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LET'S PLAY THE CLEANING GAME

The cleaning game is a combinatorial game related to the model for cleaning graphs with brushes, studied, for example, by Alon, Messinger, Nowakowski, Prałat, and Wormald.

The board of the game is a fixed, finite, undirected graph G . At the beginning all the graph G is *dirty* (that is, all edges and vertices are dirty). Two players alternately put one brush on some vertex. At any point of the game, if there is a dirty vertex with at least as many brushes as incident dirty edges, the *cleaning process* starts: the vertex and all its incident edges are cleaned by moving exactly one brush along every dirty edge. The process continues until there is no dirty vertex with a sufficient number of brushes. The game finishes when all the graph is cleaned.

In the impartial game, the player who puts the last brush wins the game. For this variant, we show that the second player wins on every complete graph with at least 3 vertices. Other results and open problems are mentioned.

This is joint work with Paweł Prałat.