Tower of Hanoi

Julia Robinson Mathematics Festival
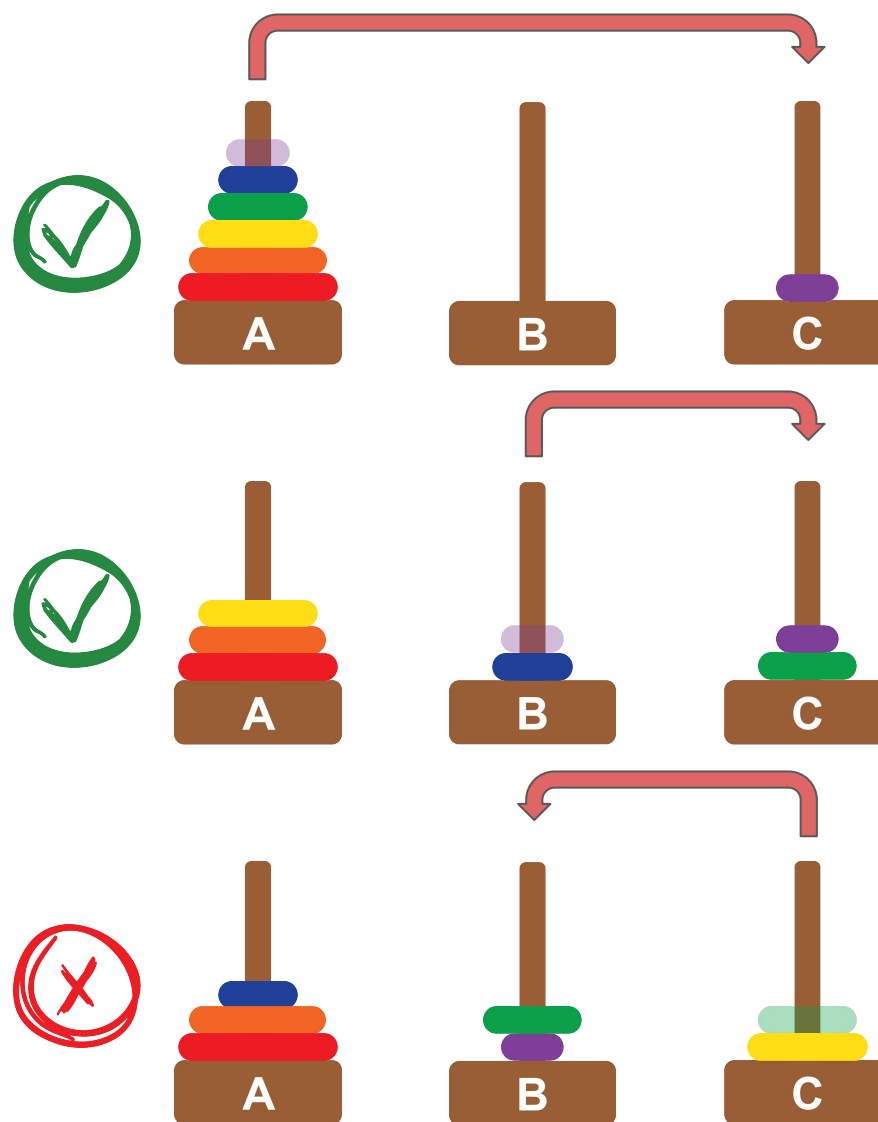
San Francisco Math Circle
at San Francisco State University
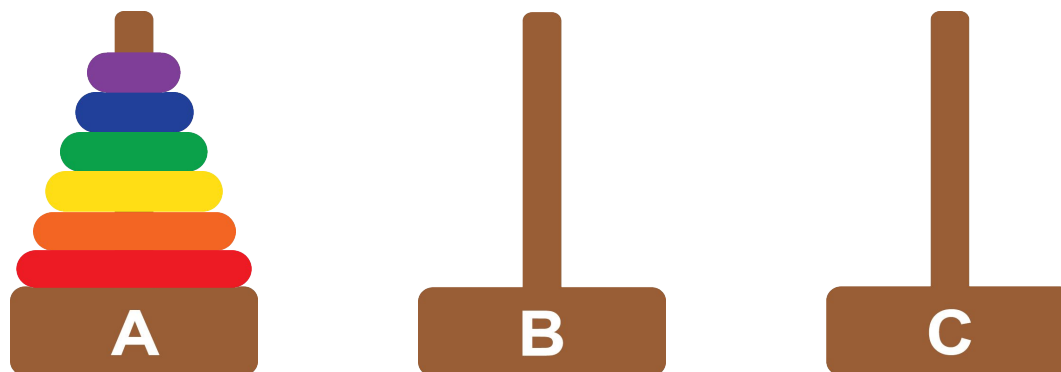
App

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Tower of Hanoi

Objective:
- Move all disks from Peg A to Peg C, one at a time.

