

# Assignment 1

Due 9/18/17

2. Figure 9 shows the preference ballots for an election with 17 voters and 4 candidates. Write out the preference schedule for this election.

<b>Ballot</b> 1st <i>C</i> 2nd <i>A</i> 3rd <i>D</i> 4th <i>B</i>	<b>Ballot</b> 1st <i>B</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>A</i>	<b>Ballot</b> 1st <i>A</i> 2nd <i>D</i> 3rd <i>B</i> 4th <i>C</i>	<b>Ballot</b> 1st <i>C</i> 2nd <i>A</i> 3rd <i>D</i> 4th <i>B</i>	<b>Ballot</b> 1st <i>B</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>A</i>	
<b>Ballot</b> 1st <i>A</i> 2nd <i>D</i> 3rd <i>B</i> 4th <i>C</i>	<b>Ballot</b> 1st <i>A</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>B</i>	<b>Ballot</b> 1st <i>B</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>A</i>	<b>Ballot</b> 1st <i>B</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>A</i>	<b>Ballot</b> 1st <i>C</i> 2nd <i>A</i> 3rd <i>D</i> 4th <i>B</i>	<b>Ballot</b> 1st <i>C</i> 2nd <i>A</i> 3rd <i>D</i> 4th <i>B</i>
<b>Ballot</b> 1st <i>A</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>B</i>	<b>Ballot</b> 1st <i>A</i> 2nd <i>D</i> 3rd <i>B</i> 4th <i>C</i>	<b>Ballot</b> 1st <i>C</i> 2nd <i>A</i> 3rd <i>D</i> 4th <i>B</i>	<b>Ballot</b> 1st <i>B</i> 2nd <i>C</i> 3rd <i>D</i> 4th <i>A</i>	<b>Ballot</b> 1st <i>A</i> 2nd <i>D</i> 3rd <i>B</i> 4th <i>C</i>	<b>Ballot</b> 1st <i>C</i> 2nd <i>A</i> 3rd <i>D</i> 4th <i>B</i>

FIGURE 9

12. Table 32 shows the preference schedule for an election with four candidates (*A*, *B*, *C*, and *D*). Use the plurality method to
- find the winner of the election.
  - find the complete ranking of the candidates.

Number of voters	29	21	18	10	1
1st	<i>D</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>C</i>
2nd	<i>C</i>	<i>C</i>	<i>A</i>	<i>B</i>	<i>B</i>
3rd	<i>A</i>	<i>B</i>	<i>C</i>	<i>A</i>	<i>D</i>
4th	<i>B</i>	<i>D</i>	<i>D</i>	<i>D</i>	<i>A</i>

TABLE 32

42. Table 32 (see Exercise 12) shows the preference schedule for an election with four candidates (*A*, *B*, *C*, and *D*). Use the method of pairwise comparisons to
- find the winner of the election.
  - find the complete ranking of the candidates.

61. **Two-candidate elections.** Explain why when there are only two candidates, the four voting methods we discussed in this chapter give the same winner and the winner is determined by straight majority. (Assume that there are no ties.)

8. The student body at Eureka High School is having an election for Homecoming Queen. The candidates are Alicia, Brandy, Cleo, and Dionne (*A*, *B*, *C*, and *D* for short). Table 30 shows the preference schedule for the election.

Number of voters	202	160	153	145	125	110	108	102	55
1st	<i>B</i>	<i>C</i>	<i>A</i>	<i>D</i>	<i>D</i>	<i>C</i>	<i>B</i>	<i>A</i>	<i>A</i>
2nd	<i>D</i>	<i>B</i>	<i>C</i>	<i>B</i>	<i>A</i>	<i>A</i>	<i>C</i>	<i>B</i>	<i>D</i>
3rd	<i>A</i>	<i>A</i>	<i>B</i>	<i>A</i>	<i>C</i>	<i>D</i>	<i>A</i>	<i>D</i>	<i>C</i>
4th	<i>C</i>	<i>D</i>	<i>D</i>	<i>C</i>	<i>B</i>	<i>B</i>	<i>D</i>	<i>C</i>	<i>B</i>

TABLE 30

- How many students voted in this election?
- How many first-place votes are needed for a majority?
- Which candidate had the fewest last-place votes?

22. Table 32 (see Exercise 12) shows the preference schedule for an election with four candidates (*A*, *B*, *C*, and *D*). Use the Borda count method to
- find the winner of the election.
  - find the complete ranking of the candidates.

32. Table 32 (see Exercise 12) shows the preference schedule for an election with four candidates (*A*, *B*, *C*, and *D*). Use the plurality-with-elimination method to
- find the winner of the election.
  - find the complete ranking of the candidates.

52. Use Table 32 to illustrate why the plurality-with-elimination method violates the Condorcet criterion.