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Assignment 5

Code:

import matplotlib.pyplot as plt

import time

import random

start\_time=time.time()

v = 4

INF = 999

def floyd(G):

dist = list(map(lambda j: list(map(lambda k: k, j)), G))

for i in range(v):

for j in range(v):

for k in range(v):

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

sol(dist)

def sol(dist):

for j in range(v):

for k in range(v):

if(dist[j][k] == INF):

print("INF", end=" ")

else:

print(dist[j][k], end=" ")

print(" ")

G = [[0, 5, INF, INF],

[50, 0, 15, 5],

[30, INF, 0, 15],

[15, INF, 5, 0]]

floyd(G)

#plotting of time complexity

x\_coordinate = []

y\_coordinate = []

for k in range(1, 20000, 100):

a = [random.randint(0, 200000) for i in range(k \* 100)]

floyd(G)

print("Time taken: ", round(time.time() - start\_time, 6))

x\_coordinate.append(k \* 100)

y\_coordinate.append(round(time.time() - start\_time, 6))

plt.plot(x\_coordinate, y\_coordinate, marker="o")

plt.xlabel("Size")

plt.ylabel("Time")

plt.show()

**Output:**

harshavaidhyam@Harshas-MacBook-Pro Algo Design % cd /Users/harshavaidhyam/Desktop/Pitt\ term-1/Algo\ Design ; /usr/bin/env /

rs/harshavaidhyam/.vscode/extensions/ms-python.python-2022.14.0/pythonFiles/lib/python/debugpy/adapter/../../debugpy/launcher 65469 -- /Users/harshavai

dhyam/Desktop/Pitt\ term-1/Algo\ Design/assignemnt5.py

**0 5 15 10**

**20 0 10 5**

**30 35 0 15**

**15 20 5 0**

**Time Complexity:**

Since there is 3 nested for loop it is O(n)\*O(n)\*O(n)

O(n3)

**Figure:** using mathplotlib

A picture containing histogram

Description automatically generated