Assignment: python programming for DLP

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Date of submission :

Problem 1: Real-Time Weather Monitoring System

Scenario:

You are developing a real-time weather monitoring system for a weather forecasting company.

The system needs to fetch and display weather data for a specified location.

Tasks:

1. Model the data flow for fetching weather information from an external API and displaying it to the user.

2. Implement a Python application that integrates with a weather API (e.g., OpenWeatherMap) to fetch real-time weather data.

3. Display the current weather information, including temperature, weather conditions, humidity, and wind speed.

4. Allow users to input the location (city name or coordinates) and display the

corresponding weather data.

Deliverables:

• Data flow diagram illustrating the interaction between the application and the API.

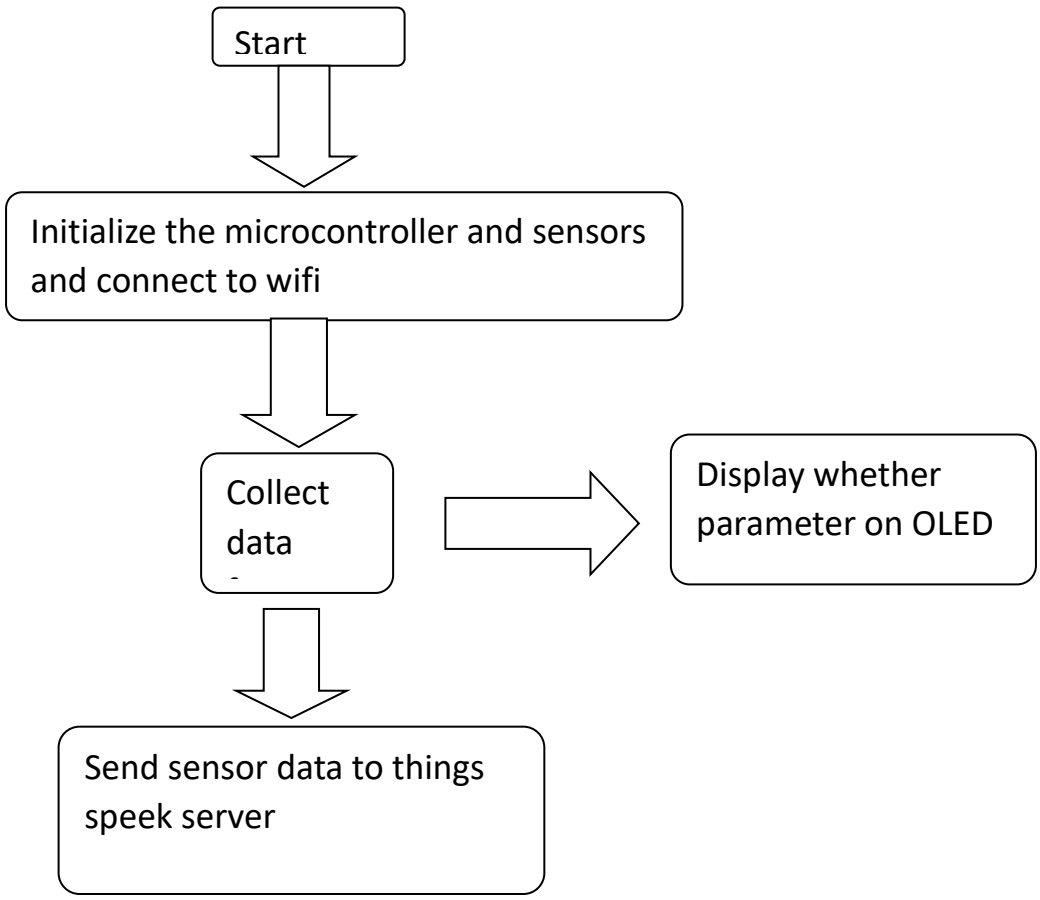
• Pseudocode and implementation of the weather monitoring system.

