Optimal Play

minmax theorem:

$$\min_{\mathbf{P}} \max_{\mathbf{Q}} \mathbf{M}(\mathbf{P}, \mathbf{Q}) = \max_{\mathbf{Q}} \min_{\mathbf{P}} \mathbf{M}(\mathbf{P}, \mathbf{Q}) = \text{value } v \text{ of game}$$

- optimal strategies:
 - $P^* = arg min_P max_Q M(P, Q) = minmax strategy$
 - $\bullet \ \ Q^* = \text{arg max}_{Q} \ \text{min}_{P} \ M(P,Q) = \text{maxmin strategy}$
- in words:
 - Mindy's minmax strategy P* guarantees loss \(\section\) (regardless of Max's play)
 - optimal because Max has maxmin strategy \mathbb{Q}^* that can force loss $\geq v$ (regardless of Mindy's play)
- e.g.: in RPS, $P^* = Q^* = uniform$
- solving game = finding minmax/maxmin strategies