Project 1/Lawnmower Project Report

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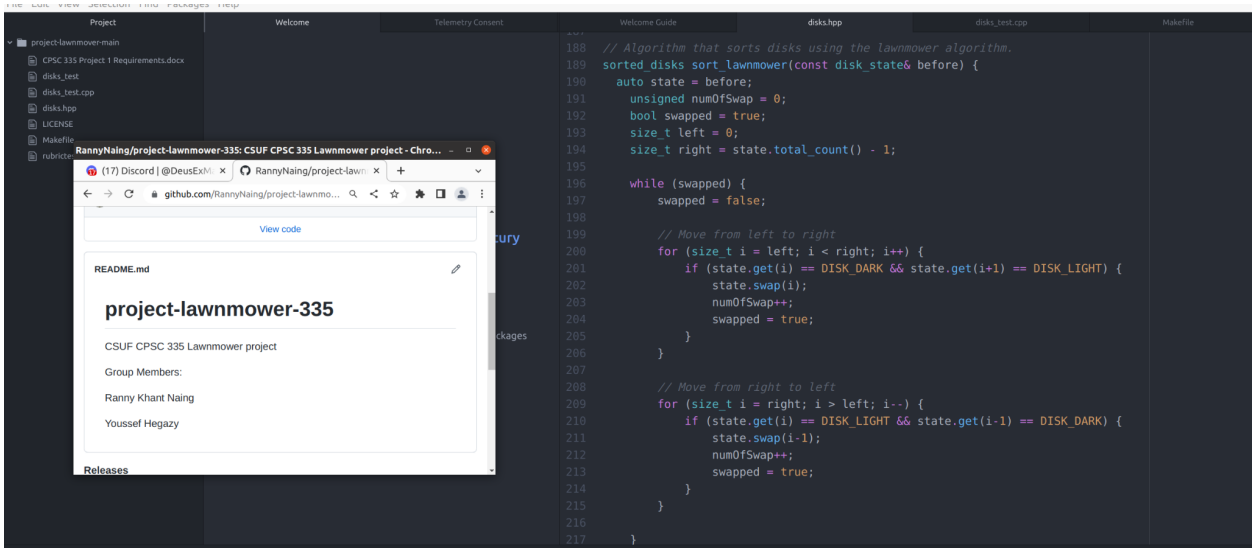
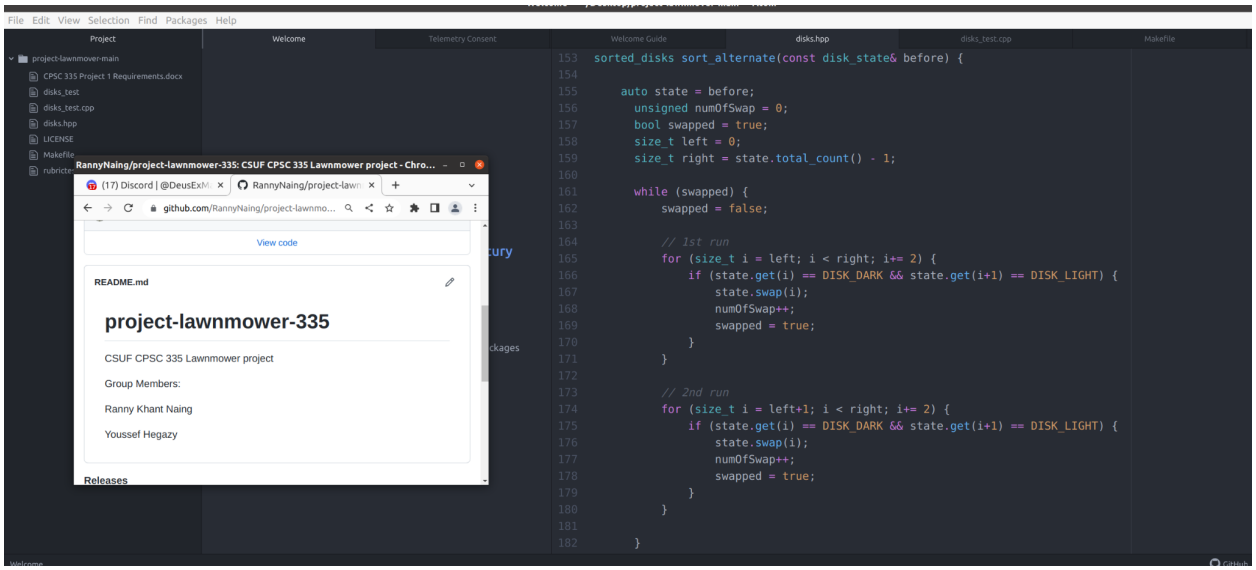
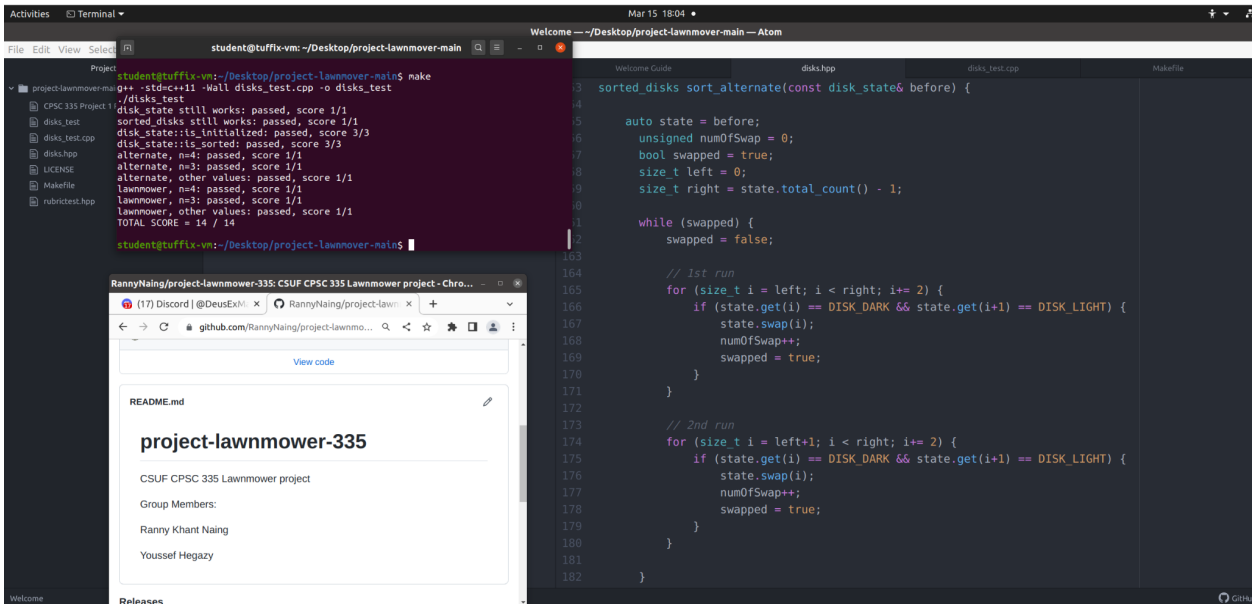
This is a submission for Project 1.



