. description of the exercise

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.

The following table contains the properties of the creatures.

	water change			distance			max. water
	sunny	cloudy	rainy	sunny	cloudy	rainy	
sandrunner	-1	0	3	3	1	0	8
sponge	-4	-1	6	0	1	3	20
walker	-2	-1	3	1	2	1	12

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 (lets 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).

A possible file content:

4

wanderer r 4

walk w 7

slider s 12

sneaky s 10

sccrrrssc

(Tips: 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 days (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.)
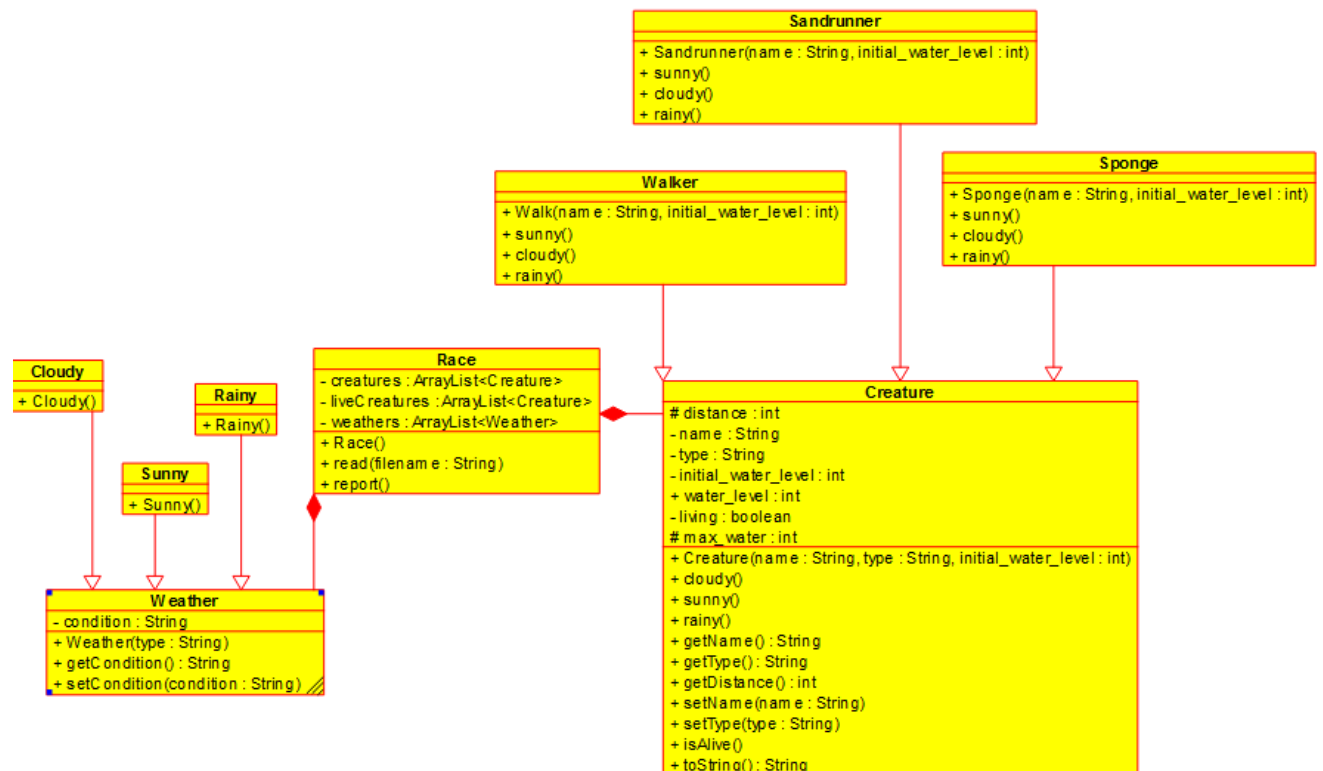
• short description how to use your program (user doc)

For users, you can get the result by editing the data in the input.txt

```
4                   //the number of competitors (lets say N).
wanderer r 4        //competitor information :   name, type, initial water level.
walk w 7
slider s 12
sneaky s 10
s c c r r r s s c      // weather representation
                 // s : sunny   c : cloudy   r : rainy
```

Please notice that you must type creatures' data in such a form and you can't change the type of creatures and weathers

UML class diagram (made with a dedicated UML tool)

