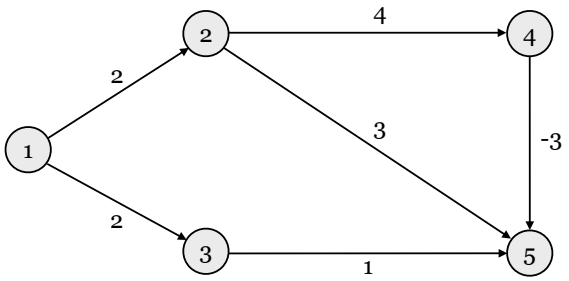
Homework: The Shortest Path Problem

Note: Every homework has 10 credit points. To pass the homework, you need to reach 50% of the points. In this homework, only the first four exercises have credit points.

1. **(a)** Describe the Generic Shortest Path Algorithm. (0.5p)

(b) Consider the graph and the flow vector of the following figure:



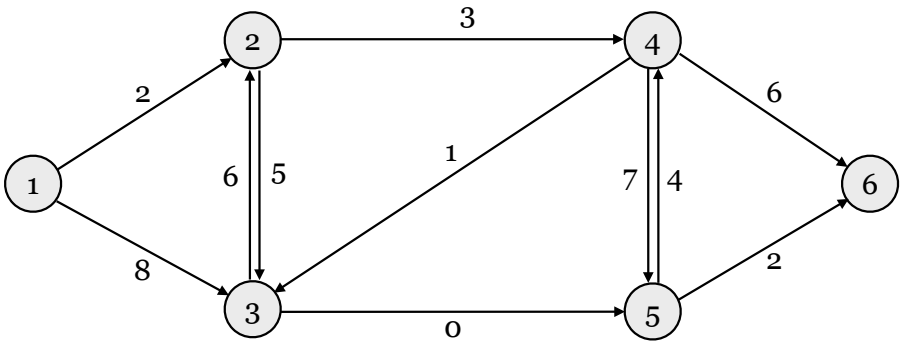
Use the Generic Shortest Path Algorithm to find the shortest path from node 1 to every other node. (1.5p)

(c) What is the difference between label setting and label correcting methods? (0.5p)

2. **(a)** Describe Dijkstra's algorithm. (0.5p)

(b) Discuss why this is referred to as a label setting algorithm. (0.5p)

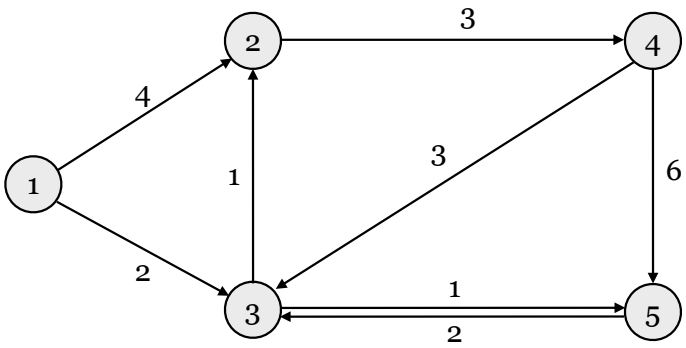
(c) Solve the shortest path problem shown in the figure below, using Dijkstra's algorithm. (1.5p)



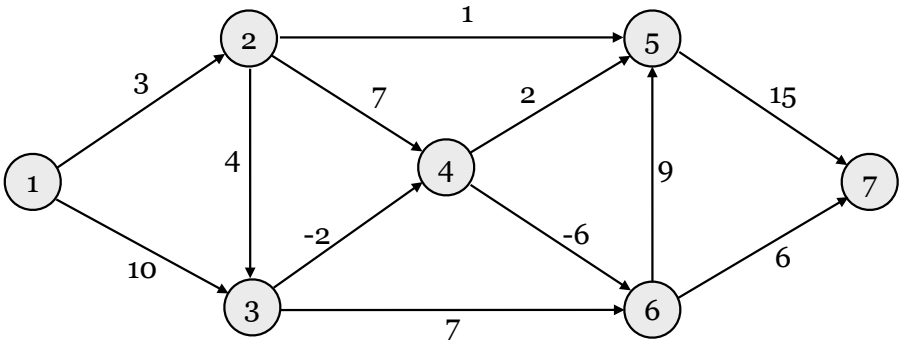
3. **(a)** Describe Bellman-Ford algorithm. (0.5p)

(b) Discuss why this is referred to as a label correcting algorithm. (0.5p)

(c) Solve the shortest path problem shown in the figure below, using Bellman-Ford algorithm. (1.5p)



4. (a) Use the Bellman-Ford algorithm to find the least cost path from node 1 to node 7 in the following network. Note that some of the arcs have negative cost. (1.25p)



(b) Use Dijkstra's algorithm on a modified network to solve the same problem. (1.25p)