CSE 222/505 Homework 4 - Deep Space Planetary System Analysis

Gebze Technical University – Computer Engineering Department

Deadline: 13th April 2025, 23:59

You have been assigned as a data analyst for a newly discovered planetary system. The probe you send provides you with data, and this data is stored in a tree data structure hierarchized according to the planets and the star to which it is connected.

Star of the planetary system resides in the root of the tree structure. The planets are arranged in order of proximity to the star, and each planet has one or more moons.

Example tree structure:

```
Sun (Star)
└── Mercury
└── Venus
└── Earth
    └── Moon
    └── Mars
      └── Phobos
      └── Deimos
      └── Jupiter
```

Notes about the tree:
-Planets in tree are arranged by the proximity information. These information is arbitrary in our hypothetical planetary system. You can construct the system however you want. But each moon of a planet must be a child of its planet. Root node must be star of the system.

-Each node can have multiple children.

Each node contains the following information:
-Name (String) //Name of the object
-Type (String) //Planet, Moon, Star
-Sensor data //SensorData class

Sensor data class:
-Temperature (double): In Kelvin
-Pressure (double): In Pascals
-Humidity (double): Percentage (0-100)

-Radiation (double): In Sieverts

Functions needed to be implemented:
-Simple UI in terminal with these commands:

-create planetSystem "name of the star" "temperature" "pressure" "humidity" "radiation"
//Stars do not have humidity so it is 0. If not do not accept it.

-addPlanet "planetName" "parentName" "temperature" "pressure" "humidity" "radiation"

-addSatellite "satelliteName" "parentName" "temperature" "pressure" "humidity" "radiation"

-findRadiationAnomalies "threshold"
//This method should traverse the tree **recursively** and returns a list of all nodes where the radiation value in SensorData exceeds the given threshold.

getPathTo "planetName" returns a Stack<String>
//representing the path from the root to the target node. **Using stack.**

printMissionReport // should print all tree data with it is given type like 300 Kelvin, 101Pascals

printMissionReport "nodeName" // should print data for a specific node.

Notes:

- No OOP design: -100
- No Error Handling: -50
- No Javadoc documentation: -50
- No Report: -30
- No usage of tree, stack or recursive: -40 for each
- Cheating: -200
- Your solution is evaluated over 100 as your performance.

Good luck.

For the further questions, please send an e-mail to a.dikmen2022@gtu.edu.tr

-Burak Dikmen