

Preference Aggregation by Voting: Algorithmics and Complexity

Präferenzaggregation durch Wählen: Algorithmik und Komplexität

Pingo

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Website

<https://pingo.coactum.de/>

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Question 1

In unpriced, unweighted bribery: Which candidate can be made a Bucklin winner by a briber with budget 1?

<i>A</i>	<i>D</i>	<i>C</i>	<i>B</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>B</i>	<i>D</i>	<i>A</i>	<i>C</i>
<i>A</i>	<i>C</i>	<i>D</i>	<i>B</i>
<i>A</i>	<i>C</i>	<i>B</i>	<i>D</i>

A *A*

B *B*

C *C*

D *D*

Question 2

In unpriced, unweighted bribery: Which candidate can be made a **Borda** winner by a briber with budget 1?

<i>A</i>	<i>D</i>	<i>C</i>	<i>B</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>B</i>	<i>D</i>	<i>A</i>	<i>C</i>
<i>A</i>	<i>C</i>	<i>D</i>	<i>B</i>
<i>A</i>	<i>C</i>	<i>B</i>	<i>D</i>

- A *A* (currently 10 points)
- B *B* (currently 6 points)
- C *C* (currently 11 points)
- D *D* (currently 9 points)

Question 3

In swap bribery (each swap costs 1): Which candidate can be made the **unique Copeland** winner by a briber with budget 1?

<i>A</i>	<i>D</i>	<i>C</i>	<i>B</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>B</i>	<i>D</i>	<i>A</i>	<i>C</i>
<i>A</i>	<i>C</i>	<i>D</i>	<i>B</i>
<i>A</i>	<i>C</i>	<i>B</i>	<i>D</i>

- A *A* (currently 2 points)
- B *B* (currently 0.5 points)
- C *C* (currently 2 points)
- D *D* (currently 1.5 points)

Question 4

In priced, unweighted bribery (odd voters cost 1; even voters 2):
Who can be bribed (budget 1) to make *A* the unique Bucklin winner?

<i>A</i>	<i>D</i>	<i>C</i>	<i>B</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>B</i>	<i>D</i>	<i>A</i>	<i>C</i>
<i>A</i>	<i>C</i>	<i>D</i>	<i>B</i>
<i>A</i>	<i>C</i>	<i>B</i>	<i>D</i>

- A** The first voter.
- B** The second voter.
- C** The third voter.
- D** The fourth voter.

Question 5

In swap bribery (each swap costs 1): Which candidate can be made the **Condorcet** winner by bribing with a budget of 2?

<i>A</i>	<i>D</i>	<i>C</i>	<i>B</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>C</i>	<i>D</i>	<i>B</i>	<i>A</i>
<i>B</i>	<i>D</i>	<i>A</i>	<i>C</i>
<i>A</i>	<i>C</i>	<i>D</i>	<i>B</i>
<i>A</i>	<i>C</i>	<i>B</i>	<i>D</i>

- A *A* (currently defeats *C*, ties *B* and *D*)
- B None of them
- C *C* (currently defeats *B* and *D*)
- D *D* (currently defeats *B*, ties *A*)

Question 6

Which of the following relations is provably true for each voting rule?

- A $\text{BRIBERY} \leq_m^p \BRIBERY
- B $\text{WEIGHTED-BRIBERY} \leq_m^p \text{BRIBERY}$
- C $\text{BRIBERY} \leq_m^p \text{WEIGHTED-BRIBERY}$
- D $\text{WEIGHTED-BRIBERY} \leq_m^p \BRIBERY

Question 7

Which of the following relations is provably true for each voting rule?

A $\$BRIBERY \leq_m^p CCM$

B $CCM \leq_m^p \$BRIBERY$

C $WEIGHTED-\$BRIBERY \leq_m^p CCWM$

D $CCWM \leq_m^p WEIGHTED-\$BRIBERY$

Question 8

Assuming $P \neq NP$, BRIBERY is NP-complete for ...

- A ... plurality.
- B ... veto.
- C ... Borda.
- D ... Bucklin.

Question 9

Compulsory vaccination against Covid-19 should be applied in Germany to ...

- A ... everyone.
- B ... everyone of age 18 or older.
- C ... everyone of age 50 or older.
- D ... no one.