# MATH 1300 - Nature of Mathematics <br> Spring 2014 

Assignment \#1
Due date: Wednesday, January 29

For problems $4,5,6$, and 7 include any intermediate work used to find the answer. If there are any ties, just report them. You don't need to break ties.

1. One snack will be served on the fan bus after the game. In order to decide what that snack will be, the fans are asked to rate their preferences among Nachos, Buffalo Wings, or Pickled Cauliflower. The ballots are as follows (where N stands for Nachos, W for Wings, and C for Cauliflower):

| N | C | C | W | C | N | W | W | N | N |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| W | N | N | N | N | W | N | C | W | W |
| C | W | W | C | W | C | C | N | C | C |
| W | N | W | N | W | W | N | C | W | W |
| N | W | C | W | C | N | W | N | C | N |
| C | C | N | C | N | C | C | W | N | C |

Write a preference schedule summarizing these ballots.
2. Explain what a Condorcet candidate is.
3. Explain what the Independence-of-Irrelevant-Alternatives criterion is and why we're talking about it in this chapter.

For problems 4 and 5 use the following preference schedule:

| Number of voters | $\mathbf{2 4}$ | $\mathbf{2 1}$ | $\mathbf{1 7}$ | $\mathbf{1 2}$ | $\mathbf{9}$ | $\mathbf{9}$ | $\mathbf{6}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1st | A | C | D | E | B | C | E |
| 2 nd | E | A | A | A | C | A | D |
| 3rd | C | D | E | B | A | B | C |
| 4th | D | E | B | C | E | E | A |
| 5th | B | B | C | D | D | D | B |

4. Find the winner and complete ranking using the Plurality method.
5. Find the winner and complete ranking using the Borda Count method.

For problems 6 and 7 use the following preference schedule:

| Number of voters | $\mathbf{3 0}$ | $\mathbf{2 9}$ | $\mathbf{2 2}$ | $\mathbf{1 5}$ | $\mathbf{1 1}$ | $\mathbf{8}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1st | A | B | D | D | B | C |
| 2nd | B | C | A | C | C | A |
| 3rd | C | D | C | B | A | D |
| 4th | D | A | B | A | D | B |

6. Find the winner and complete ranking using the Plurality-with-Elimination method.
7. Find the winner and complete ranking using the method of Pairwise Comparisons.
