Voting, Ranking, and Preference Models

By Carolina Sawyer

Michael Pearce (Mentor)

What is Preference Data?

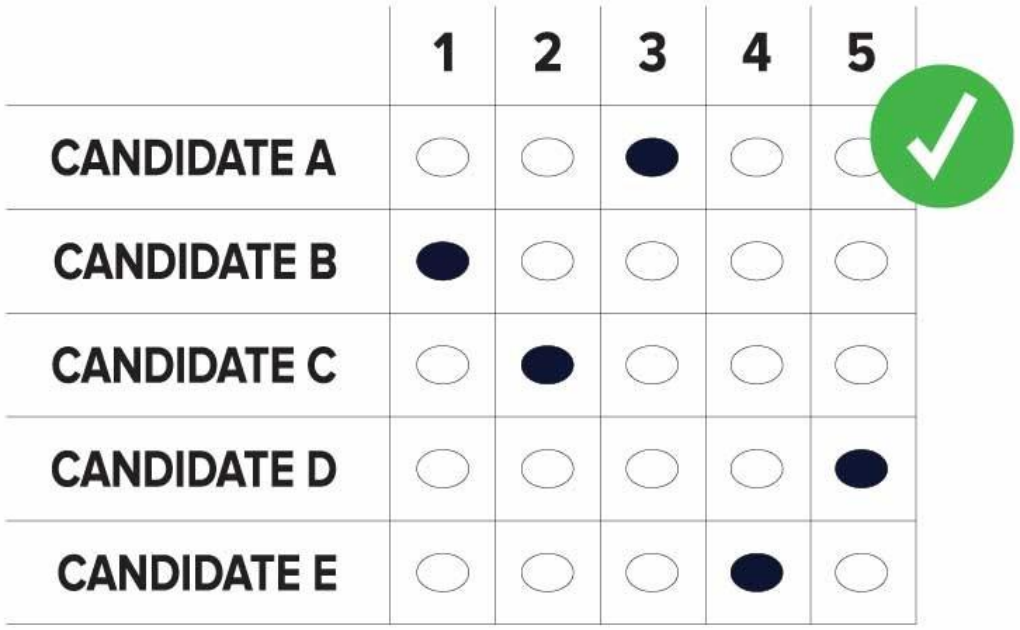
Voting systems

Search algorithms

Recommender systems

Voting Systems

- Plurality/Majority
  - Single-member district plurality
- Proportional Representation
  - Single-transferrable vote
- Semi-Proportional Representation



	1	2	3	4	5
CANDIDATE A	○	○	●	○	○
CANDIDATE B	●	○	○	○	○
CANDIDATE C	○	●	○	○	○
CANDIDATE D	○	○	○	○	●
CANDIDATE E	○	○	○	●	○

https://www1.nyc.gov/site/civicengagement/voting/ranked-choice-voting.page

Measuring Rank Distances

- Kendall Distance
  - Number of adjacent swaps
- Hamming Distance
  - Number of different positions
- Spearman's Footrule
  - Sum of difference between objects

Judge A

1	2	3	4

Judge B

3	2	4	1

Ranking Models

- Plackett-Luce
  - Describes likelihood of an object being picked
  - Consensus ranking formed with model's coefficients
- Mallows
  - Provides a consensus ranking and theta value
  - Theta value describes the strength of consensus within the group

Demo!