Problem 1 (4 points):
Show that the modified Bellman-Ford algorithm together with the rules of deciding whether an edge belongs to the MST or not indeed creates an MST. Do this in two steps:

(a) Show that the modified Bellman-Ford algorithm produces final values for \( D_{u,v}(w) \) with \( \min_v D_{u,v}(w) = \gamma(u, w) \). (2 points)

(b) Show that under the assumption that \( \min_v D_{u,v}(w) = \gamma(u, w) \), the edge selection rules indeed create an MST. (2 points)

Problem 2 (6 points):
Implement the (original) Bellman-Ford algorithm in the Spheres simulation environment using the following graph.

![Graph Image]

Figure 1: An example graph for the Bellman-Ford algorithm. The numbers at the nodes represent node numbers, and the numbers at the edges represent edge costs.

Submit a printout with the program (5 points) and all final \( \min_v D_{u,v}(w) \) values (1 point) for all \( u \) and \( w \).