CPSC 335 - Section 07
Project 1: Lawnmower Problem

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Pseudocode

```
Def Sort_Alternate():
    While Disks is not sorted:
        For i = 0 from i to n, 2 step:                    -> ((n - 0 + 1)/2) * 4 = 2(n+1) Tu
            If (Disks[i] == Dark && Disks[i+1] == Light)   -> 3 + (Max(1,0)) = 4 Tu
                Swap Disks[i] and Disks[i+1]               -> 1 Tu
        For i = 1 from i to n-1, 2 step:                  -> ((n -1 - 1 + 1)/2) * 4 = 2(n+1) Tu
            If (Disks[i] == Dark && Disks[i+1] == Light)   -> 3 Tu + (Max(1,0)) = 4 Tu
                Swap Disks[i] and Disks[i+1]               -> 1 Tu
```

Total Step Count: 4(n+1) Tu

```
Def Lawnmower():
    While Disks is not sorted:
        For i = 0 from i to n-1:                          -> ((n-1 -0 +1)/1) * 4 = 4n Tu
            If (Disks[i] == Dark && Disks[i+1] == Light)   -> 3 + (Max(1,0)) = 4Tu
                Swap Disks[i] and Disks[i+1]               -> 1 Tu
        For i = n from i to 1, -1 step:                   -> ((1 - n +1)/-1) * 4 = 4(n-2) Tu
            If (Disks[i] == Light && Disks[i-1] == Dark)   -> 3 Tu + (Max(1,0))
                Swap Disks[i] and Disks[i-1]               -> 1 Tu
```

Total Step Count: 4n - 8 + 4n = 8n - 8 = 8(n-1) Tu

Time Complexity Explanation:

For our Sort_Alternate() Algorithm, We ended up with a step count of 4(n+1) Time Units, with n being our only variable, it would be a Time-Complexity of O(N).

$4(n + 1) \in O(N)$

$c = 8 \qquad n_0 = 1$

$4n + 4 \leq c * n \ \forall \ n \geq n_0$

$4(1) + 4 \leq 8 * 1$

$4 + 4 \leq 8$

$8 \leq 8$

Hence, $4(n + 1) \in O(N)$

For our Lawnmower Algorithm, We ended up with a step count of 8(n-1) Time Units, Having n again as our only variable, it would also be a Time-Complexity of O(N).

