

11th March

Last time

		<u>l_0</u>	<u>l_1</u>
A	7	$5/12$	$4/12$
B	6	$3/12$	$4/12$
C	3	$3/12$	$2/12$
D	2	$1/12$	$2/12$

$P_A = \# \text{ times } A \text{ is critical}$

$$\text{Power of } A = \frac{P_A}{\sum_{\text{vote}} P_{\text{vote}}}$$

→ Is this the only good definition of power?
↳ There are other ones on HW#6

→ Emily's idea: How many winning coalitions are they part of?

↳ But what about e.g.: Luxembourg example where it can be part of a winning coalition but is not instrumental to win

→ How close can make power to actual populations?

→ What should we do in practice?

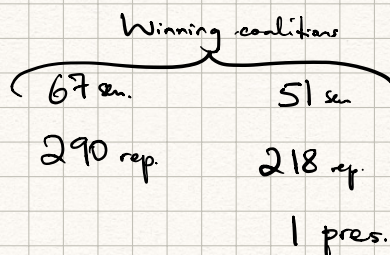
→ How often is this a problem?

CONGRESS

→ Sen 101

→ Reps 435

→ Pres 1



Total coalitions:

$$= \underline{\underline{2^{537}}}$$

...

How many situations is a senator critical?

- How to have exactly 290 reps? $= \binom{435}{290}$
- How to have at least 290 reps? $= \binom{435}{290} + \binom{435}{291} + \dots + \binom{435}{435}$

Spock is a senator, how many times is Spock critical?

$$H = \sum_{k=290}^{435} \binom{435}{k} \quad \text{pres out}$$

$$h = \sum_{k=218}^{435} \binom{435}{k} \quad \text{pres in}$$

$$H \binom{100}{66} + h \binom{100}{50}$$

Kirk is in the house of reps, how many times is Kirk critical?

$$S = \sum_{k=67}^{101} \binom{101}{k}$$

$$S \binom{434}{289} + s \binom{434}{217}$$

$$s = \sum_{k=51}^{101} \binom{101}{k}$$

What about the president?

- They only matter if you have $51 \leq \text{senators} < 67$ and $218 \leq \text{house reps} < 290$.

$$\rightarrow \sum_{k=51}^{66} \binom{101}{k} \cdot \sum_{k=218}^{435} \binom{435}{k} + \sum_{k=51}^{101} \binom{101}{k} \cdot \sum_{k=218}^{289} \binom{435}{k} - \sum_{k=51}^{66} \binom{101}{k} \cdot \sum_{k=18}^{289} \binom{435}{k}$$

Power calculated from a computer:

Sen. - 0.33%

House rep - 0.15%

Pres. - 3.8%

In EC, how much power does each state have?

how much does each voter have?

→ Monte Carlo simulation