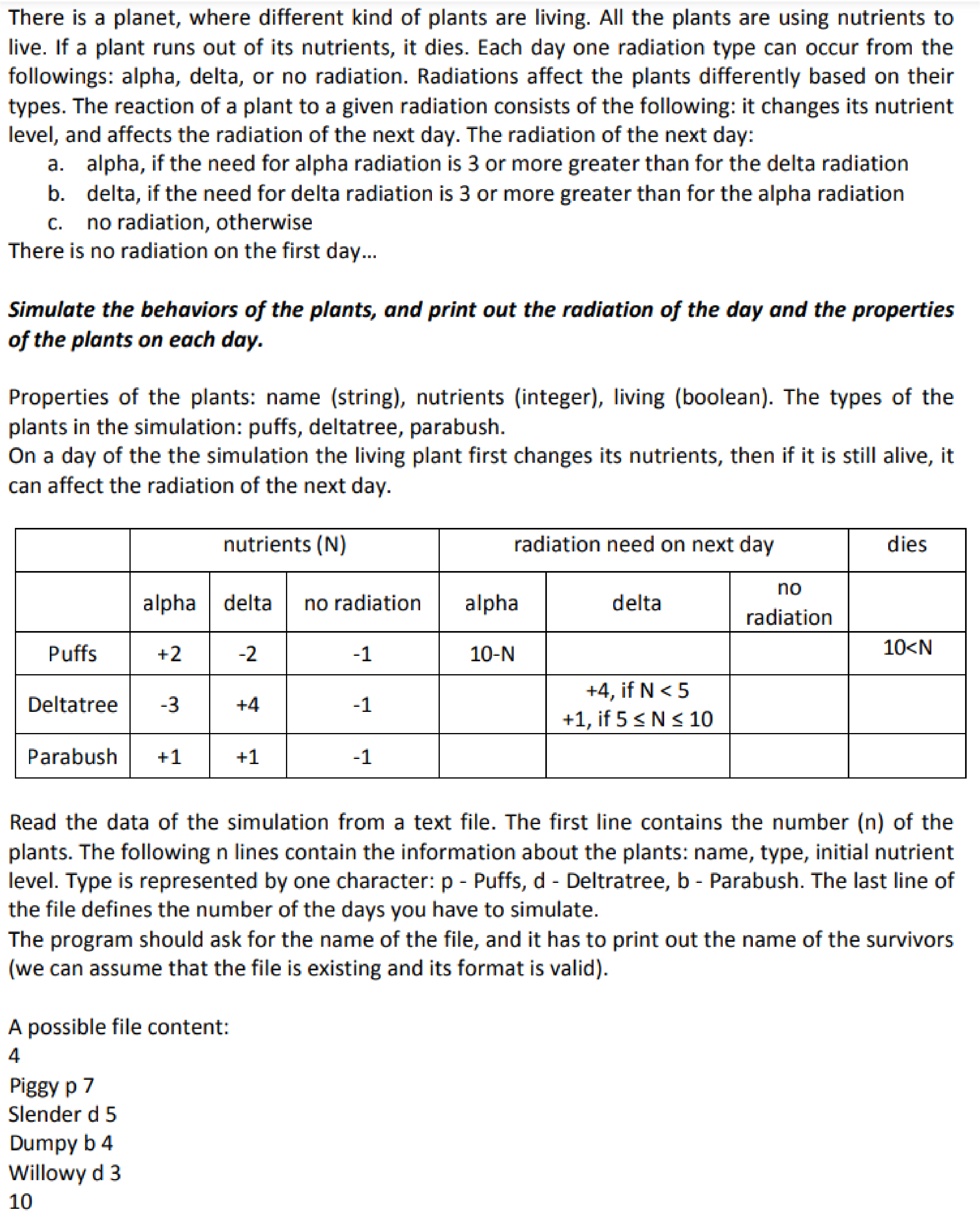
Zhainagul Altynbek kyzy, V7I2JB **1st Assignment, 2nd Task.**

