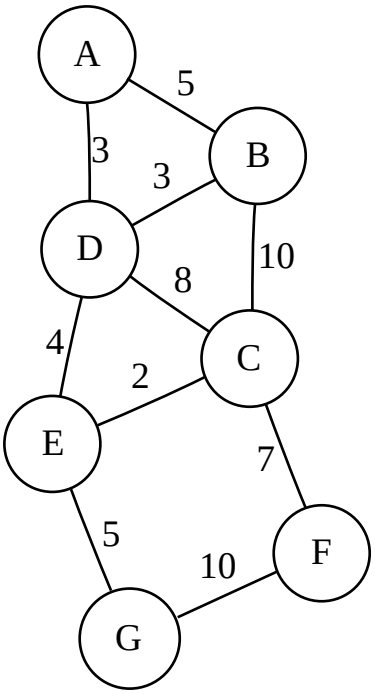
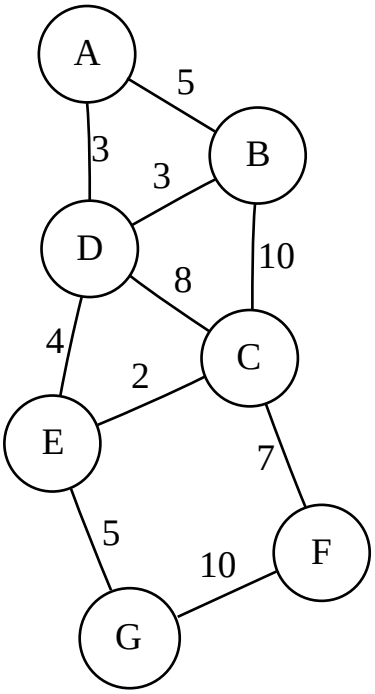
1. **(10 points)** Using Dijkstra's algorithm, find a shortest path on this graph between A and G, showing your work:



2. **(10 points)** Using Kruskal's algorithm, find a minimum spanning tree on this graph, showing your work:



3. **(40 points)** For each of the following statements, either prove it (if true) or give a counterexample (if false).

   (a) If H is an induced subgraph of a complete graph, then H is a complete graph.

   (b) A simple graph G is uniquely determined by its degree sequence.

   (c) For any connected graph G, the graph formed by adding an edge to G contains a cycle.

   (d) If G has fewer than $n-1$ edges, then G is not connected.