Assignment report for pacman

Question1

The reflex agent only take actions based on the current situation of the state of environment while ignoring past and future states. The limitation of this agent is that sometimes it may get stuck in possible loops.

Question2

To make the agent win more often, we need to modify the evaluation function. The new evaluation function will mainly depends on four parts, the score from game state, the score from food, the score from capsules and the score from the ghosts.

Question3

When the agent is trapped between two ghosts, as the death is unavoidable, the agent try to die ASAP because of the constant penalty of stop.

Question4

The pacman is the maximizer and has to choose the best possible move for maximizing the score. While the ghost is the minimizer who tries to minimize the score.

Question5

The evaluation function in reflex agent evaluates state-action pairs only. While the evaluation function in minimax agent evaluates states rather than actions. So minimax agent evaluates future states whereas reflex agent evaluates actions from the current state.

Question6

It’s because our evaluation function is not good enough, the agent might even thrash around right next to a dot without eating it because it doesn't know where to go after eating that dot.

Question7

The alpha-beta pruning can reduce its computation time by a significant factor. This tweak allows the search to proceed much faster cutting unnecessary branches which need not be searched because there already exists a better move available.

The alpha-beta agent has minimax values identical to those of the minimax agent, although the actions it selects can vary because of different tie-breaking behavior.

Question8

The expectimax algorithm is a variation of the minimax algorithm that takes into account also the uncertainty in the environment. The maximizers nodes of the tree work as in minimax but the minimizers nodes are replaced by chance nodes whose value is not the value of the minimum of their children but it will be computed as the expectation of their children’s value. The expectimax pacman will no longer take the min over all ghost actions, but the expectation according to a percieved model of how the ghosts act.