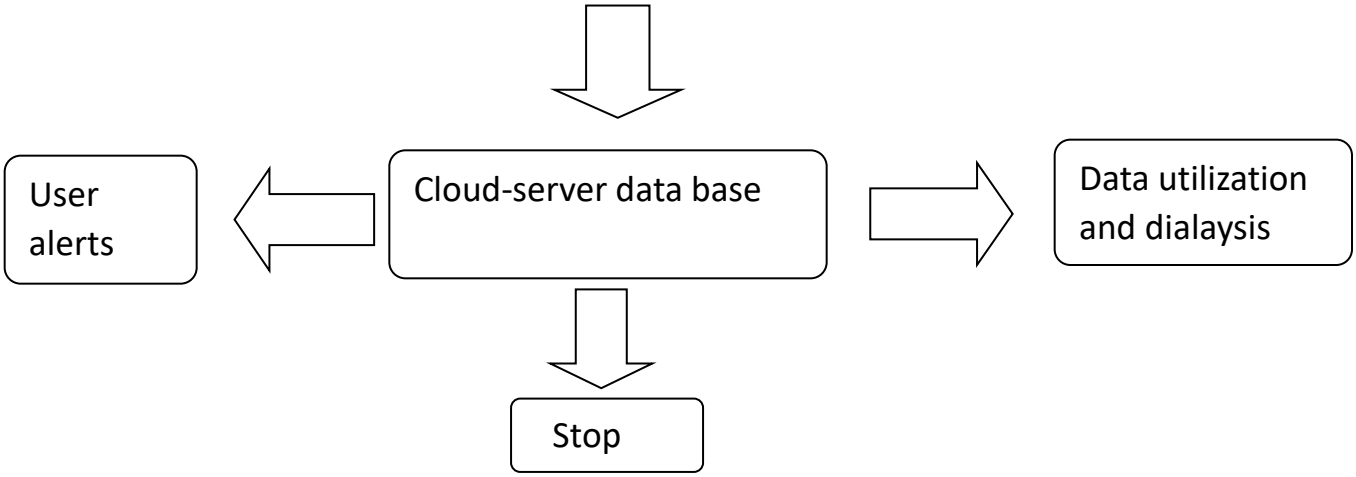
• Documentation of the API integration and the methods used to fetch and display

weather data.

• Explanation of any assumptions made and potential improvements.

FLOW CHART





IMPLIMENTATION:

```
import requests

def fetch_weather_data(api_key, location):

    base_url = "https://api.openweathermap.org/data/2.5/weather?lat={lat}&lon={lon}&appid"

    params = {

        'q': location,

        'appid': api_key,

        'units': 'metric'

    }

    try:

        response = requests.get(base_url, params=params)

        data = response.json()

        if data["cod"] == 200:

            weather_info = {

                'location':data['name'],

                'temperature': data['main']['temp'],

                'weather': data['weather'][0]['description'],

                'humidity': data['main']['humidity'],
```

```
                'wind_speed': data['wind']['speed']
            }
            return weather_info
        else:
            return None
    except Exception as e:
        print(f"Error fetching weather data: {e}")
        return None
def display_weather(weather_info, location):
    if weather_info:
        print(f"Weather in {location}:")
        print(f"Temperature: {weather_info['temperature']} °C")
        print(f"Weather: {weather_info['weather']}")
        print(f"Humidity: {weather_info['humidity']}%")
        print(f"Wind Speed: {weather_info['wind_speed']} m/s")
    else:
        print(f"Failed to fetch weather data for {location}")
def main():
    api_key = "ed7c18d0f1024da78bf89f147ccd9bca"
    location = input("Enter city name or coordinates (latitude,longitude): ")
    weather_info = fetch_weather_data(api_key, location)
    display_weather(weather_info, location)
if __name__ == "__main__":
    main()
```

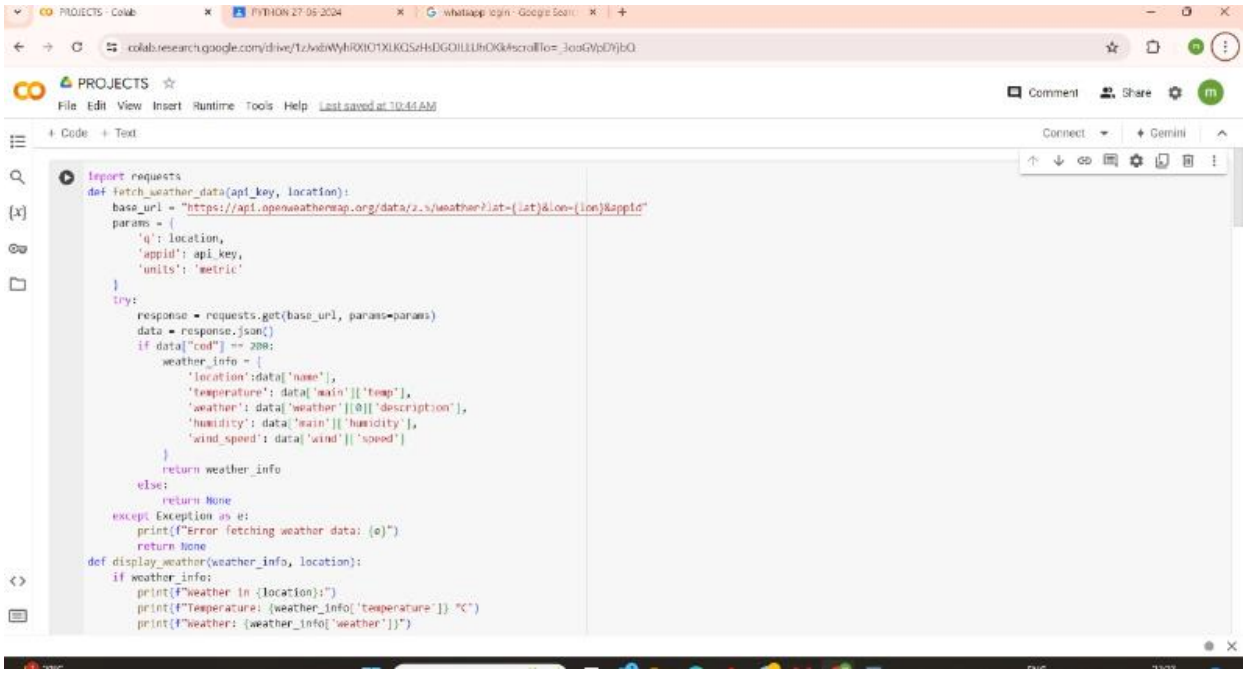
INPUT:

Enter city name or coordinates (latitude,longitude): CHENNAI

OUTPUT:

Weather in CHENNAI:

* Temperature: 29.24 °C
* Weather: broken clouds
* Humidity: 78%
* Wind Speed: 5.14 m/s



Problem 2: Inventory Management System Optimization

Scenario:

You have been hired by a retail company to optimize their inventory management system. The company wants to minimize stockouts and overstock situations while maximioptimal reorder points and quantities based on historical sales data, lead times, and demand forecasts. 4. Generate reports: Provide reports on inventory turnover rates, stockout occurrences, and cost implications of overstock situations.

5. User interaction: Allow zing inventory turnover and profitability.

Tasks:

1. Model the inventory system: Define the structure of the inventory system, including products, warehouses, and current stock levels.

2. Implement an inventory tracking application: Develop a Python application that tracks inventory levels in real-time and alerts when stock levels fall below a certain threshold. 3. Optimize inventory ordering: Implement algorithms to

calculate users to input product IDs or names to view current stock levels, reorder recommendations, and historical data.

Deliverables:

• Data Flow Diagram: Illustrate how data flows within the inventory management system, from input (e.g., sales data, inventory adjustments) to output (e.g., reorder alerts, reports).

• Pseudocode and Implementation: Provide pseudocode and actual code demonstrating how inventory levels are tracked, reorder points are calculated, and reports are generated.

• Documentation: Explain the algorithms used for reorder optimization, how historical data influences decisions, and any assumptions made (e.g., constant lead times). • User Interface: Develop a user-friendly interface for accessing inventory information, viewing reports, and receiving alerts.

• Assumptions and Improvements: Discuss assumptions about demand patterns, supplier reliability, and potential improvements for the inventory management system's efficiency and accuracy.

