

Comparing Ways of Obtaining Candidate Orderings from Approval Ballots

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Input: Approval preferences

	Ann	Bob	Cora	Dan
4 ×	✓	✓		✓
4 ×	✓	✓		
3 ×	✓			✓
1 ×	✓	✓	✓	
1 ×		✓	✓	

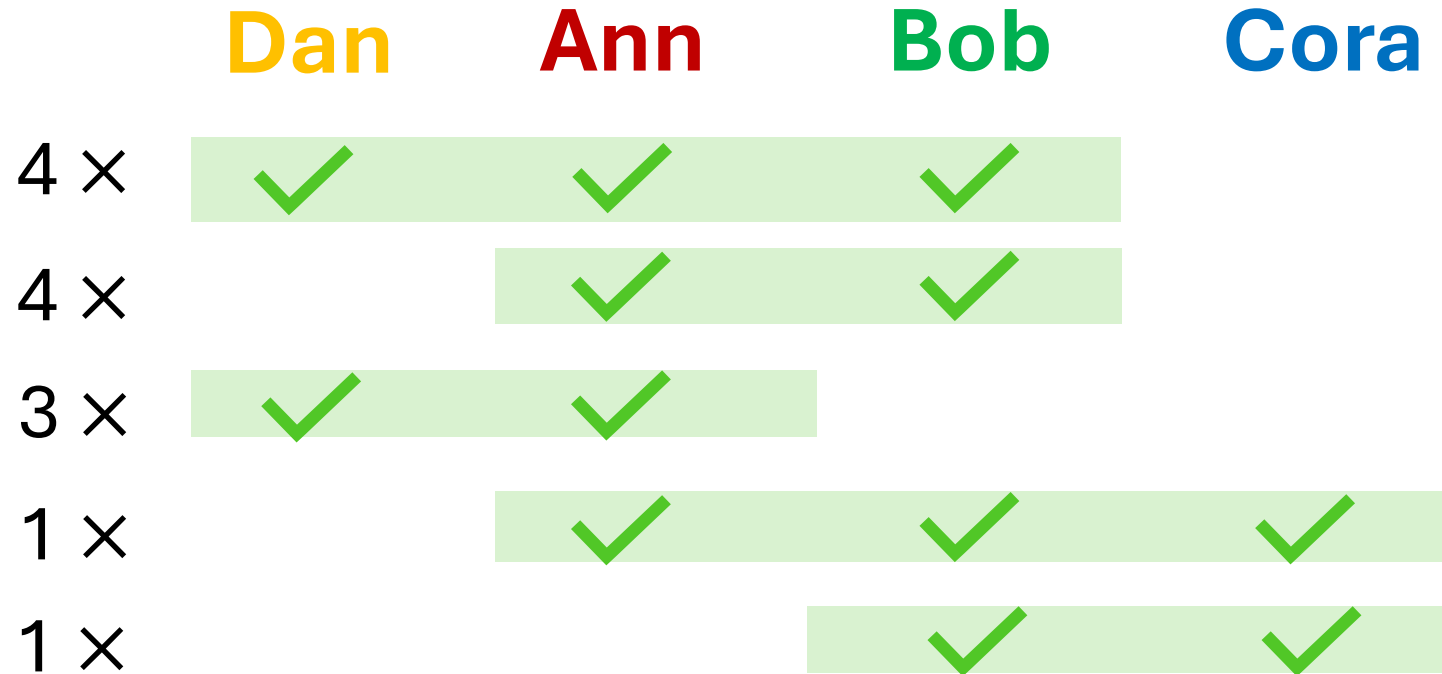
Goal: Finding a good *candidate ordering*



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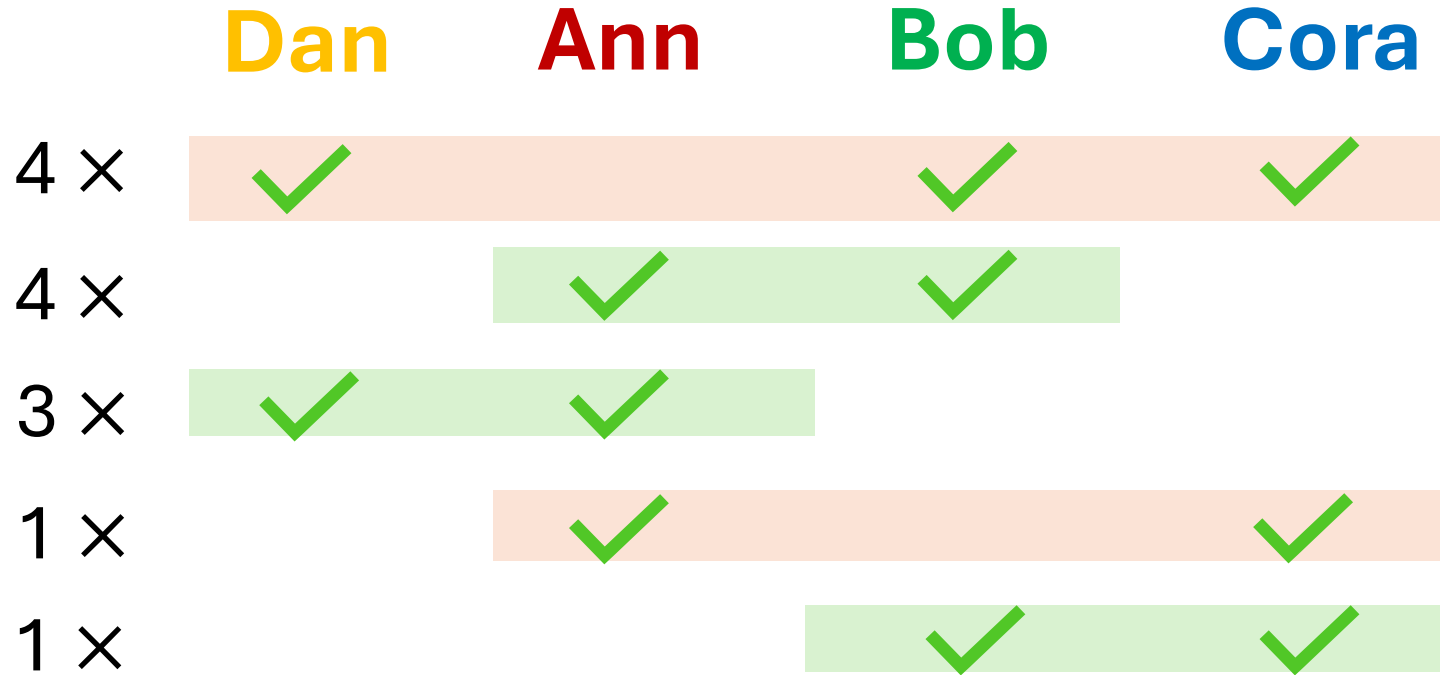
Easy case: Candidate interval (CI) property



Candidate Interval (Elkind & Lackner, 2015)

Every ballot is an interval of the axis.

Real life: No “*perfect*” axis



What if **there is no ordering** that fits the preferences perfectly?

The simplest method: Voter Deletion

The optimal axis is the one for which **we need to delete the fewest voters** to satisfy the CI property



Cost = 4

Minimize the cost

We propose **five methods**

Voter Deletion

Ballot Completion

Forbidden Triples

Minimum Flips

Minimum Swaps

Come to the poster to discover all of them !

