

1. newLayout. lay

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%%%%%%%%%%
%.%..%.%
%.% .%.%
%G %%% %
% P% .%
% %%%G %
%.% %%%%
%.% ..%
%%%%%%%%%%

```

2.

	Adversarial Ghost	Random Ghost
Minimax Pacman	① Win(1/5) AVG. -81.4	② Win(2/5) AVG. 325.4
Expectimax Pacman	③ Win(2/5) AVG. 295.4	④ Win(3/5) AVG. 668.2

①

```

C:\Users\Administrator\PycharmProjects\PRO\prac4_Pacman>python2 pacman.py -l smallClassic -g MinimaxGhost -p MinimaxAgent -q
-n 5
Pacman emerges victorious! Score: 716
Pacman died! Score: -369
Pacman died! Score: -6
Pacman died! Score: -283
Pacman died! Score: -465
Average Score: -81.4
Scores:      716.0, -369.0, -6.0, -283.0, -465.0
Win Rate:    1/5 (0.20)
Record:      Win, Loss, Loss, Loss, Loss

```

②

```

C:\Users\Administrator\PycharmProjects\PRO\prac4_Pacman>python2 pacman.py -l smallClassic -p MinimaxAgent -g RandomGhost -q
-n 5
Pacman died! Score: -351
Pacman died! Score: -370
Pacman emerges victorious! Score: 1295
Pacman emerges victorious! Score: 1085
Pacman died! Score: -32
Average Score: 325.4
Scores:      -351.0, -370.0, 1295.0, 1085.0, -32.0
Win Rate:    2/5 (0.40)
Record:      Loss, Loss, Win, Win, Loss

```

③

```

C:\Users\Administrator\PycharmProjects\PRO\prac4_Pacman>python2 pacman.py -l smallClassic -p ExpectimaxAgent -g MinimaxGhost
-q -n 5
Pacman emerges victorious! Score: 793
Pacman emerges victorious! Score: 1343
Pacman died! Score: -348
Pacman died! Score: -168
Pacman died! Score: -143
Average Score: 295.4
Scores:      793.0, 1343.0, -348.0, -168.0, -143.0
Win Rate:    2/5 (0.40)
Record:      Win, Win, Loss, Loss, Loss

```

④

```

C:\Users\Administrator\PycharmProjects\PRO\prac4_Pacman>python2 pacman.py -l smallClassic -p ExpectimaxAgent -g RandomGhost
-q -n 5
Pacman emerges victorious! Score: 1321
Pacman died! Score: 67
Pacman emerges victorious! Score: 1244
Pacman died! Score: -246
Pacman emerges victorious! Score: 1055
Average Score: 688.2
Scores:      1321.0, 67.0, 1244.0, -246.0, 1055.0
Win Rate:    3/5 (0.60)
Record:      Win, Loss, Win, Loss, Win

```

3. Describe the performance (in terms of the distribution) of Pacman in each case. In which cases is the Pacman agent implementing the correct assumption of the ghosts behaviour?

Answer:

Overall, The Minimax Pacman performs better than the Expectimax Pacman in both cases.

The Minimax Pacman performs poor with Minimax Ghosts, only win 1 in 5, also poor but better performance with Random Ghost, win 2 in 5 with an average score of 325.4.

The Expectimax Pacman performs well with Minimax Ghost, wins 2 or 3 every time. But it performs better with random ghost with higher average score.

4. Describe why the ghosts seem as if they are cooperating when using minimax even though they are not sharing information with each other.

Answer:

Because they all want to prevent Pacman from gaining score. And they assume the pacman move to a position that can get more scores, so all of them get this idea in each depth. Also, they assume score with the worst performance of themselves. Therefore they act like cooperating.