Voting Activity (Summer, 2019)

Prepared by:

Joseph Malkevitch
Mathematics Department
York College (CUNY)
Jamaica, NY 11451

email:

malkevitch@york.cuny.edu

web page:

http://york.cuny.edu

Exactly 100 voters have produced secret preferential ballots. A preferential or ordinal ballot is one where the voter ranks all the candidates from best to worst, with or without being able to put two (or more) candidates at the same level (ties). There are many notations to indicate preferential ballot information but below a system will be used where the information is displayed in a single horizontal line.

Candidate names are denoted with capital letters of the alphabet, where for this initial discussion we have three candidates X, Y, and Z.. X>Y means that X is strictly preferred to Y, but the voter does not include Z either because the voter does not know anything about that candidate or perhaps because the voters is being "strategic," and does not want to give support one way or the other regarding how X and Y compare with Z. (Such a ballot is sometimes called a truncated ballot.)

X=Z>Y means that Z and X are viewed as being equally "attractive" while each of X and Z is preferred to Y.

Tabulated result of an election with 100 voters and 4 candidates (choices), A, B, C, and D are shown:

Election 1:

51 votes A>B>C>D
49 votes B>C>D>A

Question 1:

If a single winner is to chosen who should that single winner be? What principles did you use in arriving at the answer? Can you formulate a method of deciding elections that would apply to any collection of ranked ballots that might have been submitted to the "board of elections?"

Question 2:

Can you rank the 4 candidates (perhaps with ties) based on the 100 ballots?

Question 3:

Apply the method you developed for Questions 1 and 2 for these two elections:

Election 2:

51 votes A>B>C>D
49 votes B>C>D>A
1 vote   C>B>D>A
1 vote   D>B>C>A

Election 3:

52 votes A>B>C>D
49 votes B>C>D>A
1 vote   C>B>D>A
1 vote   D>B>C>A

Question 4

Does comparing the results for Elections 1 -3 make you think that some "other method" might be better for all of these elections?