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CPSC 335 Project 1: Lawnmower

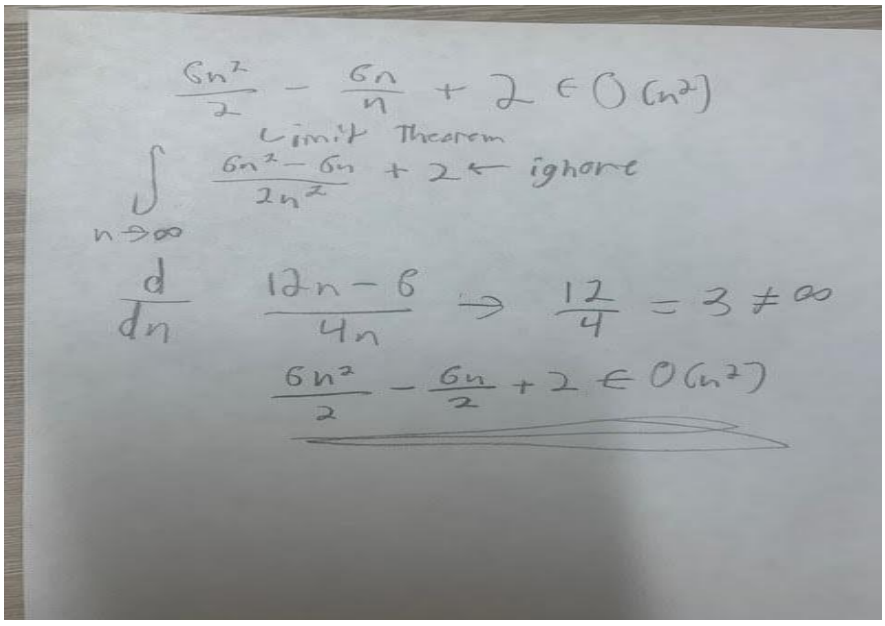
Alternating Algorithm:

```
int numOfSwap                                              -> 1 tu
disk Sort = unsorted                                       -> 1 tu
for i = 0 in sorted.size() / 2 do                          -> (n / 2) tu
  for j = i in sorted.size() do                            -> (n - 1) tu
    if (LIGHT Disk is not followed by DARK Disk) do        -> 4 tu
      swap LIGHT and DARK                                  -> 1 tu
      numOfSwap++                                          -> 1 tu
return sorted and numOfSwap
```

This is the pseudocode for the alternate algorithm, and it shows that the worst time complexity for this would be $O(n^2)$

By calculating every step of the pseudocode, we can figure out the time complexity is **1 + 1 + ((n / 2) * (n - 1) * (4 + 1 + 1))**, and if we simplified this equation we would end up with

$6\frac{n^2}{2} - 6\frac{n}{2} + 2$



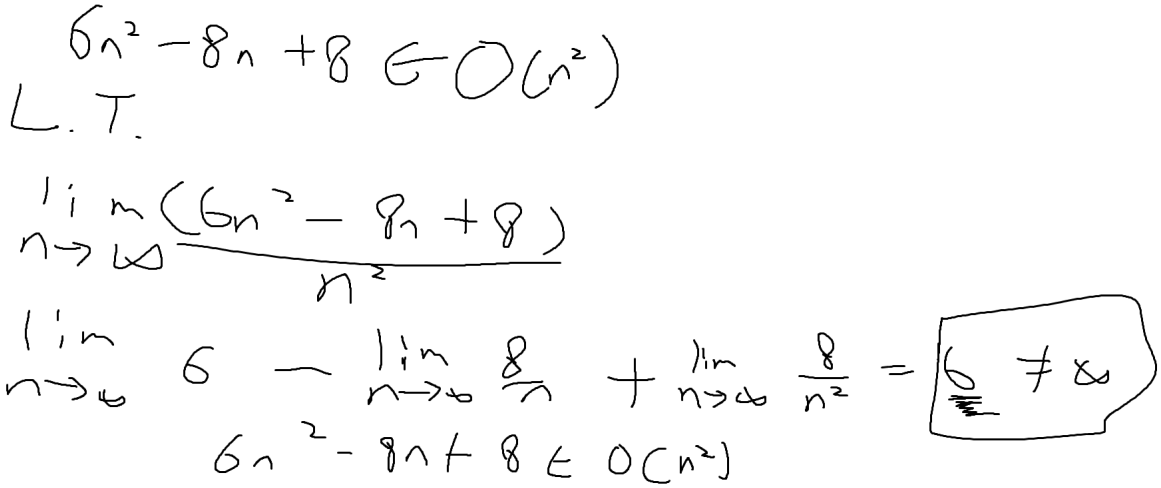
Lawnmower Algorithm:

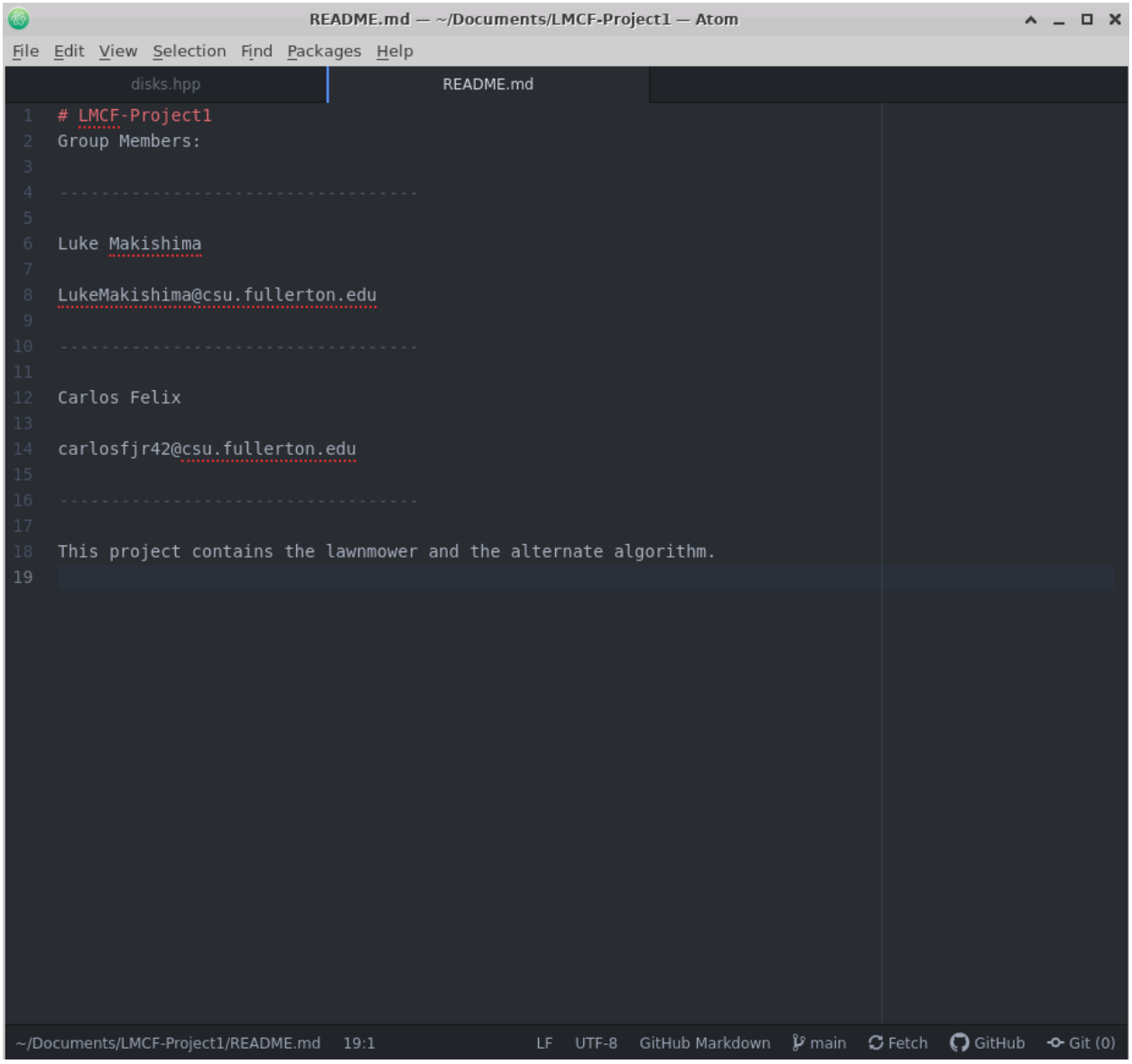
Int numOfSwaps	**-> 1 tu**
disk Sort = unsorted	**-> 1 tu**
for i = 0 in sorted.size() - 1 do	**-> (n - 1) tu**
for j in i to sorted.size() - 1 do	**-> (n - 1) tu**
if (LIGHT Disk is not followed by DARK Disk) do	**-> 4 tu**
Swap LIGHT and DARK	**-> 1 tu**
numOfSwap++	**-> 1 tu**
return sorted and numOfSwap	

This is the pseudocode for the Lawnmower algorithm, and it shows that the worst time complexity for this would be $O(n^2)$

By calculating every step of the pseudocode, we can figure out the time complexity is **1 + 1 + ((n - 1) * (n - 1) * (4 + 1 + 1))**, and if we simplified this equation we would end up with **$6n^2 - 8n + 8$**

Limit Theorem:




README.md — ~/Documents/LMCF-Project1 — Atom
File Edit View Selection Find Packages Help
disks.hpp
README.md
1 # LMCF-Project1
2 Group Members:
3
4 ----------
5
6 Luke Makishima
7
8 LukeMakishima@csu.fullerton.edu
9
10 ----------
11
12 Carlos Felix
13
14 carlosfjr42@csu.fullerton.edu
15
16 ----------
17
18 This project contains the lawnmower and the alternate algorithm.
19
~/Documents/LMCF-Project1/README.md 19:1 LF UTF-8 GitHub Markdown main Fetch GitHub Git (0)

```
[tuffix@vclvm011104-225-174 LMCF-Project1]$ g++ -std=c++11 -Wall disks_test.cpp
[tuffix@vclvm011104-225-174 LMCF-Project1]$ ./a.out
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
```