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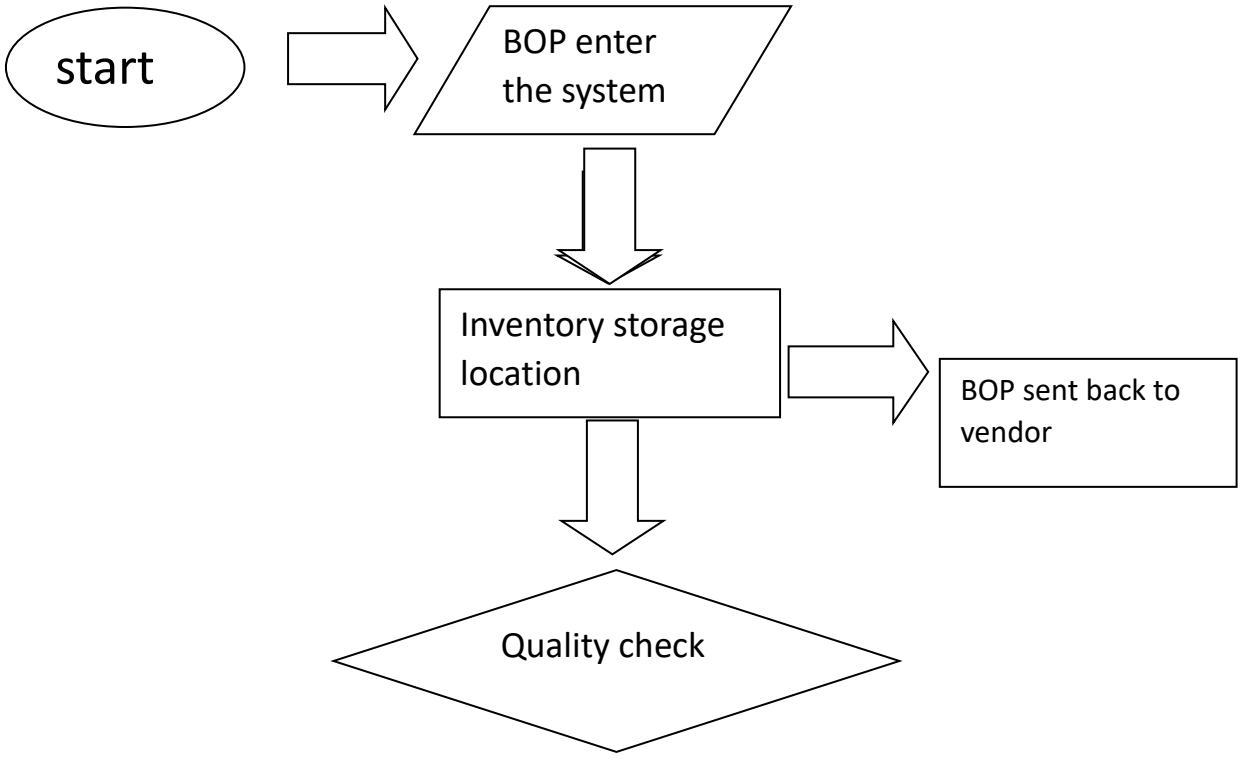
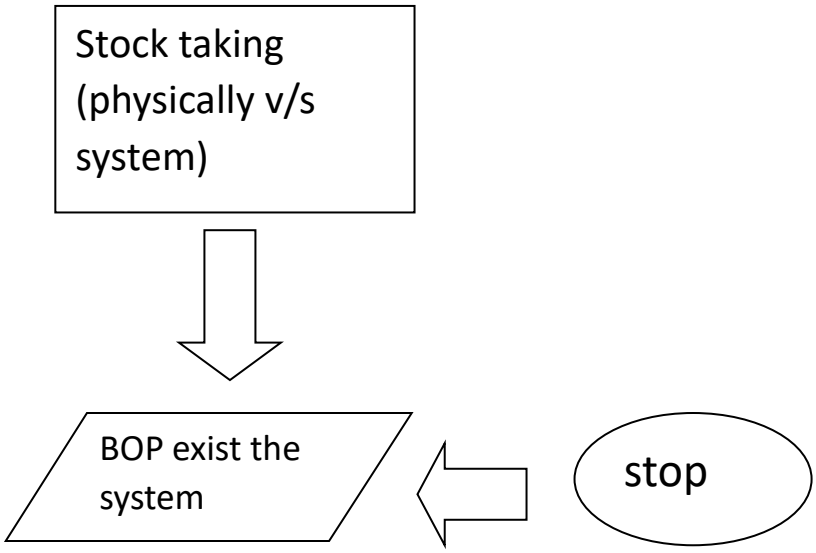