Description of the exercise:



There is a planet, where different kind of plants are living. All the plants are using nutrients to live. If a plant runs out of its nutrients, it dies. Each day one radiation type can occur from the followings: alpha, delta, or no radiation. Radiations affect the plants differently based on their types. The reaction of a plant to a given radiation consists of the following: it changes its nutrient level, and affects the radiation of the next day. The radiation of the next day:

a. alpha, if the need for alpha radiation is 3 or more greater than for the delta radiation
b. delta, if the need for delta radiation is 3 or more greater than for the alpha radiation
c. no radiation, otherwise

There is no radiation on the first day…

Simulate the behaviors of the plants, and print out the radiation of the day and the properties of the plants on each day.

Properties of the plants: name (string), nutrients (integer), living (boolean). The types of the plants in the simulation: puffs, deltatree, parabush.
On a day of the the simulation the living plant first changes its nutrients, then if it is still alive, it can affect the radiation of the next day.

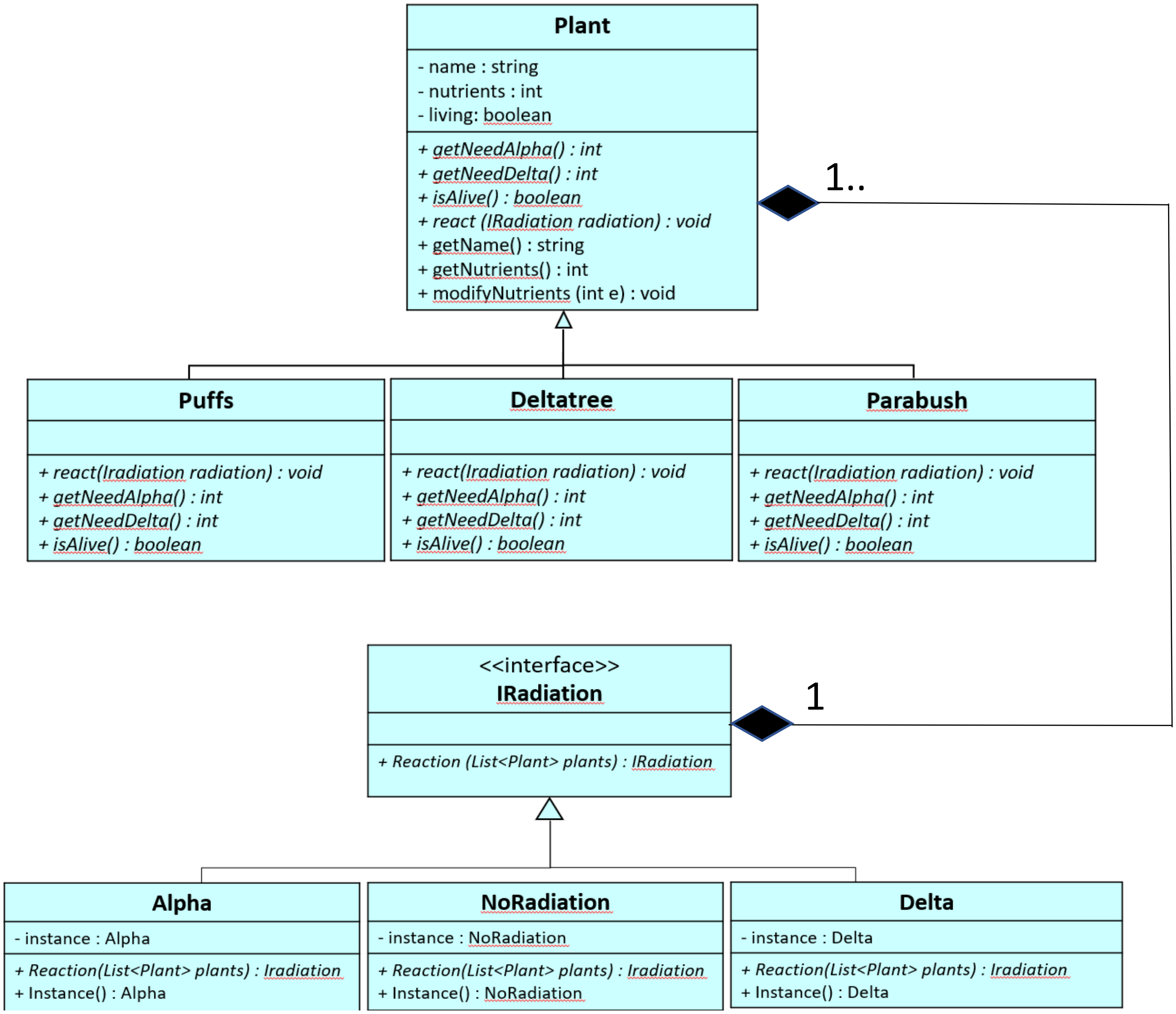
	nutrients (N)			radiation need on next day			dies
	alpha	delta	no radiation	alpha	delta	no radiation	
Puffs	+2	-2	-1	10-N			10<N
Deltatree	-3	+4	-1		+4, if N < 5 +1, if 5 ≤ N ≤ 10		
Parabush	+1	+1	-1				

