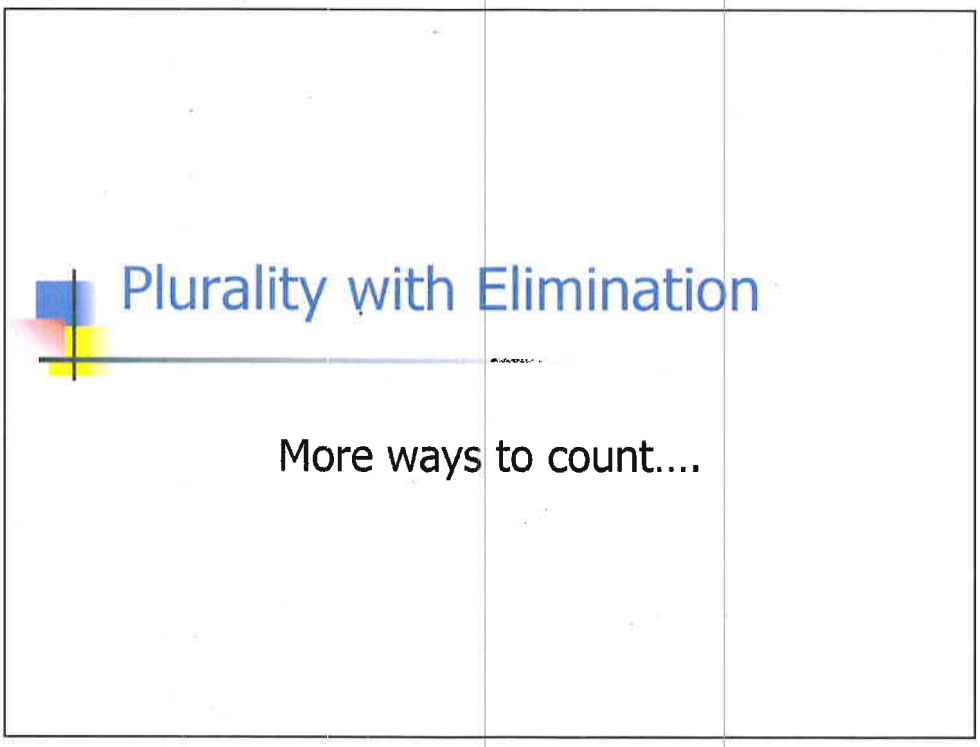
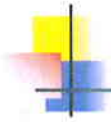


