

## Refutation of the AI experiment for a divide the dollar competition

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**Abstract:** We evaluate the AI experiment for a divide the dollar competition at the June CEC2019 IEEE conference in New Zealand. The apparatus definition is *not* tautologous, hence refuting the experiment.

We assume the method and apparatus of Meth8/VL4 with Tautology as the designated *proof* value, **F** as contradiction, **N** as truthity (non-contingency), and **C** as falsity (contingency). For results, the 16-valued truth table is row-major and horizontal, or repeating fragments of 128-tables, sometimes with table counts, for more variables. (See ersatz-systems.com.)

LET  $p, q, r, s, u, v: x, y, R, s, u$  (contestant 1),  $v$  (contestant 2);  
~ Not,  $\neg$ ; + Or,  $\vee, \cup$ ; - Not Or; & And,  $\wedge, \cap$ ; \ Not And;  
> Imply, greater than,  $\rightarrow, \vdash$ ; < Not Imply, less than,  $\in$   
= Equivalent,  $\equiv, \vDash$ , @ Not Equivalent,  $\neq$ ;  
% possibility, for one or some,  $\exists, \diamond, M$ ; # necessity, for every or all,  $\forall, \square, L$ ;  
(s=s) **T** as tautology; s@) **F** as contradiction;  
(%s<#s) **C** as contingency,  $\Delta$ , ordinal 1; (%s>#s) **N** as non-contingency,  $\nabla$ , ordinal 2;  
 $\sim(y < x)$  ( $x \leq y$ ), ( $x \subseteq y$ ).

From: Ashlock, D.; Greenwood, G. (2019). Divide-the-dollar competition. CEC-C1. [cec2019.org/programs/competitions.html#cec-12](http://cec2019.org/programs/competitions.html#cec-12). [dashlock@uoguelph.ca](mailto:dashlock@uoguelph.ca)

The conventional divide-the-dollar game is a two player game where the players simultaneously bid on how to divide a dollar.  
If the bids sum to a dollar or less each player receives their bid, otherwise they receive nothing. ...  
In this game, instead of dividing a dollar, a scoring set,  $S \subset \mathbb{R}^N$  is used.  
Each player bids a point coordinate and, if the resulting point is in the scoring set, then the players receive their bid, otherwise nothing. ...  
The contest will use sets not seen by the players before and will be restricted to the two-player version.  
All sets satisfy  $x, y \in \mathbb{R}^2$  with  $x \geq 0, y \geq 0$ , and  $x, y \leq 2$ . ...  
Winners will be determined for each problem test set ... (1.1)

[ 101 step formula to be inserted here after winner is announced, 6/13/2019 ]  
TTTT TTTT TTTT TTTT(8), FFFF FFFF FFFF FFFF(8) (1.2)

Eq. 1.2 as rendered is *not* tautologous, thereby refuting the soundness of the experiment.