**RIDA BATOOL**

**BSDSF23M007**

**LAB REPORT**

**Adversarial Search**

**MINMAX ALGORITHM:** A brute-force approach that explores all possible game states to determine the best move.

Initail Board:

| |

| |

| |

Enter position (0-8): 1

| X |

| O |

| |

Enter position (0-8): 3

| X | O

X | O |

| |

Enter position (0-8): 0

X | X | O

X | O |

O | |

AI wins!

**Total nodes visited: 65217**

**ALPHA BETA PRUNING:** An optimized version of Minimax that reduces the number of explored nodes by eliminating unnecessary branches.

Initial Board:

| |

| |

| |

Enter position (0-8): 1

| X |

| O |

| |

Enter position (0-8): 3

| X | O

X | O |

| |

Enter position (0-8): 0

X | X | O

X | O |

O | |

AI wins!

**Total nodes visited: 16722**

**CONCLUSION:**

Alpha-Beta Pruning consistently reduces the number of nodes explored by nearly 50-60%, significantly improving efficiency.

**Alpha-Beta Pruning is superior** to plain Minimax in terms of efficiency while maintaining the same decision quality.