EcoSystemSimulator

Written and Implemented

By

MD JAODUN MUNTASIR (BVLLR5)

Object Oriented Programming

Eötvös Loránd University

Task

7. Different kinds of plants live on a planet. If the nutrient of a plant runs out (its nutrient level

becomes zero), the plant wastes away. There are three kinds of radiation on the planet: alpha, delta, and no radiation. The different species of plants react to radiation differently. The reaction involves a change in the nutrient level of the plant and the radiation the next day. The radiation of the next day will be alpha radiation if the sum of the demand for alpha radiation over all plants is greater than the sum of the demand for delta radiation by at least three. If the demand for delta radiation is greater by at least three than the demand for alpha radiation, the radiation will be delta. If the difference is less than three, there will be no radiation. There is no radiation the first day. Each plant has a name (string), a nutrient level (int), and a boolean that denotes whether it's alive. The plant species are wombleroot, wittentoot and woreroot. The different plant species react to the different radiations as follows. The level of nutrients changes first. After that, the plant can influence the radiation of the next day if it's still alive.

Wombleroot:

Alpha radiation makes the nutrient level increase by 2, no radiation makes it decrease by 1, and delta radiation makes it decrease by 2. It demands alpha radiation by a strength of 10 regardless of the current radiation. This plant also wastes away if its nutrient level increases above 10.

Wittentoot:

Alpha radiation makes the nutrient level decrease by 3, no radiation makes it decrease by 1, delta radiation makes it increase by 4. This plant demands delta radiation with strength 4 if its nutrient level is less than 5, with strength 1 if its nutrient level is between 5 and 10, and doesn't influence the radiation if its nutrient level is greater than 10.

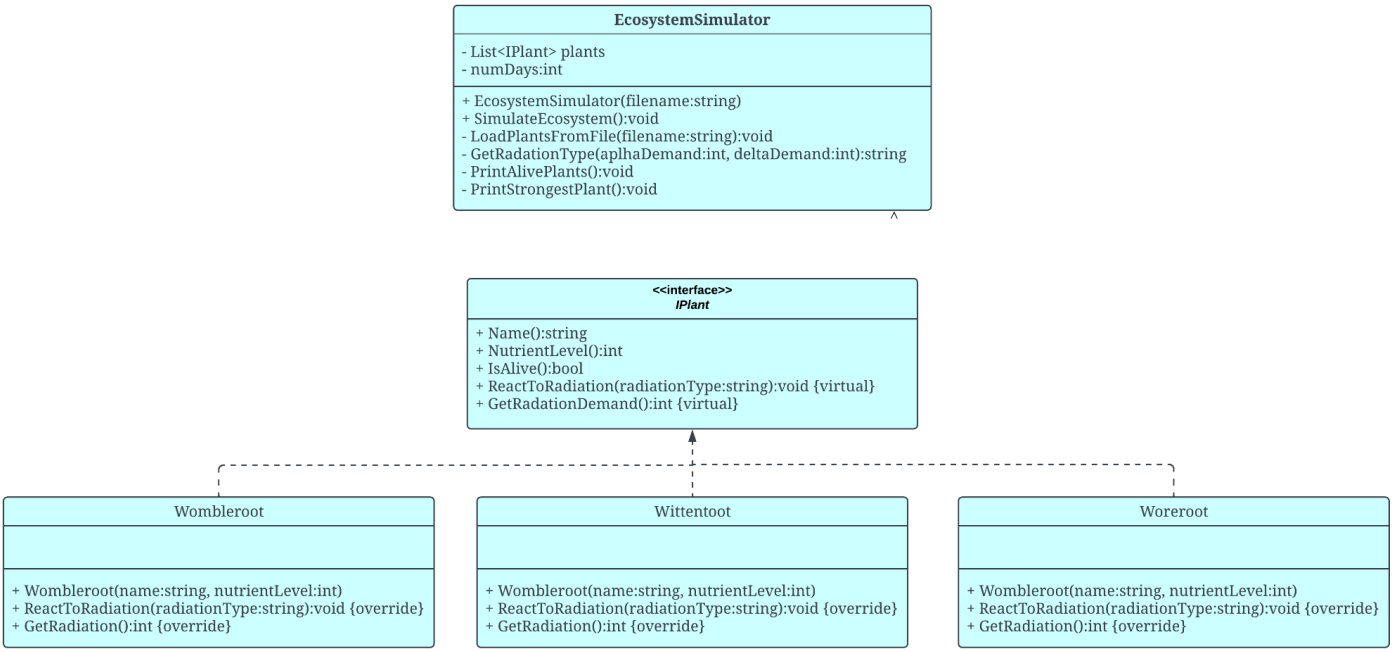
Woreroot:

Its nutrient level increases by 1 if there is alpha or delta radiation, and decreases by 1 if there is no radiation. Doesn't influence the radiation of the next day.

Simulate the ecosystem of plants and give the name of the strongest plant which is still alive after n days. Print all the data of the plants and the level of radiation on each day. The program should read the data of the simulation from a text file. The first line contains the number of plants. Each of the next lines contains the data of one plant: its name, its species, and it's starting nutrient level. The species can be: wom - wombleroot, wit - wittentoot, wor - woreroot. The last line of the file contains n, the number of days as an int. The program should ask for the filename and display the contents of the file. You can assume that the input file is correct. A possible input file

```
4
Hungry wom 7
Lanky wit 5
Big wor 4
Tall wit 3
10
```

UML Diagram


EcosystemSimulator
- List<IPlant> plants
- numDays:int
+ EcosystemSimulator(filename:string)
+ SimulateEcosystem():void
- LoadPlantsFromFile(filename:string):void
- GetRadationType(aplhaDemand:int, deltaDemand:int):string
- PrintAlivePlants():void
- PrintStrongestPlant():void
<<interface>>
IPlant
+ Name():string
+ NutrientLevel():int
+ IsAlive():bool
+ ReactToRadiation(radiationType:string):void {virtual}
+ GetRadationDemand():int {virtual}
Wombleroot
+ Wombleroot(name:string, nutrientLevel:int)
+ ReactToRadiation(radiationType:string):void {override}
+ GetRadiation():int {override}
Wittentoot
+ Wombleroot(name:string, nutrientLevel:int)
+ ReactToRadiation(radiationType:string):void {override}
+ GetRadiation():int {override}
Woreroot
+ Wombleroot(name:string, nutrientLevel:int)
+ ReactToRadiation(radiationType:string):void {override}
+ GetRadiation():int {override}