

CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, September 2

3:00 – 4:00 PM

Maria Sanford, Room 101

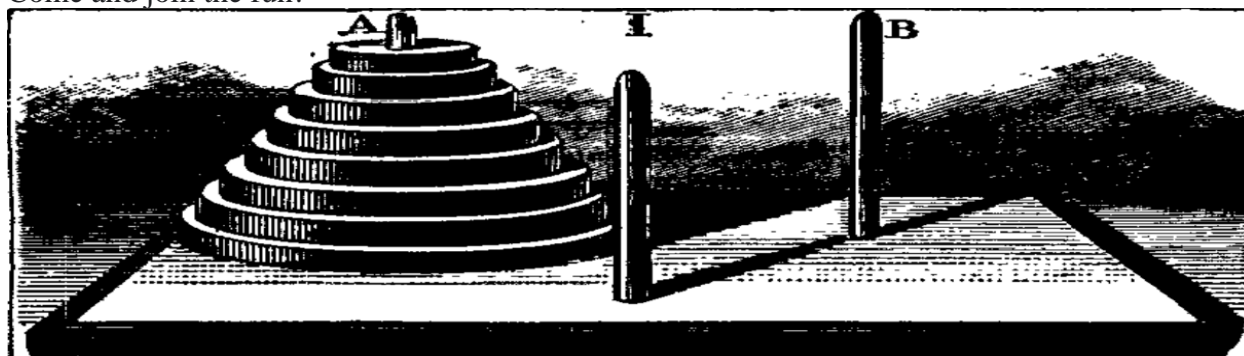
LUCAS'S TOWER OF HANOI PUZZLE

ROGER BILISOLY

CENTRAL CONNECTICUT STATE UNIVERSITY

Abstract: The French mathematician Édouard Lucas published his four-volume work, *Récréations mathématiques*, between 1882-94. This included the puzzle, The Tower of Hanoi, which was supposedly told to him by Professor N. Claus of Siam. In the diagram below, the goal is to transfer all the disks from peg A to B by moving one at a time such that a larger one is never on top of a smaller one. Lucas stated that the shortest solution for N disks required $2^N - 1$ moves.

This puzzle is now famous among lovers of recreational mathematics and is a standard example of mathematical recursion as well as dynamic programming. This talk derives a solution and computes it using programs written in R and Python. With this in hand, we focus on (1) the graph of all possible configurations of the Tower of Hanoi, which is isomorphic to finite Sierpiński triangles, and (2) a solution based on a fixed point of an infinite-string morphism, an approach developed by a group of mathematicians that includes Jean-Paul Allouche and Jeffrey Shallit. Come and join the fun!



Portion of figure 15 from page 56 of Édouard Lucas's *Récréations mathématiques*.

To join us online use the following link: <https://ccsu.webex.com/meet/gotchev>

For further information: gotchevi@ccsu.edu; 860-832-2839; <https://web.ccsu.edu/colloquium/>