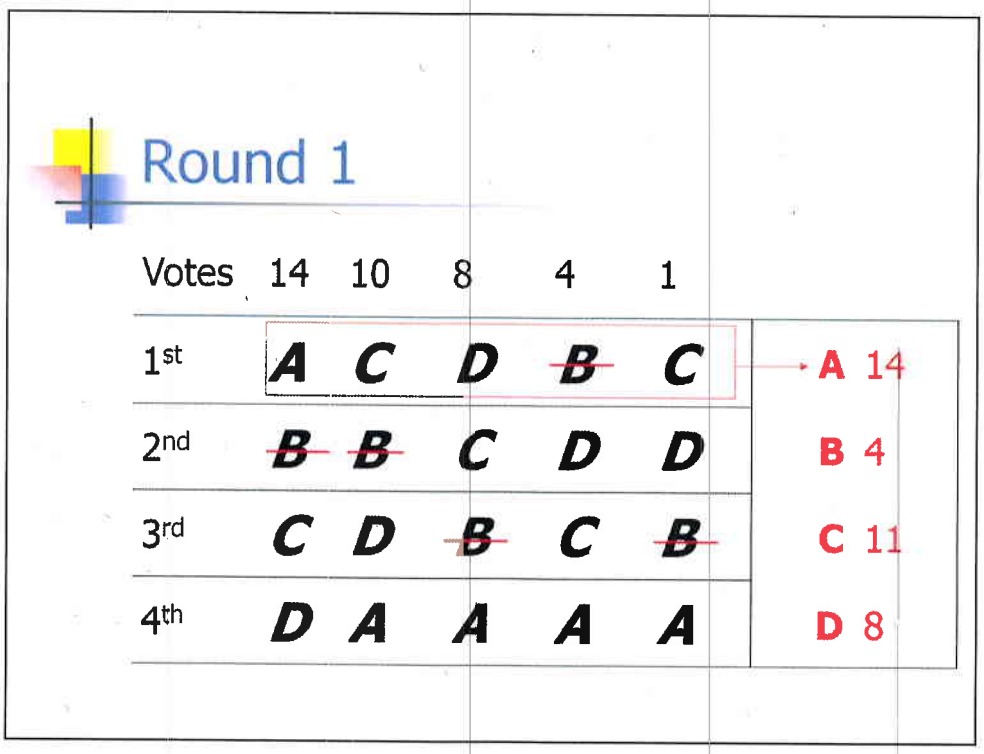
Chapter 1b.ppt



Plurality-with-Elimination

- Also called "Instant Runoff"
- Step 1: Count the first-place votes, just as you would in the plurality method. If a candidate has a majority, then that candidate is the winner. Otherwise, eliminate the candidate with the *fewest* first-place votes.

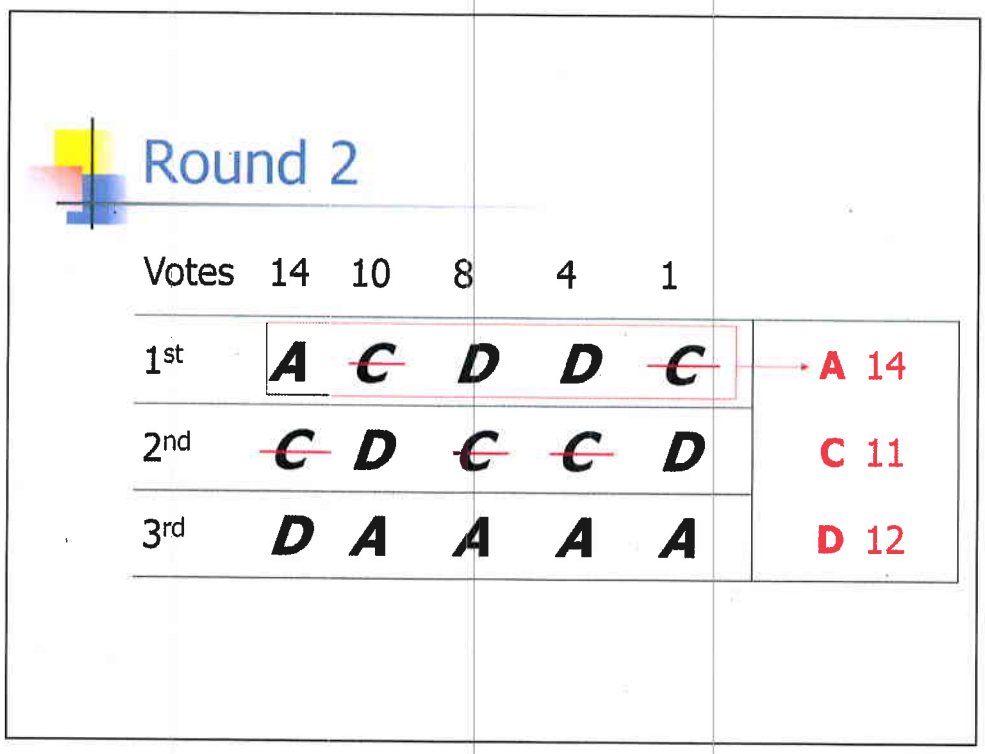
We work our way up to a majority….



How many voters? (37)

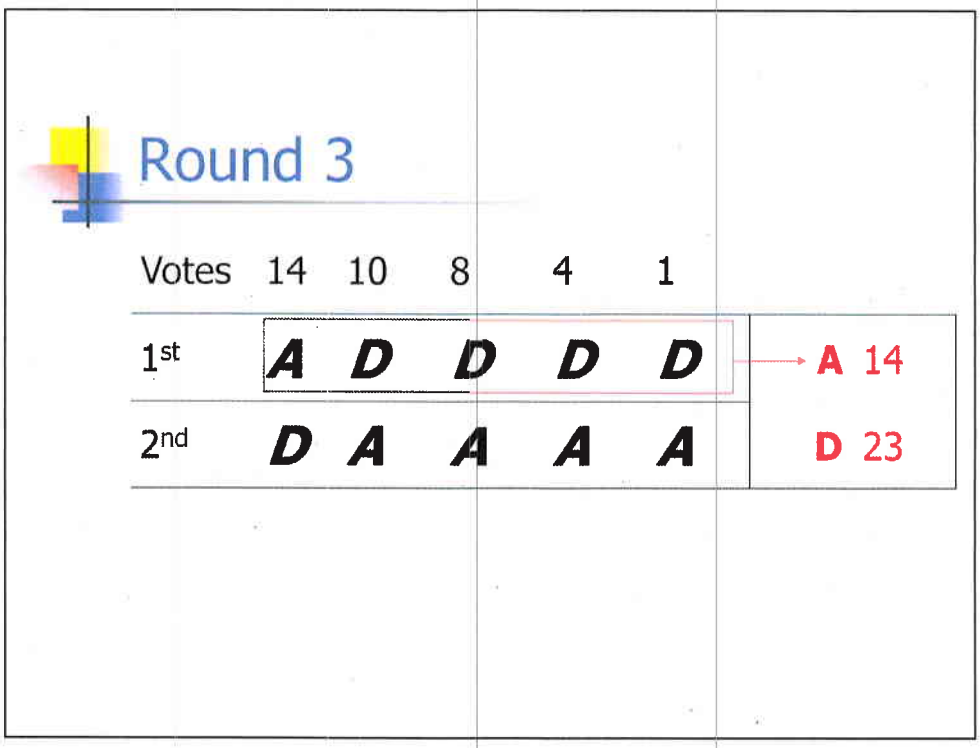
What is a majority? (19)

So no candidate has a majority, so we eliminate B who has thew fewest 1st place votes [automatic] and move the rest up. Remember, we can do that with a preference schedule.



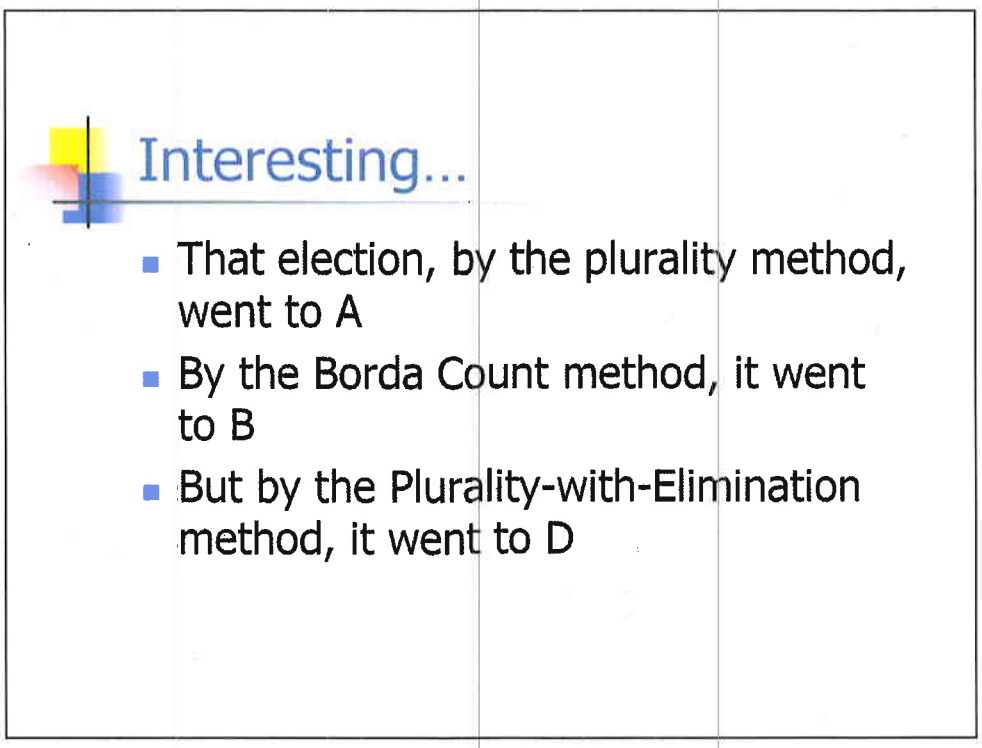
Still no majority. Whom do we eliminate? (C) ⌘ [automatic] and move everybody up.

