

Preference Aggregation by Voting: Algorithmics and Complexity

Präferenzaggregation durch Wählen: Algorithmik und Komplexität

Pingo

Wintersemester 2020/2021

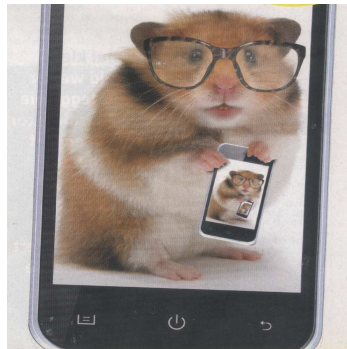
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Question 1

In **Approval voting**, every voter approves of (gives 1 point to) or disapproves of (gives 0 points to) each candidate. Whoever has the most approvals wins.

- A No election has more than one approval winner
- B Approval voting is a voiced voting system
- C Approval voting satisfies Unique-WARP
- D Approval voting is susceptible to constructive control by adding candidates

Question 2

	a	b	c
$v_1, \dots, v_4$:	0	0	1
v_5, v_6, v_7 :	1	0	0
v_8, v_9, v_{10} :	0	1	0

Is it possible to partition $V = \{v_1, \dots, v_{10}\}$ into V_1 and V_2 such that when in the TP model the approval winners of (C, V_1) and (C, V_2) run against each other, **c** is not the unique approval winner?

- A Yes, with $V_1 = \{v_1, \dots, v_7\}$ and $V_2 = \{v_8, v_9, v_{10}\}$
- B No
- C Yes, with $V_1 = \{v_1, v_2, v_5, v_6, v_7\}$ and $V_2 = \{v_3, v_4, v_8, v_9, v_{10}\}$
- D Yes, with $V_1 = \{v_1, v_2, v_3, v_5, v_6, v_7\}$ and $V_2 = \{v_4, v_8, v_9, v_{10}\}$

Question 3

	a	b	c
$v_1, \dots, v_4$:	0	0	1
v_5, v_6, v_7 :	1	0	0
v_8, v_9, v_{10} :	0	1	0

Is it possible to partition $V = \{v_1, \dots, v_{10}\}$ into V_1 and V_2 such that when in the **TE** model the approval winners of (C, V_1) and (C, V_2) run against each other, **c** is not the unique approval winner?

- A** Yes, with $V_1 = \{v_1, \dots, v_7\}$ and $V_2 = \{v_8, v_9, v_{10}\}$
- B** No
- C** Yes, with $V_1 = \{v_1, v_2, v_5, v_6, v_7\}$ and $V_2 = \{v_3, v_4, v_8, v_9, v_{10}\}$
- D** Yes, with $V_1 = \{v_1, v_2, v_3, v_5, v_6, v_7\}$ and $V_2 = \{v_4, v_8, v_9, v_{10}\}$

Question 4

	a	b	c
v_1, v_2, v_3 :	1	0	0
v_4, v_5 :	0	1	0
v_6, v_7, v_8 :	0	0	1

Is it possible to partition $V = \{v_1, \dots, v_8\}$ into V_1 and V_2 such that when in the TP model the approval winners of (C, V_1) and (C, V_2) run against each other, **c** is the unique approval winner?

- A Yes, with $V_1 = \{v_1, \dots, v_4\}$ and $V_2 = \{v_5, \dots, v_8\}$
- B No
- C Yes, with $V_1 = \{v_1, v_3, v_5, v_7\}$ and $V_2 = \{v_2, v_4, v_6, v_8\}$
- D Yes, with $V_1 = \{v_1, v_2, v_6, v_7, v_8\}$ and $V_2 = \{v_3, v_4, v_5\}$

Question 5

	a	b	c
v_1, v_2, v_3 :	1	0	0
v_4, v_5 :	0	1	0
v_6, v_7, v_8 :	0	0	1

Is it possible to partition $V = \{v_1, \dots, v_8\}$ into V_1 and V_2 such that when in the **TE** model the approval winners of (C, V_1) and (C, V_2) run against each other, **c** is the unique approval winner?

- A Yes, with $V_1 = \{v_1, \dots, v_4\}$ and $V_2 = \{v_5, \dots, v_8\}$
- B No
- C Yes, with $V_1 = \{v_1, v_3, v_5, v_7\}$ and $V_2 = \{v_2, v_4, v_6, v_8\}$
- D Yes, with $V_1 = \{v_1, v_2, v_6, v_7, v_8\}$ and $V_2 = \{v_3, v_4, v_5\}$

Question 6

Suppose c is the distinguished candidate in an election (C, V) . In which of the following control scenarios is it allowed and can it make sense to delete c ?

- A CCAC
- B DCAC
- C CCDC
- D DCDC

Question 7

Suppose c is the distinguished candidate in an **approval** election (C, V) . In which of the following control scenarios is it allowed and can it make sense to do the given action?

- A CCDC: delete the strongest rival of c
- B DCDC: delete the strongest rival of c
- C CCPC-TE: partition C into $C_1 = \{c\}$ and $C_2 = C \setminus \{c\}$
- D DCPC-TE: partition C into $C_1 = \{c\}$ and $C_2 = C \setminus \{c\}$

Question 8

Your preferences when the pandemic will end are:

2022	2023	never	2024
2024	2022	never	2023
2023	2024	never	2022
2024	2022	never	2023
2023	2022	never	2024

Which of the following voting rules should we use?

- A Plurality
- B Veto
- C Borda
- D Condorcet