Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών
Τμήμα Πληροφορικής και Τηλεπικοινωνιών

Τεχνητή Νοημοσύνη 1

Pacman Project 2

Ονοματεπώνυμο: Γιώργος Μητρόπουλος Αριθμός Μητρώου: 11150202000128

- Q1: Reflex Agent
  Here is implemented the evaluation function for the Reflex Agent.I have used the reciprocal of an important value (food) as the project's assignment has noted.Firstly, i calculate the manhattan distances from pacman's position to the remaining food and ghost states.Then i check if a ghost is next to pacman and if so a return -inf which is a bad number for the function.If not, i check if there is food next to pacman and if so, i return inf (good number because it is high) so pacman can go and eat the food.If none of these are true, i calculate the reciprocal to the closest food and return it.

- Q2: Minimax
  Here are 2 functions. (Max_value and Min_value).Max is called for the states that pacman is in.First we take the remaing actions and if we are at terminal state we call the evaluation function to assign a value.Then the code is written as it is noted in the assignments.For every successor state, the min function is called to get its value and the return the action with the greatest value.Min function is called for the states that ghost are in.Here we check if it is the last agent we have so we have to call max function for pacman.Otherwise, call min function again because there are remaining ghosts with no values,get the fucntion's value and return the action with the smallest value.

- Q3: Alpha-Beta
  This algorithm is very similar to Minimax algorithm.But now we have alpha and beta values.In max function we chekc if the successor state's value is greater than beta.If, so we prune the remaing successors by returing the value of the state and it's action.Then, the alpha value is updated if it has to.The min function works the same but here we check is the successor state's value is less than alpha, return, else update the value of beta.

- Q4: Expectimax
  This algorithm has exactly the same max function as the minimax algorithm.The difference is in exp_value function for the ghost states.In this function the only difference is that we need the value of probability which is the average value from each successor's state.

- Q5: Better Evaluation Function
  In this functions we take into account more value such a capsules and scared ghosts to return a better score for the function.The idea is similar to the evaluation function in Reflex Agent.Here i calculate the reciprocal of furthest food,scared ghosts and capsule states, and the distance of the furthest ghost. Then i return the current score + the reciprocals calculated - max distance ghost.The reason that i return -max distance ghost is because is gives better results.