Runhao Liang (Damon), 1001626644
Prof. Mcllraith, Prof. Allin, TUT 1201
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Assignment 3: Multi-Agent Pacman

Question 1

1. For a game state, a heuristic value is a reference evaluating how good to be in a state, and how likely we will reach a goal state. For a state in A* search, a heuristic value is the estimated cost, which is less than the optimal cost, from the current state to the goal state. A heuristic is good in either situation, if it is admissible, and can accurately evaluate how good to be in a state.

Question 2

1. The total score is decreasing as time goes. If the pacman finds that it is impossible to eat all foods to get more points, then it would be better to commit suicide and keep a relatively high score for now.

2. The answers are based on that whether a state's minmax value can be negative. If all minimax values can be negative, then the answer is "Not Same" for all three questions. Otherwise, if all minimax values must be positive, then the answer is "Same" for all three questions.

Question 3

1.

a. In the best-case scenario, alpha beta would be able to search O(2d) depth in the same amount of time.
b. In the worst-case scenario, alpha beta would be able to search O(d) depth in the same amount of time. The upper bound, i.e. O(d), is the same as the minmax agent without alpha-beta pruning.

2. False.