DM2 Optimisation combinatoire et convexe

1. Give a polynomial time algorithm for the following problem.

   b-MATCHING PROBLEM
   Input : A graph G and values b_v for each $v \in V(G)$.
   Output : A subset M of edges of G such that each vertex v is adjacent to b_v edges of M. (Or the statement that no such M exists.)

   An output to this problem is a *b-matching* of G.

2. Give a polynomial time algorithm for the following problem.

   SHORTEST PATH WITH NEGATIVE WEIGHTS
   Input : A graph G, vertices $s, t \in V(G)$ and weights $w_e \in \mathbb{Q}\ \forall e \in E(G)$ such that there are no negative weight cycles.
   Output : A minimum weight paths between s to t.