Probability Rules:

- The sum of the probabilities for all possible outcomes in a sample space is 1.

- The probability of an outcome is a number between 0 and 1 inclusive. An outcome that always happens has probability 1. An outcome that never happens has probability 0.

- The probability of an outcome occurring equals 1 minus the probability that it doesn't occur.

- The probability that two mutually exclusive (disjoint) events occur is 0.

Strategies for Solving Probability Problems:

Draw a picture of the situation -

- Table/Charts

White	Black	Red	Silver	Gold
0.46	0.22	0.09	0.11	0.12

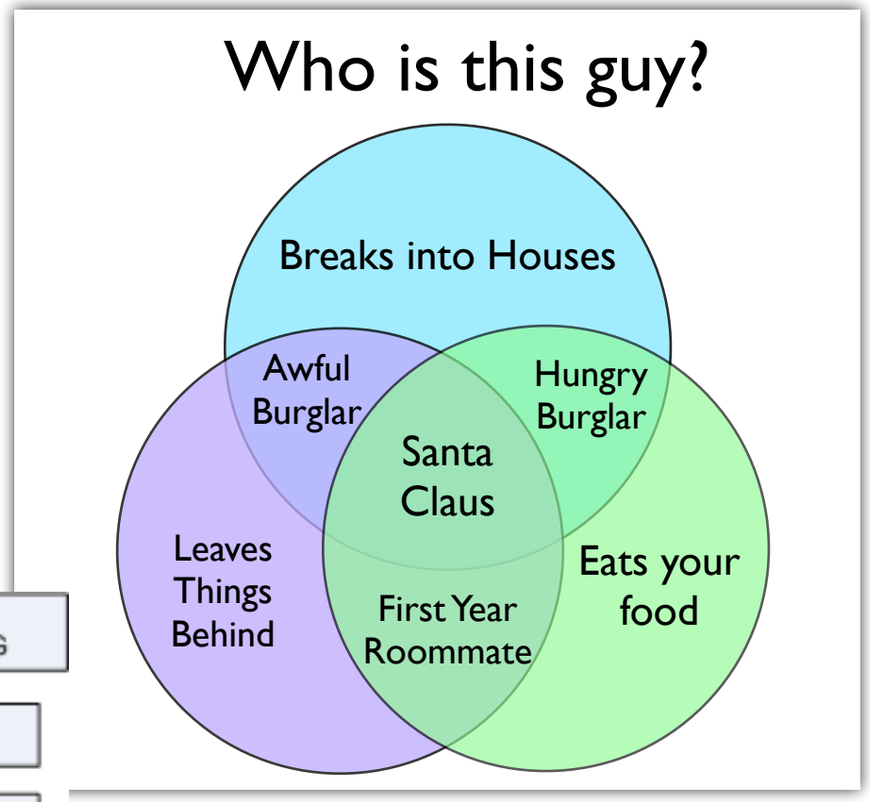
		Breakfast		
		Yes	No	Total
Gender	Male	66	66	132
	Female	125	74	199
	Total	191	140	331

- Formulas

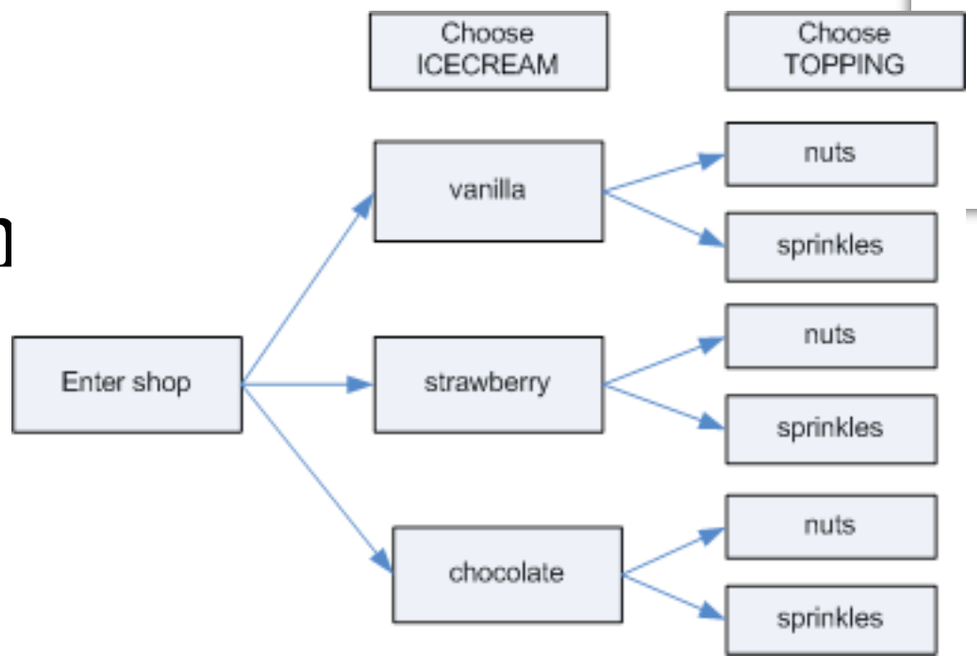
$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cap B) = 0$$

- Venn Diagram



- Tree Diagram



Formulas

Is there a formula on the AP formula sheet that applies?

