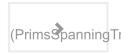
8.21. Analysis of Dijkstra's Algorithm

Finally, let us look at the running time of Dijkstra's algorithm. We first note that building the priority queue takes O(V) time since we initially add every vertex in the graph to the priority queue. Once the queue is constructed the while loop is executed once for every vertex since vertices are all added at the beginning and only removed after that. Within that loop each call to delMin , takes $O(\log V)$ time. Taken together that part of the loop and the calls to delMin take $O(V\log(V))$. The for loop is executed once for each edge in the graph, and within the for loop the call to decreaseKey takes time $O(E\log(V))$. So the combined running time is $O((V+E)\log(V))$.

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