Report on Project 2: The Multi-Agent Pac-Man

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Q1. Reflex Agent

A. Ghosts: 1
   Code output:

```
Nodes expanded: 478
Pacman emerges victorious! Score: 1527
Average Score: 1527.0
Scores:        1527.0
Win Rate:      1/1 (1.00)
Record:        Win

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Pacman died! Score: -72
Average Score: -72.0
Scores:        -72.0
Win Rate:      0/1 (0.00)
Record:        Loss
```

B. Ghosts: 2
   Code Output:

```
Nodes expanded: 691
Pacman emerges victorious! Score: 1458
Average Score: 1458.0
Scores:        1458.0
Win Rate:      1/1 (1.00)
Record:        Win

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Pacman died! Score: 341
Average Score: 341.0
Scores:        341.0
Win Rate:      0/1 (0.00)
Record:        Loss
```

Critical Analysis:

- The pacman can expand any number of nodes and largely depends on the behaviour of the ghosts.
- The pacman stutters around a place until a ghost appears to move the pacman in some other direction.
- This is the most basic agent which we refer to as reflex agent that only takes in the current scenario as input and acts accordingly.
- We have been able to print the number of expanded nodes only in cases where pacman emerges victorious.

Q2. Minimax

A. Classic Maze
   Code output:

```
Pacman emerges victorious! Score: 516
Average Score: 516.0
Scores:        516.0
Win Rate:      1/1 (1.00)
Record:        Win
```

B. Tiny Maze
   Code output:

```
Pacman died! Score: -501
Average Score: -501.0
Scores:        -501.0
Win Rate:      0/1 (0.00)
Record:        Loss
```

C. Tiny Maze
   Code output:

```
Average Score: 564.0
Scores:        564.0
Win Rate:      1/1 (1.00)
Record:        Win
```

Critical Analysis:
- This algorithm also requires the ghost to push pacman around.
- The pacman almost eventually gravitates to east in all the cases and this hinders the performance.

Q3. Alpha Beta Pruning

```
Pacman emerges victorious! Score: 1259
Average Score: 1259.0
Scores:        1259.0
Win Rate:      1/1 (1.00)
Record:        Win
```

Q4.Expectimax

```
Pacman emerges victorious! Score: 507
Average Score: 507.0
Scores:        507.0
Win Rate:      1/1 (1.00)
Record:        Win
```