Math 1116, Voting Activity, Fall 2014 Name KEY your #'s will vary

Instructions: Complete the preference ballot counts in the table below. Then use the numbers you come up with to count the ballot by each of the 4 methods we learned in class, and extend the rankings in each method. Then recast the ballot in a way that satisfied the conditions for the monotonicity criterion and see if you can get a violation. Finally, using the voting off method described in a handout to count the ballot and look for fairness violations in that method.

# of Voters	21	20	15	5	5
1st choice	A	B	D	B	D
2nd choice	C	D	C	A	C
3rd choice	D	C	A	D	B
4th choice	B	A	B	C	A

a) Plurality A=21 #2 B=25 D=20 #3 C=#4 B wins

b) w/elimination A=21 B=25 ~~C=6~~ #4 ~~D=20~~ #3 A wins

A=21+15 B=25+5 #2

condorcet violation

34 majority

IIA violation in plurality a/e

c) A-B 21+15 vs. 20+5+5 A A - 1 #3

A-C 21+5 vs. 20+15+5 C B - #4

A-D 21+5 vs. 20+15+5 D C - 11 #2

B-C 20+5 vs. 21+15+5 C D - 111 ← D wins

B-D 20+5 vs 21+15+5 D

C-D 21 vs. 20+15+5+5 D

paiwise

d) Borda count

A= 4(21) + 1(20) + 2(15) + 3(5) + 1(5) = 154 #3

B= 1(21) + 4(20) + 1(15) + 4(5) + 2(5) = 146 #4

C= 3(21) + 2(20) + 3(15) + 1(5) + 3(5) = 168 #2

D= 2(21) + 3(20) + 4(15) + 2(5) + 4(5) = 192 ← D wins

# of Voters	21	20	15	5	5
1st choice	A	B	D	B	C
2nd choice	C	D	C	A	D
3rd choice	D	C	A	D	B
4th choice	B	A	B	C	A

a) Plurality A=21 #2 B=25 C=5 #4 D=15 #3 B wins

b) w/elimination A=21 B=25 D=20 #3 C=#4 A wins

A=36 B=30 #2

c) paiwise

A-B 21+15 vs 20+5+5 A B-C 20+5 vs 21+15+5 C A-1 #3

A-C 21+5 vs. 20+15+5 C B-D 20+5 vs 21+15+5 D B- #4

A-D 21+5 vs 20+15+5 D C-D 21+5 vs. 20+15+5 D C-11 #2

D-111 ← D wins

d) Borda count

A= 4(21) + 1(20) + 2(15) + 3(5) + 1(5) = 154 #3

B= 1(21) + 4(20) + 1(15) + 4(5) + 2(5) = 146 #4

C= 3(21) + 2(20) + 3(15) + 1(5) + 4(5) = 173 #2

D= 2(21) + 3(20) + 4(15) + 2(5) + 3(5) = 187 ← D wins

Change in vote did not produce a monotonicity violation all voters the same

least favourites

1st A = 20+5=25 B = 21+15 = 36 C = 5 D = 0

B is least favourite → eliminate B

2nd A = 20+15+5 = 40 C = 5 D = 21

A is now least favourite → eliminate A

3rd C = 20+15+5+5 = 45 D = 21

C is least favourite → D wins

no violations this time

2nd version only last step changes to

C = 20+15+5 = 40 D = 21+5 = 26

C is least favourite → D wins

no violations this time