LAB-9 3/12/24

Forward Chaining

It is a crime for an american to sell weapons to hostile nations. Robert, an enemy of America, has some missiles and Robert sold it in America.

To prove - Robert is criminal

Consider p, q, r.

American (p) ∧ Weapon (q) ∧ Sells (p, q, r) ∧ Hostile (r) ⇒ Criminal (p)

∃ x Owns (A, x) ∧ Missile (x)

Introduce T1 :

Owns (A, T1)

Missile (T1)

∀ x Missile(x) ∧ Owns(A, x) ⇒ Sells (Robert, x, A)

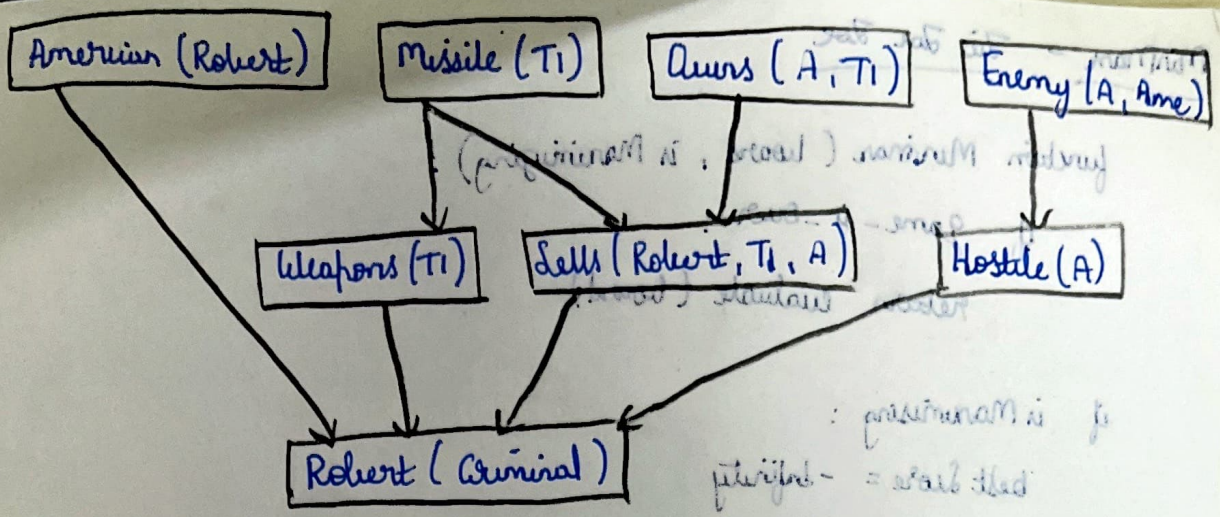
Missile (x) ⇒ Weapon (x)

∀ Enemy (x, America) ⇒ Hostile (x)

American (Robert)

Enemy (A, America)

∴ Criminal (Robert)



Proceed

Alpha-Beta Search Algorithm

(For 8 queens)

```
function AlphaBeta (state, depth, alpha, beta):
    if depth == 8:
        return 1

    best_value = 0

    for each column in current row:
        if placing a queen at (current r, c) is valid:
            child_state = state with the queen added at (row, column)

            // Recursive
            value = - AlphaBeta (child_state, depth+1, -beta, -alpha)

            best_value = max (best_value, value)
            alpha = max (alpha, value)

            if alpha >= beta:
                break
```

Proceed

MinMax - Tic Tac Toe

```
function Minimax ( board , is Maximizing) :

    if game-is-over :
        return evaluate ( board)

    if is Maximizing :
        best Score = -Infinity
        For each empty cell in board :
            Make move 'x' on the cell
            score = Minimax ( board , False)
            Undo the move
            best Score = max ( best Score , score)

        return best Score

    else
        best Score = Infinity
        for each empty cell in board :
            Make the move 'o' on the cell
            score = Minimax ( board , True)
            Undo the move
            best Score = min ( best Score , score)
        Return best Score .

Function Find Best Move :
    best Score = - Infinity
    best Move = NULL
    for each empty - cell in board
        Make the move 'x' on cell .
        score = minimax ( board , False)
        undo the move

        if score > best Score :
            best Score = score
```

bestMove = current cell

return bestMove

Output for 8 queens -

```
. Q . . . . . .
. . . . Q . . .
. . . . . . Q .
Q . . . . . . .
. . Q . . . . .
. . . . . . . Q
. . . . Q . . .
. . . Q . . . .
```

Output for Tic Tac -

current board :

```
X O X
O X O
_ _ _
```

The best move for AI is : (2, 0)

12/12/24