Backwoud Chaining :-

Example :- 2

Write the definition of Backward Chaining followed by the algorithm, then proceed with problem solving. In backward chaining the right side matches root node and the left side to create a newnode.

Same Example "West is a Criminal"

Knowledge Base :—

1. American (x) ∧ Weapon(y) ∧ Sells (x,y,z) ∧ Hostile(z) → Criminal(x)
2. Owns (Nono, M1)
3. Missile (M1)
4. Missile(x) ∧ owns (Nono, x) → Sells (West, x, Nono)
5. Missile (x) → Weapon (x)
6. Enemy (x, America) → Hostile(x)
7. American (West)
8. Enemy (Nono, America)

Query :- West is a criminal → Criminal (West)

Step1:-

In backward chaining, start from the goal state.

criminal (west)

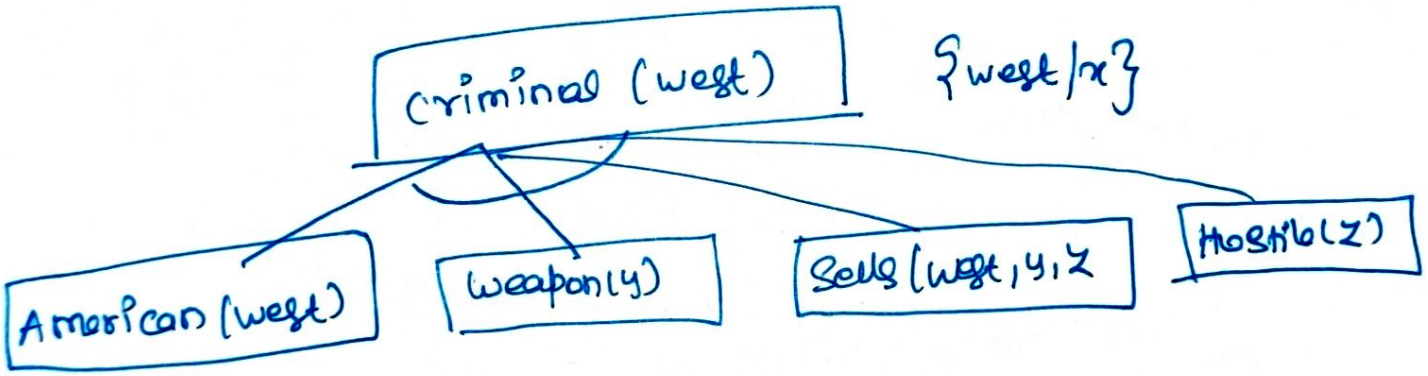
Check for the predicate criminal (west) in the knowledge base, in Rule1 Matches

Rule1:-

American(x) ∧ weapon(y) ∧ Sells(x,y,z) ∧ Hostile(z) → criminal(x)

p q

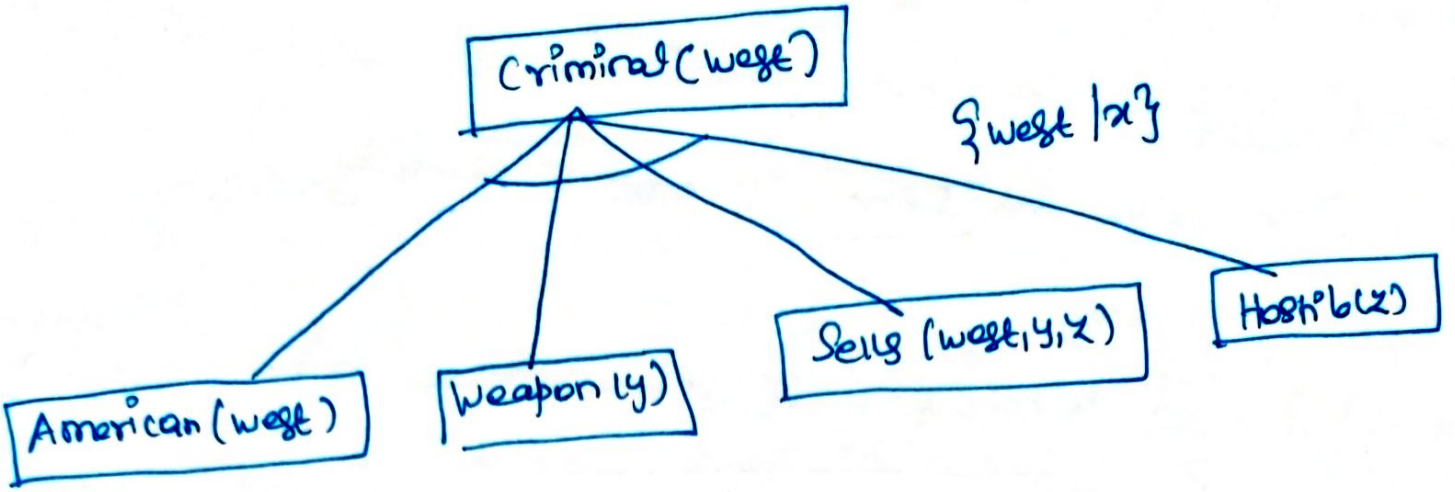
Here q Matches and p will be the new node



