Questions on Criteria

SOLUTIONS

Consider the following preference schedule :

2	1	2	1
A	X	Y	X
X	A	X	Z
Y	Z	Z	Y
Z	Y	A	A

1. If we were to conduct this election using a majority-fair method, what, if anything, would we know about the set of winners?

   nothing

2. If we were to conduct this election using a Smith-fair method, what, if anything, would we know about the set of winners?

   X:A 4:2 X:Z 6:0
   X:Y 4:2 X is Condorcet so W = {X}

3. If we were to conduct this election using a Pareto-efficient method, what, if anything, would we know about the set of winners?

   nothing

4. If we were to conduct this election using a unanimity-fair method, what, if anything, would we know about the set of winners?

   X:Z 6:0 so $Z \notin W$

5. Suppose we conduct the election using a method that satisfies the Independence of Irrelevant Comparisons criterion, and that W = { A }. If we use the same voting method to conduct the following elections, what would we know about the set of winners in each?

2	1	2	1
A	Y	Z	Y
Z	A	X	X
Y	X	Y	Z
X	Z	A	A

X + Y cross

nothing

2	1	2	1
A	X	Z	Y
Z	A	X	X
Y	Y	Y	Z
X	Z	A	A

$A \in W$

2	1	2	1
X	A	Y	X
Y	X	X	Z
A	Z	Z	A
Z	Y	A	Y

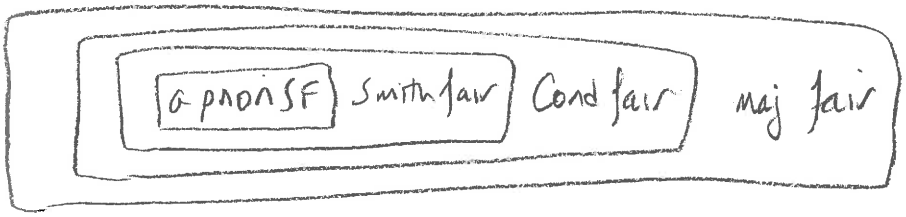
$Z \notin W$

2	1	2	1
X	Y	Y	X
Y	A	X	Z
A	Z	Z	A
Z	X	A	Y

X + Y cross

nothing

6. Before turning the page over, make a small version of the diagram showing how most of the criteria we've covered can be arranged as nesting subsets, just to test yourself on whether or not you know which criteria go where.



7. On the next page, put all the voting methods we've covered into the appropriate place on the diagram. Put ( ) around any method that is not unanimity-fair, and put a * next to any method that is monotonic.

Majority fair

Condorcet fair

Smith fair

a priori Smith fair

Beat path ★
Pairwise Comparison ★
(Sequential Comparison)
a priori SF Borda
a priori SF Plurality, elim, runoff

a posteriori SF Borda
a posteriori SF Plurality, elim, runoff

plurality ★
elimination
runoff

Borda ★
Coombs