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Multi-Agent Pacman
Artificial Intelligence
Computer Science 4300
Project 2

3.1.1 Relax Agent: What feature(s) did you use for your evaluation function?

```
return successorGameState.getScore() + (1 / float(myDistanceToClosesFoodItem)) - (1 / float(myTotalDistanceToGhost)) - myGhostDangerExtraAlarm
```

The distance to the closest food item
The distance to the closest ghost item
The number of ghost that are too close
The Score

3.1.2 Minimax: Give an explanation as to why the pacman rushes to the closest ghost in this case?

If you are getting a penalty for living, the pacman is optimized to try to get the highest score. If you know you lost, then you should kill your self to get a higher score.

3.1.4 Expectimax? You should find that your ExpectimaxAgent wins about half the time, while your AlphaBetaAgent always loses. Explain why the behavior here differs from the minimax case.

Alpha Beta is just minimax, just with pruning to save you time and calculations. Alpha Beta should never change the result of minimax. Minimax is deterministic and Expectimax is stochastic. Minimax is expecting to face an opponent that always tries their best. Expectimax assumes that their opponent sometimes does not always make the best decisions. So If ExpectimaxAgent wins half the time, and AlphaBetaAgent always loses, then I would assume that they are facing opponents that are not optimized to make the best decision. If their opponents are not optimized then I would expect for ExpectimaxAgent to do better because they account for it, while AlphaBetaAgent always expects that the opponent makes the best decision, but does not account for them not making the best decisions.

3.1.5 Evaluation Function: What features did you use for your new evaluation function?

```
return currentGameState.getScore() + myMinGhostDistance / myMinFoodDistance +
sum(newScaredTimes)
```

Score
The distance to the closest food item
The distance to the closest ghost item
The ghost scared timer

3.2 Self Analysis

What was the hardest part of the assignment for you?

The first, second, and last question were the hardest.

The first and last one I feel like I was just playing with stuff till I got good results.

The second one was hard because the pseudocode sucked on how the parts work together, but once you figured it out, the third and fourth questions were made easier

What was the easiest part of the assignment for you?

The easiest questions were the third and fourth. They were easy because we already did the hard work in the second question.

What problem(s) helped further your understanding of the course material?

The second, third, and fourth question helped because I had to implement the algorithms and learned how to put it together.

Did you feel any problems were tedious and not helpful to your understanding of the material?

The first and last question, while I will say they make you think of the problem, some of this is just you getting lucky that you got something that worked.

What other feedback do you have about this homework?

The pseudocode could have been better, but this assignment is fine.