Step2:

Our new goal is

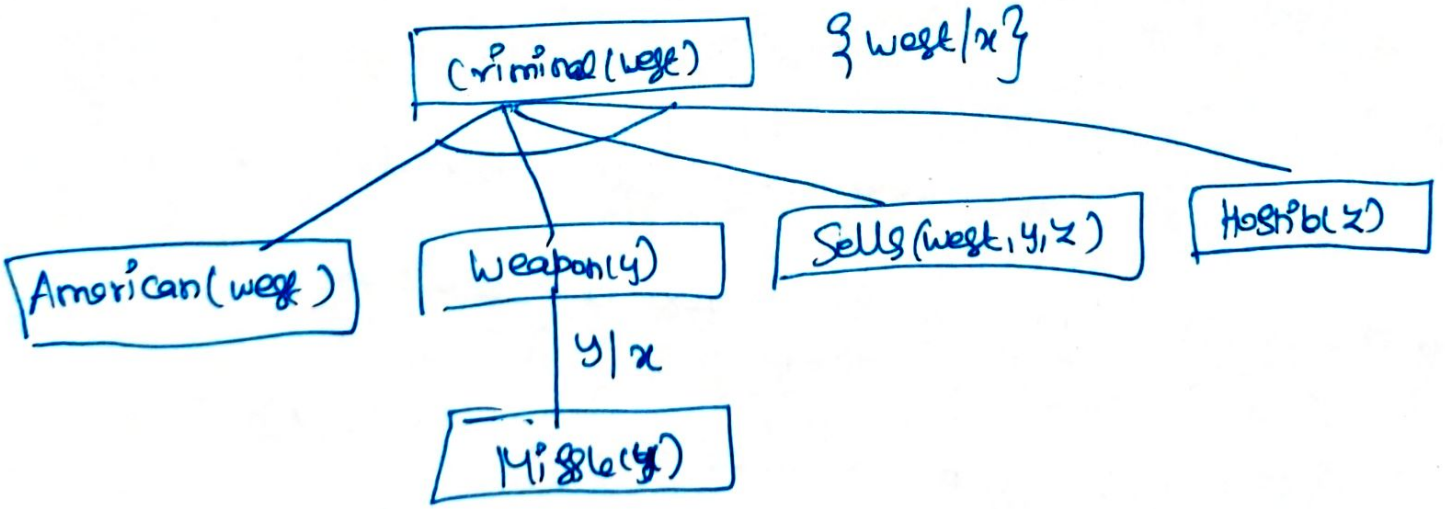
Check for the predicate American (west), it matches with rule 1. but it does not give any new node.



{ } - Nil Substitution

Step 3:-
Check for next predicate Weapon(y), it matches with the Rule-5, it gives a new node.

Rule-5 ⇒ Missile(x) → Weapon(y)
p (new node) q (matched node)



Step 4:

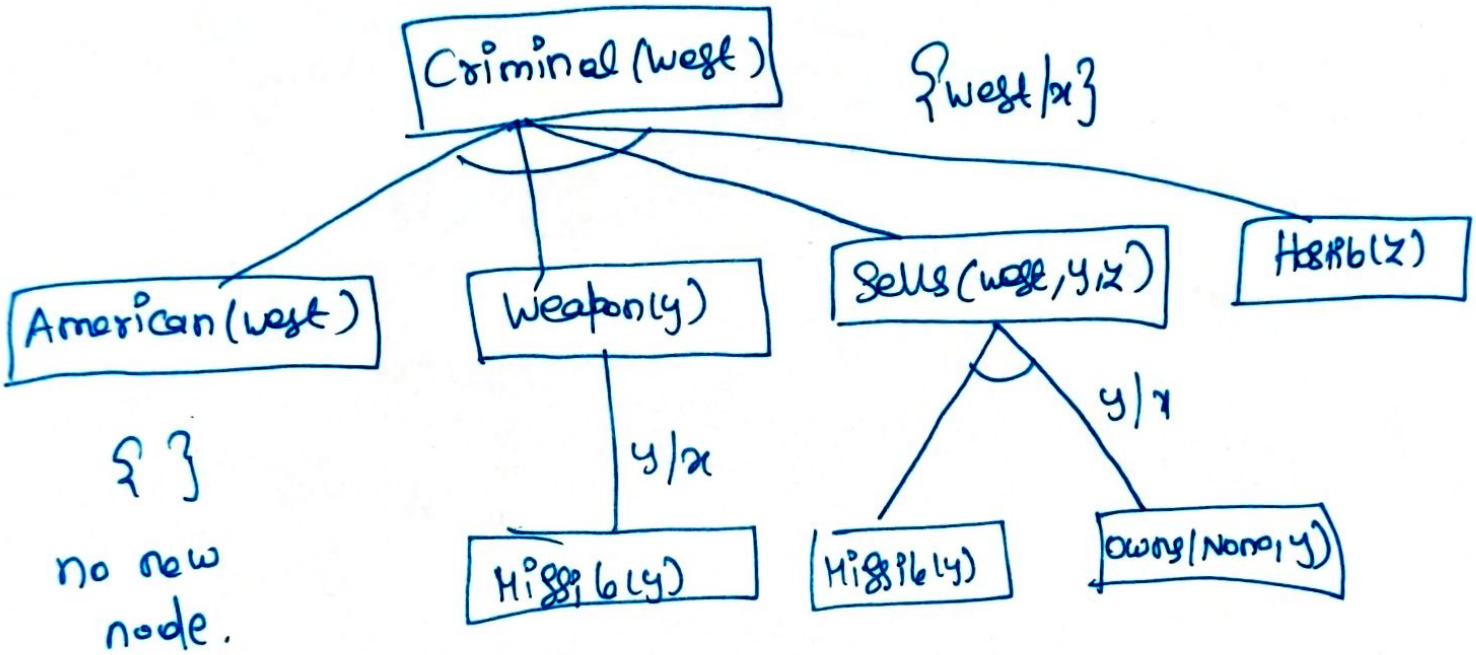
Check for the next predicate Sells (West, y, z)

it matches with the Rule 4, it gives a new node.

Rule 4 ⇒ Missile(z) ∧ owns(Nono, x) → Sells (West, z, Nono)

