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Comp341

Assignment 3

Q1)

Since Pacman does not observe ghosts, the ghost movement would not affect the settlement. The possibilities are defined based on both board geometry and ghost movement. The probabilities at the end help to tell the ghosts apart.

Q2)

In the first test Pacman is not able to find the ghost where in the second test it can find, and this change is probably caused of the range of movement. Since it cannot move in the first test the possibilities do not change because of the non-changing observation. Yet, in the second test, Pacman can move and thus gets different possibilities through changing observations.

Q3)

Yes, I can tell. The particles gather at a point time to time and ghost may not be at that point. When Pacman realizes that the ghost is not there the particles are reinitialized. This situation occurs when in resampling particles may mistake a vacant position as a ghost. After Pacman goes to that position, particles are reinitialized. For the first test, increasing the particles would not change since Pacman cannot move thus the probabilities would not change. For the second test, increasing the particles may be a solution since particle gathering would take more time yet it would decrease the efficiency.

Q4)

For approximate inference, Pacman works faster. 5000 particles make sense for some cases. In Q6, some cases seemed to work better. Yet, I think it is not necessary.

Q5)

On the website, observation probs, and beliefs are not dependent on each other given new position dependent on time, is given through a graph. So, in elapse time, for every ghost I have generated distribution with game state, particle, and ghost then I sampled the result before updating the new particle list. Since observation prob and beliefs are not dependent, for observation update for every particle I have multiplied every possibility for every ghost based on observation, Pacman position, particle, and jail position and added the result to existing belief. And finally I have normalized them.