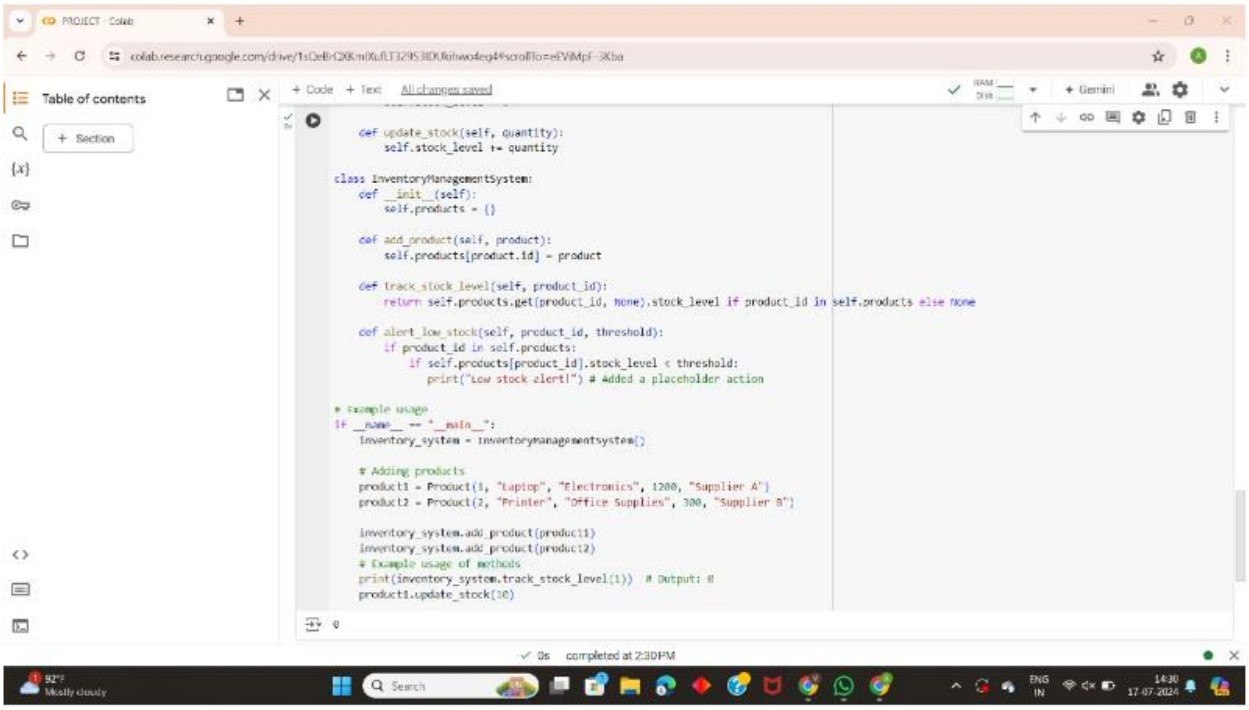
IMPLIMENTATION:

```
class Product:
    def _init_(self, id, name, category, price, supplier):
        self.id = id
        self.name = name
        self.category = category
        self.price = price
        self.supplier = supplier
        self.stock_level = 0
```

```
class Product:
    def __init__(self, id, name, category, price, supplier):
        self.id = id
        self.name = name
        self.category = category
```

```
        self.price = price
        self.supplier = supplier
        self.stock_level = 0

    def update_stock(self, quantity):
        self.stock_level += quantity

class InventoryManagementSystem:
    def __init__(self):
        self.products = {}

    def add_product(self, product):
        self.products[product.id] = product

    def track_stock_level(self, product_id):
        return self.products.get(product_id, None).stock_level if product_id in self.products else None

    def alert_low_stock(self, product_id, threshold):
        if product_id in self.products:
            if self.products[product_id].stock_level < threshold:
                print("Low stock alert!") # Added a placeholder action

# Example usage
```

```
if __name__ == "__main__":
    inventory_system = InventoryManagementSystem()

    # Adding products
    product1 = Product(1, "Laptop", "Electronics", 1200, "Supplier A")
    product2 = Product(2, "Printer", "Office Supplies", 300, "Supplier B")

    inventory_system.add_product(product1)
    inventory_system.add_product(product2)
    # Example usage of methods
    print(inventory_system.track_stock_level(1))    # Output: 0
    product1.update_stock(10)
```



3.Real-Time Traffic Monitoring System

Scenario:

You are working on a project to develop a real-time traffic monitoring system for a smart city

initiative. The system should provide real-time traffic updates and suggest alternative routes.

Tasks:

1. Model the data flow for fetching real-time traffic information from an external API

and displaying it to the user.

2. Implement a Python application that integrates with a traffic monitoring API (e.g.,

Google Maps Traffic API) to fetch real-time traffic data.

3. Display current traffic conditions, estimated travel time, and any incidents or delays.

4. Allow users to input a starting point and destination to receive traffic updates and

alternative routes.

Deliverables:

• Data flow diagram illustrating the interaction between the application and the API.

• Pseudocode and implementation of the traffic monitoring system.

• Documentation of the API integration and the methods used to fetch and display traffic

data.

