

1. Context for Weighted Voting

- A company owned by people with different shares of it.
- The UN Security Council. Permanent members have more power than the rotating members
- U.S. House: States with more people get more votes (representatives)

2. Notation and Terminology for Weighted Voting

- players (people/entity voting): P_1, P_2, \dots, P_N
- weight of each player's vote: w_1, w_2, \dots, w_N
- quota q minimum weight to approve a motion.

Weighted Voting System

$$[q : w_1, w_2, \dots, w_N]$$

$$\text{Ex} \quad [25 : 11, 11, 10, 8]$$

3. Reasonable Limits on the Quota

total # votes is $w_1 + w_2 + \dots + w_N$

- $q > \frac{1}{2}(w_1 + w_2 + \dots + w_N)$ (i.e. q must be more than $\frac{1}{2}$ # votes...)
- $q \leq w_1 + w_2 + \dots + w_N$ (q can't be more than the total # votes)

4. A Look at Power

(a) A Dictator. If $w_i \geq q$, then Player i is a dictator since this player can pass or block any proposal.

$$\text{Ex} \quad [25 : \overset{\text{dictator}}{25}, 10, 3, 2] \quad \text{total weight of 40}$$

(b) Having Veto Power. If no proposal can pass without the votes of player i , then they have veto power.

$$\text{Ex} \quad [25 : \boxed{20}, 10, 5, 5] \quad \text{total weight of 40}$$

↑ veto power

(c) A Dummy

A player whose vote is never essential for a group to reach the quota.

$$[25 : 20, 18, 1, 1] \quad \text{dummies}$$