Lumberjack

By Team Geeks

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Hurdle in the problem

- Huge grid size
- Limited time for cutting the trees
- Limited time for execution

Our Approach

Under the given constraints

As the given time for execution is limited we cannot check for the path which gives us the maximum profit

So what we did ??

Our Idea for Maximum Profit

The algorithm used by us is somewhat similar to a greedy solution. It basically searches for the tree which has the highest **profit by time** ratio from the current location you are at.

Profit Density = Profit / Time

Language used

The language we have chosen is C++.
Because it is

- It is fast.
- It has pre-built functions.

The main idea :

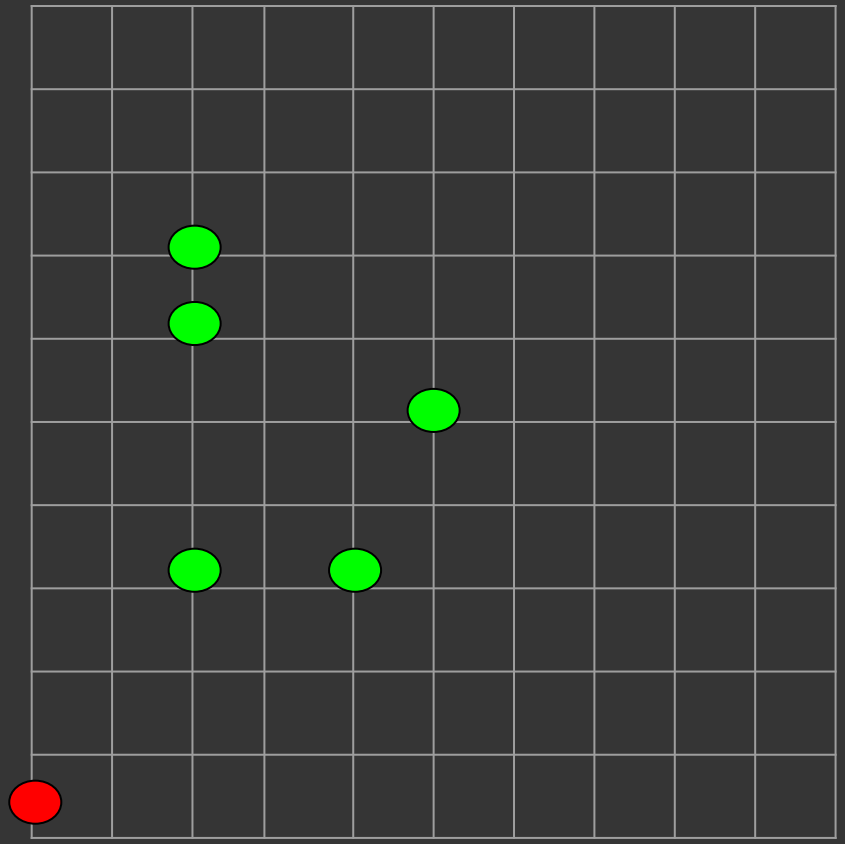
- Because the algorithm we used is a greedy approach we considered the path the lumberjack had to go to be the most profitable path.

Our alogorithm checks all the other trees to see the most profitable path from the lumberjacks current location,For each tree we recursively considered the Domino effect in all four directions and the next tree where the lumberjack needs to move is the highest profit density of all.

