COMP 6231 - Fall 2022

Assignment 3 – Analysis

Docker Containers and MPI

Done By:

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Problem Statement

MPI Execution Analysis

Prepare a report that shows the impact of varying the number of containers on **T2** and plot a line graph (number of containers on the x-axis and time taken on the y-axis).

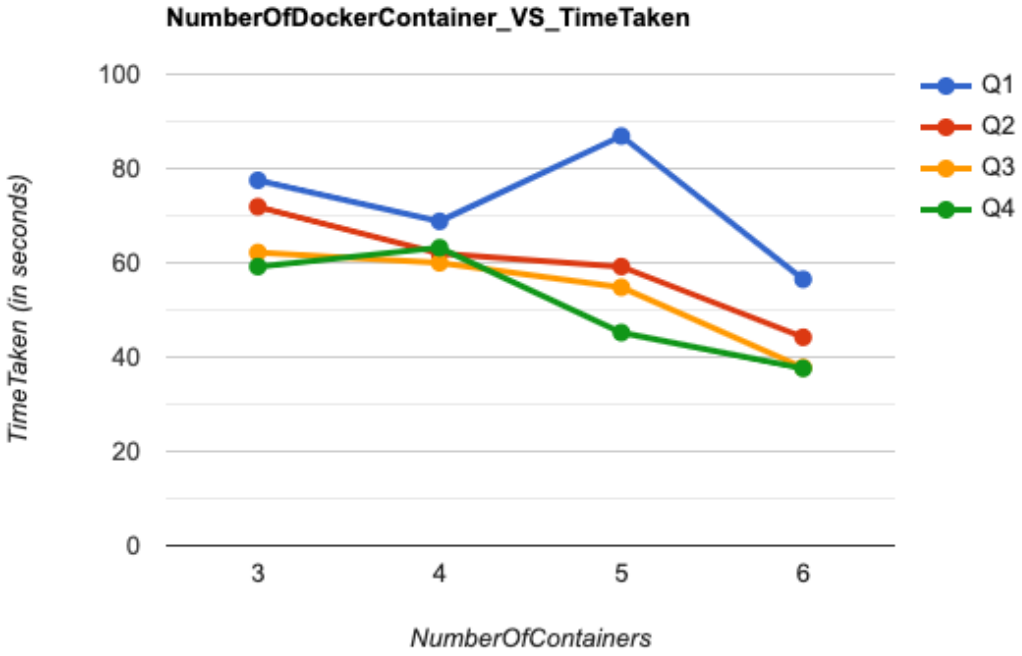
Table Data

DOCKER AND MPI

Number of containers vs Time Taken

Time Taken / Number of containers	Q1	Q2	Q3	Q4
3	77.5 seconds	71.9 seconds	62.2 seconds	59.9 seconds
4	68.8 seconds	62.0 seconds	60.0 seconds	63.2 seconds
5	86.9 seconds	59.2 seconds	54.8 seconds	45.2 seconds
6	56.5 seconds	44.2 seconds	37.8 seconds	37.6 seconds

