

Dijkstra's Algorithm

```
function Dijkstra(Graph, source):

    create vertex set S

    for each vertex v in Graph:           // Initialization
        dist[v] ← INFINITY                // Unknown distance from source to v
        prev[v] ← UNDEFINED               // Previous node in optimal path from source
        add v to S                        // All nodes initially in Q (unvisited nodes)

    dist[source] ← 0                      // Distance from source to source

    while S is not empty & min dist < infinity: //second part of condition is not
                                                //necessary if all nodes are reachable
        u ← vertex in S with min dist[u]    // Node with the least distance will be
                                                // selected first
        remove u from S

        for each neighbor v of u:           // where v is still in Q.
            alt ← dist[u] + length(u, v)
            if alt < dist[v]:                // A shorter path to v has been found
                dist[v] ← alt
                prev[v] ← u

    return dist[], prev[]
```