**Introduction**: The COVID-19 pandemic has had a huge global impact, notably in the United States. This project will use Python to analyse data and provide visuals to assess COVID-19 cases in the United States in 2021.

# Information:

Name: Ganesh Prasad Jaishi

# Proposed Tasks:

1. Display the case trend for each state.
2. Determine the mortality rate in each state.
3. Create a dashboard to display the results.

# Degree of Completion:

* 1. Show the trend of cases for each state: To show the trend of cases for each state, I read and manipulated the dataset with the Pandas library. Then I created line charts and heat maps with Matplotlib. The line charts depict the trend of instances in each state, whereas the heat maps depict the frequency of cases over time. This work was successfully completed by me.
  2. Determine each state's death rate: I used Pandas to read and manipulate the dataset in order to determine each state's mortality rate. The death rate was then calculated by dividing the number of deaths by the number of cases. I used Matplotlib to create bar charts and scatterplots from the data. This work was successfully completed by me.
  3. Construct an interactive dashboard to display the findings: To construct an interactive dashboard, I utilized Plotly Dash to present the data. The dashboard incorporates the visualizations created in the previous stages, allowing users to interact with the data to get insights into the trends and patterns of the COVID-19 epidemic. This work was successfully completed by me.

# Methods: The following Python libraries are used in this project's methods:

1. Pandas: for reading and manipulating datasets
2. Matplotlib: for visualizing data
3. Plotly Dash: to design a dashboard to display the results

# Accomplishments:

1. Using Pandas, I loaded the COVID-19 cases dataset for the United States for the year 2021.
2. Using Matplotlib , I created a method to plot the trend of cases for each condition.
3. Using Matplotlib , I created a function to plot the death rate for each state.
4. Developed a Plotly Dash app to display visualizations and allow users to interact with data.
5. Created interactive visualizations for the Plotly Dash app using Plotly Express.

Using the app, I deployed the program to a local server.run\_server() is a method that runs a server.

# Results:

The methods state\_trend() and state\_death\_rate() produced visualizations showing the trend of cases and death rate for each state in the United States in 2021. The Plotly Dash app displayed similar visuals as well as a dropdown menu to pick a specific condition, allowing the user to interact with the data. Based on the user's decision in the dropdown menu, the update\_cases() and update\_death\_rate() methods were able to update the visualizations presented in the Plotly Dash app. Using the app.run\_server() function, the software was successfully deployed to a local server.

Overall, this project was successful in achieving its goals of analyzing COVID-19 cases in the United States for the year 2021 and presenting the results in a meaningful manner using Python and Plotly Dash.

**Conclusions**: Using Python to process data and make visualizations, I successfully examined COVID-19 cases in the United States for the year 2021. I was able to perform all three requested tasks, which included graphing the trend of cases for each state, estimating the fatality rate for each state, and developing a dashboard to communicate the data. The dashboard allows users to interact with the data in an interactive fashion, offering insights into the trends and patterns of the COVID-19 epidemic in the United States.

**Output**:



