Name: Sarah Kayembe And Esther Greene

Data Structures, Spring 2024, Assignment 4

Task 3 Answers:

County: Los Angeles,CA
minimum number of counters: 17691

County: Orange, FL
minimum number of counters: 11715

County: Harris,TX
minimum number of counters: 5472

County: Hamilton,OH
minimum number of counters: 466

County: New Castle,DE
minimum number of counters: 541

Task 1

The time complexity for reading accident reports and sorting them based on the date of the start time in ascending order:
Reading reports and storing them in an arraylist takes linear time O (n)
Sorting them using a comparison-based sorting algorithm takes O(n log n)

Therefore, the entire algorithm takes: **O (n log n)**

Task 2

Considering that each accident needs to be processed within the same day as the accident occurred and given a fixed amount of time available per day:

Iterating through each day takes O (d)
Adding accident reports on each day to the queue takes O (n)
Processing each accident takes O(m)

d = number of days
n = number of accident reports
m = number of processed accidents

Therefore, the entire algorithm takes: **O (d · (n + m))**

Task 3

The first loop iterates through each accident report to count occurrences of counties. This operation takes O(n)

n = the total number of accident reports.

The second loop iterates through the unique counties to calculate the minimum number of counters needed based on the number of accidents in each county. This operation also takes O(m)

m = the number of unique counties.

Therefore, the entire algorithm takes: **O (n + m)**