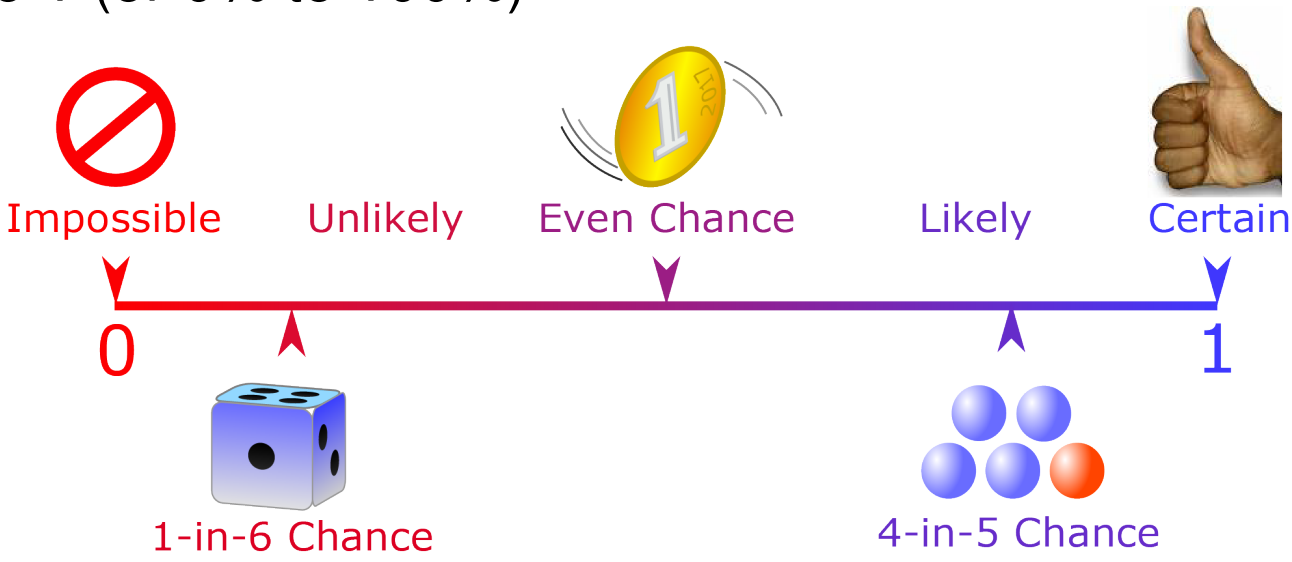
Probability

- quantitative measure of the likelihood of an event
- mathematical foundation of common sense and good judgment
- 0 to 1 (or 0% to 100%)



Picture credit: `https://www.mathsisfun.com/data/probability.html`

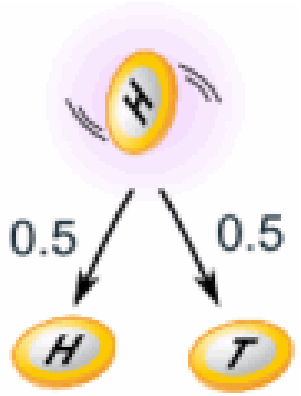
Expected Value

weighted average of the probabilities and is often used in making predictions (and decisions)

.05 $\times$ Effective Class Engagement
+.30 $\times$ Effective ASULearn Engagement
+.50 $\times$ Exams
+.15 $\times$ Final Project

https://towardsdatascience.com/what-is-expected-value-4815bdbd84de

Coincidence or Expected?



