COP 3515 – Fall 2020

Homework #3

Title: Go Green, Go Home

design, implement, and evaluate

The Covid-19 pandemic rages in in Florida. The work that you've been able to do for Tampa General so far has been appreciated. However, they have now discovered that they need additional help from you. The challenge that they are facing is that they have too many patients and not enough beds.

When Covid-19 patents show up at the hospital, they can be at various stages of the disease. The initial stage ("green") means that the patient has a raspy cough, and feels weak overall. The next stage ("yellow") happens when the patent starts to have headaches, new loss of taste or smell, nausea or vomiting, and diarrhea. The next stage ("red") occurs when they start to have trouble breathing, persistent pain or pressure in the chest, new confusion, inability to wake or stay awake, or bluish lips or face. The final stage, the most serious stage ("purple"), occurs when the patient can no longer breathe by themselves and need the help of a ventilator to breathe.

Patients who arrive at Tampa General can be at any one of these stages. They'll be given a bed if one is available or shipped to another hospital if one is not available. While they are at the hospital their status can change on a day-by-day basis. Here's the probability of a patient at one stage transitioning to the next stage of severity:

Green	Yellow	Red	Purple
50	40	20	

Assume that when all patients check into the hospital, they are currently getting worse. Each time a patient gets worse, assume that they will either stay the same or get worse for the next three days – they won't get better during this time. Note that when a purple patient enters the hospital, they will automatically stay in the purple state for 3 days. After three days, you can once again check to see if they are starting to get better.

If a patient does not get worse, they have then started to get better. **Once people start to get better, they cannot become worse again.** Here's the probability of a patient at one stage transitioning to the previous stage of severity:

Green	Yellow	Red	Purple
75	60	40	30

You are to write a program that will process a data file that contains patient information. The hospital has 100 Covid-19 beds that can be used. When a patient shows up, place them in a bed and note what stage they are at. Each day generate a random number to determine if they have gotten worse. If they have gotten worse then update their status color. If they have not gotten worse, then generate another random number to determine if they have gotten better. If they have gotten better then update their status color. If they were a green patient and they got better, discharge them from the hospital.

The format of the data in the data file will be as follows:

Sex, Covid-19 status (G/Y/R/P), age

After all of the data has been processed at the end of each day, you should print out (1) the status of all of the beds in the hospital – G/Y/R/P/. and (2) the gender of each patient in a bed in the hospital – M/F/. You should also print out the following statistics:

1. Current number of patients who are in the Green status.
2. Current number of patients who are in the Yellow status.
3. Current number of patients who are in the Red status.
4. Current number of patients who are in the Purple status.
5. Your program should run until all of the Covid-19 patients have gone home.

Note: As C does not have an inbuilt function for generating a number in the range, but it does have rand function which can generate a random number from 0 to RAND_MAX. With the help of rand () a number in range can be generated as num = (rand() % (upper – lower + 1)) + lower An example of using this would be:

probEscalateSeverity = (rand() % 100;

and a value > 50 would mean that a patient would move from green to yellow.

Assignment Requirements:

1. Your code must contain the following comment header:
   ```
   /*
    * COP 3515 – Fall Semester, 2020
    *
    * Homework #3: Go Green, Go Home
    *
    * (Your Name)
    *
    */
   ```

2. **Note:** You are only permitted to use the C commands that we have covered in class so far. Yes, there are many more, but no, you can't use them in solving this homework!

3. This homework is due at the start of class on **Thursday, 11/05/20**