

Complexity Time for Cella Ant 12 by William Timani

For the Big-O Complexity of my program, I am measuring based on N moves that the ant makes. A move consists of identifying the color of the square under it, changing the color, turning left or right, and finally translating in the new direction. The main function first begins with creating and assigning variables, filling rectangles and drawing the grid. In total this amounts to 11 instructions. These instructions will be performed regardless of the number of ant moves. The next portion is a loop that loops N (number of ant moves) times. Each loop consists of 8-15 instructions (range is due to possibly checking multiple if statements). In the loop, a few instructions are function calls. Accounting for the amount of instructions in the functions, the loop has a total of 13-26 instructions. Once the loop is finished, the program ends. In total, this means there are $11 + 26N$ (worst case) instructions. Since N can become much larger than 11, we can reduce 11 to 0. Additionally as N grows, the coefficient 26 becomes generally insignificant, thus we can reduce it 1, leaving us with N instructions. Therefore the complexity of my program is $O(N)$.