**PDC LAB ASSIGN  
SUBMITTED BY:MUNEEB IQBAL(SP22-BCS-030)**

**GROUP NO#7**

**THE CODE IS TRANSLATED FOR GOOGLE COLLAB**

**Q#1**

import numpy as np

import math

def find\_primes(n):

    marked = np.zeros(n - 1, dtype=bool)

    prime = 2

    while prime \* prime <= n:

        for i in range(prime \* prime, n + 1, prime):

            marked[i - 2] = True

        prime += 1

        while prime <= n and marked[prime - 2]:

            prime += 1

    count = np.sum(~marked)

    return count

def main():

    n = 1000000

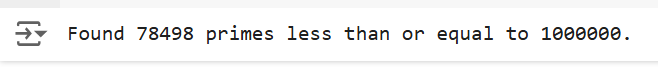
    count = find\_primes(n)

    print(f"Found {count} primes less than or equal to {n}.")

if \_\_name\_\_ == "\_\_main\_\_":

    main()

**OUTPUT**



**QUES#2**

matrix\_data = """4

0 3 -1 7

-1 0 2 -1

-1 -1 0 1

2 -1 -1 0

"""

with open('input.txt', 'w') as f:

    f.write(matrix\_data)

print("input.txt has been created.")

import numpy as np

INF = 1000000

def read\_matrix\_from\_file(filename):

    with open(filename, 'r') as f:

        n = int(f.readline().strip())

        matrix = np.zeros((n, n), dtype=int)

        for i in range(n):

            row = list(map(int, f.readline().strip().split()))

            for j in range(n):

                if row[j] == -1:

                    matrix[i][j] = INF

                else:

                    matrix[i][j] = row[j]

        return matrix

def floyd\_warshall(matrix):

    n = matrix.shape[0]

    for k in range(n):

        for i in range(n):

            for j in range(n):

                matrix[i][j] = min(matrix[i][j], matrix[i][k] + matrix[k][j])

    return matrix

def print\_matrix(matrix):

    n = matrix.shape[0]

    print("     ", end="")

    for i in range(n):

        print(f"|{i}|  ", end="")

    print()

    for i in range(n):

        print(f"|{i}| ", end="")

        for j in range(n):

            if matrix[i][j] == INF:

                print("  inf", end="")

            else:

                print(f"{matrix[i][j]:5d}", end="")

        print()

    print()

def main():

    matrix = read\_matrix\_from\_file('input.txt')

    print("Input Matrix:")

    print\_matrix(matrix)

    shortest\_paths = floyd\_warshall(matrix)

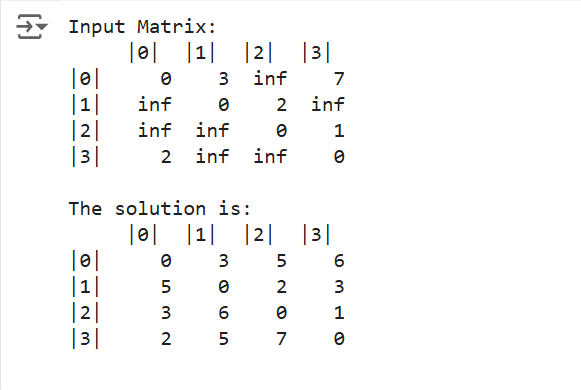
    print("The solution is:")

    print\_matrix(shortest\_paths)

if \_\_name\_\_ == "\_\_main\_\_":

    main()

**OUTPUT**

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