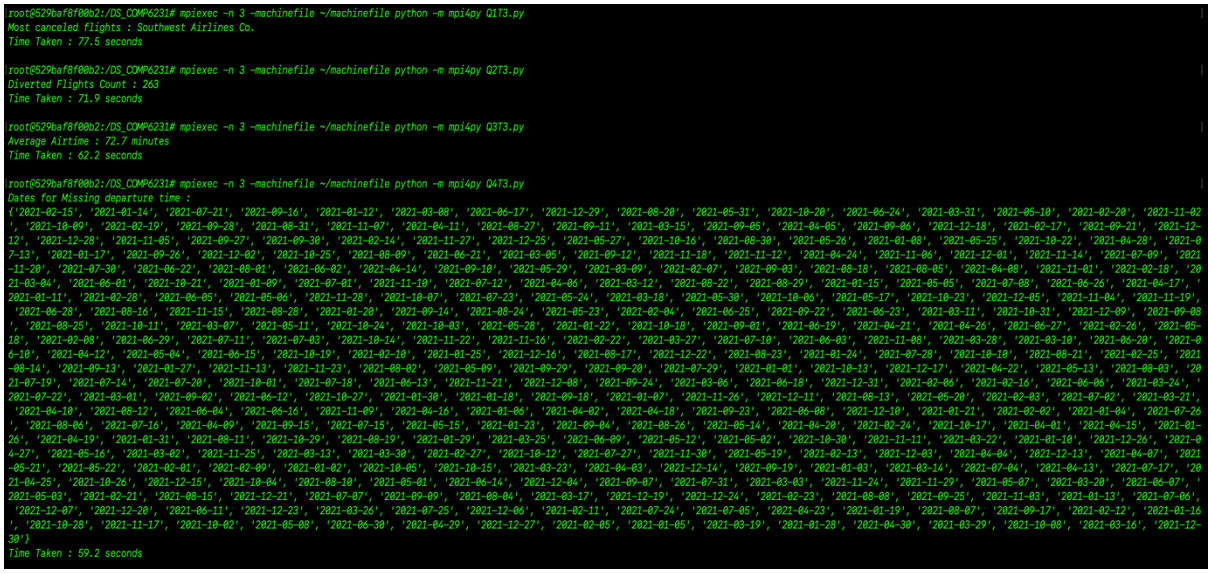
LINE Graph



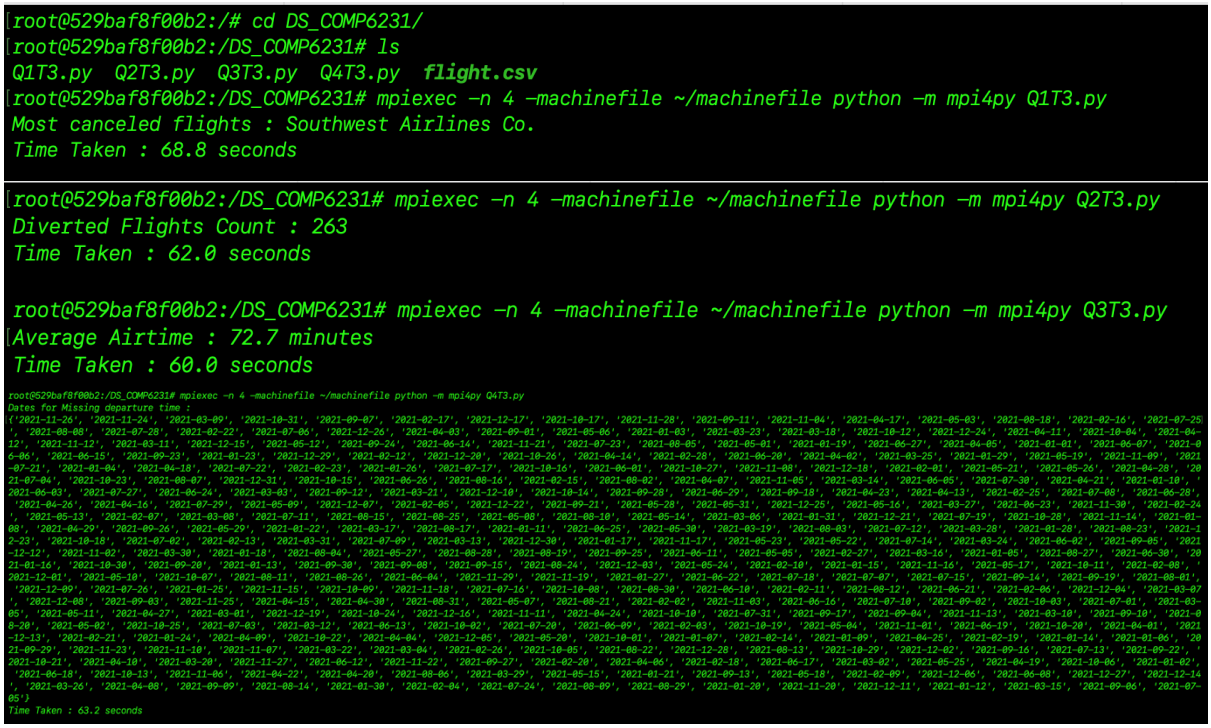

```
import sys
import matplotlib
matplotlib.use('Agg')
import matplotlib.pyplot as plt
import numpy as np

x = np.array([3,4,5,6])
y1points = np.array([77.5, 68.8, 86.9, 56.5])
y2points = np.array([71.9, 62.0, 59.2, 44.2])
y3points = np.array([62.2, 60.0, 54.8, 37.8])
y4points = np.array([59.9, 63.2, 45.2, 37.6])
plt.plot(x, y1points,  label = 'Q1', color = 'blue')
plt.plot(x, y2points,  label = 'Q2', color = 'red')
plt.plot(x, y3points,  label = 'Q3', color = 'yellow')
plt.plot(x, y4points,  label = 'Q4', color = 'green')
plt.xlabel("NumberOfContainers");
plt.ylabel("TimeTaken (in seconds)");
plt.title("NumberOfDockerConatiner_VS_TimeTaken");
plt.show()
plt.savefig(sys.stdout.buffer)
sys.stdout.flush()
```

- The analysis between the quantity of containers and the amount of time required for each issue is shown in the graph above.
- The best time for Q1 has been recorded when the number of container used is 6.
- This is mainly because of the distribution of the process. It is evident that every problem is solved considerably more quickly when there are six containers, which represents the quickest method of distributing and processing the data.
- The lowest time taken for Q1 is 56.5 seconds for 6 containers while the highest is recorded at 86.9 seconds for 5 containers.
- In case of Q2, the highest time taken is recorded when it was executed with 3 containers with a value of 71.9 seconds and the lowest remains at 44.2 seconds.
- The pattern for Q3 is more or less same as that of Q2 depicting the fastness of execution when the number of container is 6 with a value of 37.8 seconds and the highest being at 62.2 seconds for 3 containers.
- Q4 shows a unusual pattern change as the highest time it took when 4 containers were executed with a value of 63.2 seconds, but the lowest remains the same for 6 containers with a value of 37.6 seconds.

