Let's elect a class president!

Julian	6	7	6
Lulu	4	8	7
Stef	10	1	5

Who wins?

Depends on voting method

VOTING PROCEDURES

Goal:

- to become familiar with different voting procedures

- to understand how different procedures can effect the outcome of elections

Most common method: Plurality (First Past the Post)

- Vote for 1st place only
- Candidates with most votes wins

* If there are many candidates, winner may have small percentage of total

Majority method

- vote for 1st place only
- winner must get 50% + 1

- may need multiple rounds

Borda's Method

- Point system : zero for last, +1 for each above
- Select 1st, 2nd, 3rd, ...
- most pts wins

Awards :
- Heisman
- MLB mvp

ex: 5 candidates

1st : 4 pts

2nd : 3 pts

3rd : 2 pts

4th : 1 pt

5th : 0

Condorcet's method

- Rank preference $(1^{st}, 2^{nd}, 3^{rd})$
- Head-to-Head-to-Head
- Data needs to be organized

* may not be a winner

if there is a winner should be satisfactory to majority

Elimination Method

- Rank preference (1^{st}, 2^{nd}, 3^{rd}, ...)
- Candidate with 50% + 1 first place votes wins
- If this doesn't happen candidate with fewest first place votes is eliminated, these votes go to the next preference
- Keep eliminating until there is a winner

Number of Voters	4	4	2	5	2
1st	C	C	U	S	S
2nd	U	S	S	C	U
3rd	S	U	C	U	C

Plurality: C - 8 ✓

U - 2

S - 7

Majority: $C - \frac{8}{8+2+7} = \frac{8}{17} \times 100\% = 47.1\%$ ✗

total first place votes

No winner

Borda:

$C = 2(8) + 1(5) + 0(4) = 21$ pts ✓

$U = 2(2) + 1(6) + 0(9) = 10$ pts

$S = 2(7) + 1(6) + 0(4) = 20$ pts

Condorcet:

C vs USA: 4+4+5 = 13, 2+2 = 4 ✓

C vs S: 4+4 = 8, 2+5+2 = 9 ✓

S vs USA: 4+5+2 = 11, 4+2 = 6 ✓

South America wins

Elimination:

Round 1 same as majority: no winner

Round 2: USA eliminated

$SA = \frac{7+2}{17} \times 100\% = 52.9\%$ ✓ (2 from USA)

SA wins

Number of voters who ranked candidates this way	650	485	370
1st Choice	Knights	Hawks	Stingers
2nd Choice	Hawks	Stingers	Hawks
3rd Choice	Stingers	Knights	Knights

Majority: $\frac{650}{650+485+370} \times 100\% = 42\%$ No winner

Plurality: Knights (650)

Borda: K = 2(650) + 1(0) + 0(485) + 0(370) = 1300

H = 2(485) + 1(650) + 1(370) + 0 = 1990

S = 2(370) + 1(485) + 0(650) = 1125

Condorcet:

H vs K: 485 + 370 = 855 | 650

H vs S: 650 + 485 = 1135 | 370

Hawks win

Elimination:

Round 2: Stingers eliminated (fewest 1st place votes)

370 votes go to Hawks

Hawks = $\frac{485+370}{650+485+370} \times 100\% = 56.8\%$

Hawks win

Number of voters who ranked candidates this way	12	8	7	4
1st Choice	Pizza	Cupcakes	Pizza	Ice Cream
2nd Choice	Cupcakes	Ice Cream	Ice Cream	Pizza
3rd Choice	Ice Cream	Pizza	Cupcakes	Cupcakes

Proportional Representation