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CSC 375

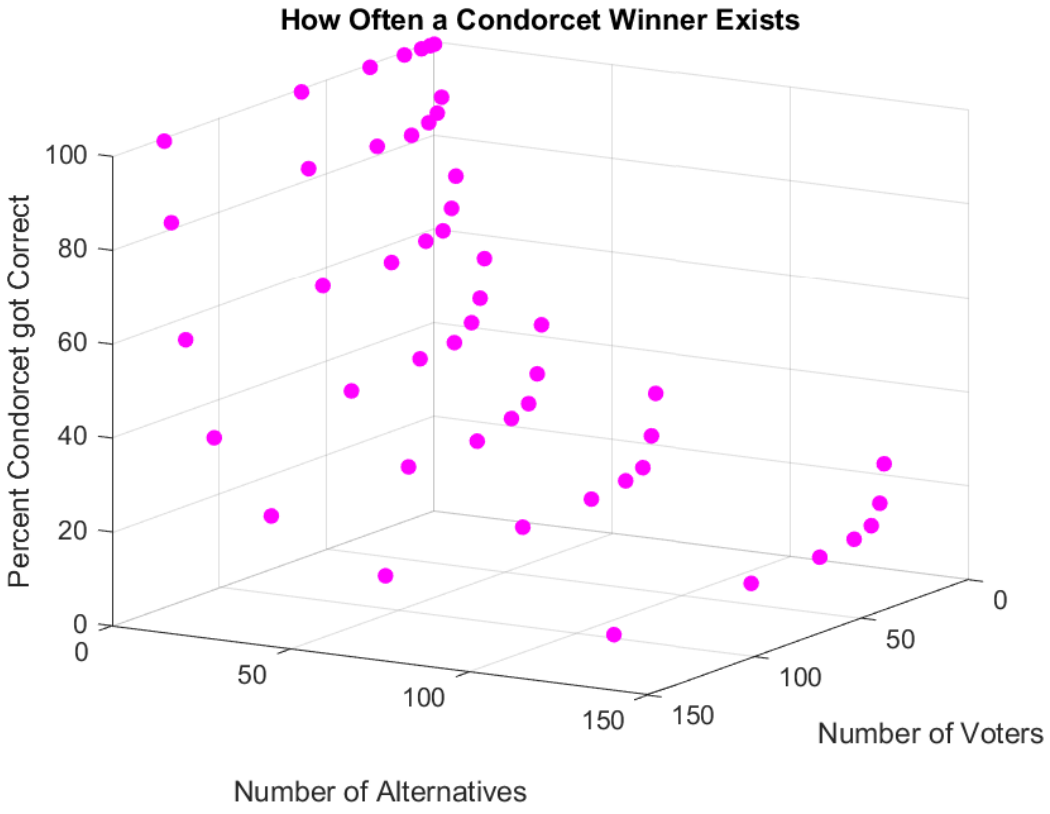
Project 1

Single-Voter Implementation

Evaluating Single-Voter Systems

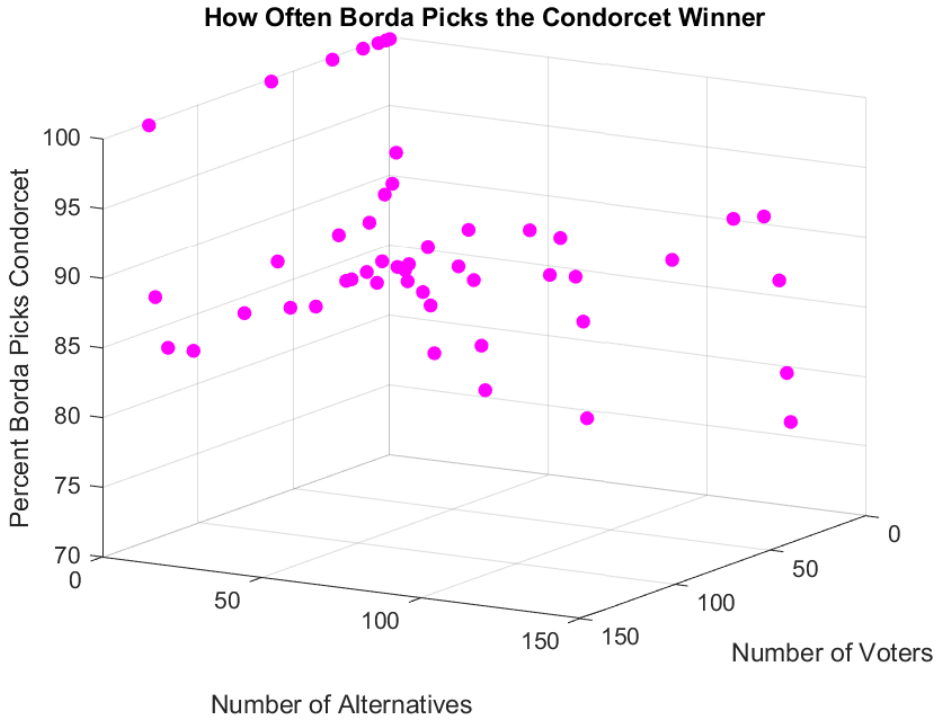
The following simulations of voting systems were developed using impartial culture for 2,4,8,16,32,64, and 128 alternatives and 3,5,9,17,33,65, and 129 voters. Each combination was simulated 10,000 times for each voting system. The following graphs were created in MATLAB based on data generated in Python.

