

1BM22CS261-SHREE SANKET

LAB-08 FORWARD REASONING ALGORITHM

CODE:

```
facts = {  
    "American(Robert)": True,  
    "Missile(T1)": True,  
    "Enemy(A, America)": True,  
    "Owns(A, T1)": True,  
    "Hostile(A)": False,  
    "Weapon(T1)": False,  
    "Sells(Robert, T1, A)": False,  
    "Criminal(Robert)": False,  
}  
  
rules = [  
    ("American(Robert) and Weapon(T1) and Sells(Robert, T1, A) and Hostile(A)", "Criminal(Robert)"),  
    ("Owns(A, T1) and Missile(T1)", "Weapon(T1)"),  
    ("Missile(T1) and Owns(A, T1)", "Sells(Robert, T1, A)"),  
    ("Enemy(A, America)", "Hostile(A)"),  
]  
  
def check_fact(fact):  
    return facts.get(fact, False)  
  
def parse_condition(condition):  
    return condition.split(" and ")
```

```

def forward_reasoning():
    new_inferences = True
    while new_inferences:
        new_inferences = False
        for condition, conclusion in rules:
            condition_facts = parse_condition(condition)
            if all(check_fact(fact) for fact in condition_facts):
                if not check_fact(conclusion):
                    facts[conclusion] = True
                    new_inferences = True
                    print(f"Inferred: {conclusion}")

def print_inferred_facts():
    forward_reasoning()
    print("\nFinal Inferred Facts:")
    for fact, value in facts.items():
        print(f"{fact} is {'TRUE' if value else 'FALSE'}")

print_inferred_facts()

```

OUTPUT:

```
Inferred: Weapon(T1)
Inferred: Sells(Robert, T1, A)
Inferred: Hostile(A)
Inferred: Criminal(Robert)
```

```
Final Inferred Facts:
American(Robert) is TRUE
Missile(T1) is TRUE
Enemy(A, America) is TRUE
Owns(A, T1) is TRUE
Hostile(A) is TRUE
Weapon(T1) is TRUE
Sells(Robert, T1, A) is TRUE
Criminal(Robert) is TRUE
```

```
Inferred: Weapon(T1)
Inferred: Sells(Robert, T1, A)
```

```
Final Inferred Facts:
American(Robert) is TRUE
Missile(T1) is TRUE
Enemy(A, America) is FALSE
Owns(A, T1) is TRUE
Hostile(A) is FALSE
Weapon(T1) is TRUE
Sells(Robert, T1, A) is TRUE
Criminal(Robert) is FALSE
```