

Quick Review (Abridged)

- PIE: Way to calculate $|\bigcup_i A_i|$ for sets (A_1, \dots, A_n) , which can overlap.

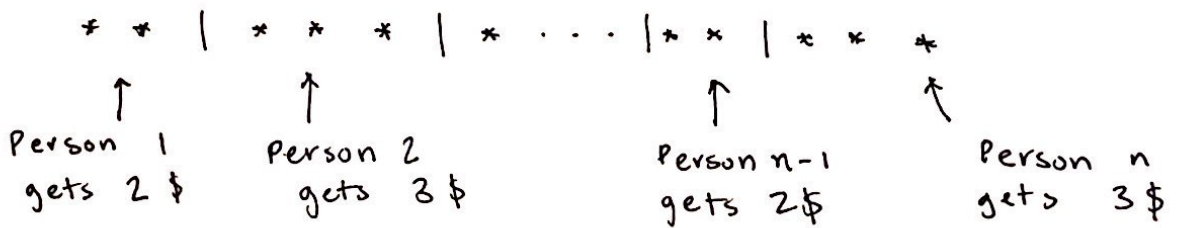
$$\left| \bigcup_i A_i \right| = \sum_i |A_i| - \sum_{i_1 \neq i_2} |A_{i_1} \cap A_{i_2}| + \sum_{i_1 \neq i_2 \neq i_3} |A_{i_1} \cap A_{i_2} \cap A_{i_3}| \\ - \dots + (-1)^{n-1} \sum_{i_1 \neq i_2 \neq \dots \neq i_n} |A_{i_1} \cap A_{i_2} \cap \dots \cap A_{i_n}|$$

- Stars + Bars (aka Balls + Bins, ...)

↳ Way to calculate how to distribute K indistinguishable objects among n distinguishable bins

L) \Leftrightarrow Ways of choosing k objects from n , with replacement and where order doesn't matter

↳ Consider a sequence of k "stars" and $n-1$ "bars":



\hookrightarrow 1-1 correspondence $\Rightarrow \binom{n+k-1}{k}$.

- Probability Formalism

↳ Sample space Ω , "Probability" function $P: \Omega \rightarrow \mathbb{R}$

↳ Events are subsets of Ω and if $E \subseteq \Omega$, we can define $P[E] = \sum_{e \in E} P[e]$.