Algorithmic Game Theory

Algorithmische Spieltheorie

Pingo

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Website

https://pingo.coactum.de/

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Question 1

Suppose you have won \$ $1,000,000$ because you were able to prove $\mathrm{P} \neq \mathrm{NP}$. Which of the following claims can be true?

A $\textsc{Partition} \leq_{\mathrm{m}}^{\mathrm{p}} \textsc{Dummy}$

B $\textsc{Partition} \leq_{\mathrm{m}}^{\mathrm{p}} \overline{\textsc{Dummy}}$

C $\overline{\textsc{Partition}} \leq_{\mathrm{m}}^{\mathrm{p}} \textsc{Dummy}$

D $\overline{\textsc{Partition}} \leq_{\mathrm{m}}^{\mathrm{p}} \overline{\textsc{Dummy}}$

Question 2

Which of the following are Yes-instances of PARTITION?

A $(1, 2, 3, 4, 5)$

B $(1, 2, 3, 4, 5, 6, 7)$

C $(1, 5, 5, 7)$

D $(1, 3, 5, 7)$

E $(11, 15, 23, 51)$

Question 3

Which of the following claims is/are true?

A In the proof that DUMMY is coNP-complete, given the instance $(1, 3, 5, 7)$ of PARTITION, we construct a weighted voting game $G = (2, 6, 10, 14, 1; 17)$ in which player 5 is pivotal for $\{1, 4\}$.

B In the proof that DUMMY is coNP-complete, given the instance $(1, 5, 5, 7)$ of PARTITION, we construct a weighted voting game $G = (2, 10, 10, 14, 1; 19)$ in which player 5 is pivotal for $\{1, 4\}$.

C If $\mathrm{coNP} \subseteq \mathrm{NP}$ then $\mathrm{coNP} = \mathrm{NP}$.

D If $\mathrm{NP} = \mathrm{P}$ then $\mathrm{coNP} = \mathrm{P}$.

Question 4

Consider the weighted voting game $G = (2, 2, 2; 4)$. In terms of the Shapley–Shubik index, is splitting into two players of equal weight for, say, the third player . . .

A . . . beneficial?

B . . . neutral?

C . . . disadvantageous?

Question 5

Consider the weighted voting game $G = (2, 2, 2; 5)$. In terms of the Shapley–Shubik index, is splitting into two players of equal weight for, say, the third player . . .

A . . . beneficial?

B . . . neutral?

C . . . disadvantageous?

Question 6

Consider the weighted voting game $G = (2, 2, 2; 6)$. In terms of the Shapley–Shubik index, is splitting into two players of equal weight for, say, the third player ...

A ... beneficial?

B ... neutral?

C ... disadvantageous?