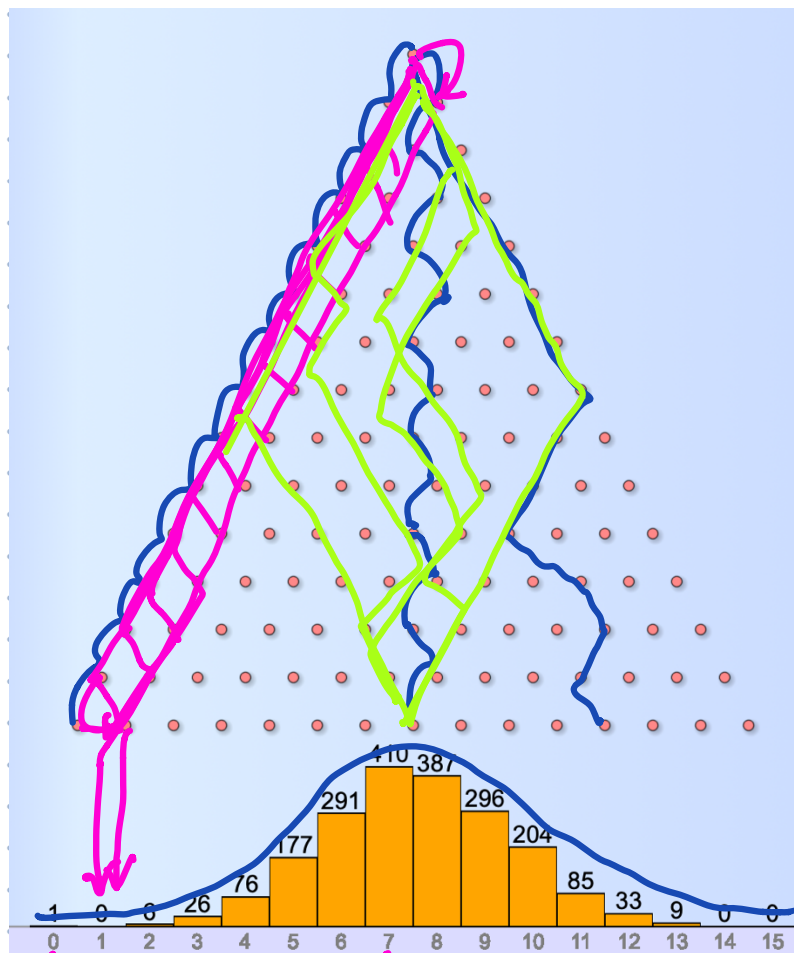


Quincunx / Galton Board



Path probabilities
all same?

$$p = \frac{1}{2}$$

$$p(15 \text{ left}) = \frac{1}{2} \cdot \frac{1}{2} \cdots \frac{1}{2} \\ = \left(\frac{1}{2}\right)^{15} \\ = \frac{1}{2^{15}}$$

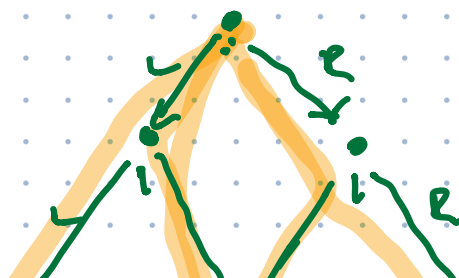
$$p(RLRLRL \cdots L) = \frac{1}{2} \cdots \frac{1}{2} \\ = \left(\frac{1}{2}\right)^{15} \\ = \frac{1}{2^{15}}$$

