

Computing Probabilities

Pure / classical approach $\rightarrow$ assumes
 all simple outcomes are equally likely.

If event A can happen in X
 simple ways, in an experiment with
 N simple outcomes then

$$P(A) = \frac{X}{N}$$

Ex: Roll a fair unbiased die (simple outcomes: 1, 2, 3, 4, 5, 6)
 then
 A = roll is less than 3
 B = roll is odd
 C = roll is less than 10
 D = roll is negative.

sample space

$$P(A) = \frac{2}{6} = \frac{1}{3} \approx 0.333 = 33.3\%$$

$$P(B) = \frac{3}{6} = 0.500 = 50.0\% = \frac{1}{2}$$

$$P(C) = \frac{6}{6} = 100\%$$

$$P(D) = \frac{0}{6} = 0.00\%$$

probabilities &
 percents $\rightarrow$
 keep 3 sig.
 figures (don't
 count leading
 zeros).

$$P(A \text{ or } B) = \frac{4}{6} = \frac{2}{3} = 0.667 = 66.7\%$$

A or B
 {1, 2, 3, 4, 5, 6}

$$= P(A) + P(B) - P(A \cap B) = \frac{2}{6} + \frac{3}{6} - \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$$

$$P(A \cap B) = \frac{1}{6} = P(A) \cdot P(B) = \frac{2}{6} \cdot \frac{1}{2} = \frac{1}{6}$$