CE2101/CZ2101
ALGORITHM DESIGN AND ANALYSIS

Project 2: Dijkstra's Algorithm

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.

(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.

Compare the two implementations in (a) and (b) with printings of CPU time, and present your analysis on which implementation is better and in what circumstances.