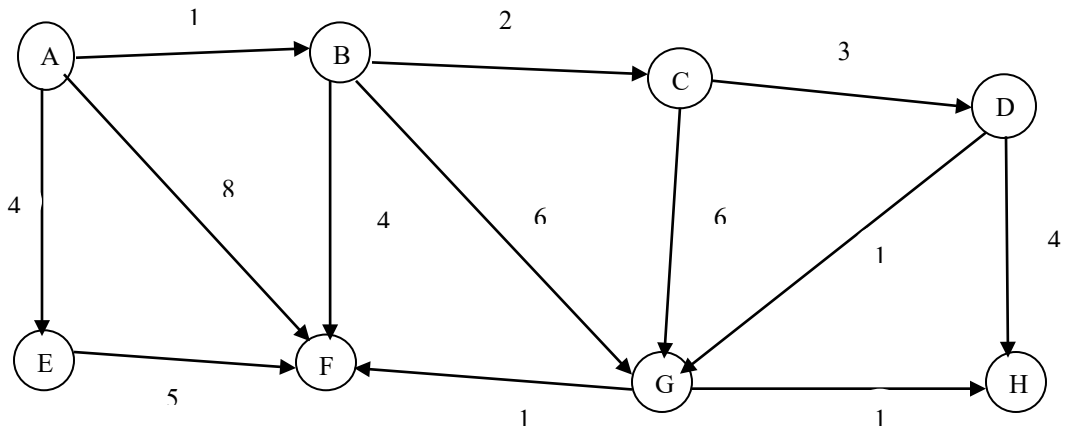
Programming Assignment - 14
Shortest Paths

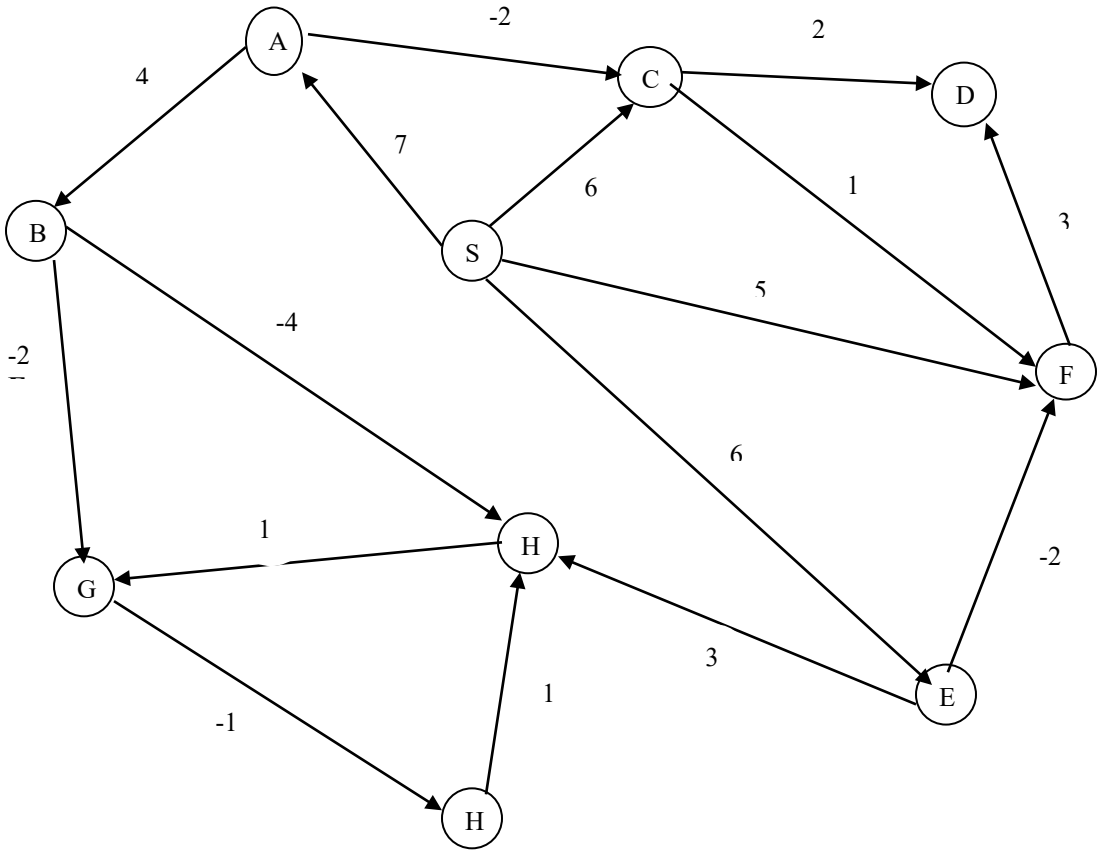
1. Dijkstra's Algorithm

Run Dijkstra's algorithm on the following graph. Show the intermediate cost values after each iteration of the algorithm, and show the final shortest path tree and cost.



