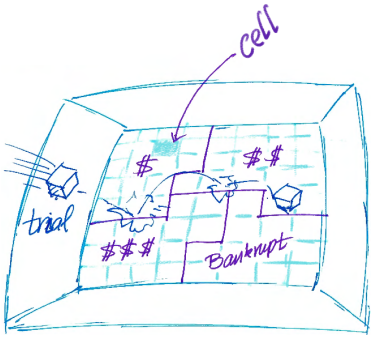
Probability and conditional probability

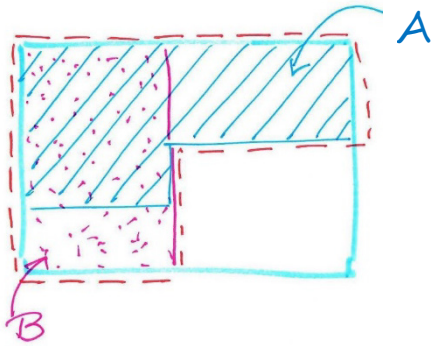
Probability

$$P(A) = \frac{\#\text{ cells in event } A}{\#\text{ cells overall}}$$



Conditional probability

$$P(A|B) := \frac{P(A \cap B)}{P(B)}$$



Algebraic approach

1. Write Bayes.
2. Use LOTP to obtain expression for denominator in Bayes.

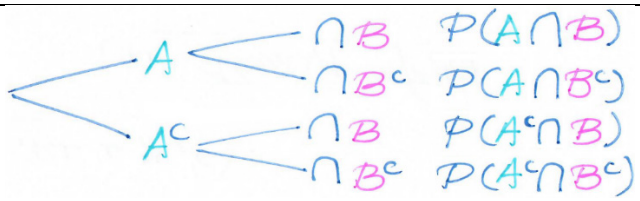
Bayes

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

LOTP

$$P(A) = \sum_i P(A|B_i)P(B_i)$$

Tree approach



Tabular approach

1. Fill in entries using given information.
2. Infer additional entries by ensuring that indicated sums equal indicated values.

	A		A^C		
B	$P(A \cap B)$	+	$P(A^C \cap B)$	=	$P(B)$
	+		+		+
B^C	$P(A \cap B^C)$	+	$P(A^C \cap B^C)$	=	$P(B^C)$
	‖		‖		‖
	$P(A)$	+	$P(A^C)$	=	1

Venn diagram

When given counts or probabilities for a population in which some subpopulations partially overlap, fill in the given counts or probabilities in a diagram like the one at the right.