⌘



D clearly has a majority, and thus D is the winner.

Interestingly enough---



By plurality A won,

But by Borda, it went to B,

And by Plurality with Elimination, it went to D.

Let's look at another that we have seen before....

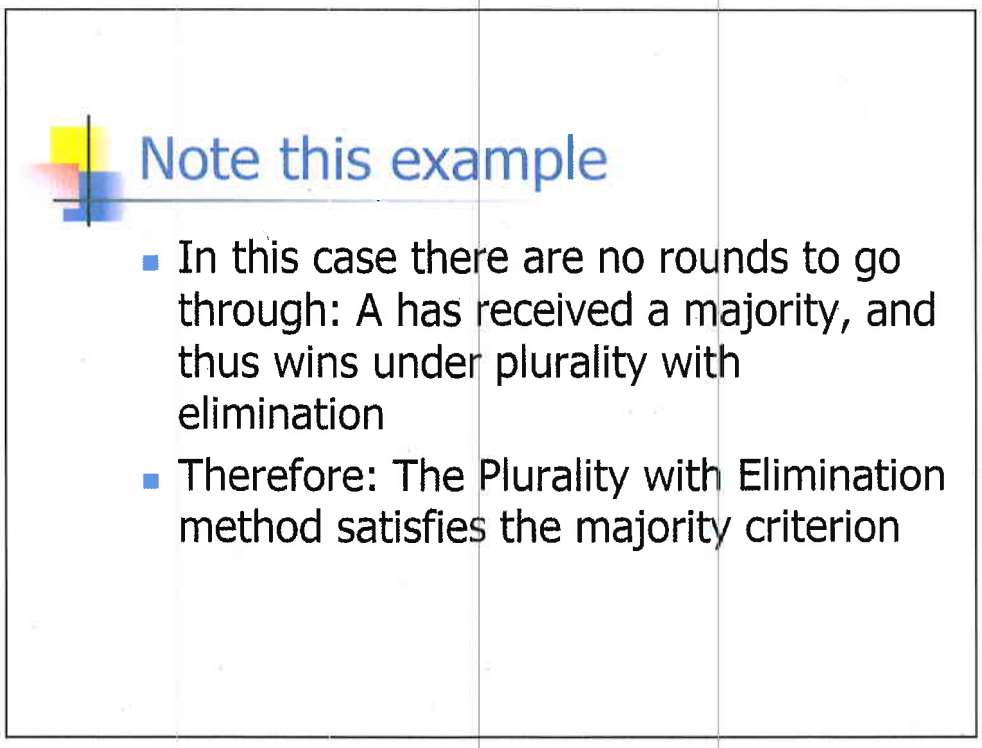
⌘

Note this example

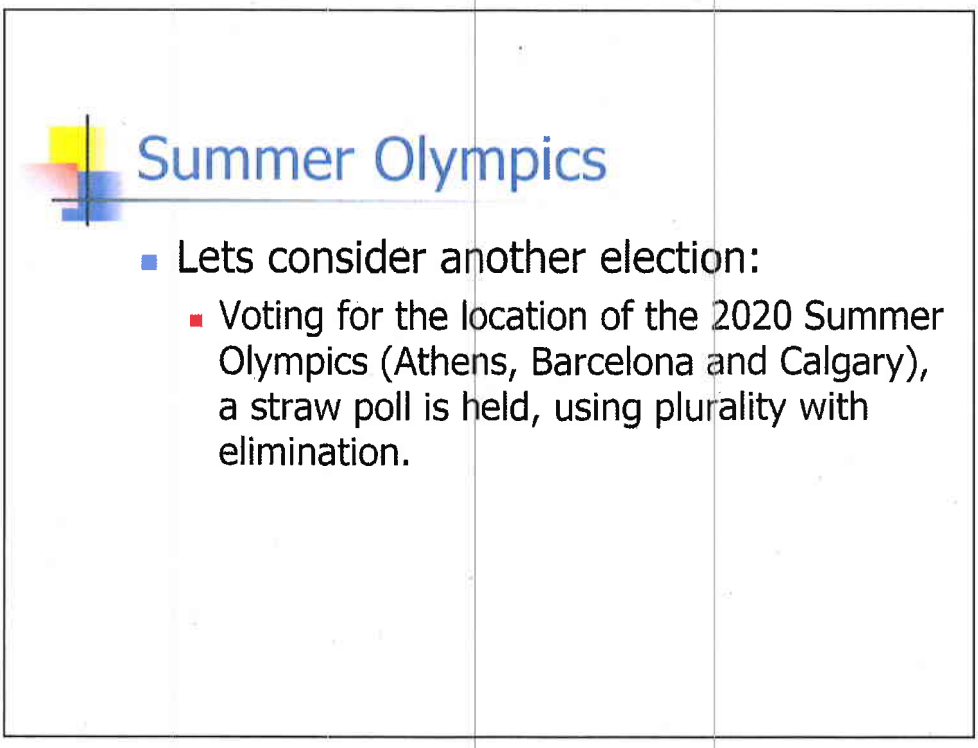
Votes:	6	2	3
1st	***A***	***B***	***C***
2nd	***B***	***C***	***D***
3rd	***C***	***D***	***B***
4th	***D***	***A***	***A***

Remember: under plurality, A won, and under Borda, B won, and A was the Condorcet candidate.

But note that A not only has a plurality, but also a majority, so by Plurality with elimination, we are done.



Important: Plurality with Elimination satisfies the majority criterion.



Often, when trying to settle something, a straw vote is held. It is not binding, but just lets everyone see where things are.

Olympics: Straw Poll 1

Votes:	7	8	10	4
1st	***A***	***B***	***C***	***A***
2nd	***B***	***C***	***A***	***C***
3rd	***C***	***A***	***B***	***B***

Ok. How many voters? (29)

What's a majority? (15)

