LaSalle College
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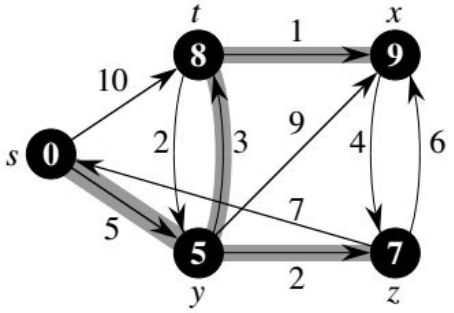
Advanced Data Structure: 420-J13-AS

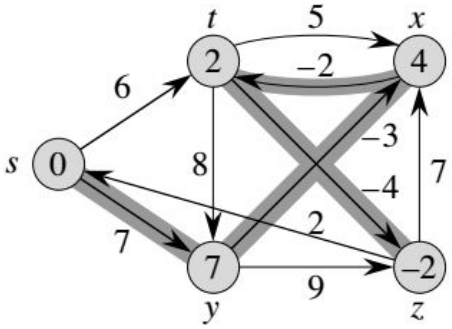
Practice Set 9

Programming

A. The method **Dijkstra()** in the class **ListGraph** uses Dijkstra's algorithm to calculate all shortest paths from a given source 's' in a graph. Use this method to find all shortests paths starting from z to the other vertices in Figure 24.6 from CLRS.



B. Implement the method **BellmanFord()** in class **ListGraph** using the Bellman-Ford algorithm. Follow the pseudocode given in the notes or in the book. Test this algorithm using the previous figure. Then, test the algorithm on the following graph (Figure 24.4 CLRS) which contains negative edges.



C. In the class **MatrixGraph** that was implemented in the previous practice set, add the new **Dijkstra()** and **BellmanFord()** methods.
D. Reimplement the class **PriorityQueue** to use a binary heap (min-heap) or a **SortedSet** (red-black tree) instead of a sorted list to improve its efficiency. Note that modifying any element in the data structure may require changing its position for the data structure to stay valid.

CLRS Exercises

- 24.1-1
- 24.1-4
- 24.3-1
- 24.3-2