CS540 Section 3 HW1 02/09/2015

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P2.(a). State: (i,j), where i,j represent cities.

Friend A is in city i, friend B is in city j.

Action: move, friend A moves from i to i', friend B moves from j to j'.

Total time: T = T + max(d(i,i'), d(j,j'))

Start state: (i,j), and T = 0

Goal state:(k,k)

We also want to minimize T.

(b). (i) No, for the goal state G,h(G) = 1, but h*(G)=0

(ii) No, for 2 cities i,j lie in a line and are connected, h(i,j)=2xD(i,j), but h*(i,j) = D(i,j)

(iii)Yes. h*(i,j)≥D(i,j)≥D(i,j)/2, so h*(i,j)≥h(i,j)

(c). Yes there are. For example, only two cities i and j. Friend A is in i and friend B is in j. There is no solution.

(d). Yes, the necessary condition for a solution is the path consists of even number of segments. So if the shortest path between the friends consists of odd number of segments, they have to detour to make it even. For example, in this map, all solutions require one friend to visit a certain city twice.