Read the data of the simulation from a text file. The first line contains the number (n) of the plants. The following n lines contain the information about the plants: name, type, initial nutrient level. Type is represented by one character: p - Puffs, d - Deltratree, b - Parabush. The last line of the file defines the number of the days you have to simulate.
The program should ask for the name of the file, and it has to print out the name of the survivors (we can assume that the file is existing and its format is valid).

A possible file content:

```
4
Piggy p 7
Slender d 5
Dumpy b 4
Willowy d 3
10
```

UML class diagram:



Method descriptions:

Radiation class:

public IRadiation Reaction(List<Plant> plants): A method in the classes Alpha, NoRadiation, and Delta, implementing the IRadiation interface. It calculates radiation needs for alpha and delta based on a list of plants and determines the next radiation type.

getName(): Returns the name of the plant.

getNutrients(): Returns the nutrient level of the plant.

modifyNutrients(int e): Modifies the nutrient level by adding or subtracting e.

getNeedAlpha(): An abstract method to calculate the need for alpha radiation.

getNeedDelta(): An abstract method to calculate the need for delta radiation.

isAlive(): An abstract method to determine if the plant is alive.

react(IRadiation radiation): An abstract method to modify nutrient levels based on the given radiation.

Test cases:

1. **Usual inpu**t: input1.txt
   ```
   4
   Piggy p 7
   Slender d 5
   Dumpy b 4
   Willowy d 3
   10
   ```
   Expected last output:
   ```
   alpha_need:6 delta_need:0
   day 10 current radiation: Alpha
   Piggy 4 alive:true type:Puffs
   Dumpy 4 alive:true type:Parabush
   ```
2. **Long input:** input2.txt
   ```
   12
   Chop p 11
   Romashka p 4
   Alma d 5
   Almurut b 14
   Zhuzum p 7
   Kainaly  b 6
   Oruk p 6
   Shabdaly d 11
   Chalkan p 2
   Chagylgan d 3
   Shpinat p 12
   Kapusta b 4
   14
   ```
   Expected last output:
   ```
   alpha_need:1 delta_need:0
   day 14 current radiation: NoRadiation
   Almurut 14 alive:true type:Parabush
   Kainaly 6 alive:true type:Parabush
   Chalkan 9 alive:true type:Puffs
   ```

Kapusta 4 alive:true type:Parabush

3. **Empty input:** input3.txt
   Expected output: Error: The file is empty.
4. **Wrong input format:** input4.txt
   Expected output: Wrong input format: For input string: "bla".
5. **Non existing file input:** input6.txt
   Expected output: Error reading the file: input6.txt (The system cannot find the file specified).
6. **Short input:** input5.txt
   Expected last output:
   alpha_need:3 delta_need:0
   day 10 current radiation: Alpha
   Chalkan 7 alive:true type:Puffs