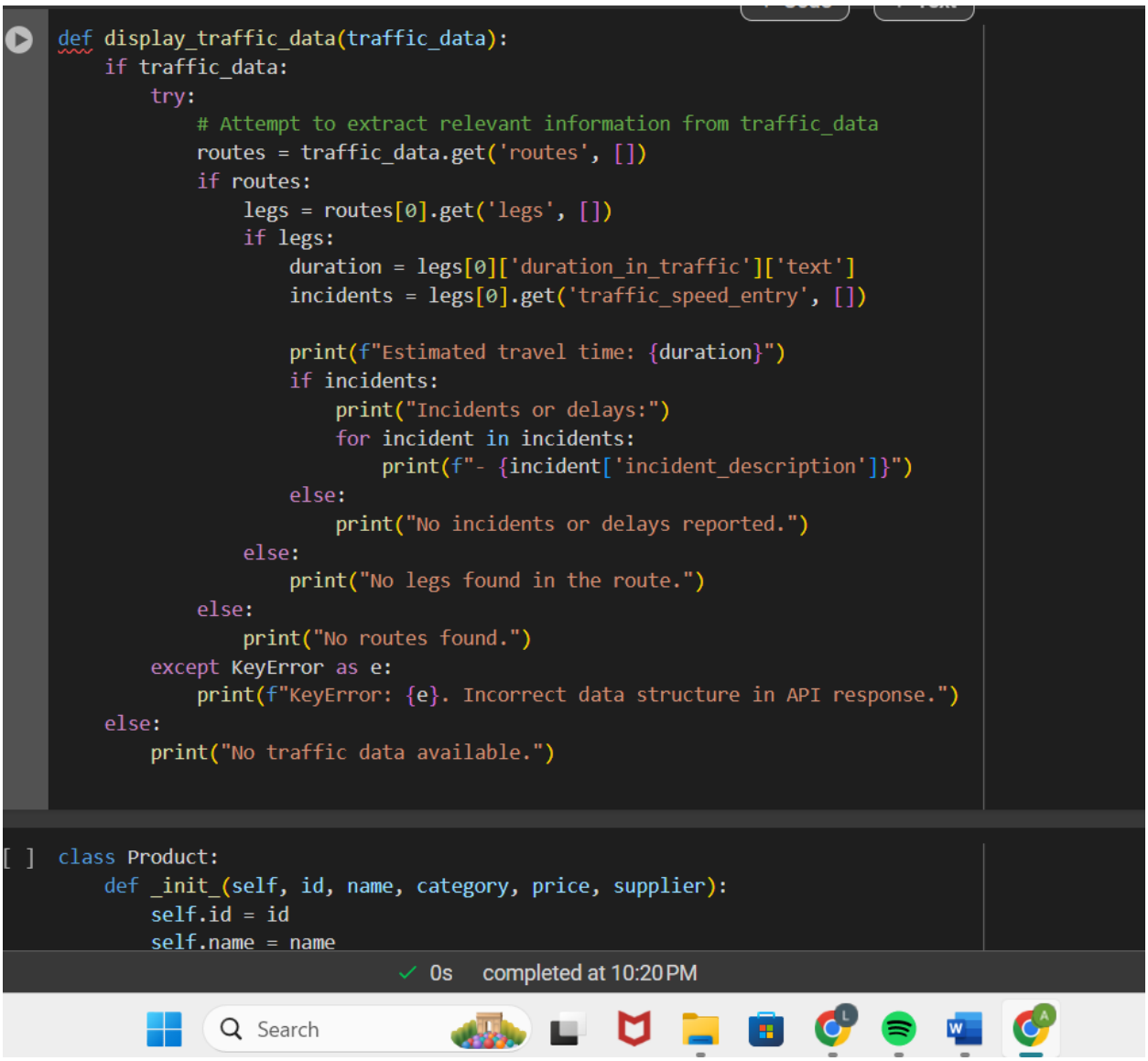
• Explanation of any assumptions made and potential improvements.

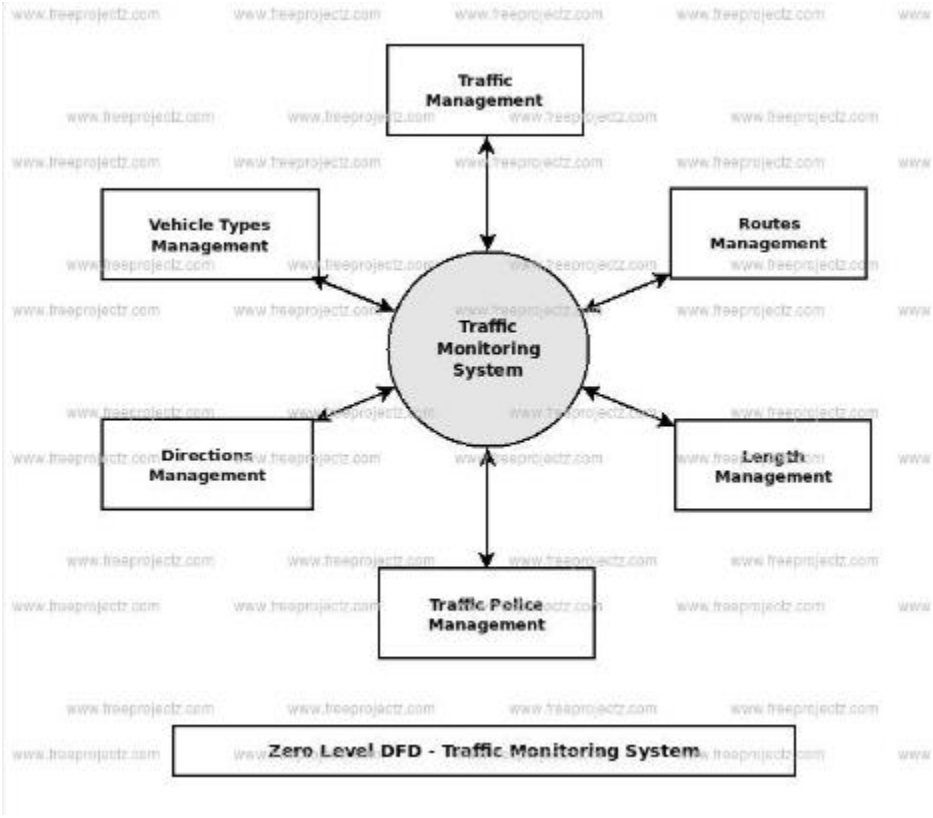
IMPLEMENTATION:

```
def display_traffic_data(traffic_data):
    if traffic_data:
        try:
            # Attempt to extract relevant information from traffic_data
            routes = traffic_data.get('routes', [])
            if routes:
                legs = routes[0].get('legs', [])
                if legs:
                    duration = legs[0]['duration_in_traffic']['text']
                    incidents = legs[0].get('traffic_speed_entry', [])


                    print(f"Estimated travel time: {duration}")
                    if incidents:
                        print("Incidents or delays:")
                        for incident in incidents:
                            print(f"- {incident['incident_description']}")
                    else:
                        print("No incidents or delays reported.")
                else:
                    print("No legs found in the route.")
            else:
                print("No routes found.")
        except KeyError as e:
            print(f"KeyError: {e}. Incorrect data structure in API response.")
```

else:

print("No traffic data available.")





Problem 4: Real-Time COVID-19 Statistics Tracker

Scenario:

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.

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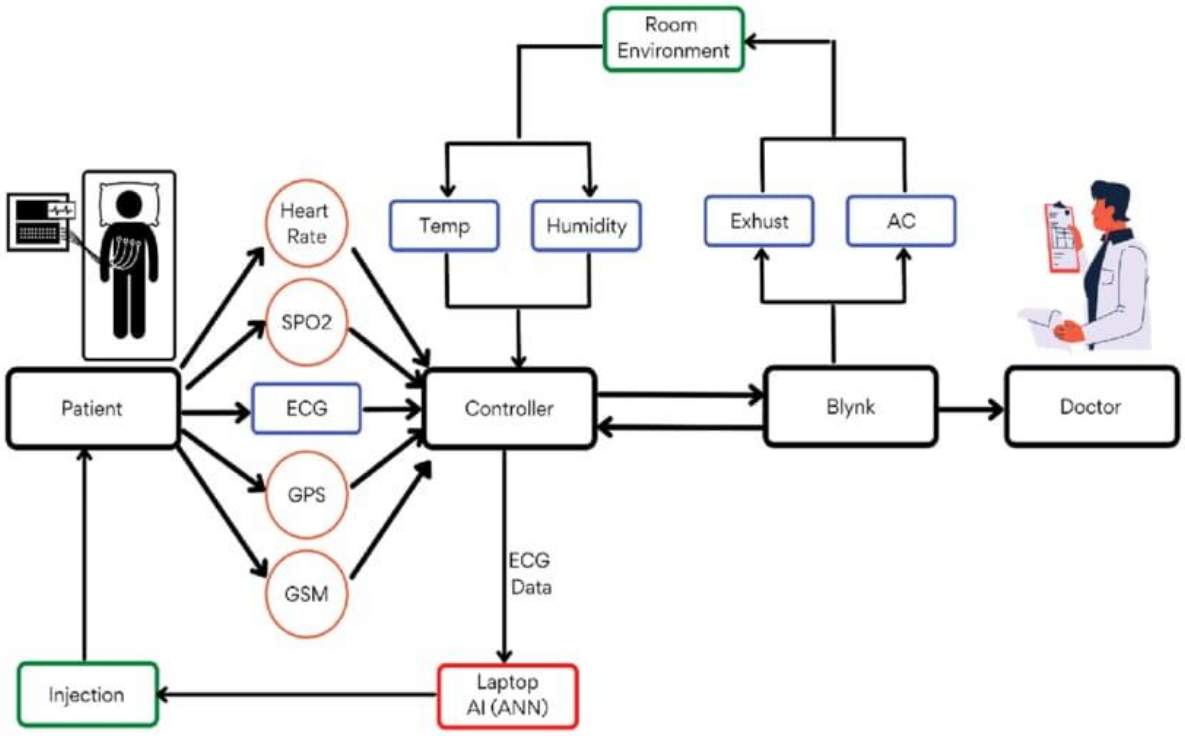


IMPLEMENTATION:

```
import requests

def fetch_covid_statistics(region):
    endpoint = "https://disease.sh/v3/covid-19/historical/all?lastdays=all"
    response = requests.get(endpoint)
    if response.status_code == 200:
        return response.json()
    else:
        return None
def display_statistics(statistics):
    if statistics is not None:
        print("COVID-19 Statistics:")
        print(f"Cases: {statistics['cases']}")
```

```
            print(f"Recoveries: {statistics['recovered']}")
            print(f"Deaths: {statistics['deaths']}")
        else:
            print("Failed to fetch COVID-19 statistics.")
def main():
        region = input("Enter a country, state, or city: ")
        statistics = fetch_covid_statistics(region)
        display_statistics(statistics)
if __name__ == "__main__":
        main()
```