Sandrunner

+ Sandrunner(name : String, initial_water_level : int)
+ sunny()
+ cloudy()
+ rainy()

Sponge

+ Sponge(name : String, initial_water_level : int)
+ sunny()
+ cloudy()
+ rainy()

Walker

+ Walk(name : String, initial_water_level : int)
+ sunny()
+ cloudy()
+ rainy()

Race

- creatures : ArrayList<Creature>
- liveCreatures : ArrayList<Creature>
- weathers : ArrayList<Weather>
+ Race()
+ read(filename : String)
+ report()

Cloudy

+ Cloudy()

Rainy

+ Rainy()

Sunny

+ Sunny()

Creature

\# distance : int
- name : String
- type : String
- initial_water_level : int
+ water_level : int
- living : boolean
\# max_water : int
+ Creature(name : String, type : String, initial_water_level : int)
+ cloudy()
+ sunny()
+ rainy()
+ getName() : String
+ getType() : String
+ getDistance() : int
+ setName(name : String)
+ setType(type : String)
+ isAlive()
+ toString() : String

Weather

- condition : String
+ Weather(type : String)
+ getCondition() : String
+ setCondition(condition : String)

short descriptions of the implemented methods

```
//Introduce sunny methods for each days to update creatures' water lelel and distance
    public void sunny(){

    }
```

```
//Introduce cloudy methods for each days to update creatures' water lelel and distance
    public void cloudy(){

    }
```

```java
//Introduce rainy methods for each days to update creatures' water lelel and distance
    public void rainy(){

    }
    // check the life of the creature
        public boolean isAlive(){
            if(water_level>=0){
                living = true;
            }
            return living;
        }

    //to read creatures' name
        public String getName() {
            return name;
        }

    // update value of creatures'name
        public void setName(String name) {
            this.name=name;
        }

    // to read the type of creatures
        public String getType() {
            return type;
        }

    // update value of creatures'type
        public void setType(String type) {
            this.type=type;
        }

    // to read the distance of each creature
        public int getDistance() {
            return distance;
        }
```

// to make all non-private methods of the super class accessible
    @Override

//to produce a textual form of result
    public String toString(){

        return   name +" and there is   "+water_level +" water level left,"+" whose distance is: "+distance   ;

    }

* list of test cases you have tested (at least 10 pieces)

1.

input.txt:

4

wanderer r 4

walk w 7

slider s 12

sneaky s 10

s c c r r r s s

output:

Creatures in the Race Competition:

creature.Sunny@7d4991ad

name: wanderer, water left: 3 distance: 3

name: walk, water left: 5 distance: 1

name: slider, water left: 8 distance: 0

name: sneaky, water left: 6 distance: 0

creature.Cloudy@28d93b30

name: wanderer, water left: 3 distance: 4

name: walk, water left: 4 distance: 3

name: slider, water left: 7 distance: 1

name: sneaky, water left: 5 distance: 1

creature.Cloudy@1b6d3586

name: wanderer, water left: 3 distance: 5

name: walk, water left: 3 distance: 5

name: slider, water left: 6 distance: 2

name: sneaky, water left: 4 distance: 2

creature.Rainy@4554617c

name: wanderer, water left: 6 distance: 5

name: walk, water left: 6 distance: 6

name: slider, water left: 12 distance: 5

name: sneaky, water left: 10 distance: 5

creature.Rainy@74a14482

name: wanderer, water left: 8 distance: 5

name: walk, water left: 9 distance: 7

name: slider, water left: 18 distance: 8

name: sneaky, water left: 16 distance: 8

creature.Rainy@1540e19d

name: wanderer, water left: 8 distance: 5

name: walk, water left: 12 distance: 8

name: slider, water left: 20 distance: 11

name: sneaky, water left: 20 distance: 11

creature.Sunny@677327b6

name: wanderer, water left: 7 distance: 8

name: walk, water left: 10 distance: 9

name: slider, water left: 16 distance: 11

name: sneaky, water left: 16 distance: 11

creature.Sunny@14ae5a5

name: wanderer, water left: 6 distance: 11

name: walk, water left: 8 distance: 10

name: slider, water left: 12 distance: 11

name: sneaky, water left: 12 distance: 11

creature.Cloudy@7f31245a

name: wanderer, water left: 6 distance: 12

name: walk, water left: 7 distance: 12

name: slider, water left: 11 distance: 12

name: sneaky, water left: 11 distance: 12

the winner of the game is :wanderer and there is   6 water level left, whose distance is: 12

the winner of the game is :walk and there is   7 water level left, whose distance is: 12

the winner of the game is :slider and there is   11 water level left, whose distance is: 12

the winner of the game is :sneaky and there is   11 water level left, whose distance is: 12

input:

    2.
    Input:
    4
    wanderer r 4
    walk w 7
    slider s 12
    sneaky s 10
    s

    result:
    Creatures in the Race Competition:

    creature.Sunny@7d4991ad
    name: wanderer, water left: 3 distance: 3
    name: walk, water left: 5 distance: 1
    name: slider, water left: 8 distance: 0
    name: sneaky, water left: 6 distance: 0

    the winner of the game is :wanderer and there is   3 water level left, whose distance is: 3

    3.input:

    3
    wanderer r 4

walk w 7
slider s 12
s r c

output:

Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wanderer, water left: 3 distance: 3
name: walk, water left: 5 distance: 1
name: slider, water left: 8 distance: 0

creature.Rainy@28d93b30
name: wanderer, water left: 6 distance: 3
name: walk, water left: 8 distance: 2
name: slider, water left: 14 distance: 3

creature.Cloudy@1b6d3586
name: wanderer, water left: 6 distance: 4
name: walk, water left: 7 distance: 4
name: slider, water left: 13 distance: 4

the winner of the game is :wanderer and there is   6 water level left, whose distance is: 4

the winner of the game is :walk and there is   7 water level left, whose distance is: 4

the winner of the game is :slider and there is   13 water level left, whose distance is: 4

4.input:

3
wanderer r 5
walk w 8
slider s 9
s r c s

output:
Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wanderer, water left: 4 distance: 3
name: walk, water left: 6 distance: 1
name: slider, water left: 5 distance: 0

creature.Rainy@28d93b30
name: wanderer, water left: 7 distance: 3
name: walk, water left: 9 distance: 2
name: slider, water left: 11 distance: 3

creature.Cloudy@1b6d3586
name: wanderer, water left: 7 distance: 4
name: walk, water left: 8 distance: 4
name: slider, water left: 10 distance: 4

creature.Sunny@4554617c
name: wanderer, water left: 6 distance: 7
name: walk, water left: 6 distance: 5
name: slider, water left: 6 distance: 4

the winner of the game is :wanderer and there is   6 water level left, whose distance is: 7

5.input:

4
wanderer r 0
walk w 0
slider s 0
sneaky s 0
s

Output:

Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wanderer, water left: -1 distance: 3
name: walk, water left: -2 distance: 1
name: slider, water left: -4 distance: 0
name: sneaky, water left: -4 distance: 0

the winner of the game is :wanderer and there is   -1 water level left, whose distance is: 3

6.input:

4
wanderer r 10
walk w 9
slider s 10
sneaky s 9
s r c s

output:

Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wanderer, water left: 8 distance: 3
name: walk, water left: 7 distance: 1
name: slider, water left: 6 distance: 0
name: sneaky, water left: 5 distance: 0

creature.Rainy@28d93b30
name: wanderer, water left: 8 distance: 3
All died
name: walk, water left: 10 distance: 2
name: slider, water left: 12 distance: 3
name: sneaky, water left: 11 distance: 3

creature.Cloudy@1b6d3586
name: wanderer, water left: 8 distance: 4
name: walk, water left: 9 distance: 4
name: slider, water left: 11 distance: 4
name: sneaky, water left: 10 distance: 4

creature.Sunny@4554617c
name: wanderer, water left: 7 distance: 7
name: walk, water left: 7 distance: 5
name: slider, water left: 7 distance: 4
name: sneaky, water left: 6 distance: 4

the winner of the game is :wanderer and there is   7 water level left, whose distance is: 7

7.input:

4
wanderer r 100
walk w 100

slider s 100
sneaky s 100
s s s s s

output:
Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wanderer, water left: 8 distance: 3
name: walk, water left: 7 distance: 1
name: slider, water left: 6 distance: 0
name: sneaky, water left: 5 distance: 0

creature.Rainy@28d93b30
name: wanderer, water left: 8 distance: 3
All died
name: walk, water left: 10 distance: 2
name: slider, water left: 12 distance: 3
name: sneaky, water left: 11 distance: 3

creature.Cloudy@1b6d3586
name: wanderer, water left: 8 distance: 4
name: walk, water left: 9 distance: 4
name: slider, water left: 11 distance: 4
name: sneaky, water left: 10 distance: 4

creature.Sunny@4554617c
name: wanderer, water left: 7 distance: 7
name: walk, water left: 7 distance: 5
name: slider, water left: 7 distance: 4
name: sneaky, water left: 6 distance: 4

the winner of the game is :wanderer and there is   7 water level left, whose distance is: 7

