

# CSE222 HOMEWORK 8

# REPORT

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# tıme complexıty analysıs

## Dijkstra's Algorithm:

* The initialization step, which involves setting up arrays and data structures, takes O (V) time.
* The main loop runs at most V times. In each iteration, the algorithm performs operations such as extracting the minimum distance vertex from the priority queue, updating distances, and relaxing edges. These operations take O (log V) or O (1) time
* The time complexity of processing each edge in the adjacency list is O (E)
* Time complexity is O ((V + E) log V).

## Breadth-First Algorithm:

* The initialization step takes O (V) time.
* The main loop runs if there are vertices in the queue, which in the worst case is O (V).
* Processing each edge in the adjacency list takes O (E) time.
* Time complexity is O (V + E)

NOTE: V represents the number of vertices in the graph, and E represents the number of edges.

# run tıme results

|  |  |  |
| --- | --- | --- |
| MAPS | DIJKSTRA | BREADTH-FIRST |
| map01 | 0.369865738 sec. | 0.016887853 sec. |
| map02 | 0.380734763 sec. | 0.090757753 sec. |
| map03 | 0.241981147 sec. | 0.041147536 sec. |
| map04 | 0.310699806 sec. | 0.067692467 sec. |
| map05 | 0.413578569 sec. | 0.081049648 sec. |
| map06 | 0.436424531 sec. | 0.071993329 sec. |
| map07 | 0.177163808 sec. | 0.079189185 sec. |
| map08 | 0.456189434 sec. | 0.063867698 sec. |
| map09 | 0.268646393 sec. | 0.086842981 sec. |
| map10 | 0.130943414 sec. | 0.008812742 sec. |
| pisa | 0.218848104 sec. | 0.054120748 sec. |
| tokyo | 0.131426159 sec. | 0.041378887 sec. |
| triumph | 0.212068649 sec. | 0.068835069 sec. |
| vatican | 0.225255022 sec. | 0.036901772 sec. |