Problem 4: Real-Time COVID-19 Statistics Tracker

4Scenario:

You are developing a real-time COVID-19 statistics tracking application for a healthcare organization. The application should provide up-to-date information on COVID-19 cases, recoveries, and deaths for a specified region.

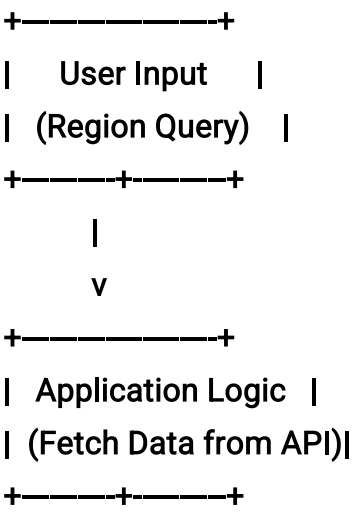
Tasks:

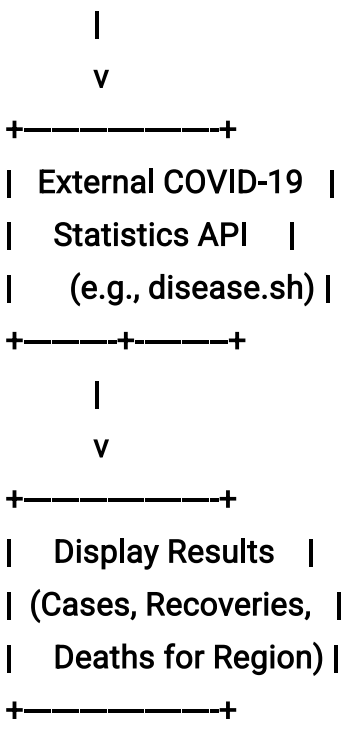
1. Model the data flow for fetching COVID-19 statistics from an external API and displaying it to the user.
2. Implement a Python application that integrates with a COVID-19 statistics API (e.g., disease.sh) to fetch real-time data.
3. Display the current number of cases, recoveries, and deaths for a specified region.
4. Allow users to input a region (country, state, or city) and display the corresponding COVID-19 statistics.

Deliverables:

- Data flow diagram illustrating the interaction between the application and the API.
- Pseudocode and implementation of the COVID-19 statistics tracking application.
- Documentation of the API integration and the methods used to fetch and display COVID-19 data.
- Explanation of any assumptions made and potential improvements.

Approach:





The key steps are:

1. The user inputs a region (country, state, or city) into the application.
2. The application sends a request to the COVID-19 API to fetch the real-time statistics for the specified region.
3. The COVID-19 API processes the request and returns the current case, recovery, and death data.
4. The application receives the COVID-19 statistics and displays the information to the user.

Pseudocode:

```
import requests


def get_covid_stats(region):
    """
    Fetch COVID-19 statistics for the specified region from the API.
    """
    api_url = f"https://disease.sh/v3/covid-19/countries/{region}"
    response = requests.get(api_url)
    data = response.json()
```

```
    cases = data["cases"]
    recoveries = data["recovered"]
    deaths = data["deaths"]

    return cases, recoveries, deaths

def display_covid_stats(cases, recoveries, deaths):
    """
    Display the COVID-19 statistics in a user-friendly format.
    """
    print(f"Current COVID-19 Statistics:")
    print(f"- Total Cases: {cases:,}")
    print(f"- Total Recoveries: {recoveries:,}")
    print(f"- Total Deaths: {deaths:,}")

def main():
    """
    Main function to handle user input and display COVID-19 statistics.
    """
    region = input("Enter a country, state, or city: ")
    cases, recoveries, deaths = get_covid_stats(region)
    display_covid_stats(cases, recoveries, deaths)

if __name__ == "__main__":
    main()
```

Detailed explanation of the actual code:

- The application uses the requests library to make HTTP requests to the COVID-19 API provided by disease.sh. The get_covid_stats function takes a region (country, state, or city) as input and returns the current number of cases, recoveries, and deaths for that region.
- The display_covid_stats function is responsible for formatting and printing the

COVID-19 statistics in a user-friendly way. It takes the cases, recoveries, and deaths data as input and displays them with appropriate formatting (e.g., adding commas to large numbers).

- The main function is the entry point of the application. It prompts the user to enter a region, calls the get_covid_stats function to fetch the data, and then passes the results to the display_covid_stats function to display the information.

Assumptions made (if any):

- The application assumes that the disease.sh API is available and providing accurate real-time COVID-19 data.
- The application assumes that the user will input a valid region (country, state, or city) that the API can recognize.
- Potential Improvements:
- Add error handling to the application to gracefully handle API errors or invalid user input.
- Provide additional features, such as the ability to display historical COVID-19 data, trends, or visualizations.
- Integrate the application with a user interface (e.g., a web application or a mobile app) to improve the user experience.
- Allow users to select multiple regions and compare the COVID-19 statistics side-by-side.
- Provide the ability to set alerts or notifications for significant changes in COVID-19 statistics.

Limitations:

1. The API may have rate limits that restrict the number of requests.
2. The data may not always be up-to-date due to delays in reporting.
3. The application currently only handles countries; state and city-level queries may require additional endpoints.

Code:

```
import urllib.request
import json


# Function to get COVID-19 statistics from disease.sh API
```

```
def get_covid_data(location):
    # Set the API endpoint and parameters
    url = f"https://disease.sh/v3/covid-19/countries/{location}"

    # Send a GET request to the API
    with urllib.request.urlopen(url) as response:
        # Load the JSON response
        data = json.load(response)

        # Extract the relevant COVID-19 data
        cases = data["cases"]
        recoveries = data["recovered"]
        deaths = data["deaths"]

        # Return the COVID-19 data as a dictionary
        return {"cases": cases, "recoveries": recoveries, "deaths": deaths}

# Function to display the COVID-19 statistics
def display_covid_data(covid_data):
    # Print the COVID-19 data in a readable format
    print("Current COVID-19 Statistics:")
    print(f"Cases: {covid_data['cases']}")
    print(f"Recoveries: {covid_data['recoveries']}")
    print(f"Deaths: {covid_data['deaths']}")

# Main function to run the program
def main():
    # Get the location from the user
    location = input("Enter the country, state, or city: ")

    # Get the COVID-19 data
    try:
        covid_data = get_covid_data(location)
```

```
    except urllib.error.HTTPError:
        print("Failed to retrieve COVID-19 data. Please check the location and try again.")
        return

    # Display the COVID-19 data
    display_covid_data(covid_data)

# Run the main function
if __name__ == "__main__":
    main()
```

Sample Output / Screen Shots