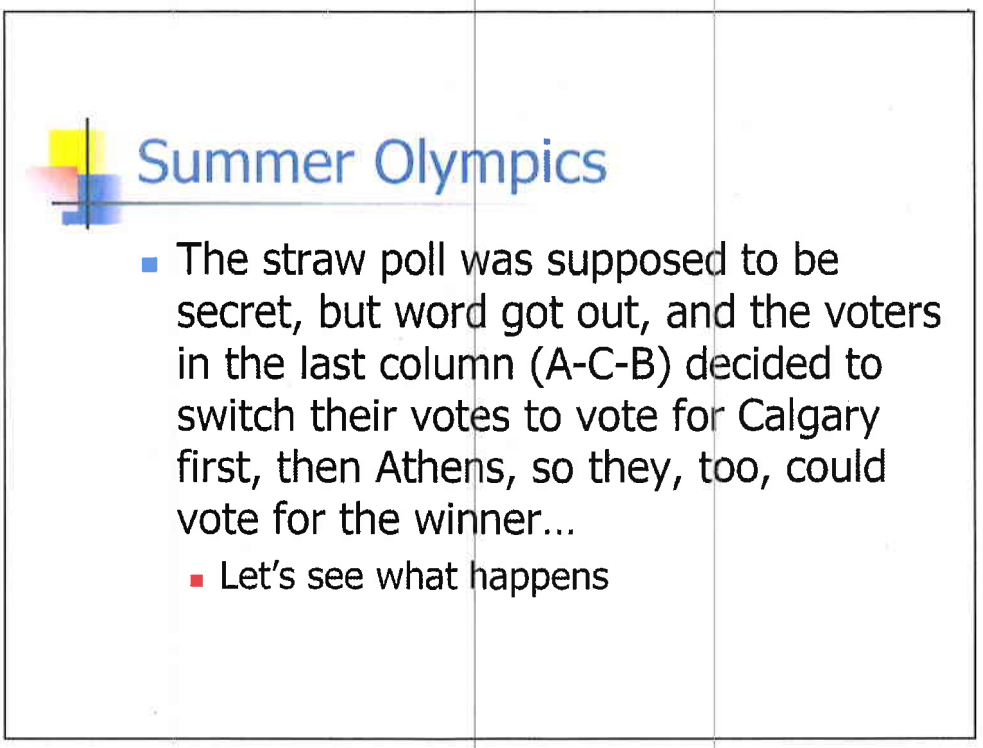
Whom do we eliminate? (Barcelona)

Olympics: Straw Poll 2

Votes:	7	8	10	4
1st	***A***	***C***	***C***	***A***
2nd	***C***	***A***	***A***	***C***

So Calgary is the winner of the straw poll

And Calgary, with 18, is the winner.



The straw poll was supposed to be secret, but word got out, and the voters in the last column (A-C-B) decided to switch their first and second place votes, so they, too, could vote for the winner…

Let's see what happens…

Olympics: Straw Vote

Votes:	7	8	10	4
1st	***A***	***B***	***C***	***A***
