CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J1214

Project Title
Lose to Win? It's Not Impossible: A Computer Simulation of Coin-Tossing Games in C++ to Test Parrondo's Paradox

Abstract

Objectives/Goals
My objective is to explain Parrondo's Paradox and provide an example and variation of it by using the C++ programming language to program coin-tossing games.

Methods/Materials
Parrondo's Paradox is a recent discovery stating that games designed to lose can be combined into one game that will win. The project required me to program games in the C++ programming language that illustrate the Paradox. I then modified the values that define each game, such as the variables e (a very small number that affects the chances of winning) and m (which affects the way the games are played), and then tested the simulation by combining the games and playing them.

Results
These games confirmed my hypothesis that a simulation of two losing games designed according to Parrondo's Paradox will result in one winning game when combined. My two games, when played alone, lost. But when I played them together, they won.

Conclusions/Discussion
I learned that simulating the games in C++ is an effective way of testing the Paradox, as only a computer program could create the biased coins I needed for the coin-tossing games.

Summary Statement
My project is about programming games in C++ that test Parrondo's Paradox.

Help Received
Parents proofread.