Programming Technology

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W3RQNK

Assignment 1

Question:

1- There is a race for creatures, which takes place on several consecutive days. **Who wins the race? (In other words, which creature can go farthest and remain live?)** At the beginning, each creature has an amount of water, and a distance of 0 from the start. There are three different kind days could occur: sunny, cloudy, rainy. The movement and the water level of a creature are affected by the type of the day and the creature. At first, a creature changes its water level according to the day, and if it is still alive, it moves. A creature dies if it runs out of water (water level drops to 0 or below). A dead creature doesn't move...

Properties of creatures: name of the creature (string), water level (integer), maximum water level (integer), living (Boolean), distance (integer).

The types of creatures on the race are: sandrunner, sponge, walker. Creatures cannot have water more than their maximum water level. Read the data of the race from a text file. The first line of the file contains the number of competitors (let's say N). Each of the following N lines contains a competitor: name, type, initial water level. The properties are separated by spaces; and the type is represented with one character: r - sandrunner, s - sponge, w - walker. The last line of the file contains the type of the days on the race: s - sunny, c - cloudy, r - rainy.

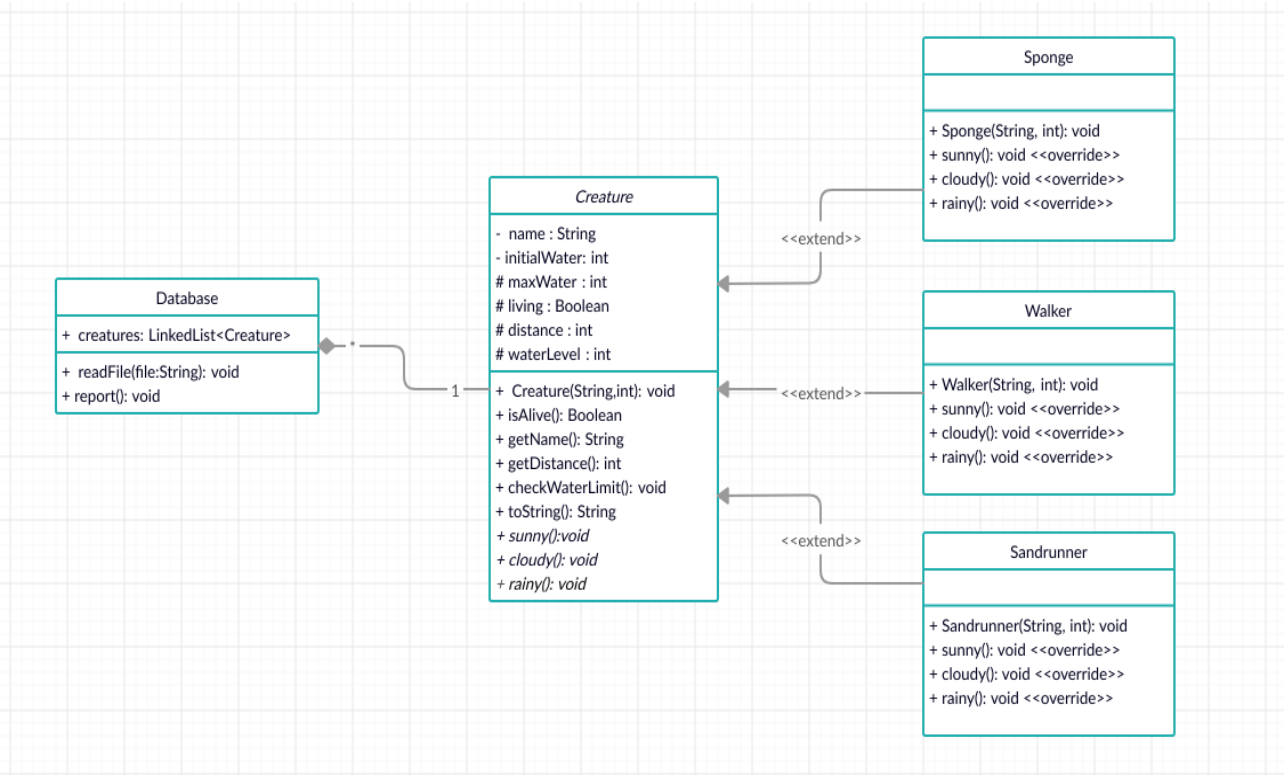
The program should ask for the name of the file, and it has to print out the name of the winner (we can assume that the file is existing and its format is valid).

Description:

We have to simulate an event more specifically a race in which different kind of creatures are participating. There are three different kinds and every kind has different attributes or properties, which means that every creature will be affected by the weather differently during the race. A creature dehydrates if it has no water so we have to constantly keep checking its water level as well. We have to find out which creature remains alive till the end of the race and has covered the maximum distance.

For this, create an abstract Creature class, and derive the three kind of creatures. Let this class have a constructor with the parameters of name and initial water level. Introduce three methods for each day (sunny, cloudy, rainy), which updates the water level, checks the life of the creature, and handles the movement. To obtain the final result, the following 3 methods are also required: isAlive, getName, getDistance.

Class Diagram:



Function Description:

readFile():

The function reads a file from the beginning and stores the name of the creatures in the linked list. It then iterates through the linked list again and applies the conditions of all the days on the creatures. It also has exceptions to check if the file is located or not.

report():

The report function iterates through the linked list to find that which creature can go farthest and remain alive. Then the names of these creatures are stored in an arraylist.

IsAlive():

The function returns a boolean value by checking if the water level of the creature.

checkWaterLimit():

The function checks if the water level is equal or less than the max water level limit of the creature.

toString():

The function returns the name and distance of the creature by combining it all into one string.

sunny() & cloudy() & rainy():

These function applies their own weather condition on the creatures.

Testing:

Sample 1:

Input:

4

wanderer r 4

walk w 7

slider s 12

sneaky s 10

Sccrrrssc

Output:

Max distance covered is: 12

And the winners are:

: wanderer

: walk

: slider

: sneaky

Sample 2:

Input:

4

lust r 4

jam w 2

ali s 12

creed s 10

sccrsssssss

Output:

No runner could survive the race

Sample 3:

Input:

1

matt r 4

rss

Output:

Max distance covered is: 6

And the winners are:

: matt

Sample 4:

Input:

0

ssss

Output:

Not enough creatures to start the race

Sample 4:

Input:

7

wanderer r 4

walk w 7

slider s 12

sneaky s 10

scavenger r 9

fly w 2

twirler s 10

sccrrrssc

Output:

Max distance covered is: 12

And the winners are:

: wanderer

: walk

: slider

: sneaky

: scavenger

: twirler