Chapel Hill Math Circle

Intermediate Group

Tower of Brahma (or Tower of Hanoi)
November 12, 2016

1. There is a story about a temple in Benares, India which contains three posts, one of which has 64 golden disks of different sizes stacked on top of each other. The disks are so delicate that they must be arranged in such a way that a larger disk may never be placed atop a smaller disk. The priests serving at the temple must move all disks from the first post to the third, one disk at a time, and they may temporarily place disks in the second post. An ancient prophecy portends that the world will end when the priests complete this task.
    a. What is the minimum number of moves in which they can accomplish this?

    b. If it takes a minute for each disk to be moved from one post to another, how many years will it take them to do it?

2. Suppose there are n disks. What is the minimum number of moves it will take to do move the disks? Prove it.