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Forecast Week 9: Dijkstra's Algorithm

1. Analyze the time complexity when implement step 2 by sequential searching whole adjacency list.

   O(n^2) as it goes through the whole adjacency list.

2. Analyze the time complexity when implement step 2 by a priority queue that maintained the bridge edges.

   A priority queue has a deque function with complexity O(n)

   2.1. Implement the priority queue by double-linked list

   The priority queue implemented as a linked list has a dequeue function with complexity O(1). But to insert them has still a complexity of O(n)

   2.2. Implement the priority queue by Min-heap.

   A min heap reduces the complexity to O(lgn)

3. Design an algorithm to reconstruct the path from spanning tree T (the result).

   Cache target node

   Go up the tree (using the parent field) until you finding a node without parent

   Node is root. The path you found by going up the links is the shortest path.

   Reverse order.

4. How to find the unreachable (have no path from s) set?

   When the unvisited nodes have a distance from all nodes in the visited nodes of infinity then the algorithm ends and returns unreachable