

Assignment 2

1) Evaluation function for ReflexAgent

- First thing to be taken care of is to not get killed by the ghosts. So if the distance between the pacman and any ghost is less than or equal to 1 unit, the evaluation function returns a very low value for the action. This can be done only if the pacman is scared.
- Next, the new state with less food count is given more value as the pacman needs to eat food
- If the food count is same, then the pacman needs to move in the direction of food. Hence a reciprocal of the shortest food distance is returned if the above two cases don't match

2) MinimaxAgent for multi-agent Pacman

- A multi-agent minimax search algorithm is implemented
- For each max (pacman) player, multiple min(ghosts) are considered.
- Following are the results obtained for an instance of MinimaxAgent called.
- It can be noted that significant time and memory is taken for a depth of 4.

Lay out used	minimaxClassic
Depth of Minimax search used	4
time taken	0.114 seconds
Number of nodes	13309
Memory utilized	479124 bytes

3) AlphaBetaAgent for multi-agent Pacman

- A multi-agent Alpha-beta minimax search algorithm is implemented
- For each max (pacman) player, multiple min(ghosts) are considered.
- Pruning is done wherever suitable using the algorithm.
- Following are the results obtained for an instance of AlphaBetaAgent called.
- It can be noted that significant time and memory improvement has occurred for a depth of 4 when compared to MinimaxAgent.

Lay out used	minimaxClassic
Depth of AlphaBeta search used	4
time taken	0.0160 seconds
Number of nodes	2974
Memory utilized	107064 bytes