Final Project

The goal of the final project is to create a MATLAB program that processes and visualizes COVID-19 pandemic data. The data (obtained from the Coronavirus Resource Center at the Johns Hopkins University) is available from the .mat file attached below. Once you load it, you will get a single variable called **covid_data** **(**https://drive.google.com/file/d/1XeILaq200jwp2u4HSJp4mbWVjhCw5s6Z/view?usp=sharing**)** that is a large cell array. (Make sure your app loads the file!) It contains the global case and death counts by country and state and by date. Specifically, the first row of the cell array specifies what each column contains: Country and State followed by a number of dates starting from "1/22/20," that is, January 22, 2020. Do not hardcode the end date, since we anticipate updating the data regularly as time progresses. Each data cell for a given country and date contains a 2-element vector of doubles: the first element is the cumulative case count, while the second is the cumulative number of deaths.

The graphical user interface of your program must contain a number of widgets:

- A single area where you plot the data. The title of the plot should be informative displaying what country/state is being shown and also indicating the relevant options that were used to generate the plot. (See below.) The x labels should be dates. You need to implement different y scales for the two plots on the left and right as shown below.
- A list box showing all available countries. The first element should be called "Global" and selecting it should plot the global data. This is not contained in the database, so you will need to compute it.
- Another list box showing all states of the currently selected country. The first option should be "All." As most countries do not have states, regions, territories or provinces associated with them in the database, this will be the only option for them. Selecting it should show the data for the country itself. There are two kinds of countries with states in the database. Australia, Canada, China and the United States have all their states, provinces, etc. listed. Other countries such as the UK, the Netherlands or Denmark are not subdivided, but they have a number of overseas territories listed. For example, the UK is not broken down to England, Scotland, Wales and Northern Ireland, but it has additional territories, such as the Falkland Islands, listed.
- A widget to select the number of days used for computing a moving average of the data (from 1 to 15). Make sure that the selection is an integer. Selecting 1 means no

averaging. Note that the moving average should use the past N-1 days and the current day, where N is the number of days selected.

- A widget to select what to plot: cases, deaths, or both.
- A widget to select whether to plot cumulative data or daily numbers. The database contains cumulative data. You must compute the daily data taking care of potential data errors. Specifically, make sure that you do not plot negative values ever.

Anytime any of the GUI widgets change, the plot and its title should be immediately updated.

Below is a screen shot of an example implementation. Watch the provided video for a brief demo of the "official" solution.

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