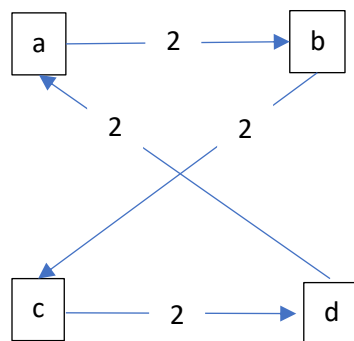Sean Lossef

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Intro to AI – Homework 2

Problem 1

1. Plurality(a) = 10
   Plurality(b) = 3
   Plurality(c) = 6
   Plurality(d) = 7
   Plurality Winner: (a)

2. Borda(a) = (2)(10) + 7 = 27
   Borda(b) = (2)(3) + 10 = 16
   Borda(c) = (2)(6) + 3 = 15
   Borda(d) = (2)(7) + 6 = 20
   Borda Winner: (a)

3. Veto(a) = 10 + 7 + 6 = 23
   Veto(b) = 10 + 7 + 3 = 20
   Veto(c) = 10 + 6 + 3 = 19
   Veto(d) = 7 + 6 + 3 = 16
   Veto Winner: (a)

4. In first round, b and c drop out (see problem 1)
   Round2(a) = 7
   Round2(d) = 6
   Plurality with Runoff Winner: (a)

5.

6. It's a tie between a,b,c,d each with 1 outgoing edge

Problem 2

Original profile:

A > B > C	C > A > B	B > C > A
27	42	24
A > C	**C > A**	**C > A**
27	42	24

Winner: C

First altered profile:

A > B > C	C > A > B	B > C > A
23	46	24
B > C	**C > B**	**B > C**
23	46	24

Winner: B

Although C > A > B got more votes, it changed the winner from C to B

Second altered profile:

A > B > C	C > A > B	B > C > A
23	42	24
B > C	**C > B**	**B > C**
23	42	24

Winner: B

Problem 3

In every election there is either an odd or even number of types of votes. In each vote, every player is either higher or lower than every other player. Therefore if there is an even number:

n = number of types of votes

n = 2k where k is some integer (since its even)

x = number of vote groups where a > b

n – x = number of vote groups where b > a

y = weight on edge in WMG

y = x – (n-x)

y = 2x + n

y = 2x + 2k

y = 2(x + k)

Therefore the edge weight has to be even.

Problem 4

C is weakly dominated by U

R is weakly dominated by M

D is weakly dominated by U

L is strictly dominated by M

The Nash Equilibrium is (U,M)

Problem 5

a. Bidder 2, 3, and 4 all have incentive to lie because they can raise their bid up to the price of the next bidder, raising the price that they have to pay for their ads.

b. Bidder 1: $9
   Bidder 2: $7
   Bidder 3: $1