Evaluating When the Condorcet Winner Exists

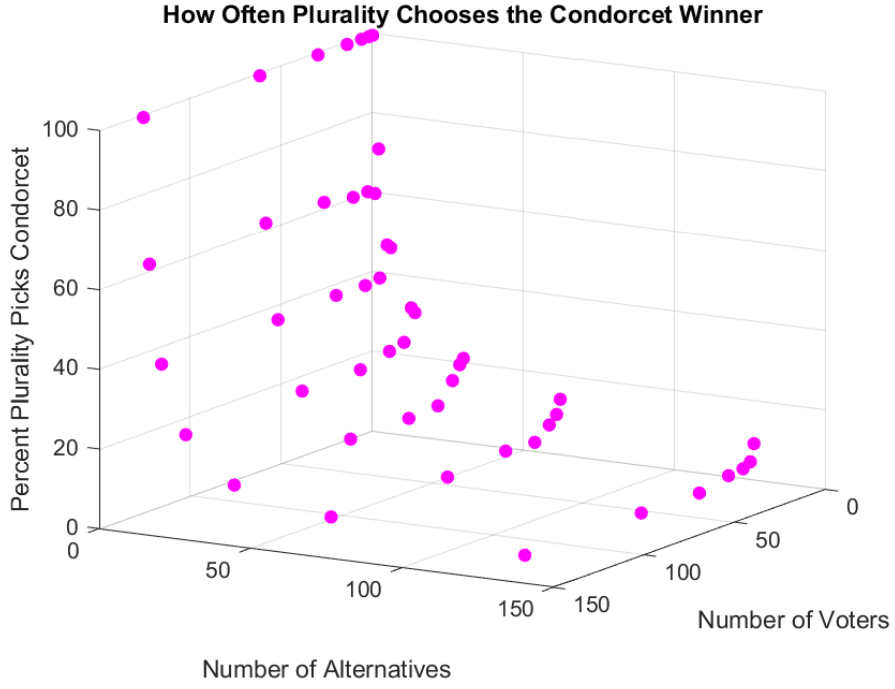


The image above showcases the percentage of simulations that a Condorcet winner exists.