Example of our implementation

Lumberjack

Tree



Tree Information

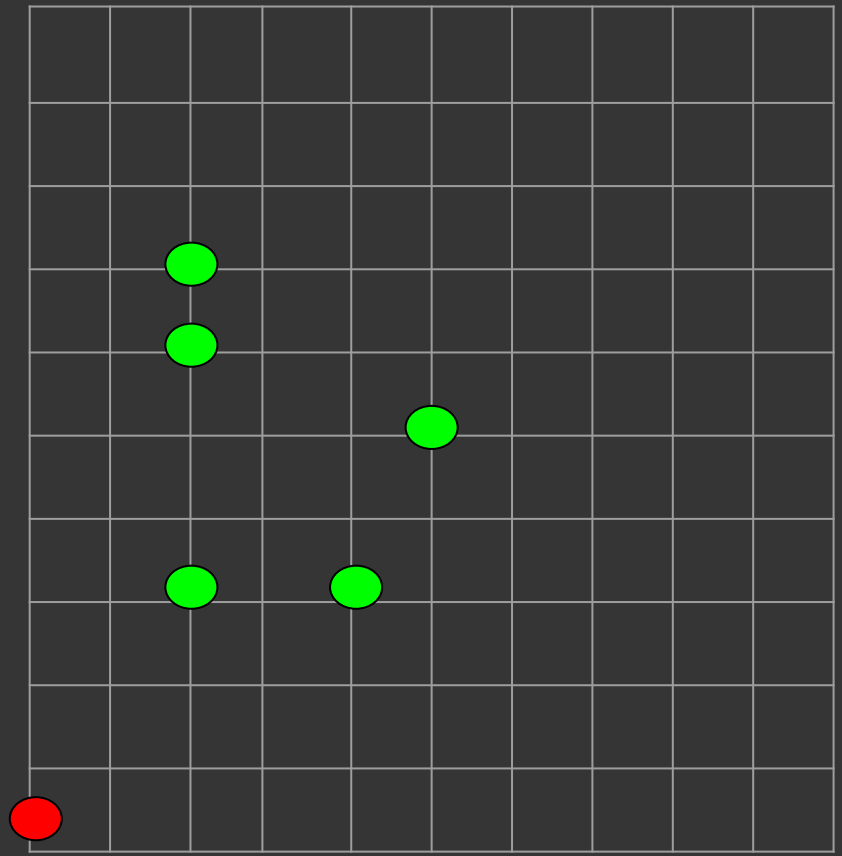
1. (2,3) h = 4; d = 5; c = 2; p = 2.
2. (2,6) h = 3; d = 1; c = 1; p = 3.
3. (2,7) h = 2; d = 2; c = 2; p = 4.
4. (5,5); h = 10; d = 3; c = 1; p =5.
5. (4 ,3); h = 5; d = 5; c = 2; p =6.

