

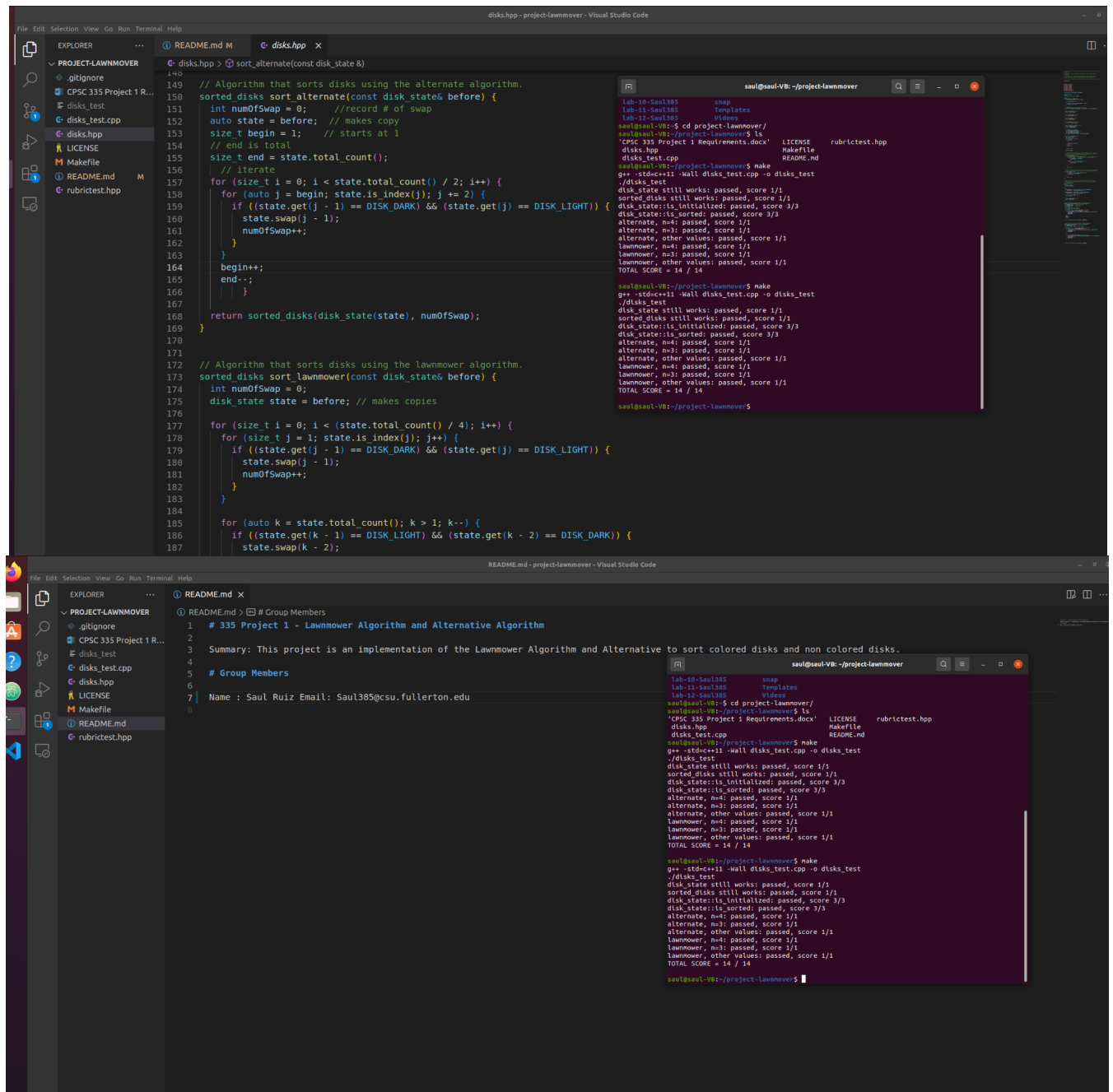
# 335 Project 1

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1.

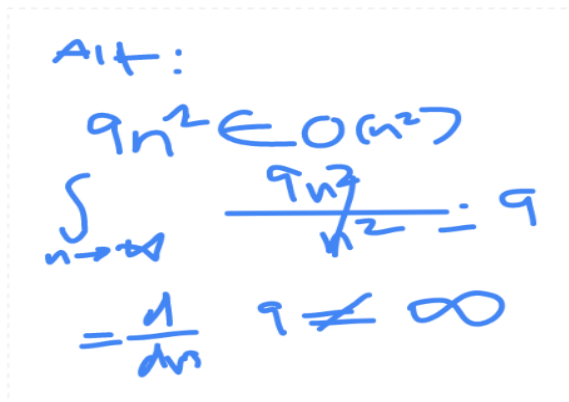


## ALT ALGO PSEUDO CODE:

|   |               |
|---|---------------|
| Int swapped= 0                              | 1tu           |
| State = before                              | 1tu           |
| Begin = 1                                   | 1tu           |
| End = total                                 | 1tu           |
|   |               |
| For begin to end/2 do                       | 1-1+ n/2= n/2 |
| For begin to index j, j+=2 do               | 1-1 + 2n= 2n  |
| If state j-1 = dark and state j == light do | 3tu           |
| Swap  | 1tu           |
| Swapped++                                   | 1tu           |
| Endif                                       |               |
| Endfor                                      |               |
| Return state and swapped                    |               |
| Endfor                                      |               |

$$SC=(n/2) * (2n) * 9 = (n^2) * 9 = 9n^2$$

Using Limit theorem:



Alt:

$$9n^2 \in O(n^2)$$
$$\lim_{n \rightarrow \infty} \frac{9n^2}{n^2} = 9$$
$$= \frac{1}{\infty} \quad 9 \neq \infty$$

## LAWNMOWER PSEUDO CODE:

|   |                  |
|---|------------------|
| Int Swapped = 0                               | 1tu              |
| Diskstate = before                            | 1tu              |
| For i=0 to total_count/4 do                   | 1+0+ n/4 = n/4+1 |
| For j=1 to index do                           | 1-1+ n = n       |
| If state j-1 = dark and state j == light do   | 3tu              |
| Swap  | 1tu              |
| Swapped++                                     | 1tu              |
| Endif   |                  |
| Endfor  |                  |
| For k = totalcount to 1 do                    | (1-n)/-1 + 1 = n |
| If state k-1 = light and state k-2 == dark do | 4tu              |
| Swap  | 1tu              |
| Swapped++                                     | 1tu              |
| Endif   |                  |
| Endfor  |                  |
| Endfor  |                  |
| Return state and swapped                      |                  |

$$SC = (n/4 + 1) * (n) * 7 = 7n^2/4 + 7n$$

Lawn Algo:

$$\frac{7n^2}{4} + 7n \in O(n^2)$$

$$\int_{n \rightarrow \infty} \frac{7n^2 + 7n}{4n^2} = \frac{7n + 7}{4n}$$

$$\frac{d}{dn} \frac{7n + 7}{4n} = \frac{7n}{4n} + \frac{7}{4n} = \frac{7}{4} + 0$$