2nd	***B***	***C***	***A***	***C***
3rd	***C***	***A***	***B***	***B***

Here's the straw vote, so the last column people switch their votes…

Olympics: Final Vote 1

Votes:	7	8	10	4
1st	***A***	***B***	***C***	***C***
2nd	***B***	***C***	***A***	***A***
3rd	***C***	***A***	***B***	***B***

… note that the last 2 columns are now identical, so they can be combined for 14 votes….

Olympics: Final Vote 1

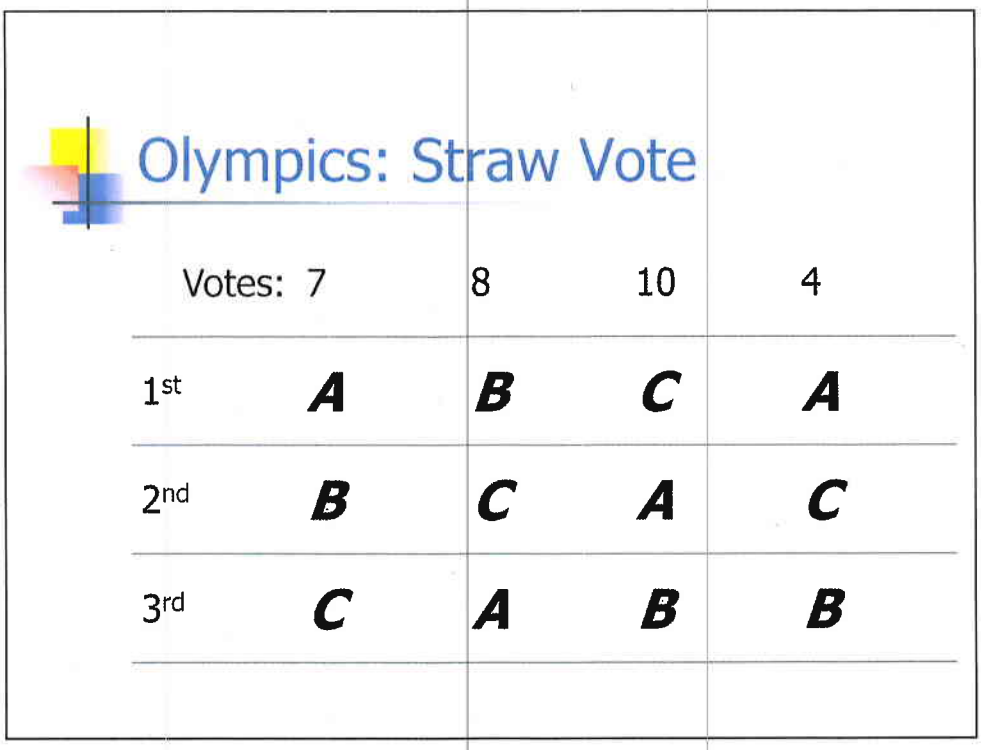
Votes:	7	8	14
1st	***A***	***B***	***C***
2nd	***B***	***C***	***A***
3rd	***C***	***A***	***B***

No majority, so we eliminate Athens, with only 7 first place votes…

And Barcelona wins.

WHAT? Whoa… how is that possible?

Let's recap.

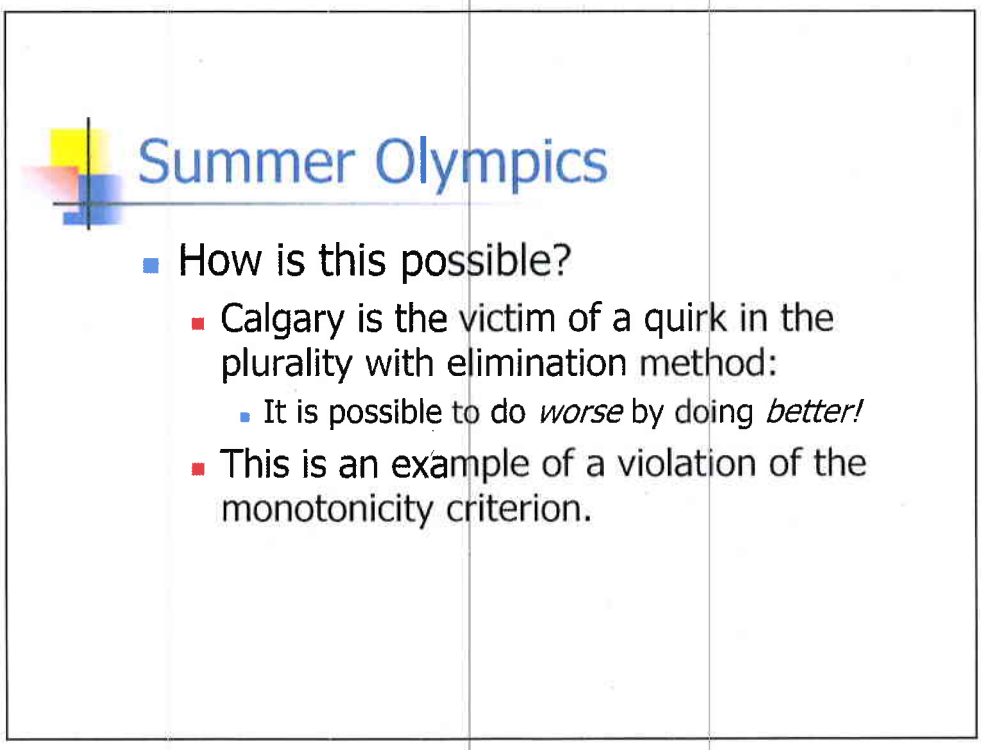


When the first vote was this, Calgary won…

Olympics: Final Vote

Votes:	7	8	10	4
1st	***A***	***B***	***C***	***C***
2nd	***B***	***C***	***A***	***A***
3rd	***C***	***A***	***B***	***B***

…but when Calgary had 2 additional 1st place votes, Barcelona won.

