http://www.math.csusb.edu/faculty/stanton/m262/intro_prob_models/intro_prob_models.html

Probability distribution for tossing 2 coins.

x	HH	HT or TH	TT
P(x)	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$

http://regentsprep.org/Regents/math/tree/Ltree.htm

Independent events: knowing A occured doesn't tell us any additional information about B.

Disjoint events: A and B can't both happen.

ActivStats III 14-2 Independence

Events A & B are independent if $P(A)=P(A|B)$

One trial: Rolling one die...

	Disjoint	Not Disjoint
Independent	Impossible	even & curved number 2, 3, 5, 6
Not Independent	2,4,6 even & 1,3,5 odd	even & prime 2, 3, 5

2, 4, 6 $P(E) = \frac{3}{6} = \frac{1}{2}$

$P(\text{curved}) = \frac{4}{6} = \frac{2}{3}$

$P(E \mid \text{curved}) = \frac{2}{4} = \frac{1}{2}$

$P(\text{prime}) = \frac{3}{6} = \frac{1}{2}$

$P(E \mid \text{prime}) = \frac{1}{3}$

$P(\text{prime} \mid \text{even}) = \frac{1}{3}$

$P(E) = \frac{1}{2}$

$P(E \mid O) = \frac{0}{3}$

Two trials:

	Disjoint	Not Disjoint
Independent	Impossible	heads on a coin & 6 on a die
Not Independent	Dem elected Pres & GOP elected VP	raining & playing baseball

$P(H) = \frac{1}{2}$

$P(H \mid 6) = \frac{1}{2}$

Word order matters!
P(girl|has a pink phone) $\neq$ P(has a pink phone|girl)

What is the probability...

a person is a Canadian who speaks French?

a Canadian speaks French?

a person is Canadian if he speaks French?

a person speaks French if he is Canadian?

I flip a coin 3 times. What is the probability I get at least one head?

P(HHH) = $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$

P(HHT) = $\frac{1}{8}$

P(HTH) = $\frac{1}{8}$

THH

HTT

THT

TTH

TTT

add = $\frac{7}{8}$

This IS better

Hi Stats 5th hour Morgan poops Canadians

P(TTT) = $\frac{1}{8}$

$1 - \frac{1}{8} = \frac{7}{8}$

Hi Its hard Stats to Class write with a mouse

I roll a die 3 times. What is the probability I get at least one 4?

$P(444) = \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{216}$

$P(44 4^c) = \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{5}{6} = \frac{5}{216} \cdot 3 = \frac{15}{216}$

$4\,4^c\,4$

$4^c\,4\,4$

$P(4\,4^c\,4^c) = \frac{1}{6} \cdot \frac{5}{6} \cdot \frac{5}{6} = \frac{25}{216} \cdot 3 = \frac{75}{216}$

$4^c\,4\,4^c$

$4^c\,4^c\,4$

$+$

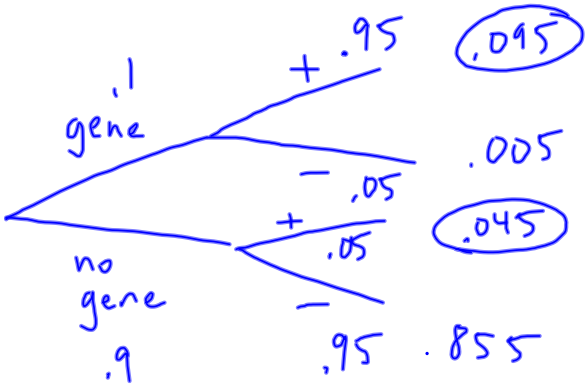
$\frac{91}{216}$

$P(4^c\,4^c\,4^c) = \frac{5}{6} \cdot \frac{5}{6} \cdot \frac{5}{6} = \frac{125}{216}$

$1 - \frac{125}{216}$

Suppose a test for a genetic disorder is 95% accurate and that 10% of the population has the disorder.
What is P(~~infected~~ | positive)?

has disorder



$P(+) = .095 + .045 = .14$

$P(\text{gene} \mid +) = \frac{.095}{.14} = .68$