Graphs of When a Condorcet Winner Exists

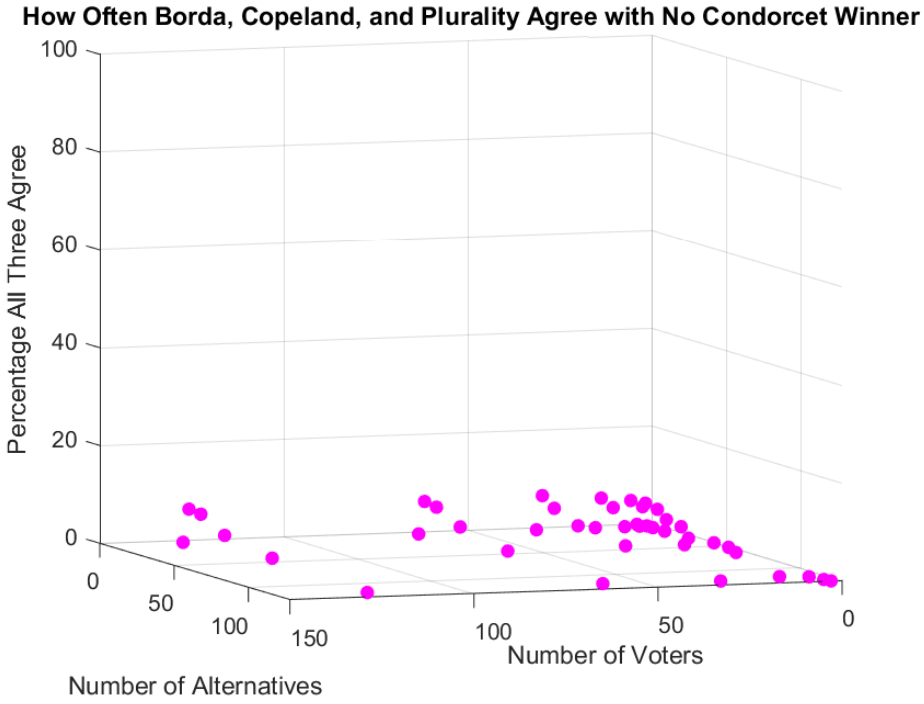


The image above showcases the percentage of simulations that Borda picks the Condorcet winner. Note too that Borda is not a Condorcet-efficient voting system.

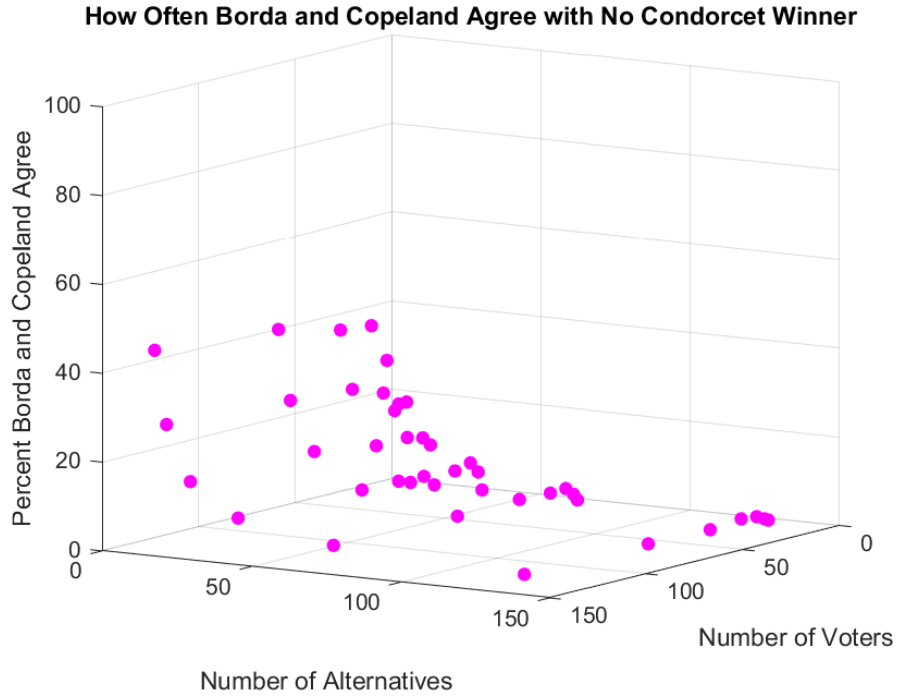


The above graph showcases the percentage of simulations that the Plurality voting system chooses the Condorcet winner as a function of the number of voters and the number of alternatives.

