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# AN ALTERNATIVE APPROACH FOR GOLD GRABBING GAME

**K.M.P.G.S.C. Kapuhennayake* and A.A.I. Perera**

*Department of Mathematics, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka*
**sonalichamathka03@gmail.com*

Initial idea of the Gold Grabbing Game introduced by Moshe Rosenfeld in 2009 is defined as follows: A fixed tree T has some non-negative integer amount of gold g(v) at each vertex v. The game can be played with any number of players by taking turns removing leaves one by one from the tree and collecting the gold from those leaves and deleting the relevant vertex v. After removing the leaves, graph T remains as a tree. When the tree is empty, the game should end, and the player who has collected the most amount of gold is the winner. The problem is to find the winning probability of each player. A software was developed to simulate the gold grabbing game and to find the winning probabilities of each player. Furthermore, we conjecture that, when the greedy method is used to choose the vertices by players, the first player can get at least half of the gold of any tree with an even number of vertices in a two-player game. That is, the winning probability of the first player is higher (at least 50%) than the winning probability of the second player. Moreover, when there are three players, the winning probability of the first player is higher than the winning probabilities of the other two players. It seems that the winning probabilities of second and third players are nearly equal. There is the need to implement the software for higher number of players and to reduce the computational time to calculate the winning probabilities.

**Keywords:** Connected Graphs, Gold Grabbing Game, Tree, Two-player game