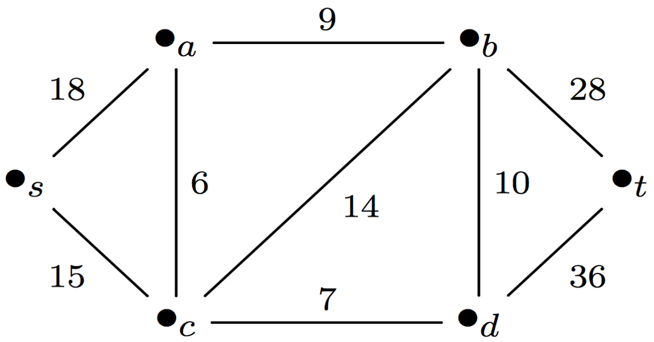
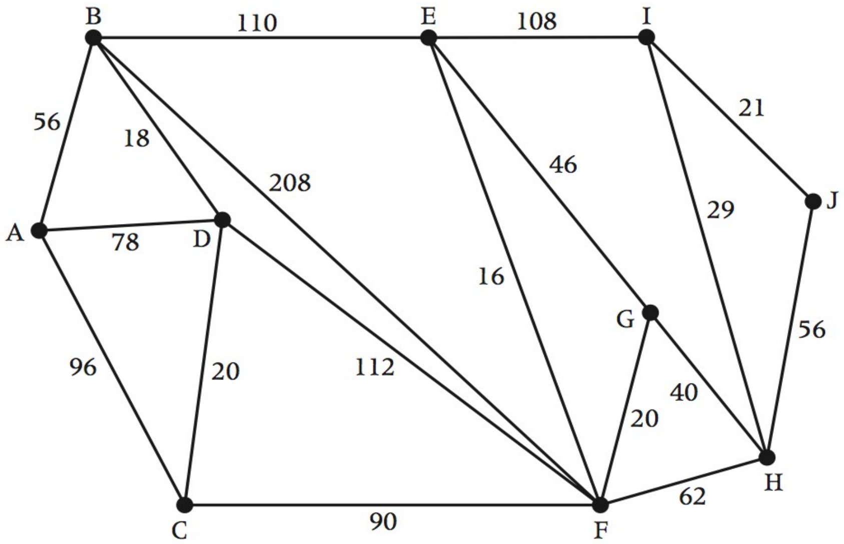
Exercises

Shortest path algorithms:

1) Find the shortest path from s to t in the following graph. How long is the shortest path? Hint: use Dijkstra's algorithm.

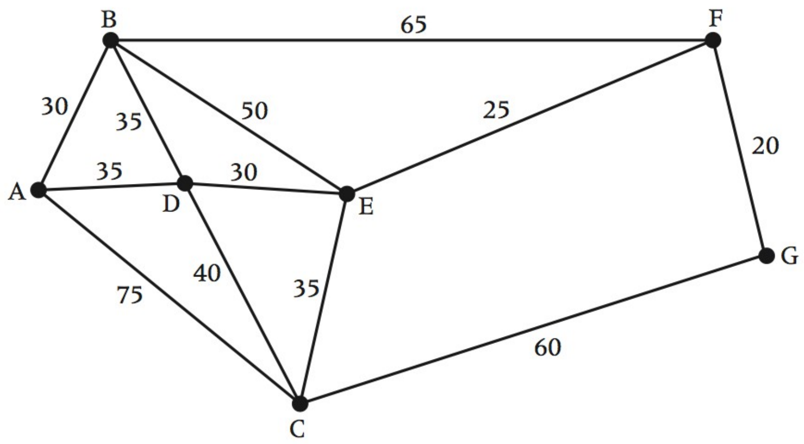


2) In the following graph the nodes are cities and the edges are the routs between them. The weights mean the time (in minutes) to get from one city to another.



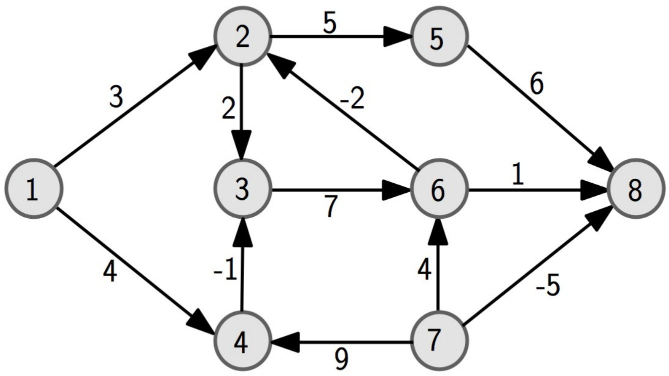
a) Use Dijkstra’s algorithm to find the minimum time to travel from A to J, and state the route.
b) A new road is to be constructed connecting B to G. Find the time needed for traveling this section of road if the overall minimum journey time to travel from A to J is reduced by 10 minutes. State the new route.

3) The following network shows the time, in minutes, of train journeys between seven stations.



a) Given that there is no time delay in passing through a station, use Dijkstra's algorithm to find the shortest time to travel from A to G.
b) Find the shortest time to travel from A to G if in reality each time the train passes through a station, excluding A and G, an extra 10 minutes is added to the journey time.

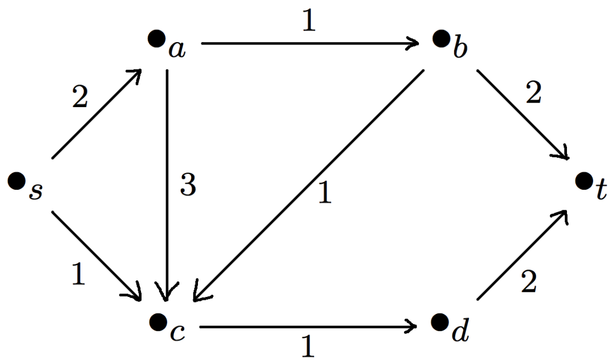
4) Apply the Bellman-Ford algorithm to the given graph (source node s = 1).



5) Apply the Floyd-Warshal algorithm to the graph of excercise 4.

Maximum Flow:

1) Find one minimal cut and two different maximal flows for the following.



2) Apply Ford-Fulkerson to the following network.