pip install pandas networkx

import pandas as pd

import networkx as nx

def calculate\_distance\_matrix(csv\_file):

# Load the dataset into a DataFrame

dataset = pd.read\_csv(csv\_file)

# Create a directed graph to represent toll locations and distances

G = nx.DiGraph()

# Add edges to the graph with distances

for \_, row in dataset.iterrows():

G.add\_edge(row['Source'], row['Destination'], weight=row['Distance'])

G.add\_edge(row['Destination'], row['Source'], weight=row['Distance']) # Bidirectional

# Calculate the shortest path distances between toll locations

distances = dict(nx.all\_pairs\_dijkstra\_path\_length(G))

# Create a symmetric distance matrix with cumulative distances

toll\_ids = sorted(list(G.nodes))

distance\_matrix = pd.DataFrame(index=toll\_ids, columns=toll\_ids)

for source in toll\_ids:

for destination in toll\_ids:

distance\_matrix.at[source, destination] = distances[source][destination]

# Ensure diagonal values are set to 0

distance\_matrix = distance\_matrix.fillna(0)

return distance\_matrix

# Example usage

csv\_file\_path = 'dataset-3.csv'

result\_dataframe = calculate\_distance\_matrix(csv\_file\_path)

print(result\_dataframe)