# COMP3021 Java Programming

# Spring 2021 Programming Assignment #1 (Fight Covid19')

**(Deadline: 11:55 PM, 20 April 2021)**

## Note:

- **This is an individual assignment; all the work must be your own.**
- **Download the project skeleton at https://course.cse.ust.hk/comp3021/assignments/assignment1/PA1.zip and finish the implementations using the skeleton.**
- **Zip your complete project directory to PA1.zip and submit it to CASS through https://course.cse.ust.hk/cass/student/. Refer to http://cssystem.cse.ust.hk/UGuides/cass/index.html for the details of uploading assignment using CASS.**
- **You can submit the assignment for as many times as you wish, we will only mark you latest submission.**
- **This PA accounts for 15% of the total course grade.**
- **Cheating/plagiarism will be caught and punished HEAVILY!**

  **University's Honor code: http://ugadmin.ust.hk/integrity/honor.html**
  **University's Penalties for Cheating: http://ugadmin.ust.hk/integrity/student-5.html**

# Background

You are going to implement the **FightCovid19'** turn-based strategy game. The objective of the game is to fight the spread of the Covid19 virus and treat the infected cases by doing various actions. To completely implement the game, you will need to finish a total of 29 TODO tasks in the skeleton provided. The works of lab 6 and lab 7 will help you to implement part of the game, but you can not copy and paste the code directly! Otherwise you may encounter strange issues that nobody knows how to solve for you. Please understand all the TODO tasks in the skeleton by read through the note carefully, do not start implementing before you have fully understood the note.

This game involves two human players (according to the configuration in the `players.txt` file that comes with the skeleton). In each turn, players are able to perform tasks on cities through their health authority staffs (HAStaffs). Each human player has exactly one city under his/her governance. The human player will have a list of health authority staffs to carry out the various tasks on the cities. Some of the possible actions are: develop medication facility, build mask factory, upgrade face mask quality, develop vaccine, upgrade vaccine, ban travel, lift travel ban, see the `selectAndPerformAction()` method in the `GameEngine.java` file for the list of possible actions. Each `HAStaff` has different medicine, experience and leadership values, these values are stored in the instance variables of the `HAStaff` object. These values affect the bonus to gain more points. A `HAStaff` of the player can do one single task in each turn. If the player has 3 HAStaffs, the player will be able to perform three tasks per turn.

Each player is assigned a budget to spend and perform various tasks in the game, such as developing or upgrading vaccine, building, or upgrading face masks, and so on.

**How does the game end?**

There are 3 winning and losing conditions that end the game:

1. The player loses the game in the following condition:

- When the city under a player's control has its infected cases equal to the city population (i.e. everybody in the city is infected!), the game engine raises MedicalException. When this exception is raised, the GameEngine will end the game and runs the `announceWinner()` method to decide the winner based on a set of conditions.

2. The player wins the game

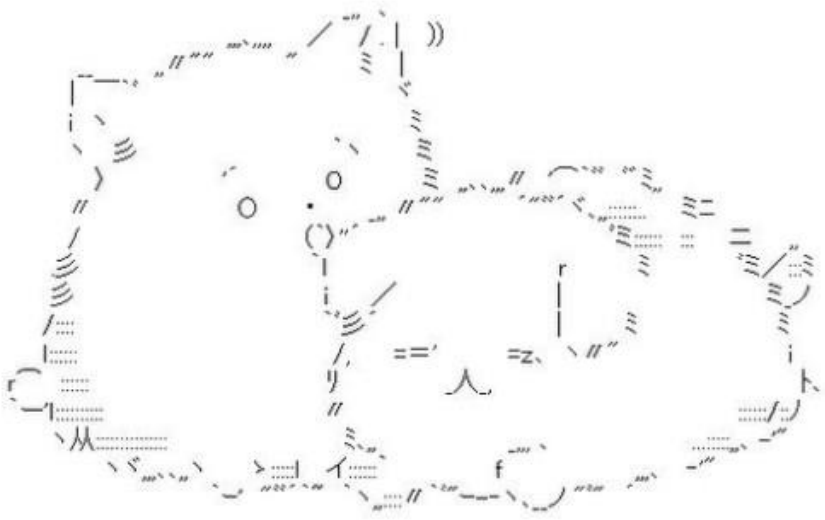
When the city/country under a player's control has 0 active cases and 0 new infected cases. If both the two players have 0 active cases and 0 new infected cases, the game engine computes the points of each player and decides the winner based on the one with greater points. Refer to the note under TODO of the `announceWinner()` method in the GameEngine.java file for the details of the winning condition.

You can play with the supplied executable file on a Windows platform to see how the game behaves.

# Getting Started

### Importing the skeleton code

1. Download the skeleton code from the course website and unzip the file to a directory
2. In IntelliJ navigate to the directory that you have unzipped the skeleton code, click `File->Open...` ,
3. Choose the directory "comp3021-covid-spring2021", Click "OK"
4. Set the "Project JDK" to be "Java version 14.0.2", refer to lab 3 on how this could be done



## Additional Classes in util package

There two classes in util package, Constants, and GameMap. Constants class provides values assignment to some constant/final variables classes. The Constants's class variables define costs of taking some actions, the percentage of the protection and vaccination levels achieved when taking some actions, or some limits.