8.input:

4
wanderer r 88
walk w 188
slider s 199
sneaky s 245
s s s s s s s s s s s s s

output:

Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wanderer, water left: 8 distance: 3
name: walk, water left: 12 distance: 1
name: slider, water left: 20 distance: 0
name: sneaky, water left: 20 distance: 0

creature.Sunny@28d93b30
name: wanderer, water left: 7 distance: 6
name: walk, water left: 10 distance: 2
name: slider, water left: 16 distance: 0
name: sneaky, water left: 16 distance: 0

creature.Sunny@1b6d3586
name: wanderer, water left: 6 distance: 9
name: walk, water left: 8 distance: 3
name: slider, water left: 12 distance: 0
name: sneaky, water left: 12 distance: 0

the winner of the game is :wanderer and there is   6 water level left, whose distance is: 9

9.input:
4
wandere r 99
walk w 188
slider s 199
sneaky s 245
r r r r

Output:
Creatures in the Race Competition:

creature.Rainy@7d4991ad
name: wandere, water left: 8 distance: 0
name: walk, water left: 12 distance: 1
name: slider, water left: 20 distance: 3
name: sneaky, water left: 20 distance: 3

creature.Rainy@28d93b30
name: wandere, water left: 8 distance: 0
name: walk, water left: 12 distance: 2

name: slider, water left: 20 distance: 6
name: sneaky, water left: 20 distance: 6

creature.Rainy@1b6d3586
name: wandere, water left: 8 distance: 0
name: walk, water left: 12 distance: 3
name: slider, water left: 20 distance: 9
name: sneaky, water left: 20 distance: 9

creature.Rainy@4554617c
name: wandere, water left: 8 distance: 0
name: walk, water left: 12 distance: 4
name: slider, water left: 20 distance: 12
name: sneaky, water left: 20 distance: 12

creature.Rainy@74a14482
name: wandere, water left: 8 distance: 0
name: walk, water left: 12 distance: 5
name: slider, water left: 20 distance: 15
name: sneaky, water left: 20 distance: 15

the winner of the game is :slider and there is   20 water level left, whose distance is: 15

the winner of the game is :sneaky and there is   20 water level left, whose distance is: 15

10.input:

Creatures in the Race Competition:

creature.Sunny@7d4991ad
name: wandere, water left: 8 distance: 3
name: walk, water left: 12 distance: 1
name: slider, water left: 20 distance: 0
name: sneaky, water left: 20 distance: 0

creature.Cloudy@28d93b30
name: wandere, water left: 8 distance: 4
name: walk, water left: 11 distance: 3
name: slider, water left: 19 distance: 1
name: sneaky, water left: 19 distance: 1

creature.Rainy@1b6d3586
name: wandere, water left: 8 distance: 4
name: walk, water left: 12 distance: 4

name: slider, water left: 20 distance: 4
name: sneaky, water left: 20 distance: 4

creature.Rainy@4554617c
name: wandere, water left: 8 distance: 4
name: walk, water left: 12 distance: 5
name: slider, water left: 20 distance: 7
name: sneaky, water left: 20 distance: 7

creature.Sunny@74a14482
name: wandere, water left: 7 distance: 7
name: walk, water left: 10 distance: 6
name: slider, water left: 16 distance: 7
name: sneaky, water left: 16 distance: 7

creature.Cloudy@1540e19d
name: wandere, water left: 7 distance: 8
name: walk, water left: 9 distance: 8
name: slider, water left: 15 distance: 8
name: sneaky, water left: 15 distance: 8

creature.Sunny@677327b6
name: wandere, water left: 6 distance: 11
name: walk, water left: 7 distance: 9
name: slider, water left: 11 distance: 8
name: sneaky, water left: 11 distance: 8

creature.Sunny@14ae5a5
name: wandere, water left: 5 distance: 14
name: walk, water left: 5 distance: 10
name: slider, water left: 7 distance: 8
name: sneaky, water left: 7 distance: 8

the winner of the game is :wandere and there is   5 water level left, whose distance is: 14