HW#2.

* Exercise (5th Edition Book)
    * Sec. 2.3

14. Given the recurrence relation

$$T(n) = 7T\left(\frac{n}{5}\right) + 10n \qquad \text{for } n > 1$$
$$T(1) = 1$$

find $T(625)$.

17. Write a divide-and-conquer algorithm for the Towers of Hanoi problem. The Towers of Hanoi problem consists of three pegs and n disks of different sizes.The object is to move the disks that are stacked, in decreasing order of their size, on one of the three pegs to a new peg using the third one as a temporary peg. The problem should be solved according to the following rules: (1) when a disk is moved, it must be placed on one of the three pegs; (2) only one disk may be moved at a time, and it must be the top disk on one of the pegs; and (3) a larger disk may never be placed on top of a smaller disk.

(a) Show for your algorithm that $S(n) = 2^n - 1$. (Here $S(n)$ denotes the number of steps (moves), given an input of n disks.)

(b) Prove that any other algorithm takes at least as many moves as given in part (*a*).

* Additional Exercise

42. A ***tromino*** is a group of three unit squares arranged in an L-shape. Consider the following tiling problem: The input is an $m \times m$ array of unit squares where m is a positive power of 2, with one forbidden square on the array. The output is a tiling of the array that satisfies the following conditions:

* Every unit square other than the input square is covered by a tromino.
* No tromino covers the input square.
* No two trominos overlap.
* No tromino extends beyond the board.

Write a divide-and-conquer algorithm that solves this problem.

45. Use the divide-and-conquer approach to write a recursive algorithm that finds the maximum sum in any contiguous sublist of a given list of *n* real values. Analyze your algorithm, and show the results in order notation.

*** Due Date: 2020. 4. 4**