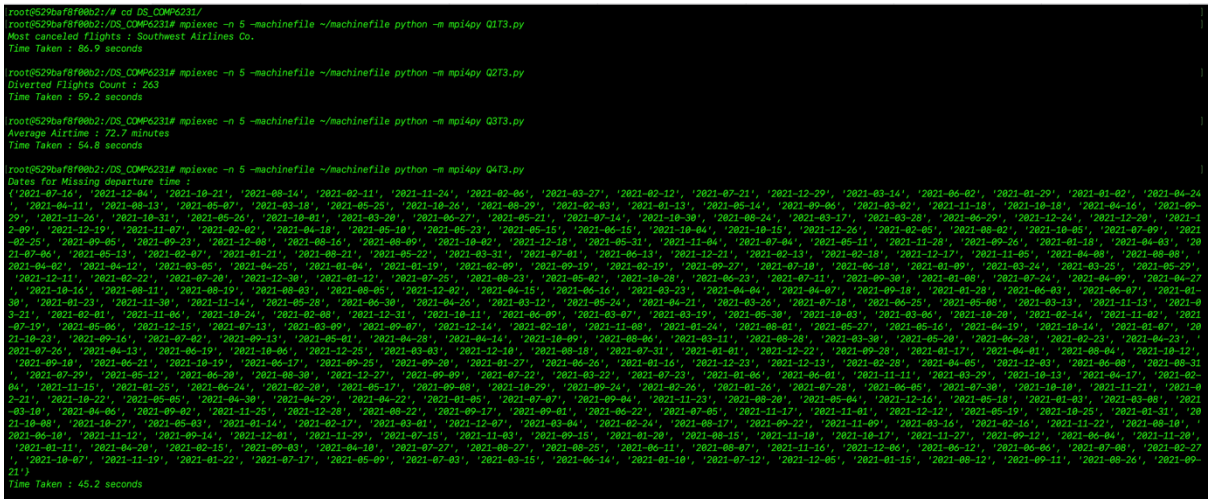
Execution Screenshots



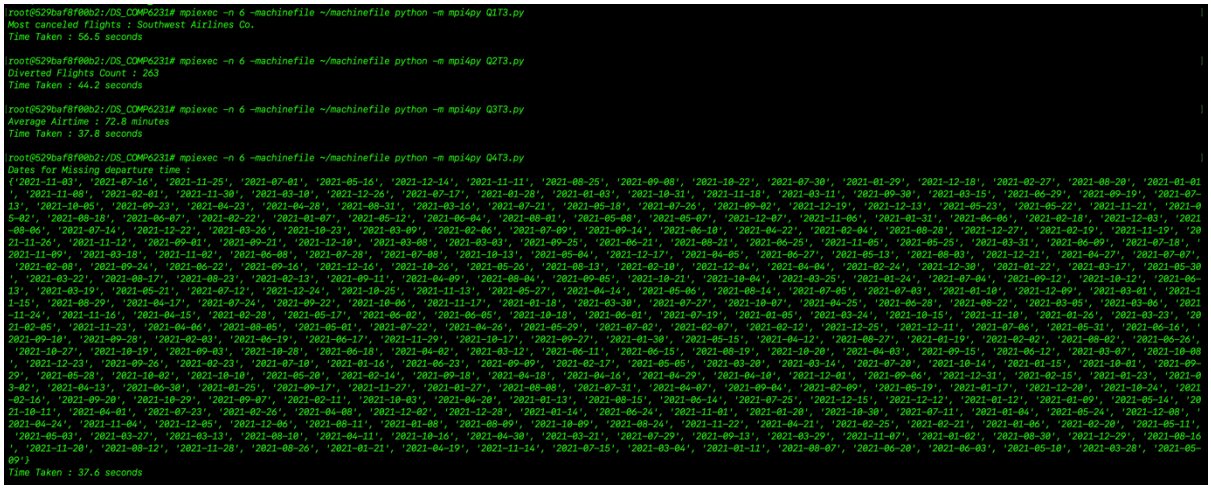
This screenshots shows the execution of Q1, Q2, Q3, Q4 with 3 containers.



This screenshots shows the execution of Q1, Q2, Q3, Q4 with 4 containers.



This screenshots shows the execution of Q1, Q2, Q3, Q4 with 5 containers.



This screenshots shows the execution of Q1, Q2, Q3, Q4 with 6 containers.