Picture credit: `http://lriser03.blogspot.com/`

$$\frac{\text{number of outcomes for 4 heads}}{\text{total number of equally likely outcomes for all possibilities}}$$

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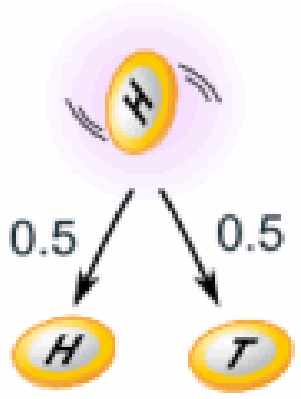

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1 possibility for 4 heads: HHHH

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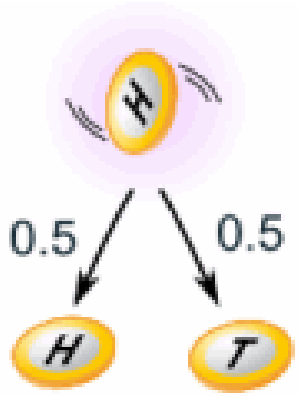

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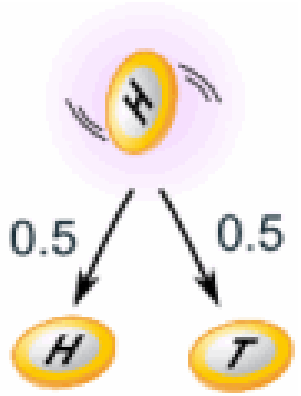

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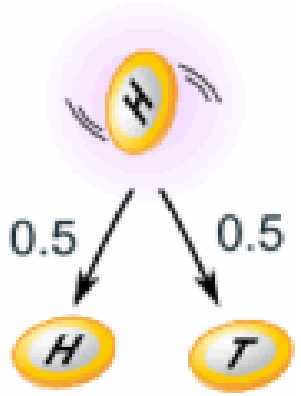

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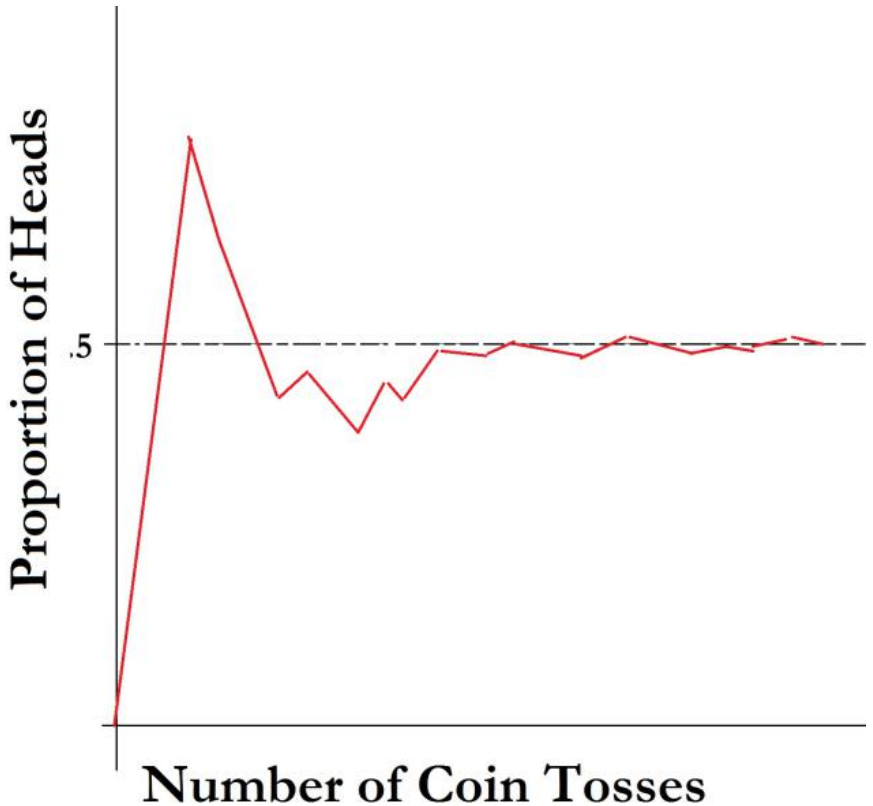
probability of 4 heads in 4 tosses: $\frac{1}{16}$

expected number of people? $\frac{1}{16} \times$ number of people in class

Law of Large Numbers

- small number of experiments can have random fluctuations
- repeat an experiment a large number of times: outcome tends to the probability with much greater certainty



Picture credit: `http://0.tqn.com/d/statistics/1/S/T/0/-/-/lawoflargenumbers.jpg`