Network 20q HW4

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1 Voting

1.1 Plurality voting

In plurality voting, only the first place of the positional voting counts, so in this voting 8/31 voters put A first, 12/31 put B first and 11 voters put C first. So the voting result is $B > C > A$.

1.2 Condorcet voting

While adapting this method, we need to count every validate pairwise comparison count, so for we could have the following counts:

Comparison Preference	Count
$A > B$	9+8+0 = 17
$B > A$	7+5+2 = 14
$A > C$	8+5+0 = 13
$C > A$	9+7+2 = 18
$B > C$	8+7+5 = 20
$C > B$	9+2+0 = 11

(1)

So we could get $A > B$,$C > A$ and $B > C$, then we could get a cycle as $A > B > C > A$.

1.3 Borda Count

In this method, every first place in the voting could get 2 points, second place could get 1 points, and the final result will be extracted from the points each candidates got.

Then $P_A = 9*1+8*2+7*0+5*1+2*0+0*2 = 30$, $P_B = 9*0+8*1+7*2+5*2+2*1+0*0 = 34$, $P_C = 9*2+8*0+7*1+5*0+2*2+0*1 = 29$. Because $P_B > P_A > P_C$, we could conclude that $B > A > C$.

2 Perturbing flipping behaviors

a. In the first graph, while we start with p(0) = 0.01, the line would perturb up to the next equilibrium, that is $\frac{1}{3}$ which meet with the 45-degree line. So $p_\infty = \frac{1}{3}$.

b. Under this condition, the equilibrium at 0 do not exist any more, but the line would still perturb up to the next equilibrium, that is $\frac{1}{3}$ which meet with the 45-degree line. So $p_\infty = \frac{1}{3}$

c. In this graph, the equilibrium at $\frac{1}{3} and \frac{2}{3}$ do not exist any more, so when flip up, the line would not encounter the 45-degree line until when $p = 1$. So $p_\infty = 1$.