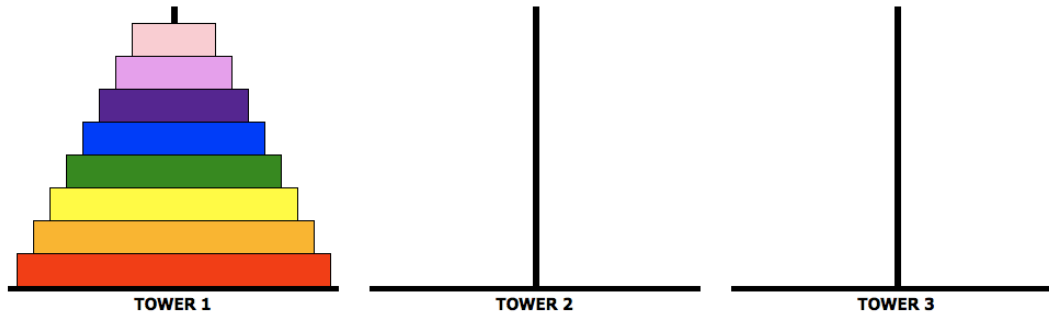


Tower of Hanoi



The puzzle of the Tower of Hanoi is to move all of the discs from **TOWER 1** to **TOWER 2** under the following restrictions:

- 1 – On each move transfer one disc from the top of any tower to another tower.
- 2 – A tile may only go on top of a larger tile.

The challenge is to move the entire tower in the fewest possible moves.

OBSERVATIONS:

The fewest number of moves to move a tower of 2 discs appears to be 7. And the fewest moves to move a tower of three discs appears to be 15. We came to these conclusions by experimenting.

To analyze the situation further we displayed all possible (legal) configurations for just two discs. See attached page. Arranging these configurations into a vertex-edge graph, we were able to see the shortest path from the initial position to the desired configuration is indeed just 7 steps. We want to continue the investigation by doing the same for three discs.

CONNECTION TO 1213

Bonnie showed how to solve the puzzle using 1213 sequence. For this method the discs need arrows pointing to the left or right alternately up the tower. The arrow on the bottom tower should point to **TOWER 2**. Further we label the towers in order of length 1, 2, 3, 4, 5, 6, 7, 8, 9, ... as needed.

To move the discs move them in order of the 1213 sequence. Move each disc in the direction of it's arrow. If there isn't a tower in that direction, wrap around to the tower on the other end. Why does this work?

