

Project 1

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Project

project-lawnmower

- .git
- disks.hpp
- LawnmowerAlgorithm.cpp
- README.MD
- rubrictest.hpp
- test

README.MD

```
1 Group Members:
2
3 Nicholas Tran
4
5 Timothy Wiratmo
```

README.MD* 4:1



student@tuffix

```
student@tuffix-vm:~/Desktop/CPSC 335/project-lawnmover$ g++ LawnmowerAlgorithm.cpp -o test
student@tuffix-vm:~/Desktop/CPSC 335/project-lawnmover$ ./test
disk_state still works: passed, score 1/1
sorted_disks still works: passed, score 1/1
disk_state::is_initialized: passed, score 3/3
disk_state::is_sorted: passed, score 3/3
alternate, n=4: passed, score 1/1
alternate, n=3: passed, score 1/1
alternate, other values: passed, score 1/1
lawnmower, n=4: passed, score 1/1
lawnmower, n=3: passed, score 1/1
lawnmower, other values: passed, score 1/1
TOTAL SCORE = 14 / 14

student@tuffix-vm:~/Desktop/CPSC 335/project-lawnmover$
```

Lawnmower Algorithm

```
{
    bool isSorted = false; // 1 tu
    int numOfSwap = 0; // 1 tu

    while (isSorted == false) { // n times
        int swapCheck = numOfSwap; // 2 tu
        int loopCount = 0; // 1 tu

        while (loopCount < ([list size] - 1)) { // n - 1 times
            if (left = dark && right == light) { // 2 tu
                swap; // 1 tu
                numOfSwap++; // 1 tu
            }
            loopCount++; // 1 tu
        }

        while (loopCount > 1) { // n - 1 times
            if (left = dark && right == light) { // 2 tu
                swap; // 1 tu
                numOfSwap++ // 1 tu
            }
            loopcount-- // 1 tu
        }

        if (numOfSwap == swapCheck) // 1 tu
            isSorted == true; // 1 tu
    }
}
```

$$2 + [n \times 3((n-1) \times (4+1))((n-1) \times (4+1)) + 2]$$

$$2 + (3n(5n-5))(5n-5) + 2)$$

$$2 + (15n^2 - 15n)(5n - 3)$$

$$2 + (75n^3 - 45n^2 - 75n^2 + 45n - 2 - 3n - 5n + 3)$$

$$+ (75n^3 - 45n^2 - 75n + 3)$$

$$2 + 15n(5n^2 - 4n + 3) \in O(n^2)$$

$$2 + 15 + 5 + 8 + 3$$

✓
20

10

33

$$2 + 15n(5n^2 - 8n + 3) \leq 33n^2$$

$$n=1$$

$$2 + 15(5 - 8 + 3) \leq 33$$

$$2 \leq 33$$

$$\checkmark$$

Alternate Sort

```
{
    bool isSorted = false // 1 tu
    int numOfSwap = 0; // 1 tu
    int loopCount = 0; // 1 tu

    while (isSorted == false) { // n times
        int currentIndex = 0; // 1 tu
        int swapCheck = numOfSwap; // 1 tu

        while (currentIndex + loopCount < [listSize] - loopCount) { // n/2 times
            if (left == dark && right == white) { // 2 tu
                swap; // 1 tu
                numOfSwap++ // 1 tu
            }
            currentIndex ++ // 1 tu
        }

        if (swapCheck == numOfSwap && loopCount != 0) // 2 tu
            isSorted = true; // 1 tu
        else
            loopCount++; // 1 tu
    }
}
```

$$37(2n(n/2(4)+1)+3$$

$$7+2n(2n)$$

$$7+2n^2$$

$$7+4n^2 \leq 11n^2$$

$$n=1 \quad 7+4 \leq 11 \quad \checkmark$$

$$n=2 \quad 7+16 \leq 44 \quad \checkmark$$