# **M2 - Big Data Management and Analytics**

### **Decision Modelling – Practical 3 – Voting Rules in Python**

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This document adds some comments to the code of the practical works.

Some comments about the input file:

* It is a .csv file.
* The total number of candidates that contend in the elections are m.
* The total number of voters that vote in the elections are n.
* Thus, each row is of the form: Total Voters following a preference followed by their preference order.
  + Voters, Preference\_1, Preference\_2, …. Preference\_m
  + Example:

[Voters, Preference\_1, Preference\_2, Preference\_3, Preference\_4

6, a, b, c, d

4, b, c, a, d

5, c, d, a, b

7, d, c, a, b]

Approach:

* SimpleMajorityRulefor2
  + In case of this, the required result is a simple majority between two candidates a and b, without considering the other candidates voting preferences.
  + In our solution, we have generalised this by inputting any two candidates of the election and not checking the absolute majority (i.e., should be more than 50% of the votes), instead we check the majority as per the total votes received as per the voting preferences.
  + Also, in case of ties, in our solution, whoever be the candidate a is selected.
* In case of other voting functions – Plurality and BordaVoting, for ties, the winner is selected randomly. Also, all of these functions have only one round.
* For PluralityRunOff, again for ties, the winner is randomly selected. For this function, two rounds are implemented.
* In case of CordocetVoting, only one round is implemented, and the case when there’s is no winner is also handled.

The same is summarized in the table below (Table 1).

*Table 1: Summary of Voting Rules and implementation details*

|  |  |  |
| --- | --- | --- |
| **Voting Rule** | **Ties** | **Rounds** |
| 1. SimpleMajorityRulefor2 | Candidate A (first candidate) | 1 |
| 1. Plurality | Random Selection | 1 |
| 1. PluralityRunOff | Random Selection | 2 |
| 1. CordocetVoting | No ties – since, winner is unique | 1 |
| 1. BordaVoting | Random Selection | 1 |