Quest 9

Simulating COVID-19 spread in a conceptual community

Description

In the quest, develop a simulation programme using Python with object oriented design to analyze the spread of the COVID-19 virus in a conceptual community with a population of one million.

Following features can be observed in the population:
There are about one hundred thousand families in the community and a family can have two to seven members. More than 30% of the population are senior citizens who is older than 65 years. Twenty percent of the population is children, who are below 18 years.
It is assumed that forty thousand people involve in essential services of the country.

The chance of getting infected with the virus is 10-20%, 15 - 40%, and 35 - 60% for children, adults, and senior citizen, respectively. However, wearing face masks reduce the risk of getting infected to 5 - 10% in all the population. In the meantime, it is assume that the family members have a 40 to 80% chance of getting infected if one family member get infected.

The symptoms of the infection are visible after 5^{th} day onwards. The virus will not spread from an infected patient from the 11^{th} day of infection.
When a patient is detected with COVID-19, that patient is hospitalized for 10 days.
It is assume the fatality rate of the infection is 0.1%.
There is no effect from the gender on the virus.
One who get infected build the immunity for 6 to 7 months.

Quest

Simulate the spread of the virus among the community daily if a one person is infected with COVID-19 in the day 1.
In the simulation, user should have capability to enforce 'wear face mask' at any point of the simulation and enforce travel restrictions at any point, as well as lift the enforcement.
Indicate the daily number of infected patients, total hospitalized patient count, total fatalities, number of recovered people up to 50 days.

Please indicate the counts in four different charts after simulation finish. If you use external library to generate the charts, please clearly mention them.

State your assumptions in a separate file clearly and include it to the compress file.

Only one member of the group is needed to upload the compressed file.

Include the class diagrams in a separate file.

Include all the files of the project to the compressed file and name the compressed file in CO2210_Quest9_19ENGBatch_<group number>.zip format.

Deadline of this assignment is on 26th December 2021 at 2355H.

This is a group project and the group members are listed below.

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