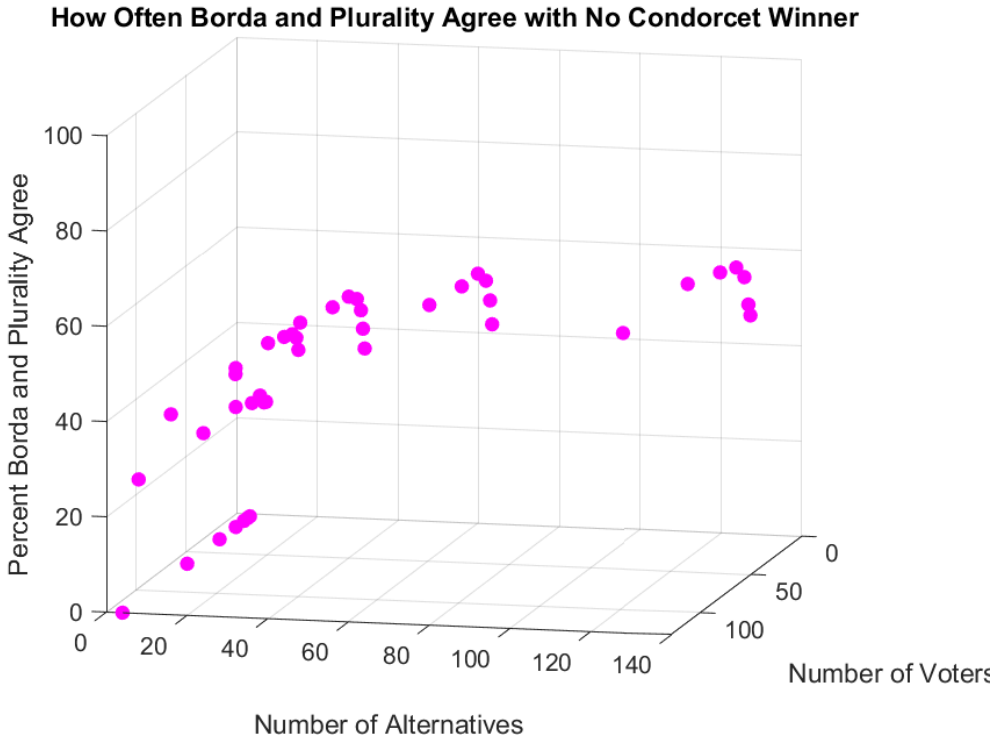
Graphs of When a Condorcet Winner Does Not Exist



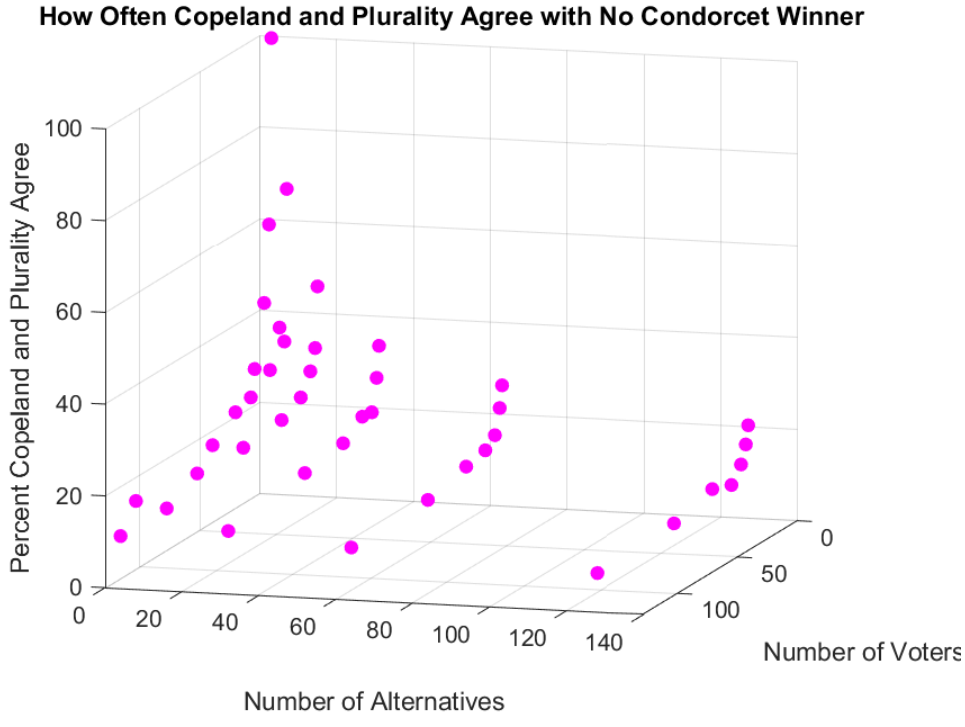
The image above showcases the percentage of simulations that Borda, Copeland, and Plurality all pick the same winner when the Condorcet winner does not exist.



The graph above showcases the percentage of simulations that Borda and Copeland agree when there is not Condorcet winner.



The image above shows the percentage of simulations that the Borda and Plurality voting systems select the same candidate when there is no Condorcet winner.



The image above shows the percentage of simulations that the Copeland and Plurality voting systems agree with no Condorcet winner.