$8(n-1) \in O(N)$

$c = 8 \quad n_0 = 2$

$8(n-1) \leq c * n \ \forall \ n \geq n_0$

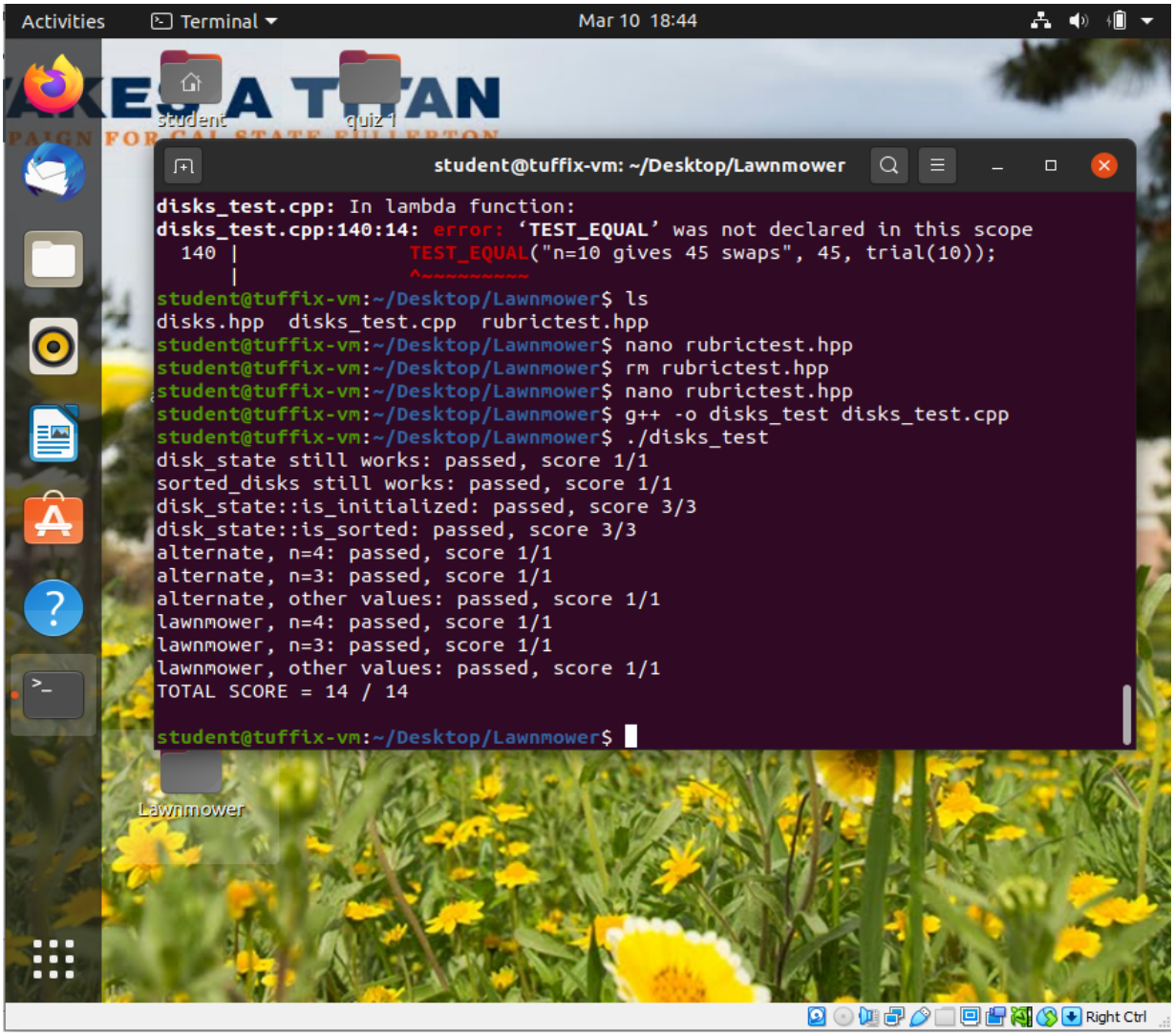
$8n - 8 \leq 8 * 2$

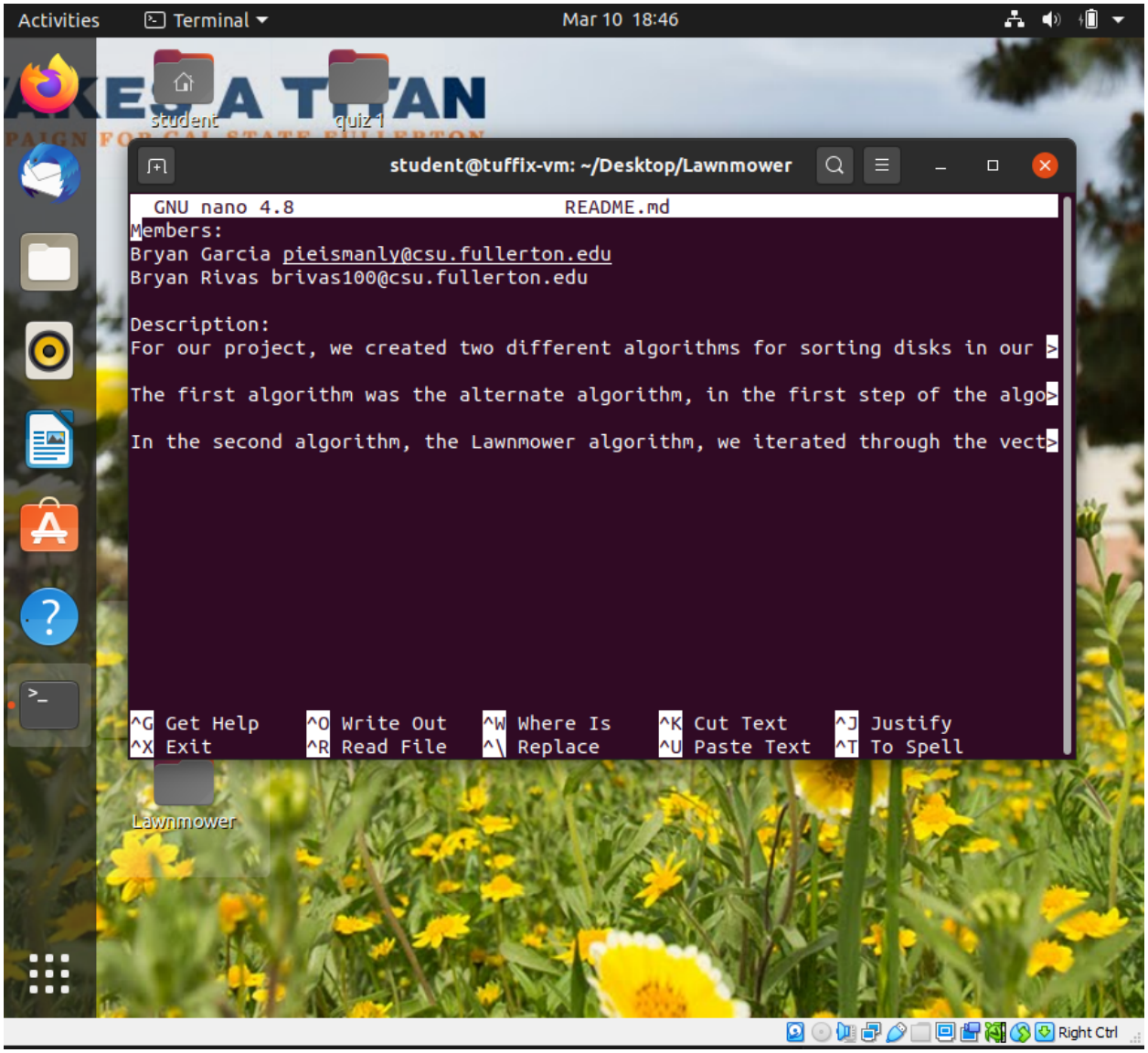
$8(2) - 8 \leq 16$

$8 \leq 16$

Hence, $8(n-1) \in O(N)$

Screenshots




Activities
Terminal
Mar 10 18:46
student
quiz 1
student@tuffix-vm: ~/Desktop/Lawnmower
GNU nano 4.8 README.md
Members:
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Description:
For our project, we created two different algorithms for sorting disks in our >
The first algorithm was the alternate algorithm, in the first step of the algo>
In the second algorithm, the Lawnmower algorithm, we iterated through the vect>
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell
Lawnmower
Right Ctrl