p — new node

q — Matched node



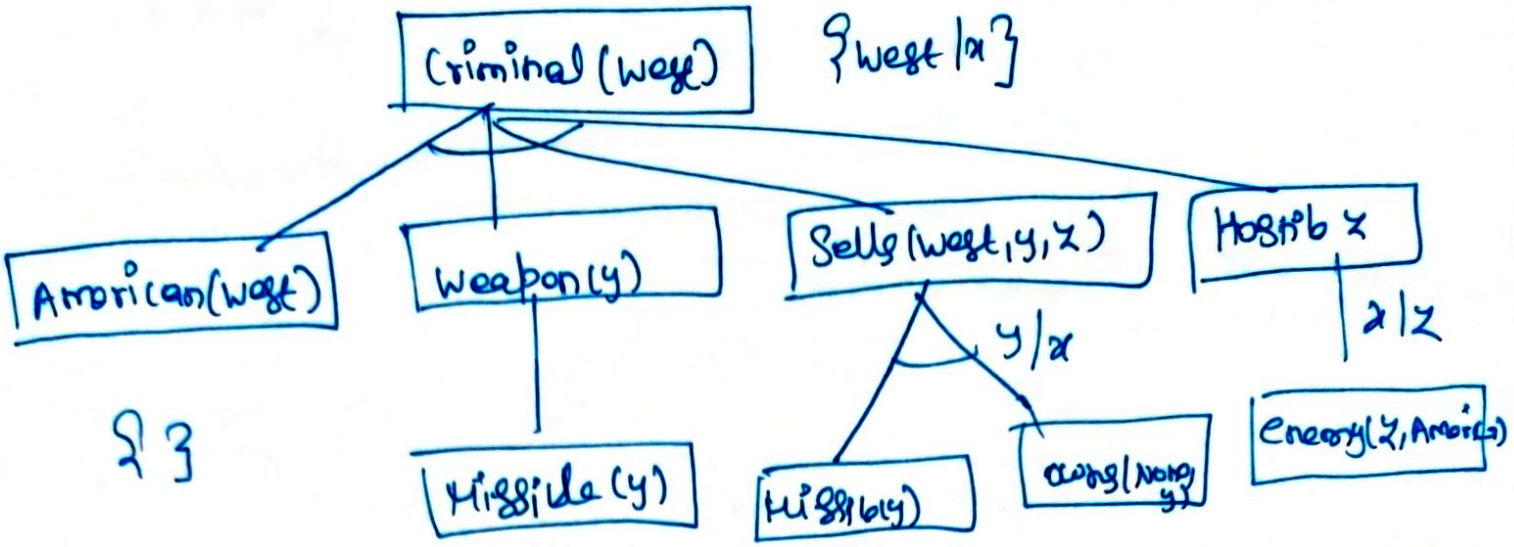
Step 5: —

Check for the next predicate Hostile(z), it matches with Rule 6, it gives a new node.

Rule 6 ⇒ Enemy(x, America) → Hostile(z)