Question

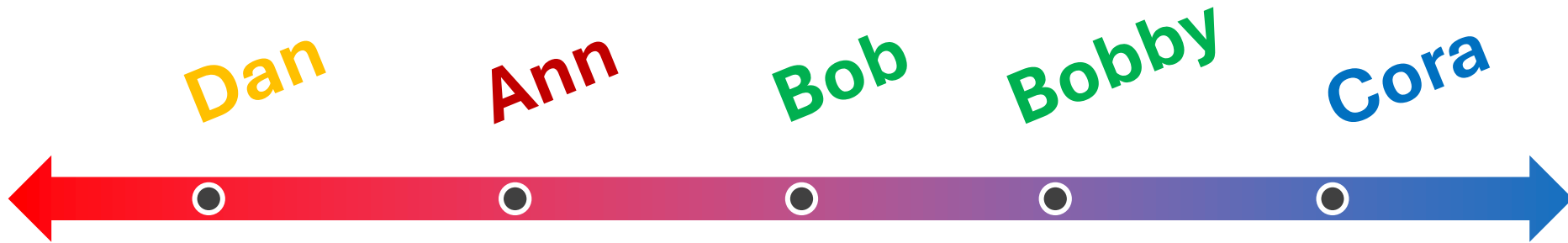
Which method should
we use?

Axiomatic & Experimental Analysis

Axiomatic Analysis

Clone Proximity

Clones should be next to each other on the axis (or separated by other clones)



(**Bob** and **Bobby** are clones if everyone who approves one also approves the other)

Axiomatic Analysis

Resistance to Cloning

The resulting axis should remain optimal we add or remove a clone of an existing candidate



Axiomatic Analysis

Impossibility Theorem

No axis scoring rule satisfies Clone Proximity and Resistance to Cloning

Characterization Theorem

Voter Deletion is the only axis scoring rule to satisfy
1. Resistance to Cloning and 2. Ballot Monotonicity

A lot of cool axioms in the poster
+ find out which methods satisfy which axioms!

Experimental Analysis

1D Euclidean + Noise
(Synthetic)



French voters preferences
(Real Data)



Supreme Court votes
(Real Data)



And much more

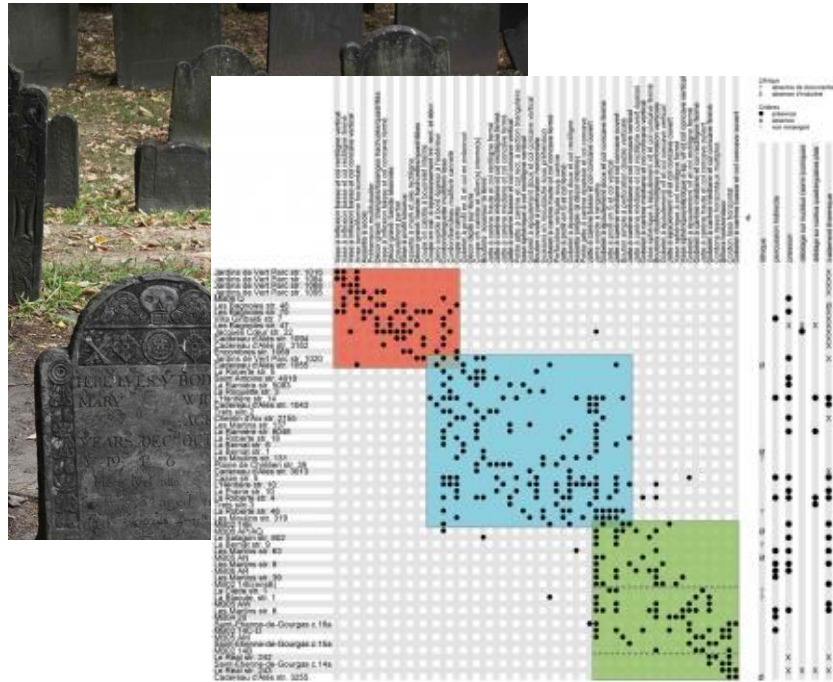
**STAR
WARS**

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Come to the poster for more details and to know the results!

Some other use cases



Seriation (Archeology)



Poster positions and scheduling

Thanks for your attention

Come to the poster :)