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CSE 13

1 November 2020

Write Up

For this assignment we were tasked with implementing two functions capable of solving the Hanoi Towers Puzzle. One was set to be a recursive function and the other an iterative function using stacks.

The more efficient and less complex implementation is the recursive implementation. Due to the way that a recursive function works, the amount of individual function calls and operations performed is less than that required of the same iterative function. The recursive function solves the problem by using the known pattern for solving Hanoi to break the problem into smaller pieces and slowly reassemble all of the moves made into one cohesive function that will output all of the required moves. No stack is required (although I did them to implement mine) which also means that no time is wasted calling for stack functions and no memory can be lost.

The iterative function has more downsides and is generally a worse option. The way the iterative function works is rather than breaking the problem into smaller pieces and solving on a known pattern, it tries every possible move, only actually performing those that are legal. We can eliminate repeat moves by recognizing that depending on how many disks we have moved, we can eliminate some of our options, leaving only those that would push the puzzle forward. Even in this case though, the iterative function must try at least two possible moves. This means that in

addition to being less efficient, it will also be slower due to the added complexity of accessing the stack functions in order to check the status of the puzzle.

Another huge downside to the iterative method is the memory required for running the function. No matter what, you will use more memory than the recursive function at every step due to the requirement of stacks. The recursive function will only require memory for the few variables and constants needed to perform the recursion, no stack required. Overall the complexity of the iterative function is much higher, and if prompted to choose which one to use in a program of my making, I will almost certainly choose the recursive method