**Artificial Intelligence HW-1**

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References taken from:

Artificial Intelligence: A Modern Approach by Stuart and Peter

http://eddmann.com/posts/depth-first-search-and-breadth-first-search-in-python/

http://lucieackley.com/heuristic.pdf

The heuristic I used for the corners problem and the food search problem was Manhattan-distance heuristics.

Estimated time on the homework: 18-20 hours.

Details for the **Corner Problem**:

The Heuristic resulted in expansion of 901 nodes

For the corners problem, we listed the unvisited corners and then computed the Manhattan-distance to each of them. Then corner with minimum Manhattan-distance is selected. That is the minimum number of steps needed to reach the corner. Current position of pac-man is updated with this corner and the corner is removed from the unvisited list. This goes on till unvisited list is empty. Then the total (sum of the distances) distance will be an admissible and consistent heuristic.

This is a consistent heuristic as it will choose same corners and the heuristic returns 0 at a goal state since the Manhattan-distance will never be zero.

Details for the **Food Search Problem**:

expanded nodes: 9551

thresholds: [15000, 12000, 9000, 7000]

Again, the Manhattan-distance heuristic is used for the food-search problem.

We call food List to get the list of food coordinates. A temporary list is maintained that finds the Manhattan-distance between the pac-man position and each of the food coordinates. It then returns the maximum distance travelled to eat all the dots.

The heuristic is consistent because the Manhattan-distance is the absolute shortest path from one point to another for pacman.