Mini program: Hospital Operation

This program mimics the operation of a hospital during the COVID-19 crisis. This program is called hospital_operation.py. The purpose is to let the user understand how much pressure a health care facility faces during the crisis. This program will also demonstrate the reason why some health care systems crushed during the breakout.

We first make a Hospital class object. It has attributes of list_of_doctors, list_of_nurses, list_of_patients, number_of_ventilator and number_of_supplies. list_of_doctor containing all the Doctor class objects within this hospital starts at 10. list_of_nurses containing all the nurses within a hospital starts at 40. number_of_ventilator will contain the number of ventilators this hospital has starts at 50. number_of_supplies containing the number of medical supplies this hospital contains start at 100.

Each doctor and nurse object has attributes of HP, stress, equipt_with_medical_supplie, and is_infected. HP stores the health point of a doctor/nurse, initially at 100 points. stress represents the stress level of a doctor/nurse, start at 10 points. equipt_with_medical_supplie contains information about whether the doctor/nurse is equipped with protectives or not. True for equipped, and False for not equipped. is_infected indicates the health situation of a doctor/nurse. If a doctor/nurse is equipped with medical supply, there is 0 chance they will be infected. If is_equipped is false, there is an 80% chance this doctor/nurse to be infected. If a doctor/nurse is infected, they can no longer help with any hospital work/ cure any patient.

There is also a "Patient" class object. Each Patient class contains attributes of the name, age, gender, HP, and is_infected. name, age, and gender represent the name, age, and gender of a patient. They are randomly generated. HP stores the health point of a doctor/nurse, which is randomly generated within a range from 30-80 points. is_infected indicates the health situation of a patient starts at False, meaning this patient is sick. Each Patient class has a method called reduce_HP to decrease the HP of a patient by infection rate(also randomly generated from 0 to 20) on a daily base. If the infection rate is 0, the patient's HP will not decrease any more; HP is increased by 5 points each day. If a patient's HP is above 90 points, the is_infect attribute is False.

This program has a function called daily_routines(), accepts the Hospital class object as the parameter. It will generate a random number of the ventilator, and the

random number of medical supplies. The range of the numbers is from 0-5. The corresponding attributes are modified. This function also generates a random number of patients.

This program can choose to accept patients less than certain HP and assign them to doctors. If a patient is accepted and assigned to a patient, their HP will decrease less than before. Otherwise, the patient's HP remains the same as before. The two functions accordingly are accept_patient() and assign_patient().

If a doctor has more than 5 patients, there is a function that adds 20 points to the doctor's stress (called add_stress()). If the doctor:nurse ration is less than 1:4, then add_stress() adds 20 points to each doctor's stress. If a doctor's stress point is over 80, then this doctor will be affected.

This program will have a function called death_count. It accepts Hospital class as a parameter. It counts the individual within the list_of_doctors, list_of_nurses, and list_of patient with HP set to 0. It will sum the results and return the total number of death cumulatively. If all doctors and nurses are infected, then program over.

Under the main function, there is a loop function that starts on day 1. Within the loop function, daily_routines() is the first function to be called and to print the overall circumstance of the hospital. Then, the user can choose to accept_patient, assign_patient, and see the result from count_death. After all these functions executed, the day increased by 1(day += 1). If on day 10, there is at least one un-infected doctor, then print a program over and message about "after ten days, there are n doctors left in the hospital, we lost n number individuals in ten days. Please stay at home respect the work of the medical staff". Otherwise, once all the doctors are infected or HP at zero, this program will print a message says program over, you have failed the role as a hospital operator. At the end a number of all the death cases in Canada and world-wide will be printed using APIs.