INPUT:

Enter a region(eg,world,USA,Germany): Hungary

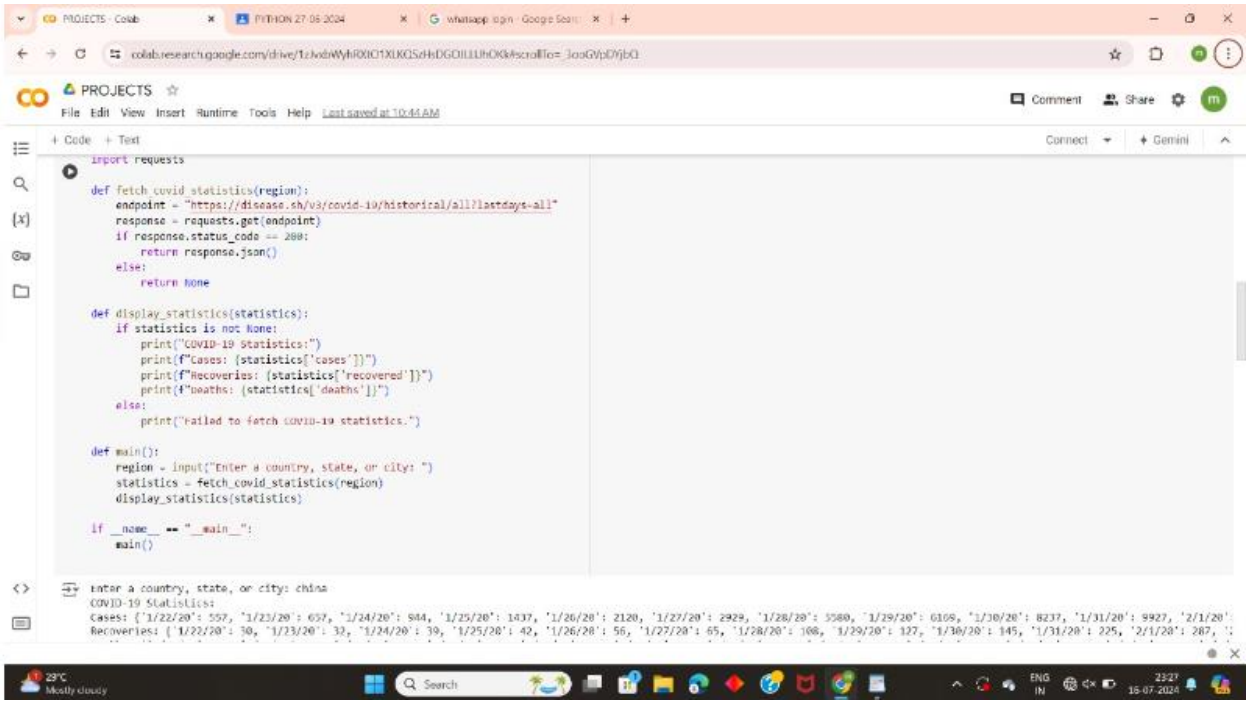
OUTPUT:

COVID-19 Statistics for hungary:

Cases: 2230232

Recovered: 2152155

Deaths: 49048


PROJECTS
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import requests
def fetch_covid_statistics(region):
endpoint = "https://disease.sh/v3/covid-19/historical/all?lastdays=all"
response = requests.get(endpoint)
if response.status_code == 200:
return response.json()
else:
return None
def display_statistics(statistics):
if statistics is not None:
print("COVID-19 Statistics:")
print(f"Cases: {statistics['cases']}")
print(f"Recoveries: {statistics['recovered']}")
print(f"Deaths: {statistics['deaths']}")
else:
print("Failed to fetch COVID-19 statistics.")
def main():
region = input("Enter a country, state, or city: ")
statistics = fetch_covid_statistics(region)
display_statistics(statistics)
if __name__ == "__main__":
main()
Enter a country, state, or city: china
COVID-19 Statistics:
Cases: {'1/22/20': 557, '1/23/20': 657, '1/24/20': 944, '1/25/20': 1437, '1/26/20': 2120, '1/27/20': 2929, '1/28/20': 5580, '1/29/20': 6169, '1/30/20': 8237, '1/31/20': 9927, '2/1/20':
Recoveries: {'1/22/20': 30, '1/23/20': 32, '1/24/20': 39, '1/25/20': 42, '1/26/20': 56, '1/27/20': 65, '1/28/20': 108, '1/29/20': 127, '1/30/20': 145, '1/31/20': 225, '2/1/20': 287,
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