CS0048 DATA STRUCTURES AND FILES

Assignment 5 – Emergency Room Simulation

Description

Use an IDE for this assignment and create a package called ER – put the three files in the package. In this assignment, you will create an application that will simulate the patients in an emergency room and how long they wait before they are seen. Every patient is assigned a priority from 1 to 10 (1 is the most important and 10 is the least important). The patients will be read in from the file **PatientData.txt** which has each record (line) as

firstName, lastName, patientID, year, month, day, priority

Create classes as follows

`Patient` with 4 attributes - firstName, lastName, patientID (7 digits, cannot begin with 0), DOB. Add constructors and other methods.

`ERCase` with 3 attributes – Patient, priority, timeWaiting. Add constructors and other methods. This class must implement the interface **`Comparable<ERCase>`** and implement the method **`public int compareTo(ERCase c)`**

`EmergencyRoom` – uses a Priority Queue to manage the patients in the ER waiting room. Add 5 cases to the Priority Queue at the start of the simulation. Then in each time cycle possibly add cases and possibly remove cases. For each time cycle the probability that 0, 1, 2 or 3 patients arrive at the ER are 20%, 30%, 30% and 20% respectively. For each time cycle, the probabilities that 0, 1 or 2 patients are seen (leave the Priority Queue) are 25%, 50% and 25% respectively.

In **`EmergencyRoom`** there are two parts to the simulation

In the first part, the program runs through 10 cycles printing information on patients who arrive and patients who leave during each cycle. Error information should also be printed if there is incorrect data in the text file . Pause the output after each cycle so that we can clearly see what is happening.

In the second part, the program will reset everything from part 1, add 5 cases and then run through 75 cycles without printing anything. After running it will print summary data: how many patients arrived at the ER, how many have been seen and what was the average wait time for those who have been seen.

Other Information

- **You must include clear comments in your code so that I can follow what you did when grading. You should also methods (functions) in `EmergencyRoom` to simplify the code.**
- Store DOB as an object - one possibility is **`LocalDate`**
- Java has a **`PriorityQueue`** class so use it to create a **`PriorityQueue<ERCase>`** to manage the cases in the **`EmergencyRoom`**.
- Use exception-handling when reading from the text file data. You can ignore any record that has errors – your program will just read the next line.
- Concentrate on making output readable and understandable.

Turning in the Assignment

No screenshots are necessary for this assignment. Zip up the whole project from the base folder and submit the zipped file. Due by the start of the next class on February 24.