Constraints

- Time = 11 units
- Size of grid = 10 units
- Number of tree = 5

Weight = c*d*h
Price = p*d*h

Example of our implementation



Xcurrent =0 , Ycurrent=0

Profit Density for each tree from the given Position

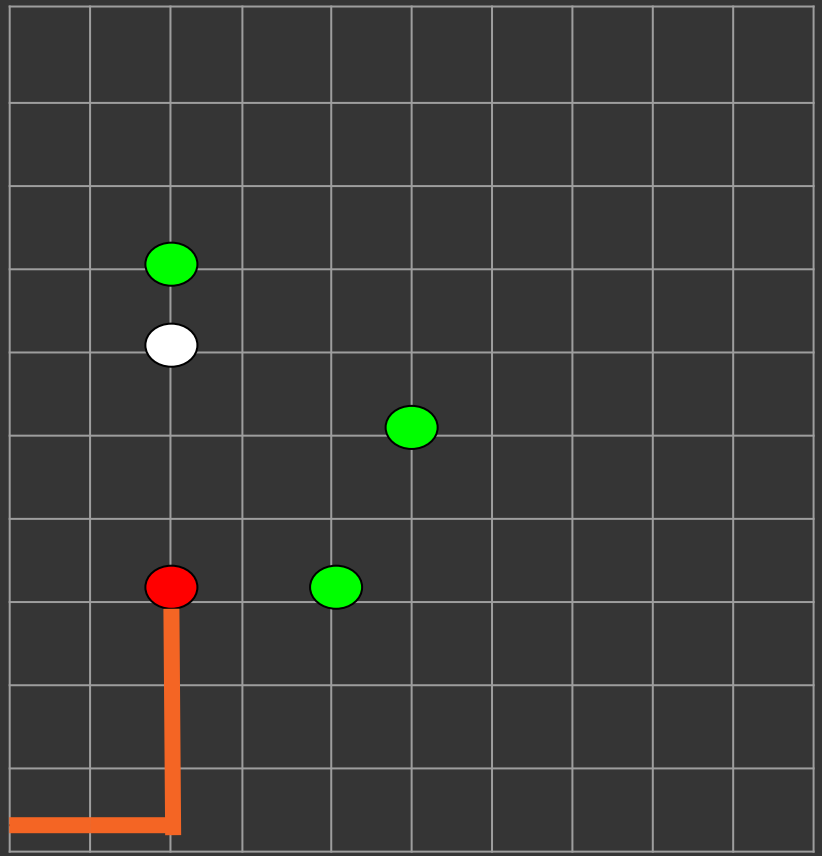
Considering Domino Effect

1. 4.9 (time=10 ,Tree 2 is part of domino and cut up)
2. 1 (time = 9 and no domino)
3. 2.3 (time=11 , Tree 2 is part of domino and cut down)
4. Can't cut
5. Can't cut

Conditions For Domino Effect:

- Tree should be within the circular range with radius of the falling tree.
- Falling tree weight must be more than the weight of tree on which it falls.

Example of our implementation



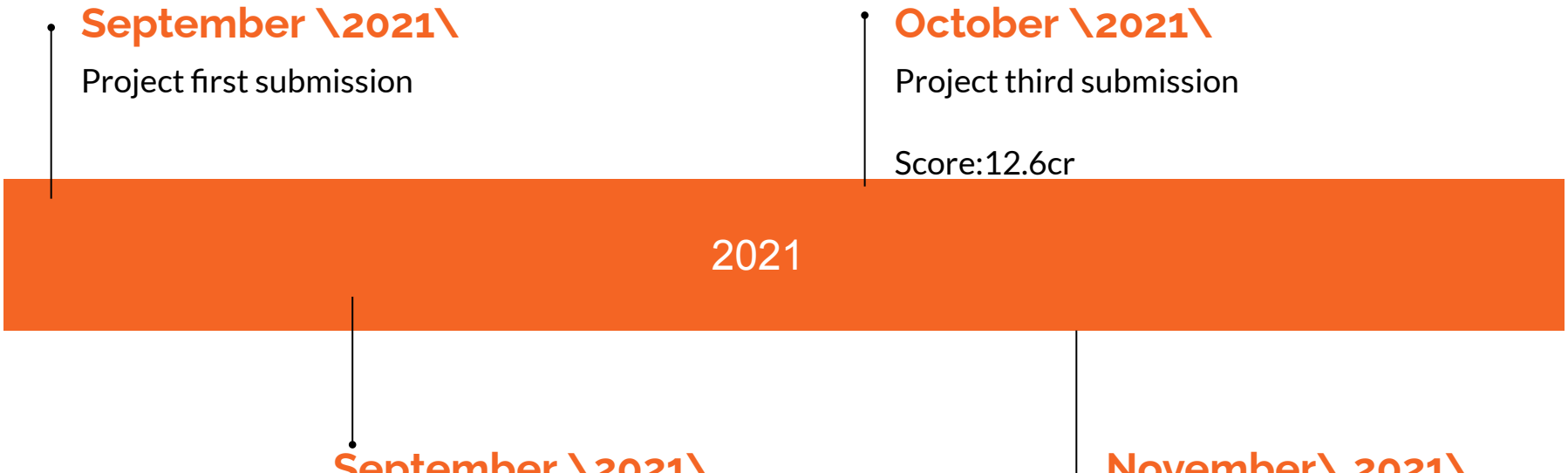
We can notice that we are getting maximum profit if we cut tree 1.

Now the available time is 1 unit
So no tree can be cut

OUTPUT

Move Right
Move Right
Move Up
Move Up
Move Up
Cut Up

Milestones


September \2021\
Project first submission
October \2021\
Project third submission
Score:12.6cr
2021
September \2021\
Project second submission
Score:1.5cr
November\ 2021\
Project fourth submission

Thank You

Instructor,
Mr. k.kondepu sir
For giving us this opportunity of doing a project

Ta's

For their constant effort for making the process of evaluation smooth