Homework 6 - Problem 4

a) Reducing problem P to problem Q_1 - Finding the longest path for G_1, s_1 and t_1:

1. Construct G_1, s_1 and t_1:

   Given you get G, S and t,

   Duplicate G into G_1,
   Copy s into s_1,
   Copy t into t_1,

2. Run algorithm A_{Q1} on G_1, s_1, and t_1

   Now Given L:

   If the length of the longest path from s_1 and t_1 is equal to the number of vertices in G, then there is an s-t hamiltonian path in G, otherwise there is no path.

b) Reducing problem P to problem Q_2 - Finding the shortest path for G_2, s_2 and t_2

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1. Construct G_2, s_2 and t_2:

   Given you get G, S and t,

   Duplicate G into G_2
   Copy s into s_2
   Copy t into t_2

2. Run algorithm A_{Q2} on G_2, s_2, and t_2

   Now Given L:

   If the length of the longest path from s_1 and t_1 is equal to the number of vertices in G, then there is an s-t hamiltonian path in G, otherwise there is no path.