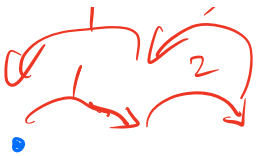
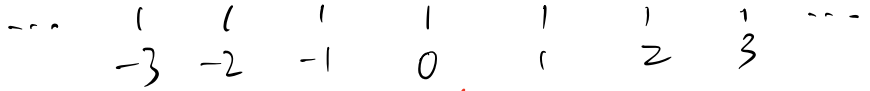
RANDOM WALK





B_n = {After n steps, back to the origin}

$n = 100$

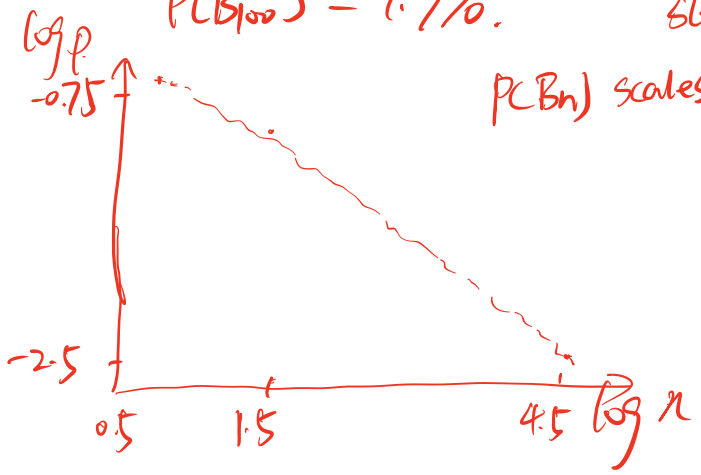
$\Omega = \{L, R\}^n$, LRRLL···

$P(B) = \frac{|B_n|}{|\Omega|} = \frac{\binom{n}{n/2}}{2^n}$; # steps to left = # steps to right

n is even

$P(B_{100}) \doteq 7.9\%$. slope : $-1/2$

$P(B_n)$ scales $\approx \frac{1}{\sqrt{n}}$



Now consider this:

$\Rightarrow F_n$: "Back to origin for the first time"

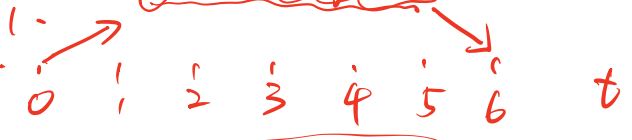
$P(F_n) < P(B_n)$

	Ω	$\lvert F_n \rvert$		
n:	2	4	6	8
$\lvert F_n \rvert$:	2	2	4	10_n

intuition: has to stay on one side

Define P_n : $|F_n| = 2 \cdot |P_{n-2}|$

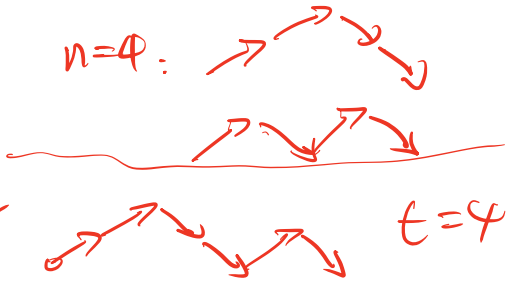
3.
2. non-negative $n=6$
1.
pos.



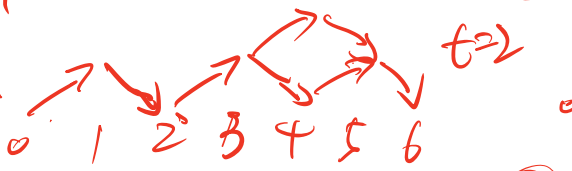
how to calculate $|P_n|$?

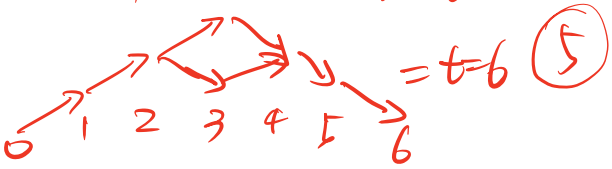
n	2	4	6
$\lvert P_n \rvert$	1	2	5

$n=4$:

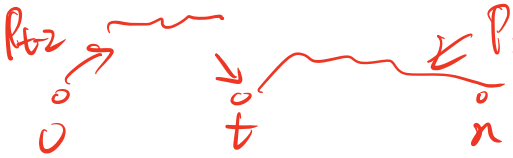


$n=6$:





t: 1st time it hits zero.



$\Rightarrow |P_{n-t}| = |P_{t-2}| \cdot |P_{n-t}|$

$\Rightarrow |P_n| = |P_0| \cdot |P_{n-2}| + |P_2| \cdot |P_{n-4}| + \cdots + |P_{n-2}| \cdot |P_0|$