
SC2001/CE2101/CZ2101

ALGORITHM DESIGN AND ANALYSIS

Project 2: The Dijkstra's Algorithm

10 .. 20 100

In the Dijkstra's algorithm, the choice of the input graph representation and the priority queue implementation will affect its time complexity.

- (a) Suppose the input graph $G = (V, E)$ is stored in an adjacency matrix and we use an array for the priority queue. Implement the Dijkstra's algorithm using this setting and analyze its time complexity with respect to $|V|$ and $|E|$ both theoretically and empirically. i)
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- (b) Suppose the input graph $G = (V, E)$ is stored in an array of adjacency lists and we use a minimizing heap for the priority queue. Implement the Dijkstra's algorithm using this setting and analyze its time complexity with respect to $|V|$ and $|E|$ both theoretically and empirically. i)
ij)
- (c) Compare the two implementations in (a) and (b). Discuss which implementation is better and in what circumstances.