

Voting Methods and Group Choice

Groups of Voters

	I	II	III	IV	V	VI
	(18)	(12)	(10)	(9)	(4)	(2)
candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

55 voters (of 6 types, I through VI) choose one winner from 5 candidates (A,B,C,D,E)

Ranked preferences are shown. 18 voters in Group I prefer A the most and B the least, etc.

All voters vote sincerely, i.e. without making any guesses about other voters' probably choices and so on.

Identical preferences, different rules → different winners

“Group choice,” “majority will,” etc. are fundamentally ambiguous

Rules matter.

Consider 6 different electoral rules.

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candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

1. Plurality: one vote per voter, most votes wins

18 votes for A
 12 votes for B
 10 votes for C
 9 votes for D
 6 votes for E

A wins

2. Plurality Top-2 Runoff: one vote per voter, two highest candidates advance to runoff round, most votes wins

18 votes for A
 12 votes for B
 10 votes for C
 9 votes for D
 6 votes for E

A and B advance to runoff round

18 votes for A
 37 votes for B

B wins

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candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

3. Sequential Runoff: one vote per voter, last place candidate eliminated, voting repeated until one candidate wins majority

Round 1: 18 A ; 12 B ; 10 C ; 9 D ; 6 E (E is eliminated)
 Round 2: 18 A ; 16 B ; 12 C ; 9 D (D is eliminated)
 Round 3: 18 A ; 16 B ; 21 C (B is eliminated)
 Round 4: 18 A ; 37 C (A is eliminated)

C wins

4. Borda Count: each voter *rank*s candidates. Points are awarded for ranking (e.g. 4 points for 1st place, 3 pts for 2nd place, ..., 0 pts for 5th place), winner is highest point getter.

A gets $18(4) + 12(0) + 10(0) + 9(0) + 4(0) + 2(0) = 72$
 B gets $18(0) + 12(4) + 10(3) + 9(1) + 4(3) + 2(1) = 101$
 C gets $18(1) + 12(1) + 10(4) + 9(3) + 4(1) + 2(3) = 107$
 D gets $18(3) + 12(2) + 10(1) + 9(4) + 4(2) + 2(2) = \mathbf{136}$
 E gets $18(2) + 12(3) + 10(2) + 9(2) + 4(4) + 2(4) = 134$

D wins

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	(18)	(12)	(10)	(9)	(4)	(2)
candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

5. Condorcet Winner: winner is any candidate that beats all others in pairwise (head-to-head) votes (if such a winner exists)

A loses to B (18-37) → not A

B beats A (37-18)
B loses to C (39-16) → not B

C beats A (37-18)
C beats B (39-16)
C loses to D (12-43) → not C

D beats A (37-18)
D beats B (29-26)
D beats C (43-12)
D loses to E (27-28) → not D

E beats A (37-18)
E beats B (33-22)
E beats C (36-19)
E beats D (28-27) → E wins

E wins

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candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

6. Approval Voting: every voter selects as many candidates as meet his approval (from 0-5 candidates), candidate with most approval votes wins

Vertical lines show cutoff between approval and disapproval.

a)

	I	II	III	IV	V	VI
	(18)	(12)	(10)	(9)	(4)	(2)
candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

A wins

b)

	I	II	III	IV	V	VI
	(18)	(12)	(10)	(9)	(4)	(2)
candidates	A	B	C	D	E	E
	D	E	B	C	B	C
	E	D	E	E	D	D
	C	C	D	B	C	B
	B	A	A	A	A	A

B wins

etc.

Any candidate can win under approval voting