p — new node

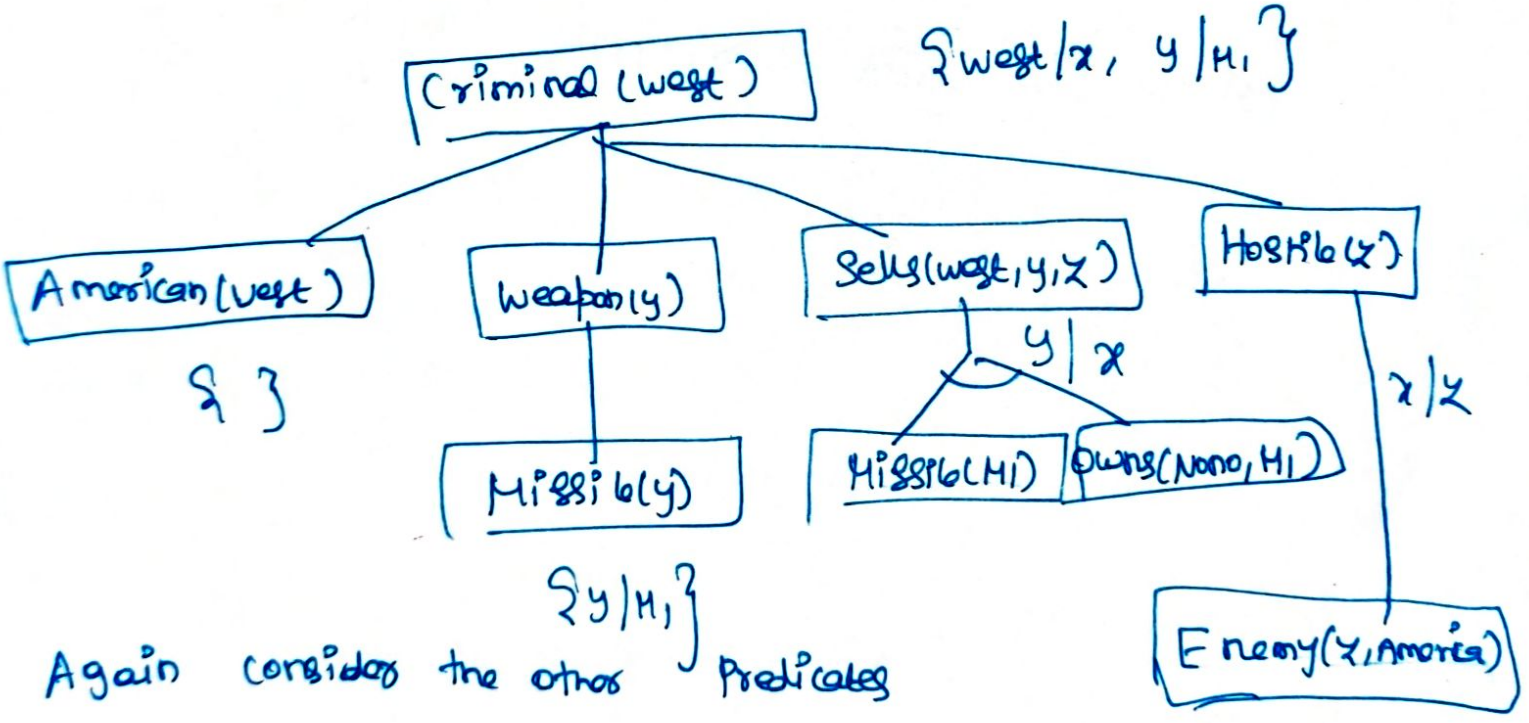
q — Matched Node



Step 6:-

Now, Move to the terminal node

Consider Missile(y) → It matches with Rule 3 replacing y/M1

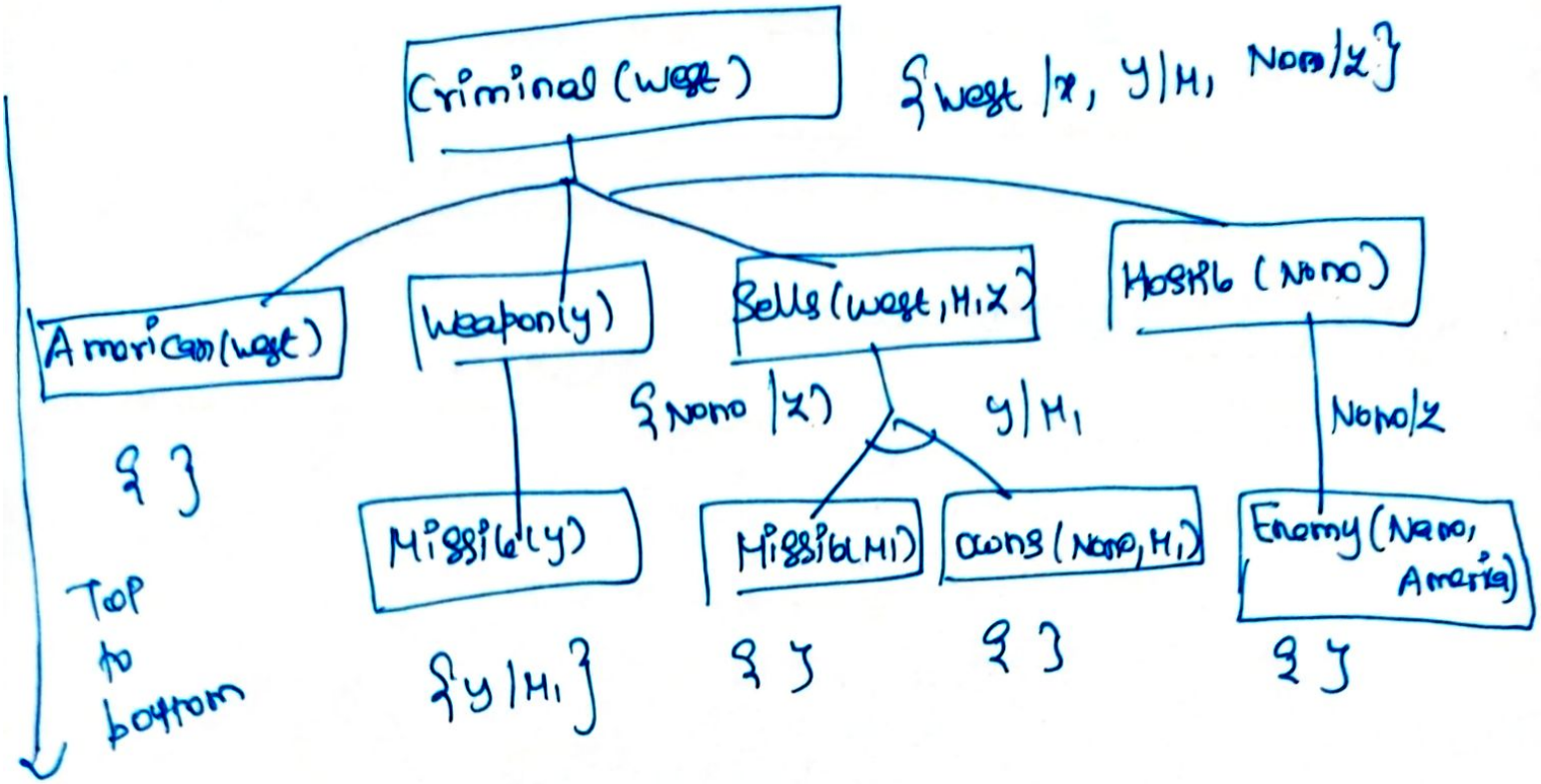


Again consider the other predicates

Missile(M1) matches with rule 3 → without substitution or Nil substitution

Owns(Nono, M1) Matches with rule 2 → Nil substitution

Enemy(z, America) Matches with rule 8 → replacing Nono/z



The proof tree generated by backward chaining on the crime example to prove West is criminal. The tree should be read depth first left to right.