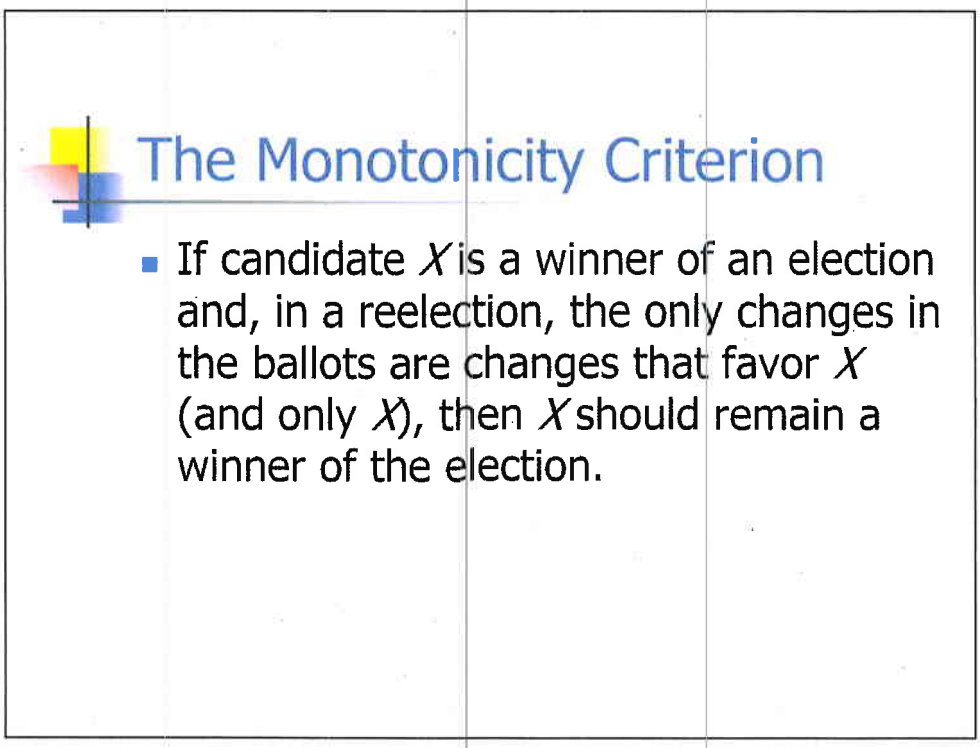


How is this possible?

Calgary is the victim of a quirk in the plurality with elimination method:

It is possible to do *worse* by doing *better!*

This is an example of a violation of the *monotonicity criterion.*



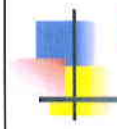
If candidate X is a winner of an election and, in a reelection, the only changes in the ballots are changes that favor X (and only X), then X should remain a winner of the election.

It would also be easy to come up with an example that shows that plurality-with-elimination can also violate the Condorcet criteria.

In spite of this, plurality with elimination is becoming more widely used....

Plurality with Elimination

- Used by:
  - Olympic Committee
  - San Francisco municipal elections
  - Burlington, VT municipal elections
  - Other US cities in process of adopting this
    - Berkeley, CA; Ferndale, MI…
  - Members of House of Representatives in Australia.



Pairwise Comparisons

or

Copeland's Method

One more method…

So far…

- The methods we have considered so far can violate the Condorcet Criterion
  - Plurality
  - Borda Count
  - Plurality with Elimination
- New method of pairwise comparisons satisfies the Condorcet criterion

All the methods we have considered so far can violate the Condorcet Criterion

- Plurality
- Borda Count
- Plurality with Elimination

The new method of pairwise comparisons satisfies the Condorcet criterion

⌘