Screenshot for Lawnmower algorithm



Screenshot for Alternate algorithm



Screenshot for the compiling

Pseudo code for Lawnmower algorithm

Def sort_lawnmower(before):	Step Counts
state = before;	1
numOfSwap = 0;	1
swapped = true;	1
left = 0;	1
right = total_count()-1;	2
while (swapped):	n/2

```
        swapped = false;                                    1
        for(i = left; i < right; ++i):                      n
            if(state[i] == dark && state[i+1} == light):    3
                Swap[i];                                    1
                numOfSwap++;                                1
                swapped = true;                             1
            end if
        end for
        for(i = right; i > left; --i):                      n
            if(state[i] == light && state[i+1} == dark):    3
                swap[i];                                    1
                numOfSwap++;                                1
                swapped = true;                             1
            end if
        end for
    end while
return disk_state(state,numOfSwap);
```

Total Step Count = 1+1+1+1+ 2+ n/2*(1+n*(3+max(3, 0))+n*(3+max(3 0)))

= 6+n/2*(1+6n+6n)

= 6+n/2*(1+12n)

=6n^2 + 6 + n/2

The Lawnmower algorithm has an efficiency of O(n^2).

Pseudo code for Alternate algorithm

	Step Counts
Def sort_lawnmower(before):	
state = before;	1
numOfSwap = 0;	1
swapped = true;	1
left = 0;	1
right = total_count()-1;	2
while (swapped):	n+1
swapped = false;	1
for(i = left; i < right; i += 2):	n/2
if(state[i] == dark && state[i+1} == light):	3
Swap[i];	1
numOfSwap++;	1
swapped = true;	1
end if	
end for	

```
        for(i = left +1 ; i < right; i += 2):                    n/2
            if(state[i] == dark && state[i+1} == light):         3
                Swap[i];                                         1
                numOfSwap++;                                     1
                swapped = true;                                  1
            end if
        end for
    end while
return disk_state(state,numOfSwap);
```

Total Step Count = 1+1+1+1+ 2+ (n+1)*(1+n/2*(3+max(3, 0))+n/2*(3+max(3 0)))

= 6+(n+1)*(1+3n+3n)

= 6+(n+1)*(1+6n)

=6+ n + 6n^2 + 1 + 6n

=6n^2 + 7n + 7

The alternate algorithm has an efficiency of O(n^2).