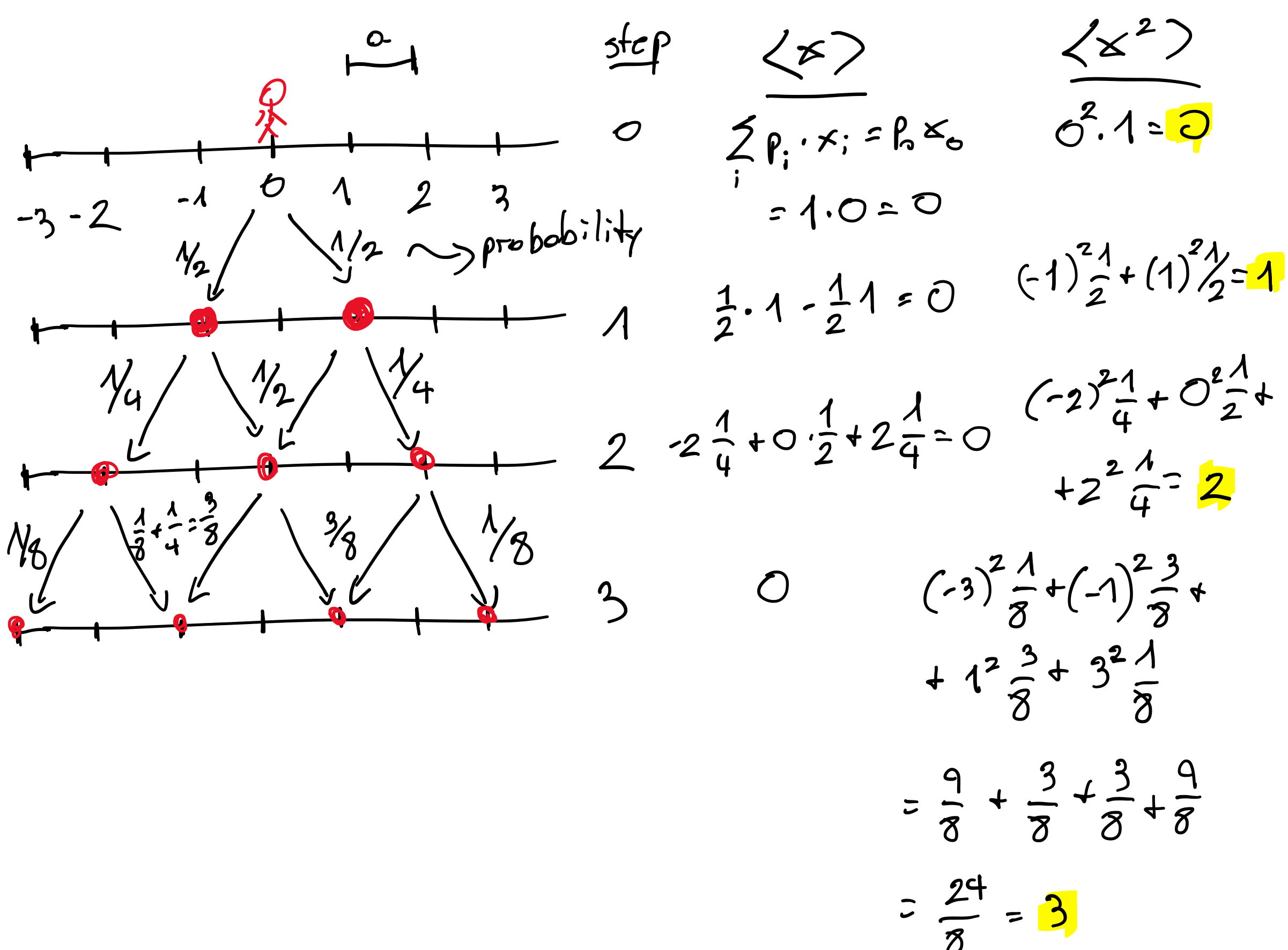


Diffusion as a random walk



$\Rightarrow \langle x \rangle = 0$ for all steps

$$\langle x^2 \rangle = N a^2$$

↓ lattice

time step number = $T \rightarrow$ total time
 size = $\Delta t \rightarrow$ time step

$$\langle x^2 \rangle = \frac{T}{\Delta t} a^2 \Rightarrow \frac{\langle x^2 \rangle}{T} = \frac{a^2}{\Delta t}$$

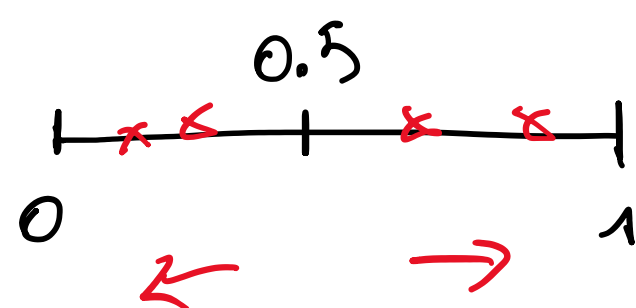
diffusion constant = D

Let's simulate in Python

Model params:

a
 Δt

How do we encode for a coin flip?



How do we simulate 100 random walkers?

$$\text{Position} = [pos_0, pos_1, pos_2, \dots]$$

$$\text{Positions} = \begin{bmatrix} pos_0^0 & pos_1^0 & pos_2^0 & \dots \\ pos_0^1 & pos_1^1 & \dots & \\ \vdots & & & \end{bmatrix}$$

random walker identity (points to the row index)
 time point (points to the column index)