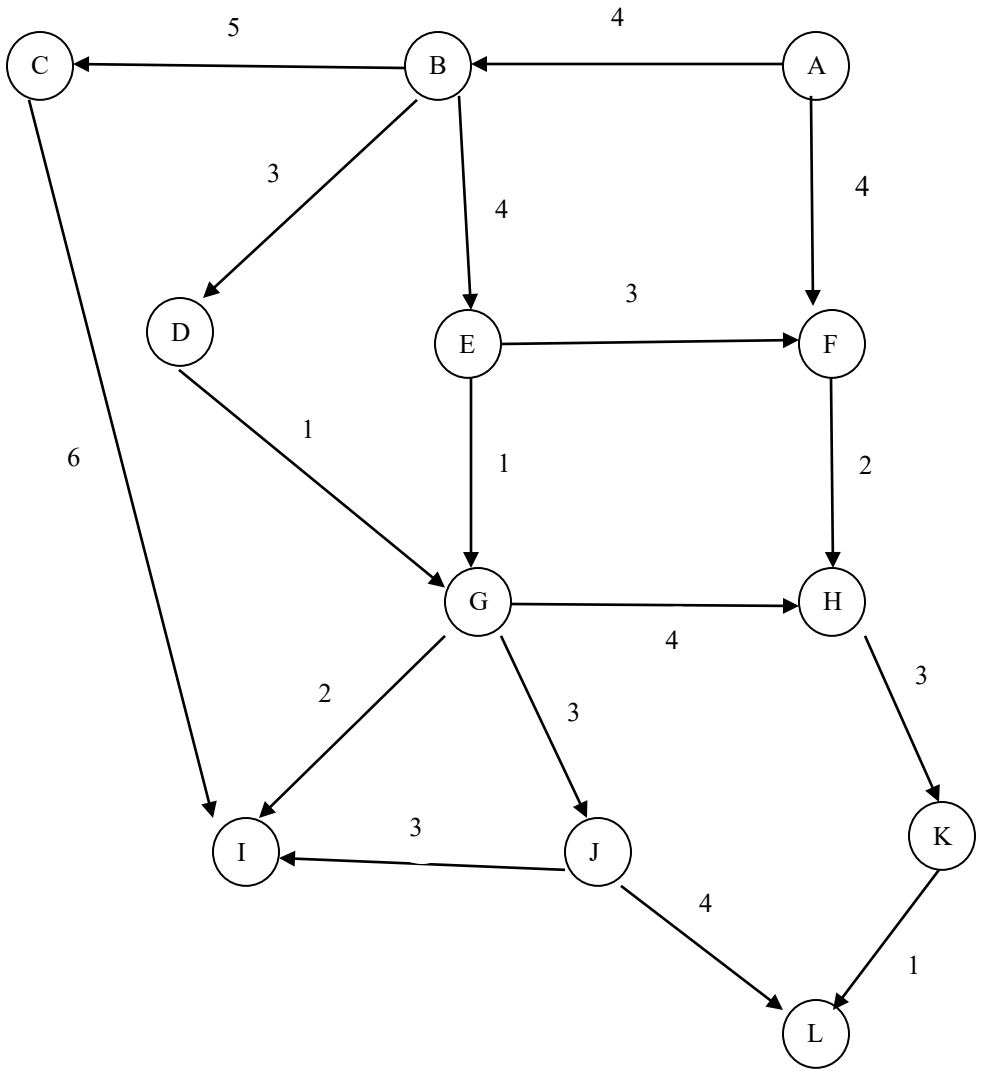
2. Bellman-Ford

Run Bellman-Ford algorithm on the following graph. Show the intermediate distance values after each iteration of the algorithm, and show the final shortest path tree and cost.



3. Shortest Path on DAG

Find the shortest cost path from vertex A to all other vertices for the following vertex. Show the intermediate steps and cost at each iteration of the algorithm, and show the final shortest path tree and cost.

