Alexis Rodriguez

ID: 80590676

Professor Ceberio

CS 2401 Elementary Data Structures

**Java Code**

A screenshot of a cell phone

Description automatically generated

**Performance**

**First For Loop Analysis:**

**Performance: N(3 + SecondForLoop + 12) + 4**

|  |  |
| --- | --- |
| **Repeats** | **Doesn’t Repeat** |
| i < **N** | upperBound = **N** |
| index = lowerBound | lowerBound = 0 |
| max = array[lowerBound] | int i = 0 |
| **Second For Loop** | int i = N (Last Comparison) |
| Comparison of lowerBound and upperBound |  |
| i % 4 == 0 |  |
| i % 4 == 1 |  |
| array[index] = array[upperBound] |  |
| array[upperBound] = max |  |
| upperBound-- |  |
| i % 4 == 3 |  |
| i % 4 == 4 |  |
| array[index] = array[lowerBound] |  |
| array[lowerBound] = max |  |
| lowerBound++ |  |
| i++ |  |

**Second For Loop Analysis:**

**Performance = N(5) + 2**

|  |  |
| --- | --- |
| **Repeats** | **Doesn’t Repeat** |
| j < upperBound | j = lowerBound |
| max < array[j] | j = N |
| max = array[j] |  |
| index = j |  |
| j++ |  |

**Worst Case:**

This is under the assumption that every if statement is true within the for-loop meaning that every single line of code will run. Overall, the number of steps within the program will increase as N increases.

**Best Case:**

**F(0) = 4**

The best-case scenario of the program is when N is 0 since N can’t be negative. In this case, the program will only run 4 lines of code: 3 initializations of variables, and 1 comparison between the variable i and N. In this case, the comparison to enter the first for-loop will result in false resulting in the termination of the program.

**Average Case:**

The average case scenario is similar to the worst-case scenario in the sense that it has a performance of O(). The main difference is that in when the program enters the first loop, it will only enter one if statement reducing the number of repeating steps by 3.