## The players.txt file

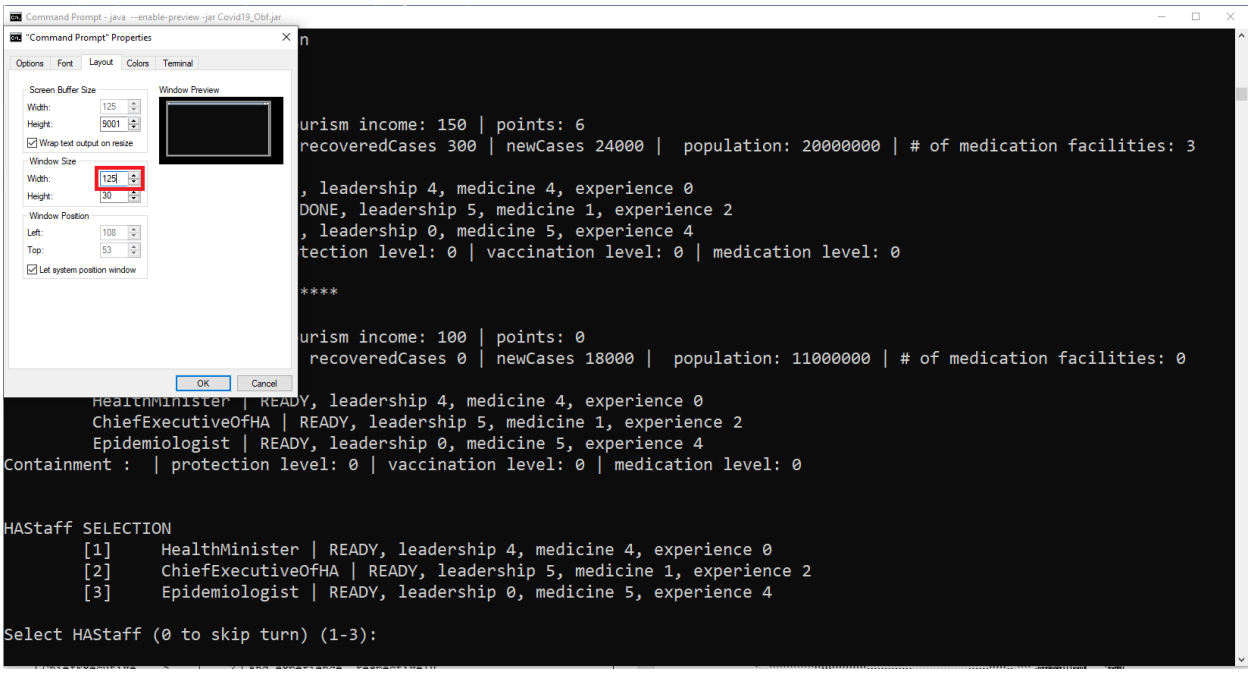
The players.txt file specifies two players' information. The detail is given below:

| | |
|---|---|
| 2 | number of players |
| Country1 5000 150 0 | First player's name, budget, tourism income, points |
| 1 Tokyo 20000000 8000 0 | city ID, name, population, active, recovered cases |
| HealthMinister 4 4 0<br>ChiefExecutive 5 1 2<br>Epidemiologist 0 5 4 | Role name, and rating (1..5) for leadership, medicine, and experience, respectively. |
| Country2 5000 100 0 | Second player's name, budget, tourism income, points |
| 1 Brisbane 11000000 6000 0 | city ID, name, population, active, recovered cases |
| HealthMinister 4 4 0<br>ChiefExecutive 5 1 2<br>Epidemiologist 0 5 4 | Role name, and rating (1..5) for leadership, medicine, and experience, respectively. |

Line 3 specifies the first player's information. Line 4 specifies the first player's city information. Line 5,6,7 specify the player's roles: HealthMinister, ChiefExecutive, and Epidemiologist. Line 9,10,11,12 specify the above-mentioned info for the second player.

# Running the executable jar file

An executable file for the PA could be downloaded from the PA1 link at the course web. You could use it to verify the correctness of your finished PA. To run the executable file under Windows (we only have Windows machine to compile it :( ), first you have to make sure the .txt file (players.txt file) is in the same directory as the executable file. Then Open a Windows command window, adjust the width of the command window to 125 as indicate below for a better display:




Then issue the command:

```
java --enable-preview -jar Obf_covid19.jar
```

## After you are done with the PA

Congratulations! Hope you have enjoyed it! Now you can export your complete project directory as PA1.zip and submit this file to the CASS link shown on page 1. You can submit for as many times as you wish before the deadline, but we will only mark you latest submission.

## Late Submission Policy

There will be a penalty of -1 point (out of a maximum 100 points) for every minute you submit the PA late. If you submit your PA1 at 00:30am on 21 April 2021 (Wednesday), there will be a penalty of -35 points for your assignment. The lowest score you may get from the assignment is zero. If you submit your PA1 at 2:35am on 21 April 2021 or later, you will have zero for the PA1. So be sure to submit the finished PA1 as early as possible.