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Is there a formula/idea that is not on the AP formula sheet that applies?

If events are disjoint, then $P(A \cap B) = 0$

The Law of Large Numbers - LOLN

Wolfram Alpha -

A "law of large numbers" is one of several theorems expressing the idea that as the number of trials of a random process increases, the percentage difference between the expected and actual values goes to zero.

Wikipedia -

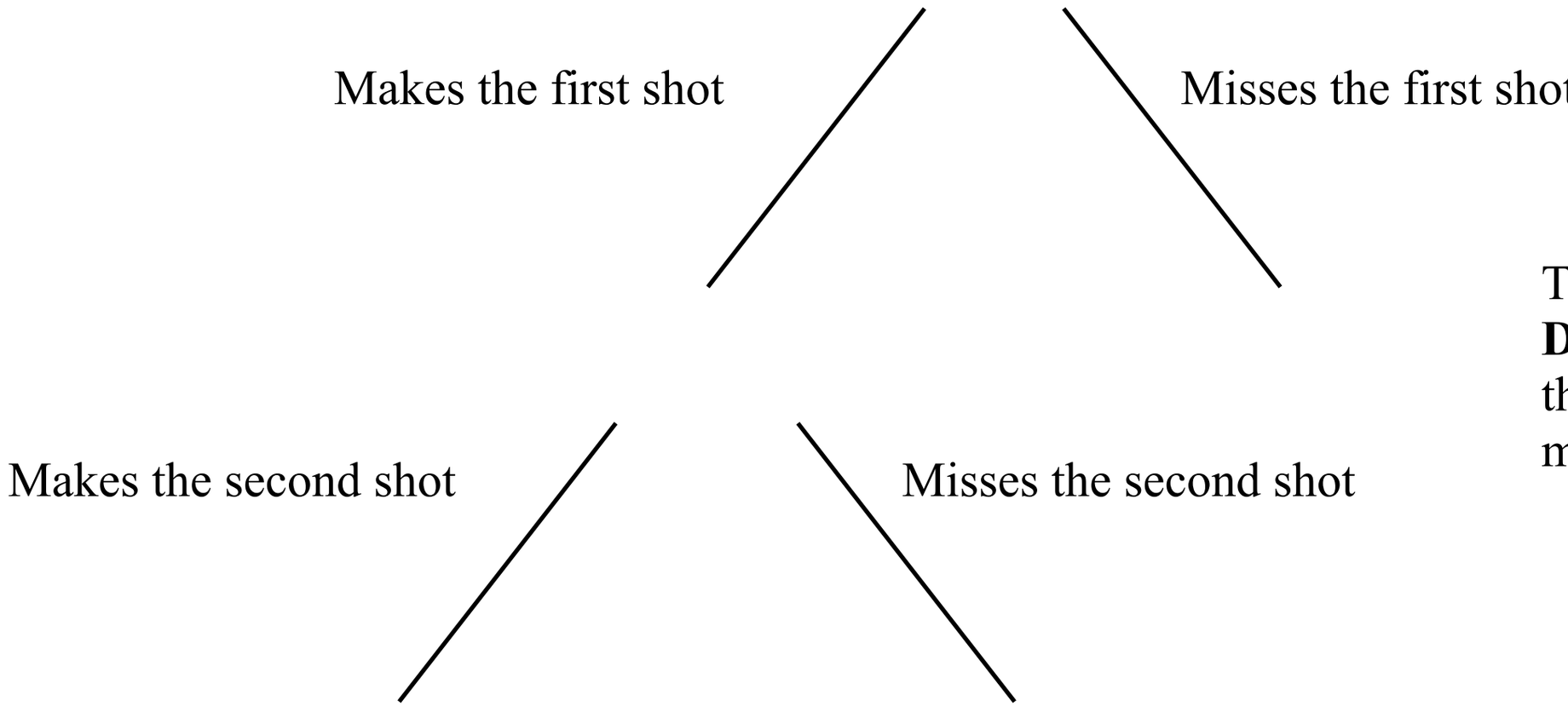
In probability theory, the **law of large numbers** (**LLN**) is a theorem that describes the result of performing the same experiment a large number of times. According to the law, the average of the results obtained from a large number of trials should be close to the expected value, and will tend to become closer as more trials are performed.

AP Stats -

As the number of repetitions of a random experiment increases, the relative frequency of an event will tend to converge toward the probability of the event.

http://www.socr.ucla.edu/htmls/SOCR_Experiments.html

One and One situation: A basketball player goes to the line for a one and one. If he/she makes the first shot, he/she gets a second. If he/she misses the first shot, the ball is live.



This is called a **Tree Diagram** and is one of the methods used to model probability

Suppose a player has a 60% Free Throw Percentage. What is the most likely outcome? Zero made shots, one made shot, or two?

For next class, try to find a way to use randint to simulate 50 trials of this.

Hint: Think of how you could "randomly select" made shots versus missed shots

You may brainstorm with classmates (in fact, I encourage it) to find a model for this scenario

Simulation

- Assign the digits for the random digit table or for your calculator.
- Describe how the simulation will be run. If using random digits, be sure to state whether duplicates are allowed. Be sure to give a stopping rule.
- Conduct the simulation with a reasonable number of replications.
- State the conclusion reached in the context of the problem.

Apply this solution to the One and One basketball question