# Zach Ambur CS 540 HW#1

## Problem 2

(a)

**State space**: States are all possible city pairs (i, j). The map is not the state space. Number of states is (n^2 + n) / 2 (n^2 is also correct, n^2 / 2 is deducted 0.5 point, other answers are deducted 1 point).

**Successor function:** The successors of (i, j) are all pairs (x; y) such that Adjacent(x, i) and Adjacent(y, j).

**Goal:** Be at (i, i) for some i.

**Step cost function:** The cost to go from (i, j) to (x; y) is max(d(i, x); d(j, y)).

(b)

(i) No

(ii) No

(iii) Yes

(c) Yes. Consider a map with only two cities, 1 and 2. The first friend starts at 1, the second friend starts at 2, and there is a road connecting these two cities. Since the friends cannot meet on the road and one cannot wait at a city while the other travels, there is no solution for this particular case.

(d) Yes. Consider the following map where friend A starts at city 1 and friend B starts at city 8. Any solution on this map will require at least one friend to visit city 1 twice.