Rules:
- Only a disk at the top of a peg can be moved.
- A disk can be moved onto an empty peg.
- A disk can be moved onto a larger disk but cannot be moved onto a smaller disk.
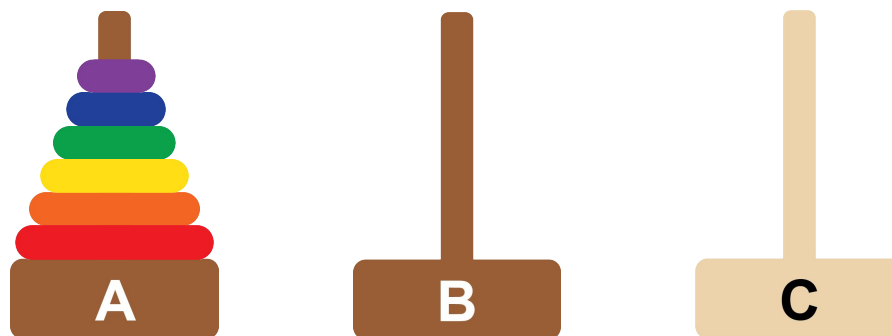
1. Start with 4 disks on Peg A. Can you move all of them to Peg C?

2. What is the fewest number of moves it takes to move all of the disks from Peg A to Peg C?

3. What if you started with 5 disks on Peg A? 6 disks? More?

4. You're allowed to make at most 100 moves. What is the largest number of disks you can start with on Peg A so that you can move all of the disks from Peg A to Peg C?
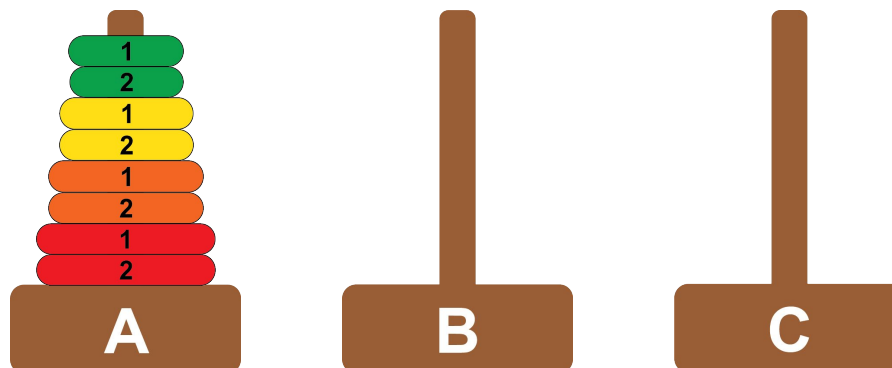
1. Peg C is now colored differently from Pegs A and B. You are only allowed to move disks between pegs of different colors. How do your answers to Explorations 1 - 4 change with this new restriction?
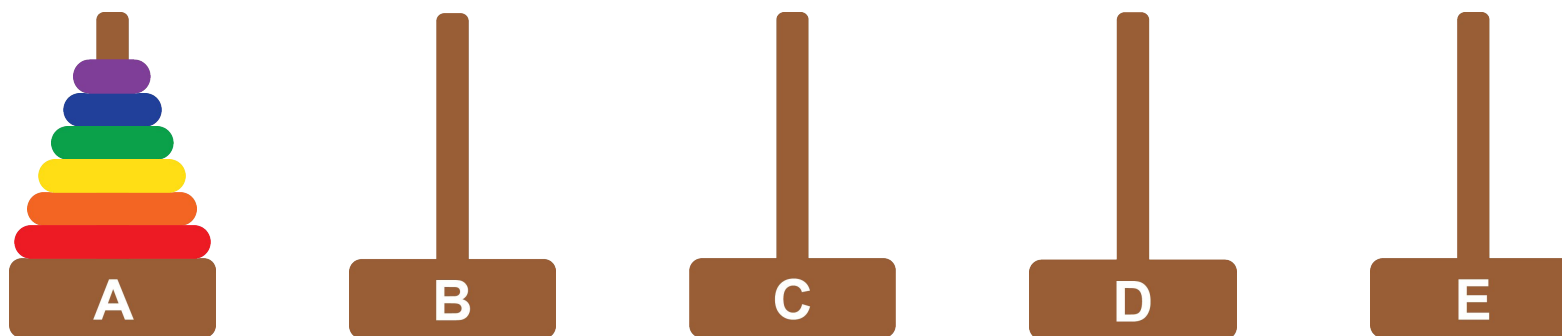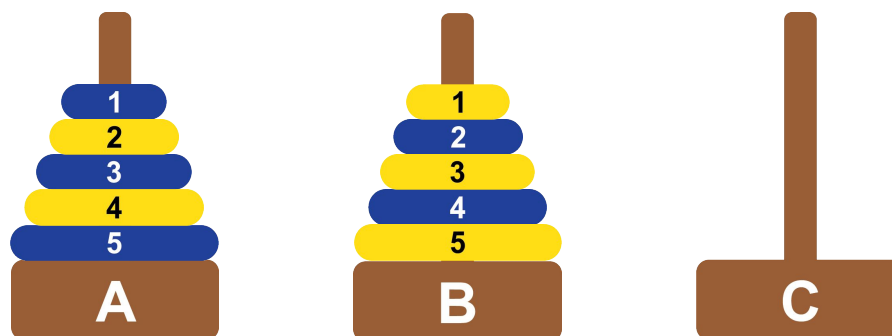

2. How do your answers to Explorations 1 - 4 change if there are 4 pegs? 5 pegs? More?

1. How do your answers to Explorations 1 - 4 change if there are two disks of each color? Disks can be placed on disks of the same size.

2. You now only have blue and yellow disks like in the picture above. What is the fewest number of moves it takes so that all of the blue disks are on Peg B and all of the yellow disks are on Peg A? What if you started with 6 blue and 6 yellow disks? More?