Dyrads

Solution

Notice that we can never cast a spell on green trees, therefore first we spilt the trees by green trees and process them independently. Then observe that a continuous segment of same type of trees can be treated as one, i.e. `YYYYYYY` is equal to a single `Y`. As a result we are going to handle segment of trees which is alternating in `Y` and `W`, like: `WYWY...WYW`. We will assume that we are always referring to this form in the rest of this solution.

Count the number of `Y` and `W`. If there is more or equal `Y` than `W`, do the following: cast `Grow` on each `W`, then `Grow` all trees. Otherwise do the follow: cast `Blow` on each `Y`, then `SuperGrow` all trees.

For a segment of n trees, we always turn all trees to `G` using $\lfloor n/2 \rfloor + 1$ spells.

Proof of optimality

If we cast a spell on a `Y` or `W` tree, assuming that it is a valid spell for both trees, then they always results in difference type of trees. The same argument can also applies for a sequence of spells.

Therefore for a `Y` and `W` tree, they must be applied a difference sequence of spells before both turned green. Which means for two adjacent trees, there must be at least one spell start or end in between them. At the same time, since each tree should be cast at least once, therefore there should also be at least one spell start or end in the leftmost and rightmost position.

In total there are $n + 1$ such positions that there should be at least one spell start or end on it. Each spell can 'covers' two positions. Therefore the lower bound of spells required equals $\lceil (n + 1)/2 \rceil = \lfloor n/2 \rfloor + 1$.