Exercises

Exercise 1. How many ways to ascend a ladder with n rungs if on each step we may advance by 1 or 2 rungs?

Exercise 2. How many ways to cover a $2 \times n$ rectangle with 2×1 domino tiles so that each square of the rectangle is covered by exactly one square of a tile?

Exercise 3. How many n-letter strings consisting of letters A and B, where there are never two consequtive A's?

Exercise 4. How many n-letter strings consisting of letters A, B, C, and D, where there's an odd number of A's?

Exercise 5. Tower of Hanoi is a puzzle consisting of three pegs and n distinct-sized disks initially stacked in the order of sizes on the leftmost peg. The goal is to move all disks to the rightmost peg obeying the additional constraints that we may only move one disk at a time and may never place a larger disk on top of a smaller one. The middle peg can be used as a temporary holding place. How many steps are needed to solve the puzzle for n disks?