

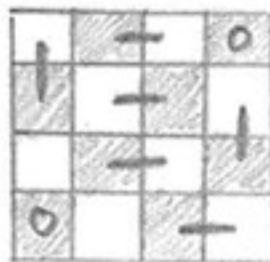
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**The Pennies and Paperclips Game
Aka the Checkerboard and Dominoes Game**

Conjecture 1: In this pennies and paperclips game, the pennies will always win if they are placed in two of the same colored boxes(white and white or gray and gray).

Proof 1: On this checkerboard, every paperclip has to cover two boxes, one gray and one white. So, when the pennies take away two gray boxes, they leave two white boxes that can't be covered since paperclips cover one box of each color. Same vice versa, if the pennies take away two white boxes, they leave two gray boxes that can't be covered.

Good,



○ = pennies
- = paperclips

Conjecture 2: In this pennies and paperclips game, the paperclips will always win if the pennies are placed in two different colored boxes(white and gray).

Proof 2: On this checkerboard, when the pennies take away one gray box and one white box, they leave 7 gray boxes and 7 white boxes. Since paperclips have to cover one box of each color, the paperclips know they will always win with what is left. They know this because there will always be a Hamiltonian path that visits each square exactly once. When this path is broken up by the two pennies, the paperclips know they will be able to cover the rest of the squares because there will always be an even amount of boxes between the pennies. All the paperclips have to do to win is follow the rest of the path.



- - - = hamiltonian path
○ = pennies
- = paperclips