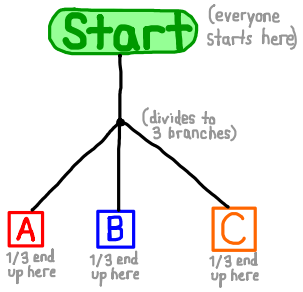
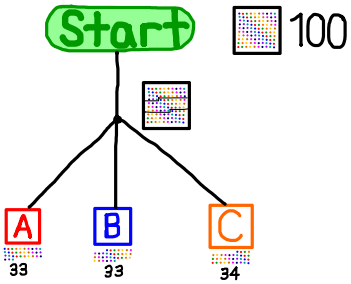
WMW #5: Garden Paths

Involves probability, infiniteness, paths, and graphs
We'll go straight to examples:

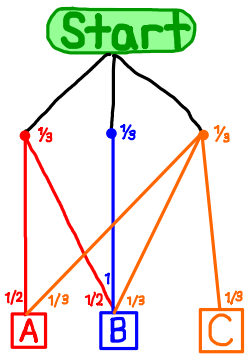
Imagine this:



So if 100 people were to go down this path,



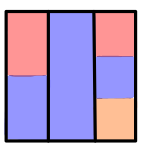
Another example:



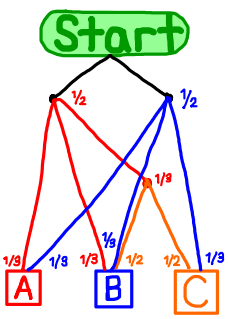
For A $\frac{1}{6} + \frac{1}{9} = \frac{5}{18}$
For B $\frac{1}{6} + \frac{1}{3} + \frac{1}{9} = \frac{11}{18}$
For C $\frac{1}{9} = \frac{1}{9}$

Make sure the values add up to 1.

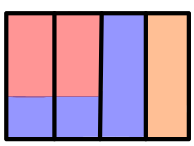
$\frac{5}{18} + \frac{11}{18} + \frac{2}{18} = \frac{18}{18}$ ✓



Another example:

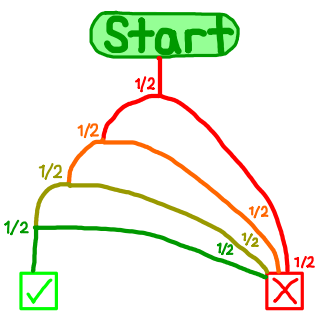


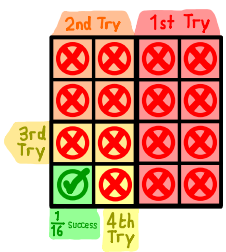
For A $\frac{1}{6} + \frac{1}{6} = \frac{1}{3}$
For B $\frac{1}{6} + \frac{1}{6} + \frac{1}{12} = \frac{5}{12}$
For C $\frac{1}{6} + \frac{1}{12} = \frac{1}{4}$



Probability with Garden Paths

Imagine that I flip four coins. What are the chances that the coins are all HEADS?

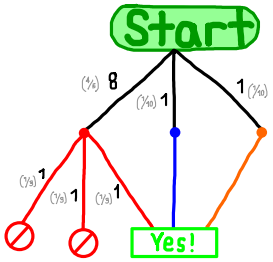




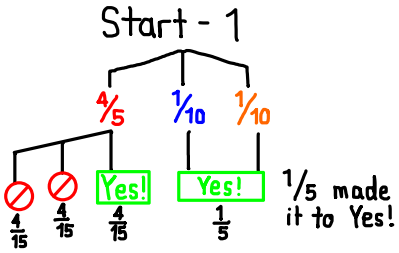
Weighted Paths

What are the chances of getting ⊘?

How about Yes! ?



Let's calculate them with this method:

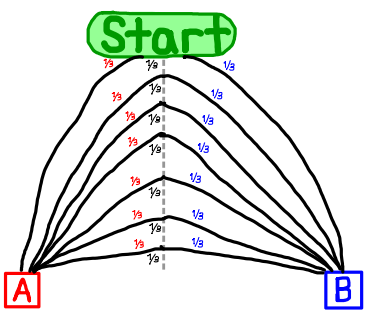


Make sure the values add up to 1:

$\frac{4}{15} + \frac{4}{15} + \frac{4}{15} + \frac{1}{5} = \frac{4+4+4+3}{15} = \frac{15}{15} = 1$

Then calculate: ⊘ : $\frac{4}{15} + \frac{4}{15} = \frac{8}{15}$
Yes! : $\frac{4}{15} + \frac{3}{15} = \frac{7}{15}$

Infinite Series?



So that $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{243} + \ldots + \frac{1}{3^n} = \frac{1}{2}$? WOW!
In fact, $\frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4} + \ldots + \frac{1}{x^n} = \frac{1}{x-1} \rightarrow \sum_1^\infty \frac{1}{b^n} = \frac{1}{b-1}$
where b is a constant