Preference Aggregation by Voting: Algorithmics and Complexity

Präferenzaggregation durch Wählen: Algorithmik und Komplexität

Pingo

Wintersemester 2020/2021

Dozent: Prof. Dr. J. Rothe

Website

https://pingo.coactum.de/

Access Number:
885317

© Titanic Verlag

Question 1

Anna, Belle, Chris:	c	a	b	d
David, Edgar:	a	d	b	c
Felix, George:	b	d	a	c

Is it possible to partition $V = \{\text{Anna, Belle, Chris, David, Edgar, Felix, George}\}$ into V_1 and V_2 such that when the plurality winners of (C, V_1) and (C, V_2) run against each other, a is the unique plurality winner?

A Yes, with $V_1 = \{\text{Anna, Belle, David, Edgar}\}$ and $V_2 = \{\text{Chris, Felix, George}\}$

B No

C Yes, with $V_1 = \{\text{Anna, Belle, Chris, Felix}\}$ and $V_2 = \{\text{David, Edgar, George}\}$

D Yes, with $V_1 = \{\text{Anna, Edgar, Felix}\}$ and $V_2 = \{\text{Belle, Chris, David, George}\}$

Question 2

Anna, Belle, Chris:	c	a	b	d
David, Edgar:	a	d	b	c
Felix, George:	b	d	a	c

Is it possible to partition $V = \{\text{Anna, Belle, Chris, David, Edgar, Felix, George}\}$ into V_1 and V_2 such that when the veto winners of (C, V_1) and (C, V_2) run against each other, a is the unique veto winner?

A Yes, with $V_1 = \{\text{Anna, Belle, David, Edgar}\}$ and $V_2 = \{\text{Chris, Felix, George}\}$

B No

C Yes, with $V_1 = \{\text{Anna, Belle, David, Felix}\}$ and $V_2 = \{\text{Chris, Edgar, George}\}$

D Yes, with $V_1 = \{\text{Anna, Edgar, Felix}\}$ and $V_2 = \{\text{Belle, Chris, David, George}\}$

Question 3

Anna, Belle, Chris:	c	a	b	d
David, Edgar:	a	d	b	c
Felix, George:	b	d	a	c

Is it possible to partition $V = \{\text{Anna, Belle, Chris, David, Edgar, Felix, George}\}$ into V_1 and V_2 such that when the Condorcet winners of (C, V_1) and (C, V_2) run against each other, b is the Condorcet winner?

A Yes, with $V_1 = \{\text{Anna, Belle, David, Edgar}\}$ and $V_2 = \{\text{Chris, Felix, George}\}$

B No

C Yes, with $V_1 = \{\text{Anna, Belle, David, Felix}\}$ and $V_2 = \{\text{Chris, Edgar, George}\}$

D Yes, with $V_1 = \{\text{Anna, Edgar, Felix}\}$ and $V_2 = \{\text{Belle, Chris, David, George}\}$

Question 4

Anna, Belle, Chris:	c	a	b	d
David, Edgar:	a	d	b	c
Felix, George:	b	d	a	c

Is it possible to partition $V = \{\text{Anna, Belle, Chris, David, Edgar, Felix, George}\}$ into V_1 and V_2 such that when the Condorcet winners of (C, V_1) and (C, V_2) run against each other, d is the Condorcet winner?

A Yes, with $V_1 = \{\text{Anna, Belle, David, Edgar}\}$ and $V_2 = \{\text{Chris, Felix, George}\}$

B No

C Yes, with $V_1 = \{\text{Anna, Belle, David, Felix}\}$ and $V_2 = \{\text{Chris, Edgar, George}\}$

D Yes, with $V_1 = \{\text{Anna, Edgar, Felix}\}$ and $V_2 = \{\text{Belle, Chris, David, George}\}$

Question 5

Anna, Belle, Chris:	c	a	b	d
David, Edgar:	a	d	b	c
Felix, George:	b	d	a	c

Is it possible to partition $C = \{a, b, c, d\}$ into C_1 and C_2 such that when the Condorcet winners of (C_1, V) and (C_2, V) run against each other, b is the Condorcet winner?

A Yes, with $C_1 = \{a, b, c\}$ and $C_2 = \{d\}$

B No

C Yes, with $C_1 = \{a, c\}$ and $C_2 = \{b, d\}$

D Yes, with $C_1 = \{a, d\}$ and $C_2 = \{b, c\}$

Question 6

For which of the following voting systems can it make a difference whether we use the TE (“ties eliminate”) or the TP (“ties promote”) rule in control by partition of candidates or voters?

A Plurality

B Veto

C Borda

D Condorcet

Question 7

Assuming $\mathrm{P} \neq \mathrm{NP}$, is it true that a control problem must be in P if a voting system has the following property regarding the corresponding control scenario.

A susceptibility

B vulnerability

C resistance

D immunity