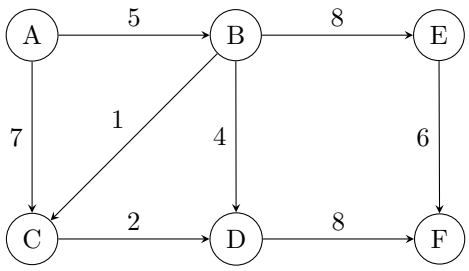

Problem 1. Perform a breadth-first search of the graph starting from vertex A. Give the number of steps to reach *every* other vertex. Additionally, give the order in which the vertices are *first* witnessed; that is, give the order in which they first enter the exploration queue (and not necessarily the order in which they are explored).

Vertices are witnessed in the order A, B, C, D, E then F.
From A to B, 1 step.
From A to C, 1 step.
From A to D, 2 steps.
From A to E, 2 steps.
From A to F, 3 steps.

Problem 2. Use Dijkstra's algorithm on this graph starting from vertex A. Give the cost of the least-cost path to *every* other vertex. Additionally, give the order in which the vertices are *first* witnessed; that is, give the order in which they first enter the exploration queue (and not necessarily the order in which they are explored).

Vertices enter the exploration queue in the order:
$A \to 0$, $B \to 5$, $C \to 7$, $E \to 13$, $D \to 9$, $C \to 6$, $D \to 8$, $F \to 16$, $F \to 19$.
From A to B, the least cost is 5.
From A to C, the least cost is 6.
From A to E, the least cost is 13.
From A to D, the least cost is 8.
From A to F, the least cost is 16.

Problem 3. Give two valid topological sorts of this graph.

First Topological Sort: A, B, E, C, D, F.
Second Topological Sort: A, B, C, E, D, F.