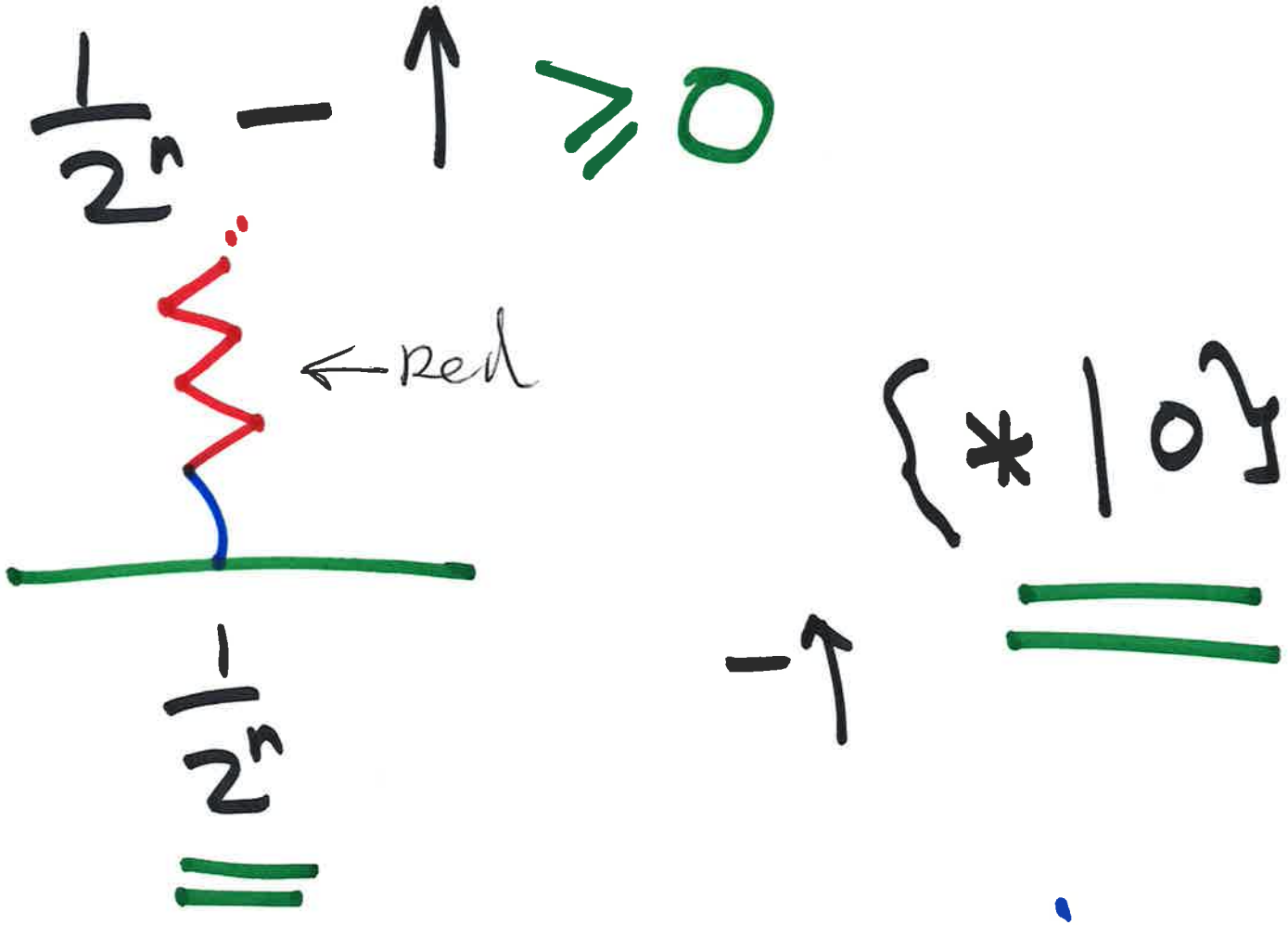
$G = *$ $\quad *+*=0$

$* \parallel 0$

$\uparrow$ up

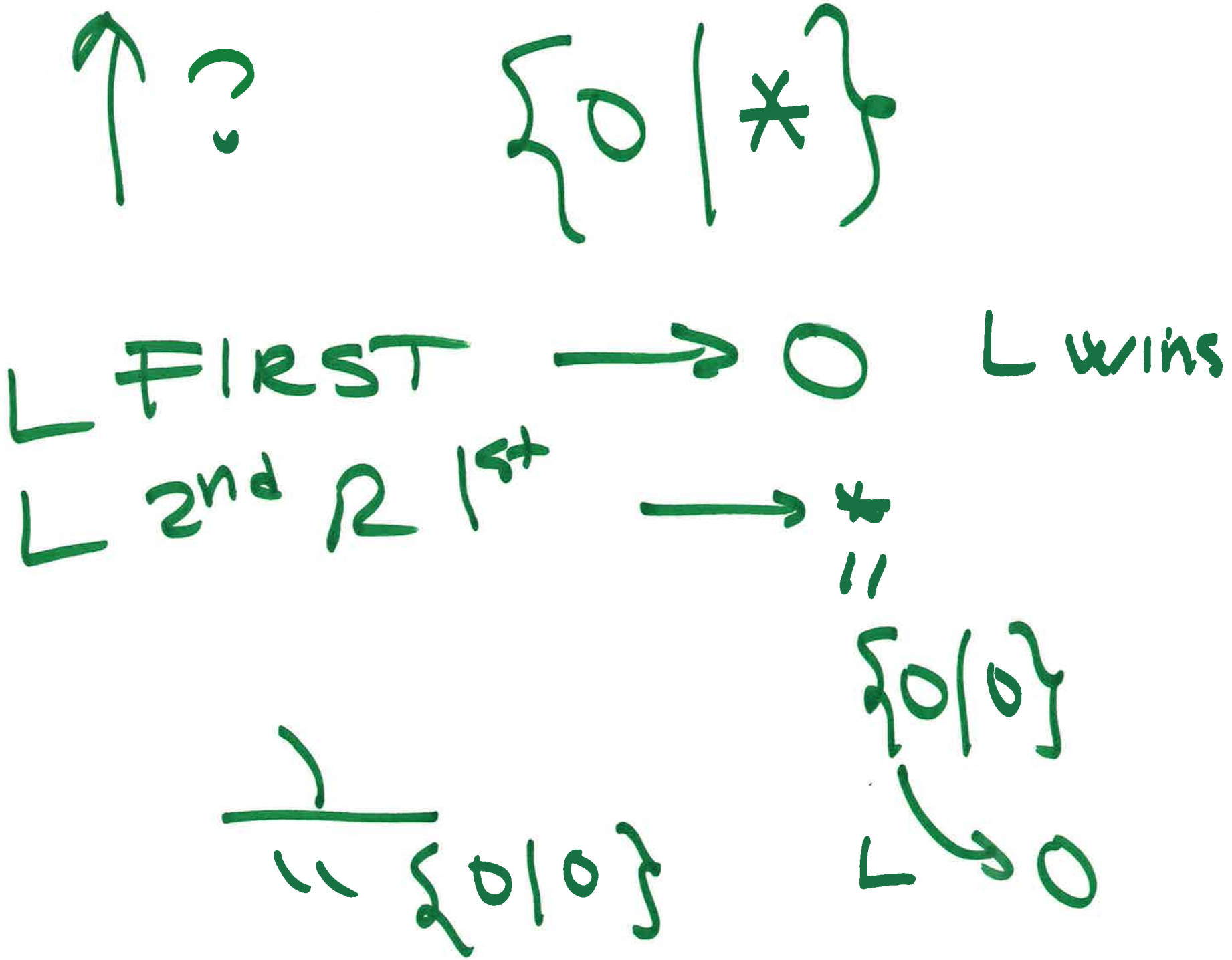
$\uparrow = \{0 \mid *\}$

$0 < \uparrow < \frac{1}{2^n}$

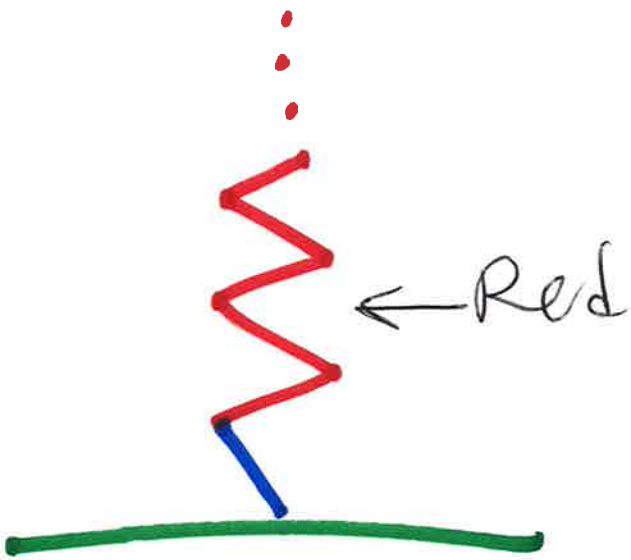


Left wins 1st or 2nd

You try this ....


↑ ?
{0|*}
L FIRST → 0
L wins
L 2nd R 1st → *
||
{0|0}
1
|| {0|0}
L → 0

Solution: 3.4



$\{* \mid 0\}$

L 1st $\rightarrow$ $\frac{1}{2^n} + *$

R $\quad 0$ $\quad 1/2^n$ L wins

R

R cuts R small case same

FIN