$$p(\text{path}) = \frac{1}{2^{15}}$$

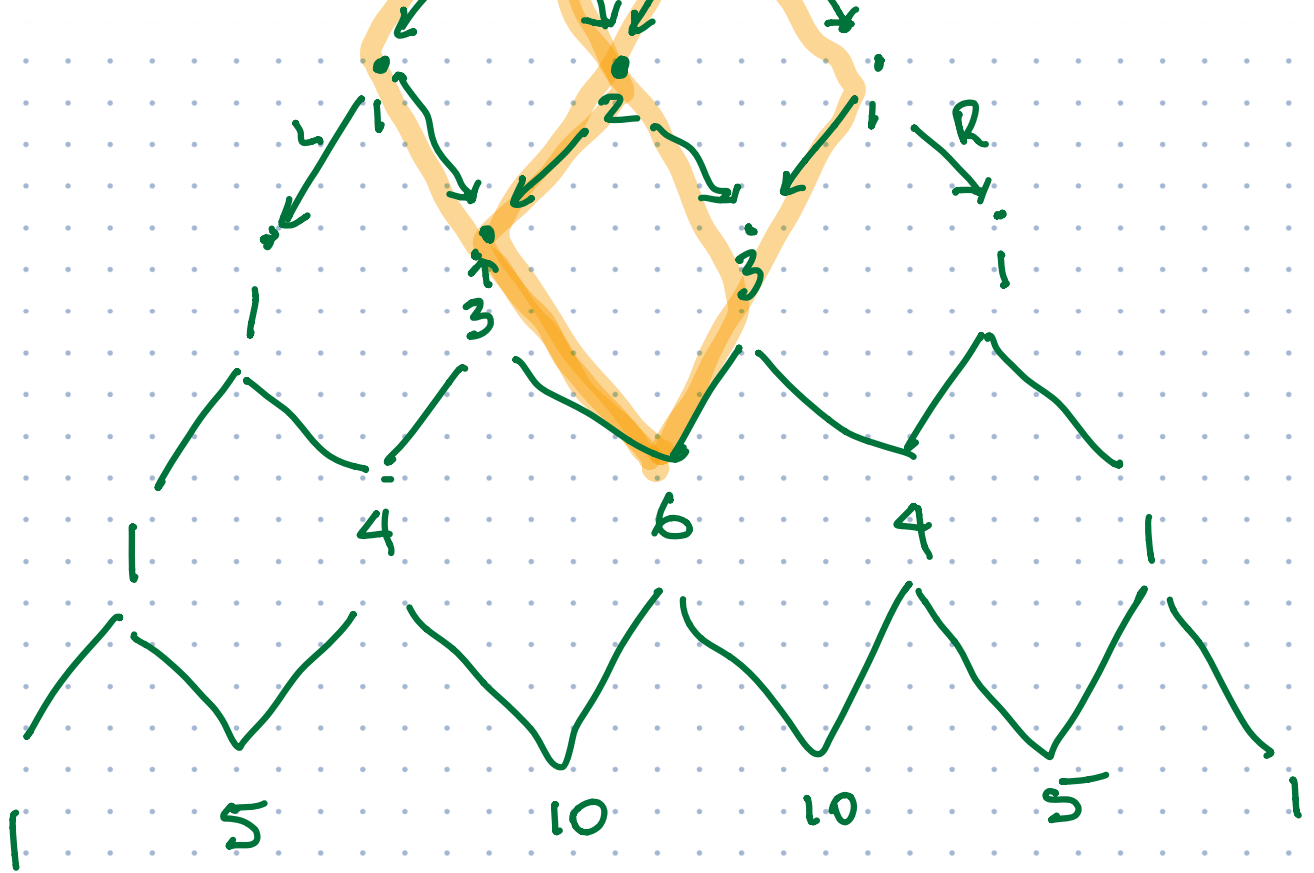
1 15 L L L ... R ... L
15 spots

$$p(7 \text{ bin}) = \text{left 7 times, right 8 times} \\ =$$

Manually



Pascal's
Triangle



Formulaic

$$p(\text{bin } 7) = \frac{\binom{15}{7} (0.5)^7 (0.5)^8}{1}$$

LLRRLRRRLLLRRR
LLLLLLLR . . . R

$${}^{15}C_7 = {}^{15}C_8 = 6,435$$

$$= \frac{n}{Z} = \frac{6,435}{2^{15}} = \frac{6,435}{32,768}$$

$$= 0.196300615$$

Observed $p_f = \frac{410}{2001} = 0.204897551$