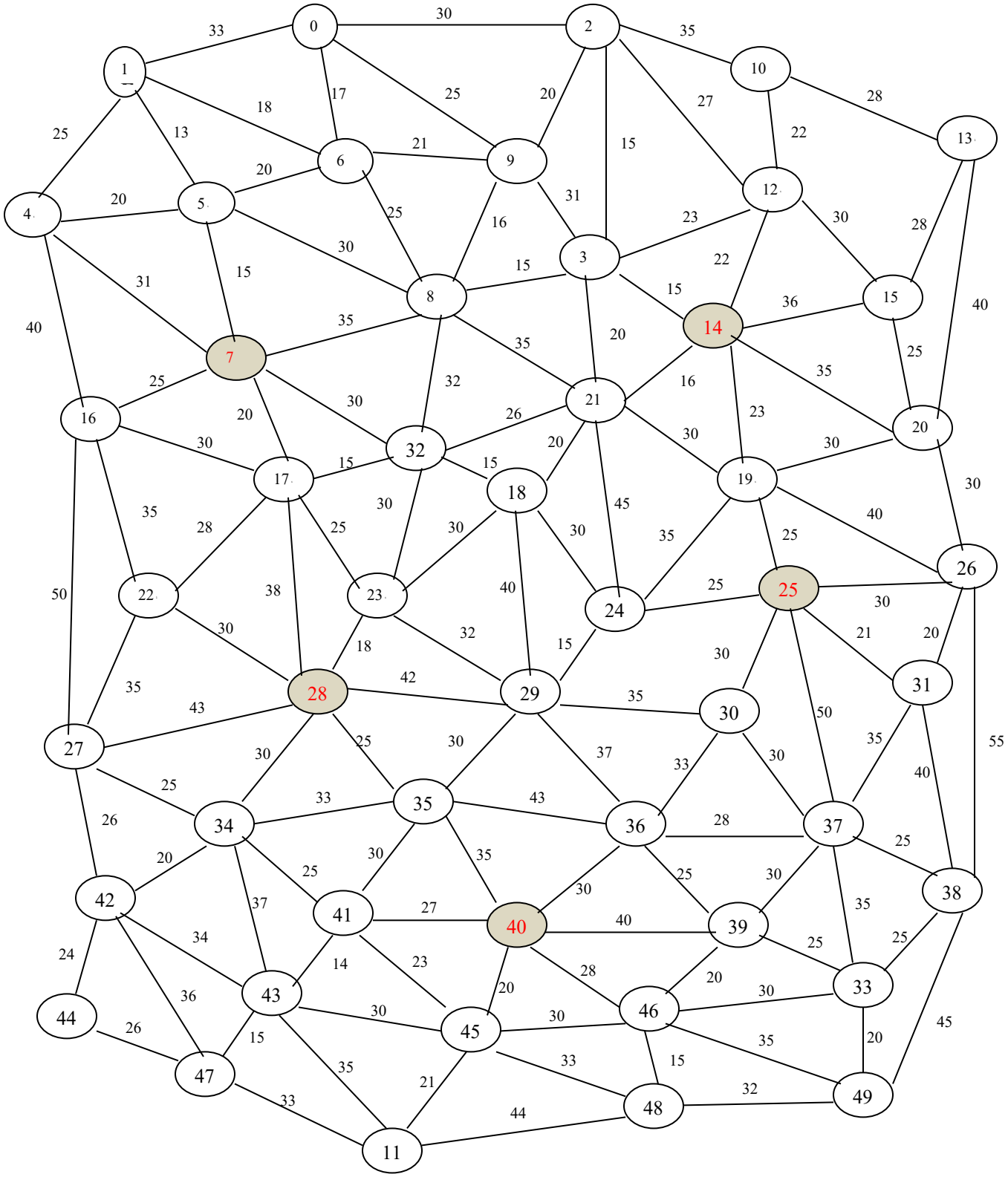


Programming Assignment

The Sentinel Alarm Company wants to create a plan so that it can respond to emergency call from its customers in the shortest time. The locations and the travel time between adjacent customers and the field stations are shown in the figure below. The field stations are located at nodes 7, 14, 25, 28, and 40. Remaining nodes show the locations of its customers. The edges show the possible routes and the travel time between the customers. Customers can be served from any one of these field stations. The company would like to create a plan that identifies which customer should be served from each of its field stations and the routes and distances that must be used by their service vehicles. Show how company can serve all its customers while minimizing the response time to its customers.

Write a program to determine which customers must be served from each field stations. Show the minimum response times from the field stations to the customers. Print the list of routes (nodes) and the total travel time from the field stations to each of the customer location.

If you could build only one field station that minimizes the total cost of the cable used, which node(s) would you choose for your field station?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